**Comparison of Visual and Acoustic Surveys for the Detection and Dynamic Management of North Atlantic Right Whales (*Eubalaena glacialis*) in Canada**

Abstract

Near real-time acoustic detections of North Atlantic right whale (*Eubalaena glacialis*) calls are currently used interchangeably with visual observations to trigger risk-mitigation measures in Canadian waters. Comparing these two survey methods is critical for correct survey data interpretation and development of optimal monitoring strategies. The goals of this study were to develop a simulation to quantitatively compare acoustic and visual surveys and use it to inform current and future right whale risk mitigation. We expanded upon an established whale movement model to generate distributions of whale cues (calls and surfacings) available for detection within dynamic management zones in the Gulf of Saint Lawrence, Canada. Survey transits by acoustic (Slocum gliders) and visual (aircraft, vessels, and remotely piloted aircraft systems) platforms were simulated using realistic platform movements and detection functions. We used a Monte Carlo approach to estimate the probability of detecting a single cue in each zone as a function of survey platform, number of whales, and number of survey transits. Acoustic gliders detected right whale presence in every scenario. Visual platforms required large numbers of whales and/or survey transits to reliably detect whale presence; single transits were not sufficient to reliably rule out the presence of small numbers (< 3) of whales. Our results serve as a tool to be used by decision-makers to inform optimal right whale monitoring strategies that consider the relative strengths of the various platforms.