

Environmental Compliance for Sediment Remediation in Canada

Dan Berlin (dberlin@anchorqea.com), Thomas Wang, PE, Matt Woltman, PE, and Joy Dunay
(Anchor QEA, LLC, Seattle, WA, USA)
Derek Ormerod, PE, and Amy Corp (Anchor QEA, LLC, Bellingham, WA, USA)

Background/Objectives. Before 2013, few sediment remediation projects in Canada had been completed, and provincial and federal regulations did not clearly define environmental performance requirements during construction. Water quality protection is regulated by provincial governments as well as federal agencies Fisheries and Oceans Canada, Health Canada, and Environment and Climate Change Canada, but regulatory authority is delegated to the federal custodian for federal-led projects (Public Services and Procurement Canada, Department of National Defence, or Transport Canada). Further, water quality guidance for dredging projects was only available for clean maintenance dredging projects, and no guidance exists for water quality protection of dredging contaminated sediments. In the past 5 years, however, several remedial dredging and capping projects have been completed in British Columbia. Environmental performance criteria have been established for each project to protect aquatic life, minimize dredge residuals, prevent recontamination, and address habitat impacts, resulting in a clearer definition of how the regulations apply to cleanup projects. This presentation will review Canada's environmental regulatory structure and discuss project-specific environmental requirements for several recent sediment remediation projects completed in Canada between 2013 and 2018.

Approach/Activities. The process for development of project-specific environmental compliance requirements in Canada will be presented, including a comparison to United States regulations. Specific project environmental compliance requirements—including water quality performance criteria; environmental compliance monitoring programs; and controls for dredge residuals, recontamination, and resuspension—will be reviewed for the following sediment remediation projects: Esquimalt Graving Dock Remediation (Esquimalt, British Columbia), Plumper Bay/Ashe Head Remediation (Esquimalt, British Columbia), Colwood Jetties Remediation (Esquimalt, British Columbia), and Middle Harbour Remediation (Victoria, British Columbia). Resuspension controls, such as silt curtains and sheetpile containment, were required to contain dredge residuals and control water quality impacts and recontamination. Water quality performance criteria and mixing zones were established based on water quality modeling, and intensive monitoring programs were implemented to monitor for impacts to water quality and spread of suspended sediments.

Results/Lessons Learned. The strictest interpretation of the regulations would have resulted in water quality criteria so stringent that projects could not be completed, with requirements such as no discharge of contaminants or full-length double silt curtains around dredging and capping activities. However, discussions with agencies and consideration of practical project limitations led to negotiated thresholds that were practical and provided for localized mixing zones. This outcome was balanced by very intensive daily water quality monitoring requirements for total suspended solids, turbidity, and chemistry and expensive silt curtains and sheetpile wall containment systems required to protect water quality and the spread of suspended sediments. Full-length silt curtains were not feasible for most projects, and partial-length silt curtains were effective at protecting aquatic life but did little to control dredge residuals or prevent recontamination of nearby areas. A combined sheetpile wall and silt curtain system was effective at preventing recontamination of previously remediated areas. Monitoring results show

that water quality performance criteria, intensive monitoring programs, and resuspension controls resulted in protection of aquatic life during construction.