

## Tabusintac Bay (New Brunswick, Canada): an important spring migratory stopover for Atlantic Brant (*Branta bernicla hrota*)

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### Abstract

Atlantic Brant (*Branta bernicla hrota*) is an Arctic-breeding migratory waterfowl that relies heavily on Common Eelgrass (*Zostera marina*) for food during migration and overwintering. Although the abundance of Atlantic Brant along the coasts of the Maritime provinces has declined drastically over the past decades, some flocks continue to migrate through the area in spring. Here, we present field observations of Atlantic Brant spring staging in the Tabusintac Bay, New Brunswick, Canada. We surveyed the Tabusintac Bay seven times between 26 May and 6 June 2018. We observed a maximum daily count of 1259 individuals, which is comparable to high counts from the 1970s. These spring surveys indicate the continuing importance of Tabusintac Bay to Atlantic Brant for spring staging. There is a pressing need to increase monitoring and research in the region and to preserve or enhance the quality of the area for spring staging brant.

Key words: Atlantic Brant; *Branta bernicla hrota*; spring migration; Common Eelgrass; *Zostera marina*; Tabusintac

### Introduction

Brant (*Branta bernicla*) is an Arctic-breeding migratory waterfowl species that relies heavily on native seagrasses (*Zostera* spp.) for food during migration and overwintering (Reed *et al.* 1996; Ganter 2000; Kollars *et al.* 2017). Four distinct populations are recognized in North America, including Atlantic Brant (*Branta bernicla hrota*; CWSWC 2022). Atlantic Brant nests on Southampton Island and around the Foxe Basin in the eastern Canadian Arctic and overwinters along the eastern coast of the United States, from Massachusetts to North Carolina (Ganter 2000). The Atlantic Brant population has been decreasing since 2000, but has remained stable over the last five years, with an estimated population size of 106 000 in 2019 (CWSWC 2022). This population was subject to a significant decline in the early 1930s following a widespread and drastic decline in Common Eelgrass (*Zostera marina*) along the Atlantic coast caused by the pathogenic slime mold *Labyrinthula zosterae* (Cottam *et al.* 1944). Before the decline of eelgrass, Atlantic Brant commonly used to migrate through the Maritime provinces of Canada during the fall and

spring. However, since the 1940s, a greater portion of the Atlantic Brant population takes a more direct path between their breeding and wintering grounds, flying directly to eastern James Bay (Quebec, Canada), and fewer individuals pass through the Maritimes (Ers-kine 1988; Castelli *et al.* 2010). Once abundant and widely distributed along the coasts of the Maritimes, Atlantic Brant are now observed in lower numbers and in a limited number of locations (Hanson 2004; McAskill 2019). Unlike other species of geese, Atlantic Brant are dependent on native seagrasses during migration, preferring coastal estuaries, shorelines, and lagoons for feeding (Ladin *et al.* 2011; CWSWC 2022). As a result, the identification and conservation of eelgrass meadows, as important coastal foraging areas, is important for the management of this species in eastern Canada.

Here, we present field observations of spring staging Atlantic Brant in the Tabusintac Bay, on the east coast of New Brunswick, Canada (47.3407°N, 64.9452°W). These field observations were part of a larger project that used unmanned aerial vehicles to detect Atlantic Brant (LaRocque *et al.* 2021). The area

has been identified as critically important to waterfowl and shorebirds and is recognized under the Ramsar Convention as a Wetland of International Importance (RAMSAR 2017) and by Bird Life International as an Important Bird Area (IBA Canada 2021). The area has long been used by Atlantic Brant as a stopover site during migration (Erskine 1988; Hanson 2004), and they spend a few weeks in the bay in the spring (from mid-May to early June; B.J. Fowler pers. comm. 15 April 2018).

