COVER STORY

Spring 2018

Heron & Egret Influx in Atlantic Canada

Introduction

By Alix d'Entremont

Each spring, from mid-April through to the end of May, a light sprinkling of southern herons and egrets overshoots the birds' breeding areas and arrives in Atlantic Canada, with the highest densities appearing in Nova Scotia's southwestern counties. Reports from birders in the region showed that, in relation to a typical year, the arrival during spring 2018 included more individuals, was more extensive, and occurred earlier, apparently due to two weather systems in March. It was only around mid-April that word got out of an unprecedented heron and egret die-off on Sable Island — hinting at the true scale, and perhaps even the population impact, of this event.

The March influx of waders in Atlantic Canada, excluding those on Sable Island, comprised 33 Great Egrets, 8 Great Blue Herons, 3 Little Blue Herons, 2 Tricolored Herons, 1 Snowy Egret, and 1 Green Heron.

Dr. David McRuer, a Wildlife Health Specialist at Parks Canada and associate at the Canadian Wildlife Health Cooperative, noted that, during the first half of April, most of the herons and egrets at Sable Island had died except 1 Great Egret and 4 Great Blue Herons. By May, the deceased birds

Table 1. Large Wader Arrival Dates

	2018	2007-2017 Average	Earliest
Great Egret	Mar 15	Apr 13	early Mar
Great Blue Heron	Mar 15	late Mar*	*
Little Blue Heron	Mar 27	Apr 14	Mar 03
Tricolored Heron	Mar 24	May 05	Feb 28
Snowy Egret	Mar 24	Apr 20	Mar 16
Green Heron	Mar 27	May 03	Apr 09

**Great Blue Herons can overwinter, so attempting to assign accurate first spring arrival dates is difficult, but they typically begin to arrive in Nova Scotia in late March. It is impossible to confidently assign an earliest arrival date for the species since they do overwinter.*

This Little Blue Heron at Three Fathom Harbour, *Halifax*, Mar 31-Apr 10 (here Apr 8), was one of three that arrived in Atlantic Canada during March 2018.
Photo by Rob DeBay

on the island included 31 Great Egrets, 21 Great Blue Herons, 3 Green Herons, 1 Cattle Egret, 1 Yellow-crowned Night-Heron, and 1 Little Blue Heron. Dr. McRuer submitted 16 Great Egrets, 6 Great Blue Herons, and 1 Green Heron to the Canadian Wildlife Health Cooperative of the Atlantic Veterinary College in Charlottetown, PEI, for necropsies. Of the birds submitted, only 8 Great Egrets, 5 Great Blue Herons, and 1 Green Heron were in good-enough condition to be fully examined.

Waders arriving on Sable Island in early spring would typically encounter low temperatures combined with periods of wind and rain. This year, there were extended periods of high winds from mid-March to mid-April. The necropsy report confirms the assumption that the deceased birds probably arrived in an exhausted condition and subsequently starved. Here is an excerpt from the interpretation notes of the Wildlife Diagnostic Report of the Canadian Wildlife Health Cooperative:

> All of the bodies examined, regardless of species, showed evidence of marked emaciation with severe muscle atrophy and a complete absence of subcutaneous and internal body fat stores. As there was no gross or microscopic evidence of underlying disease, the primary cause of death in all of these birds is considered to be emaciation secondary to starvation.

Four Great Egret corpses on Sable Island in May 2018.
Photo by Zoe Lucas

In addition to the harsh conditions of a Sable Island spring, Zoe Lucas notes that water-based foraging habitat for herons and egrets has diminished over the past few decades. Freshwater and brackish ponds are diminishing in size, with some disappearing entirely. Dune erosion, infilling by wind-blown sand, and tides and storm surges are causing ponds to diminish in depth and surface area, with associated changes in temperature, water chemistry, and species composition and densities.

