Impacts of COVID-19 pandemic-related changes in shipping on the soundscape and calling behavior of right whales in the New York Bight

Public health measures in response to the COVID-19 global pandemic led to significant changes in human activities across the globe. As vehicle and airplane traffic decreased in April and May 2020, scientists documented notable reductions in the overall noise levels in many terrestrial habitats and in some marine habitats. Global commercial shipping patterns were also impacted by the pandemic. For the Ports of New York and New Jersey, these changes included a slow decline in the volume of large commercial vessel traffic that reached a minimum of ~16% lower traffic in 2020 than in 2019 between May and June. The objective of this study was to use passive acoustic monitoring data to explore regional changes in background noise and North Atlantic right whale (*Eubalaena glacialis*) calling behavior in response to these changes in shipping. An array of bottom-mounted passive acoustic recorders collected data in the New York Bight from October 2017-October 2020. Changes in vessel traffic patterns were reflected in changes to the ambient noise levels in the New York Bight during the spring of 2020 when compared to 2018 and 2019. This included reduction of the highest noise levels (95% levels), while average noise levels (50% levels) remained virtually unchanged across years. Right whale calling behavior across the three years was investigated to assess whether individual whales showed vocal modifications in response to the changes in background noise associated with the pandemic. Soundscape-related impacts from the pandemic and, in turn, to the vocal behavior of low frequency baleen whales in this coastal urbanized environment highlight the persistence of low-frequency noise from commercial shipping, which showed only modest changes to average background noise in this habitat despite major changes to human activity.