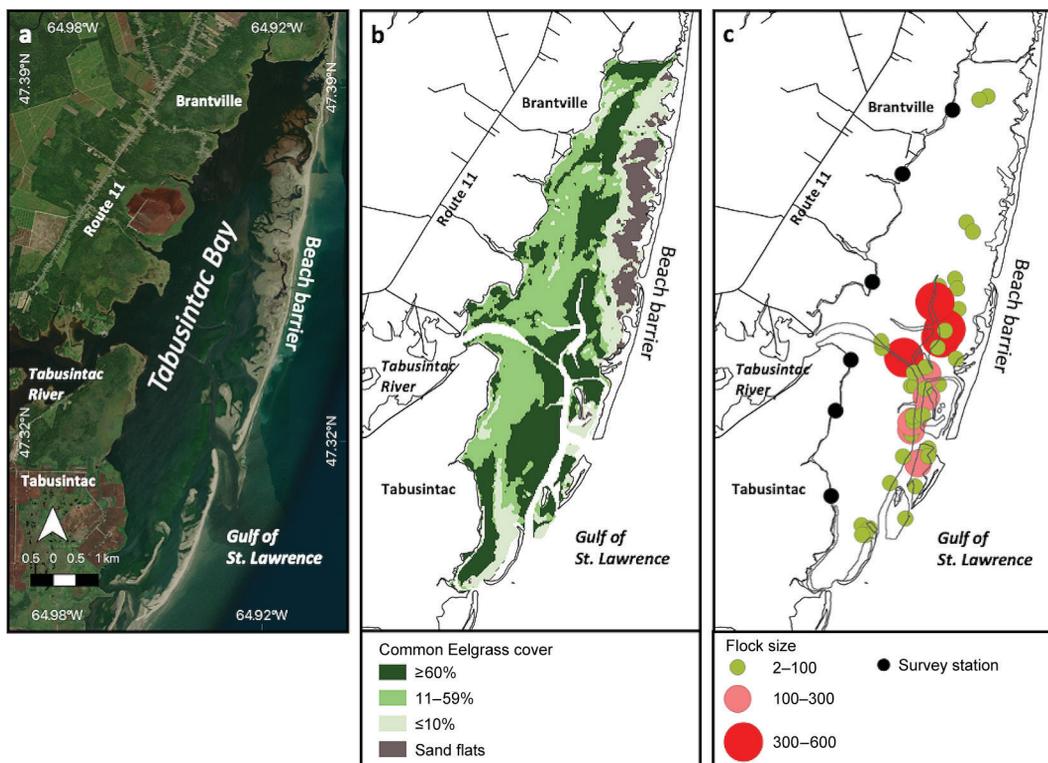
## Methods

Spring staging Atlantic Brant were surveyed from 26 May to 6 June 2018 in six areas covering the entire Tabusintac Bay (Figure 1a). The bay is protected from the Gulf of St. Lawrence by a natural beach barrier and contains extensive monospecific beds of eelgrass (Figure 1b; Forsey *et al.* 2020; Leblanc *et al.* 2021). One observer used a spotting scope to observe Atlantic Brant at a survey station within a particular survey area. The entire bay was surveyed seven times between 26 May and 6 June 2018. To avoid double counting of flocks, the observer would begin surveying the birds at either the northern or southern end of

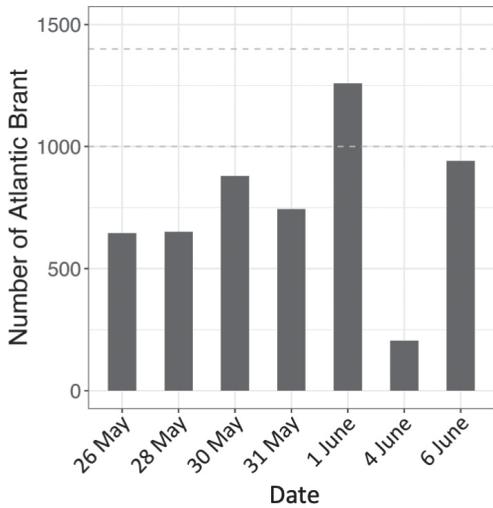
the estuary and keep track of flocks already surveyed while moving to the next station. Each survey day, the observer would alternate the starting point between the northern and southern ends of the estuary. Surveys were not conducted during heavy rain or fog when light conditions were poor. To determine the flock's position from the survey stations, the observer took a bearing with a compass and estimated the flock's distance from the main coast or beach barrier. The global positioning system coordinates of the survey stations, bearings, the distance from landmarks (with known coordinates) within the survey area, and distances were then used to estimate the position of flocks using ArcGIS 10.5.1 software (Esri, Redlands, California, USA).