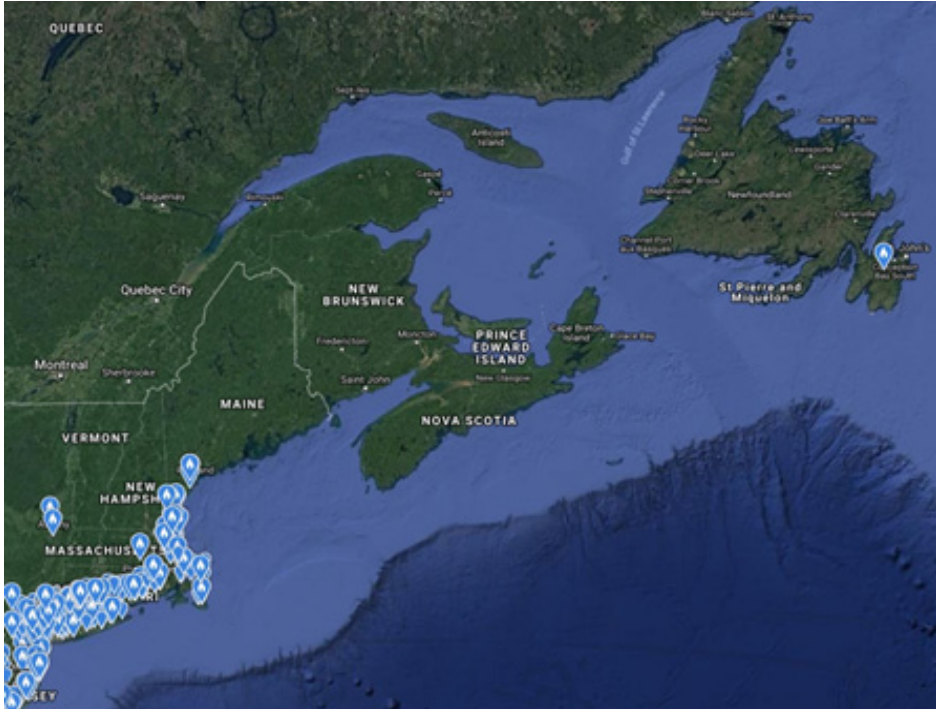
Since Nova Scotia sees the highest number of vagrant southern waders in Atlantic Canada, and since we have access to detailed historical *Nova Scotia Birds* records, it seems appropriate to compare the regional arrival dates in 2018 with the average and earliest dates for Nova Scotia. The average dates in Table 1 are for the last 10 years (2007-2017), since

CLOCKWISE FROM TOP:
One of the two Tricolored Herons that were present in late March (here Mar 25) in the Sambro area.
Photo by Jason Dain

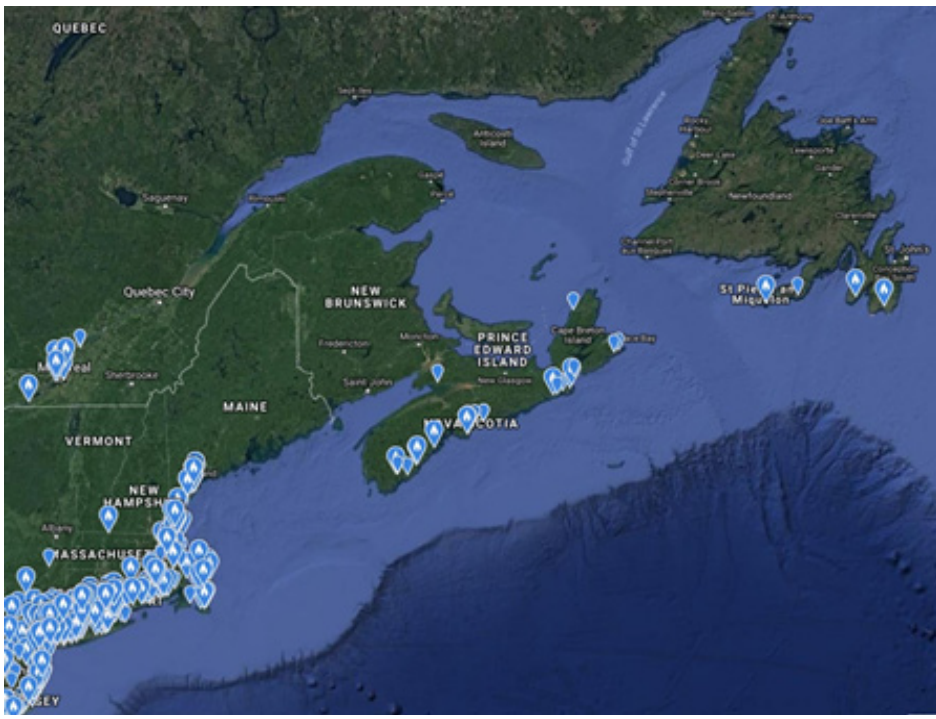
A Great Egret at Louisbourg Mar 27.
Photo by Steven McGrath

