**Using sonobuoys and visual surveys to characterize North Atlantic right whale (*Eubalaena glacialis*) calling behavior in the Gulf of St. Lawrence**

The appropriate use and interpretation of passive acoustic data for monitoring the North Atlantic right whale (*Eubalaena glacialis:*hereafter right whale) relies on knowledge of their calling behavior and how it varies with respect to time, space, age, sex, and physical behavior. To assess these relationships in a habitat of increased management importance, sonobuoys (disposable, drifting hydrophones) were deployed in the Gulf of St. Lawrence, Canada, to record sounds produced from aggregating right whales during visual aerial surveys in the summers (June through August) of 2017 (*n*= 8), 2018 (*n*= 13) and 2019 (*n*= 16). Acoustic data from each sonobuoy deployment were manually reviewed for right whale upcalls, gunshots, and various mid-frequency (250-800 Hz) tonal calls. The calls were quantitatively compared to concurrently collected demographic and observed behavior variables obtained through photo-identification data using correlation matrices, linear regressions and generalized linear models. Our results show: 1) call rates increased from June to August for all call types; this is the first known report of a temporal trend in right whale mid-frequency tonal calls; 2) calling rates were associated negatively with observed foraging behavior, and positively with observed socializing behavior; 3) upcalls were occasionally produced at higher rates (> 20 calls h-1) when in association with gunshot and tonal calls; 4) acoustic monitoring did not always detect right whale presence at fine timescales (2 – 6 h), but presence estimates were improved when multiple calls types were considered; and 5) calling rates were too variable to provide reliable count estimates of observed right whales. These results have important implications for the interpretation of passive acoustic monitoring in this habitat and provide evidence that some whale behaviors (e.g., socializing) may be reliably inferred from acoustics alone.