## Results and Discussion

The seven spring surveys resulted in 5326 brant observations. Daily counts ranged from 205 to 1259 individuals (Figure 2), with a daily average of  $761 \pm 122$  SE. The number of Atlantic Brant observed in a given area of the bay ranged from two to 643, and the average flock size was  $88 \pm 19$  SE. The largest Atlantic Brant flocks (277–643) were mostly found in



**FIGURE 1.** a. Study area at Tabusintac Bay, northeastern New Brunswick, Canada. b. Distribution of Common Eelgrass (*Zostera marina*) in Tabusintac Bay, generated using a Landsat image acquired in 2017 (Leblanc *et al.* 2021). c. Flock size of spring staging Atlantic Brant (*Branta bernicla hrota*) in Tabusintac Bay, New Brunswick, Canada, from 26 May to 6 June 2018.



**FIGURE 2.** Counts of spring staging Atlantic Brant (*Branta bernicla hrota*) in Tabusintac Bay, New Brunswick, Canada, in 2018. The dashed lines represent the minimum (1000) and maximum (1400) number of Atlantic Brant observed in Tabusintac in the 1970s (Erskine 1988).

the mid-section of the bay, near the beach barrier and dense eelgrass beds (eelgrass beds with cover  $\geq 60\%$ , Figure 1c). The largest flocks were also observed foraging relatively near the Tabusintac Bay's channel. Smaller flocks (2–92) were generally seen in the bay's northern and southern portions.

In eastern North America, the primary stopover sites of migrating Atlantic Brant are around the James Bay region. During spring migration, brant concentrate initially in the southern section of James Bay (Ruppert Bay), then travel to the northwest of the James Bay coast before moving to the Foxe Basin region (Castelli *et al.* 2010). However, there have been reports of some brant still using a coastal migration route through the Maritimes in the spring, stopping at Grand Manan Island, New Brunswick, and Cape Sable Island, Nova Scotia (Castelli *et al.* 2010). Our preliminary findings indicate that the Tabusintac Bay continues to be an important spring staging area for Atlantic Brant. During aerial surveys conducted across the whole Tabusintac Bay in the spring in the mid 1970s, 1000 Atlantic Brant were observed in 1974 and 1400 in 1977 (Erskine 1988). The largest daily count in 2018 (1259 individuals) is comparable to those in the 1970s, suggesting that the bay continues to be a significant stopover site in New Brunswick. Although the Tabusintac Bay harbours extensive eelgrass beds, a recent study has found that eelgrass is declining in some areas (Leblanc *et al.* 2021). Continued decline of eelgrass beds in the Tabusintac Bay could jeopardize the critical ecological services they

provide, including important feeding sites for Atlantic Brant and other migratory waterfowl. As a result, there is a pressing need to increase monitoring and research efforts in the region and preserve or enhance the quality of the area for spring staging brant. The spring surveys in 2018 provide valuable current population data that can be used to guide future studies on Atlantic Brant habitat use in relation to eelgrass abundance and quality in the Tabusintac Bay.

### Author Contributions

Writing – Original Draft: M.-L.L.; Review & Editing: A.H., B.L., A.L., and M.M.H.; Conceptualization: M.-L.L.; Investigation: M.-L.L.; Methodology: M.-L.L.; Formal Analysis: M.-L.L.; Funding Acquisition: M.-L.L. and B.L.

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