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San Juan Islands Tidal Energy Characterization

CRADA 541 (PNNL 79168)

May 2022

*Nichole K Sather
Zhaoqing Yang*

Orbital Marine Power LTD

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Abstract

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Pacific Northwest National Laboratory
Richland, Washington 99354

Abstract

The San Juan Islands are an archipelago with multiple tidal channels that produce strong tidal currents that could be harnessed for electricity generation. At present, there is limited electrical generation on the islands, with power primarily provided by a subsea cable connection with the mainland. As part of the C-MIST program, NOAA's CO-OPS program collected ADCP data at 46 stations in the San Juan Islands and adjacent waterways, from April to August of 2017. PNNL has recently developed a 3-D tidal hydrodynamic model for tidal energy resource characterization and assessment in the Salish Sea (Yang et al. 2021). Several tidal channels in the San Juan Islands were identified as top hotspots for potential tidal energy extraction. However, due to the complex geometry and inter-connected waterways, tidal currents around San Juan Islands also exhibit strong spatial and temporal asymmetry. Therefore, it is important to analyze the NOAA ADCP data to define metrics relevant to tidal energy, and further refine PNNL's tidal hydrodynamic model to accurately simulate currents in small tidal channels and account for sharp bathymetry gradients. The outcome of this technical assistance will allow developers to identify the promising opportunities for tidal energy in the San Juan Islands.

Pacific Northwest National Laboratory

902 Battelle Boulevard
P.O. Box 999
Richland, WA 99354
1-888-375-PNNL (7665)

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