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Habitat occupation time-series of St. Lawrence belugas from
passive acoustic monitoring

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Passive acoustic monitoring (PAM) was used to generate a 6-week continuous time-series of occupation of a segment of the St. Lawrence Estuary by belugas. The PAM data were acquired from a cabled hydrophone deployed at mid-depth into the 300-m deep Laurentian channel off Cap-de-Bon-Desir during summer 2003. Beluga vocalisation activity time-series was obtained from the [0.5-5.0 kHz] bandpassed PAM data that were processed to filter out noise from the heavy shipping on the nearby St. Lawrence Seaway and from occasional whale watching boats, and low-frequency traces of clicks, via adaptive spectral subtraction and image processing methods applied to the spectrogram. The remaining traces on the binary image of the spectrogram were summed up to generate a vocalisation index, which was essentially due to belugas in this region. The vocalisation index time-series was then analysed for presence of circadian rhythms and correlations with the semi-diurnal tidal cycle, currents from an acoustic Doppler current profiler and wind. Results are interpreted from the knowledge of the biological and physical oceanographic processes occurring in the monitored area.