Two Great Egrets and a Snowy Egret (middle) at L'Ardoise, *Rich,* Apr 8.
Photo by Jeannie Shermerhorn

This Great Egret at Shelburne Mar 16-Apr 17 (here Mar 18) likely arrived via an extratropical cyclone on Mar 14. *Photo by Mohsin Khan*



Map 1 (TOP RIGHT): Mar 2017 eBird Great Egret sightings. Other than an extremely early record in Newfoundland on March 19, by the end of March 2017 the wave of Great Egrets had only reached southern Maine, which is a typical pattern.



Map 2 (BOTTOM RIGHT): Mar 2018 eBird Great Egret sightings. The arrival of Great Egrets in Atlantic Canada during spring 2018 was early. The gap in sightings between southern Maine and Atlantic Canada suggests that an offshore route was taken.

the birding community is now more connected and the number of birders is higher than in previous years, yielding more accurate and current average first-arrival dates.

The table above shows that most of these waders arrived at least one month earlier than normal. The influx of spring-overshoot Great Egrets into Atlantic Canada typically begins after the first week of April, with highest densities in western Nova Scotia. The influx in 2018 was much different, with many birds being reported in mid to late March, mostly in eastern Nova Scotia, Saint-Pierre et Miquelon, and Newfoundland. A meteorological mechanism that resulted in the March 2018 arrival is hypothesised in "Weather Analysis", below.

Maps 1 and 2 show Great Egret sightings reported to eBird during March 2017 and 2018. It is apparent that the birds arriving in Atlantic Canada in March 2018 did so well ahead of their typical arrival dates. The northern limit of the Great Egret's breeding range on the US Atlantic Coast is southern Maine, so birds found further north are overshooting individuals. They typically begin to arrive east of their breeding range in Maine and Atlantic Canada at about the same time in mid-April. The gap in sightings from southern Maine to Nova Scotia in Map 1 suggests that those in Atlantic Canada during March 2018 were here much earlier than in a typical year and presumably arrived via an offshore route.

Weather Analysis

By John Kearney

It is likely that you have seen radar images on television or online showing flocks of birds circling in the eye of a hurricane. Once refuge is found in the eye, birds stay there until they pass over land, where they can descend to safety. This is how hurricanes bring a host of rare, southern birds to the coasts of our region, typically from June through November.

"Hurricane" is the name given to tropical cyclones in the western Atlantic Ocean. When one forms at mid-latitudes, it is called an extratropical cyclone but is most commonly referred to as a low. Some of the most powerful of these cyclones can also have an eye surrounded by swirling, counterclockwise-flowing winds.

It is the hypothesis of this analysis that the formation of an eye in two extratropical cyclones during March 2018 enabled an unknown portion of migrating herons and egrets, carried out to sea off the Carolinas, to survive until they reached the shores of the Atlantic Provinces.

The wind maps in Figures 1 and 2 are sourced from http://earth.nullschool.net. As shown in the first panel of Figure 1, the

Figure 1: Surface Winds, Mar 12-14, 2018 (with Nova Scotia Time)

