

Hybrid SDB and MBES surveys for dredge volume computations and channel condition assessment

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Accurate volumetric calculations for dredge fill removal depend on having good-quality pre- and post-dredge survey data. These surveys are typically conducted using Multibeam Echosounders (MBES). Depending on project timelines, a time lapse between the pre-dredge survey and commencement of dredging operations may allow a meaningful seabed change, such as shoaling after a weather event. Pre-survey data may also not be made available to the dredging contractor. If a vessel equipped with MBES is not available immediately prior to commencement of dredging operations, the actual dredge volume may not match estimates, which may in turn lead to cost and schedule overruns. After project completion, the post-dredge survey only captures a single point in time. Routine channel condition surveys are therefore required, but MBES-equipped vessel availability and cost may limit their frequency.

In this study, we investigate the use of a hybrid Satellite-Derived Bathymetry (SDB) and MBES survey to obtain pre-dredge and post-dredge depths for volumetric computations. A physics-based SDB computation method is used to determine pre-dredge depths and an in-situ MBES survey is used to determine post-dredge depths. We compare the volumetric calculations for the hybrid SDB + MBES method with calculations based on an assumed flat seafloor and discuss the estimated accuracy of the results. Finally, we discuss other potential uses of a hybrid SDB + MBES dredge volume computation method, such as rapid condition assessment after a known triggering event (such as a storm or vessel collision).