

Abstract Submitted
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A Study of Water Wave Wakes of Washington State Ferries¹

BRADLEY PERFECT, JAMES RILEY, JIM THOMSON, University of Washington, ENDICOTT FAY, Washington State Ferries — Washington State Ferries (WSF) operates a ferry route that travels through a 600m-wide channel called Rich Passage. Concerns of shoreline erosion in Rich Passage have prompted this study of the generation and propagation of surface wave wakes caused by WSF vessels. The problem was addressed in three ways: analytically, using an extension of the Kelvin wake model by Darmon et al. (*J. Fluid Mech.*, **738**, 2014); computationally, employing a RANS Navier-Stokes model in the CFD code OpenFOAM which uses the Volume of Fluid method to treat the free surface; and with field data taken in Sept-Nov, 2014, using a suite of surface wave measuring buoys. This study represents one of the first times that model predictions of ferry boat-generated wakes can be tested against measurements in open waters. The results of the models and the field data are evaluated using direct comparison of predicted and measured surface wave height as well as other metrics. Furthermore, the model predictions and field measurements suggest differences in wake amplitudes for different class vessels. Finally, the relative strengths and weaknesses of each prediction method as well as of the field measurements will be discussed.

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