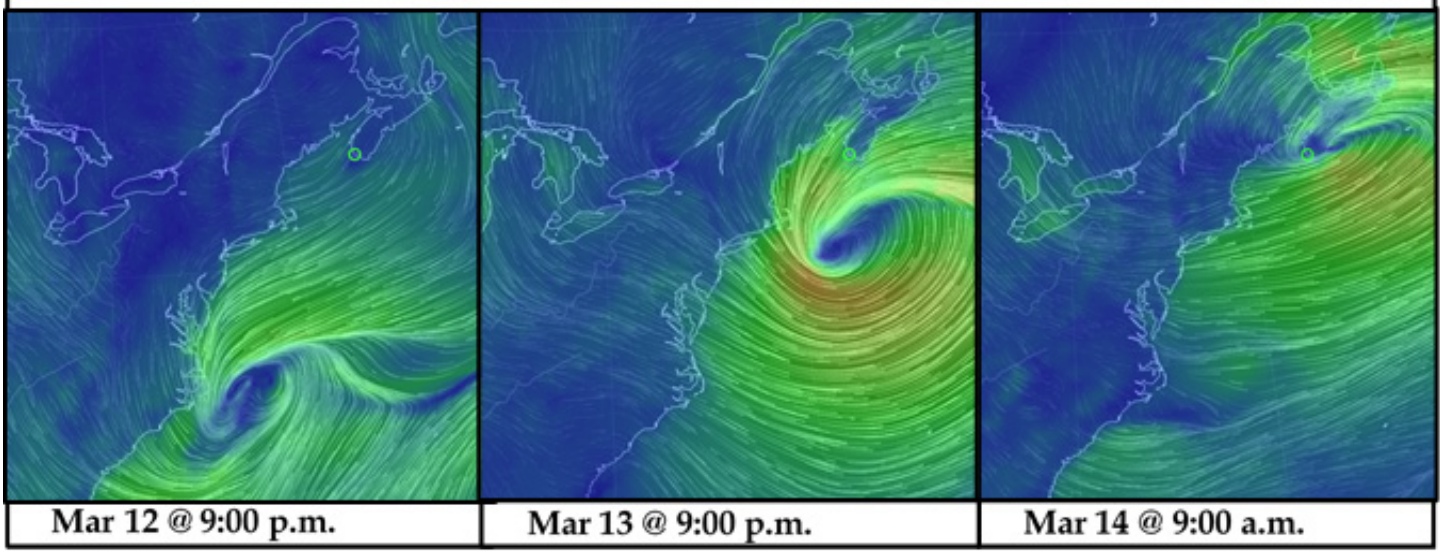
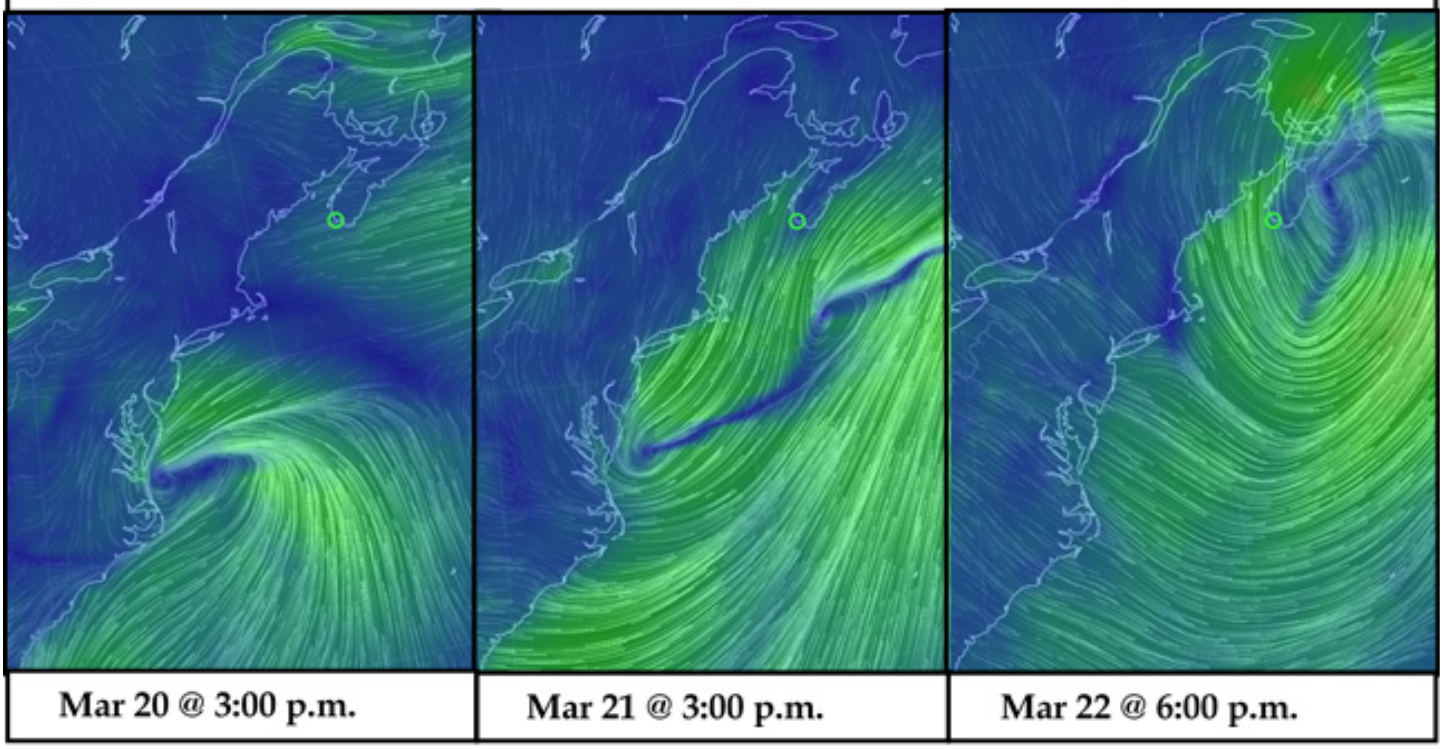


Figure 2: Surface Winds, March 20-22, 2018 (with Nova Scotia Time)



eye of the first storm appeared off the coast of North Carolina by the evening of March 12 (9:00 p.m. Nova Scotia time). The eye is the blue colour surrounded by counterclockwise winds. Blue represents winds less than 10 km/h, green represents winds 50-100 km/h, and orange and red represent winds over 100 km/h.

The eye moved north-northeast until it reached the shores of Shelburne County, Nova Scotia, around 9:00 a.m. on Mar 14 (right panel, Figure 1). Between the times shown in the left and centre panels of Figure 1, the storm appeared to stall and the eye became smaller, however, the storm gained momentum and developed a larger eye before it reached Nova Scotia, where it broke up over land. The narrowing of the eye off New Jersey may have resulted in birds that were travelling in the eye being swept away by high winds and may account for the small number of egrets and herons associated with this storm in Nova Scotia.

The second storm, shown in Figure 2, formed during the day on Mar 20, with strong winds potentially sweeping migrants off the coast of Florida and the Carolinas toward an eye forming in the coastal waters of Virginia (left panel, Figure 2). The features of this storm varied from those of a typical

strong extratropical cyclone. At higher altitudes of about 1,500 meters, it had a typical eye with calm winds, but the circling winds were skewed to the northeast, causing it to look somewhat like an arrowhead rather than a circle. At surface level, the eye was not apparent; instead, there was a long, narrow tongue of near-calm winds that extended hundreds of kilometers out into the Atlantic (centre panel, Figure 2). This tongue swung north on Mar 22 (right panel, Figure 2) and reached Nova Scotia just east of Halifax. This storm brought the greater portion of the herons and egrets that were seen in Nova Scotia in March and early April, but it also resulted in arrivals in Saint-Pierre et Miquelon and Newfoundland.

It seems plausible that the herons and egrets travelled at surface level in the calm tongue rather than in the high-altitude eye. There are two reasons for this. First, the high-altitude eye was over Shelburne County in the afternoon of March 22, so the first herons and egrets would have been seen there rather than in Halifax County. Second, if the birds had been in the upper-level eye, they never would have reached Sable Island, where so many dead herons and egrets were found. But birds travelling in the tongue of surface calm could have come close to Sable Island (the whitish speck along the upper-right edge of each panel) when the tongue turned north towards the eastern shore of Nova Scotia. There is not enough meteorological information to know the exact route of the tongue, but there is reason to suspect that it came close to Sable Island or at least created conditions for winds less than 30 km/h near the island.

Discussion

The timing and distribution of the March 2018 arrival of herons and egrets in Atlantic Canada suggest an offshore route from the US Atlantic Coast. The arrival dates and locations, combined with wind maps, provide evidence for the transport of migrants by two extratropical cyclones, with birds reaching the mainland likely having followed the relatively calm eye or tongue.

It is interesting that there was such a low survival rate on Sable Island. Those birds might have travelled outside the area of calm winds, causing them to be dramatically weakened and contributing to their starvation on the island.