Isotherms and Winter Distribution of **Trumpeter Swans**

Trumpeter Swan *Photo: Larry Radko*

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THE EARLY FRENCH EXPLORERS, missionaries and Acadian settlers, left a record in the 16th and 17th centuries of swans in eastern Canada before the flood of European settlement arrived. These records of birds, believed to be Trumpeter Swans (*Cygnus buccinator*), were brief and scattered (Banko 1960). They tell us little about numbers and report winter occurrence only in New England. The paucity of these early records leaves us with little understanding of their original summer or winter distribution. The recently re-established Ontario Trumpeter Swan population has demonstrated its ability to migrate and has shown

its choice of wintering zones. These swans would probably have the same capabilities as their forerunners nearly 500 years ago. The purpose of this paper is to relate the contemporary winter range of this re-established population of Trumpeter Swans with the present mean January isotherms.

The earliest report of swans in Canada was in 1538 on the St. Lawrence River by Jacques Cartier (Biggar 1924). Travelling in the ship in which he had crossed the Atlantic, he sailed up the St. Lawrence River, very nearly as far as Montreal. With the need to cautiously sound his way upstream, he was forced to sail in the deepest water. Observations of wildlife close to shore were thus limited. He anchored his ship from 19-28 September and rowed upstream in his longboats, presumably avoiding the main current, to reach the Indian village of Hochalaga (vicinity of present day Montreal). During this trip in shallow water he saw "many" swans.

There is a problem with Cartier's dates, which were recorded under the old Julian calendar as 19 September-30 September. In 1582, Pope Gregory XIII introduced a new calendar, which we use today, and which corrected the 10 day accumulated error in the 1500 year old Julian calendar (Hatcher 1984). Under the new Gregorian calendar, Cartier actually saw these swans on 29 September - 10 October.

Could these have been early migrating Tundra Swans (*Cygnus columbianus*)? This is not likely because Tundra Swans are late fall migrants, some remaining on the prairies until freeze-up. They cross Minnesota, Wisconsin and Michigan from late October to late November. The majority move through these states between 5 to 15 November (Bellrose 1976). They reach their final destination and wintering grounds in the Atlantic States from mid-November to mid-December (Limpert and Earnst 1994). The earliest fall records for Tundra Swans in Ontario were 17 and 23 October (Quillian 1973) when birds were seen in the Kingston area. These dates suggest that it is very unlikely that there were "many" Tundra Swans on the St. Lawrence River east of Montreal in late September-early October.

Could the swans Cartier saw have been Trumpeter Swans that had flown in from elsewhere? That would depend on the maturity and stamina of cygnets and the molt dates of adults. Cygnets fledge on the western prairies (Kraft 1991) and in Minnesota (L. Gillette, pers. comm.) in September. In Ontario, they fledge from mid-September to early October. These cygnets would not have had the stamina to fly to the St. Lawrence River by late September. Mattson *et al.* (1995) found that Wisconsin Trumpeter Swans began their fall migration in late October, with most leaving in late November. Trumpeter Swan parents have a very varied and extended period of molt. An individual can regain flight in about 30 days. Some yearlings may be flightless in July but some adult males in Ontario and elsewhere do not regain flight until October (L. Gillette pers comm; Banko 1960).

Cartier's dates support the view that the "many" birds he saw were local Trumpeter Swans, possibly a breeding population. Dièreville, a trader from France, visited the Acadian settlers on the Bay of Fundy, Nova Scotia in 1699-1700 (Dièreville 1933). He wrote from Port Royal (44° 42' N 065° 36' W) that the settlers "could safely collect the eggs of swans and geese." Squires (1976) identified the swans as Tundra Swans, but that species nests much farther north on the tundra and only very rarely has been recorded breeding within the tree line. These nesting swans on the Bay of Fundy must have been Trumpeter Swans. If so, they would extend the historical distribution of breeding Trumpeter Swans to the Atlantic coast.

In New York in 1671-72, a Jesuit priest wrote (Thwaites 1959) that "swans and Canada Geese are very abundant during the entire winter and in spring one sees nothing but continual clouds of all sorts of waterfowl." The location he gave was Lake Toshero which he wrote was 14 leagues long by one or two leagues wide. The only lake of that size near the Oswego River which he mentioned is Oneida Lake near Syracuse, New York. This is the only French historical record which gives the location of swans in the winter. They must have been close to the northern limit of their winter distribution. It is of interest that 1671 would have been about the middle of the "little ice age" when a sharp downturn in the climate created much colder conditions than prevail today.

Archaeological sites also produced the bones of Trumpeter Swans in eastern Canada. In northern Newfoundland, near the straits of Belle Isle at the Port aux Choix burial site, four Trumpeter, 22 Tundra and six undetermined swan bones were recovered (Tuck 1976). Two Trumpeter Swan bones also were dug from the Coteau du Lac site upstream from Montreal in Quebec (H. Savage, pers. comm.).

When the restored population of Trumpeter Swans in Ontario are frozen out of their nesting wetlands, their identifying wing-tags show that most go only as far south as they must to find open water and food. The majority winter along the north shore of Lake Ontario, where many are attracted by artificial feeding. There are, however, birds wintering on inland rivers north of Lake Ontario (e.g. at Washago and in the Severn River system) that depend on aquatic vegetation (Lumsden *et al.* 2012). There have been few long distance movements. Most of the population remains in Ontario but some move into the Atlantic States.

The Ontario swans, therefore, have shown us where they choose to winter. It is possible to extrapolate from this distribution to other areas to determine where the potential exists for wintering additional swans.

The position of the +3°C, the 0°C, the -3°C, the -6°C and -9°C mean isotherms for January in eastern North America (source internet: Geography 2200, Lecture 12, Florida State University) are shown in Figure 1. When the

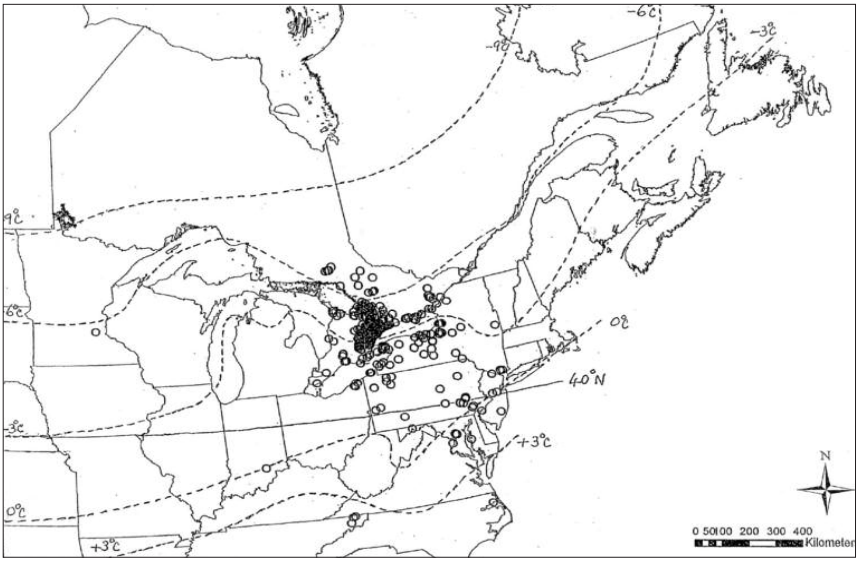

Figure 1. Mean January isotherms for eastern North America and the December, January and February distribution of Ontario-tagged Trumpeter Swans.

December to February locations of tagged Ontario Trumpeter Swans are superimposed (Figure 1), a pattern emerges. Most of the population remains in Ontario for the winter between the -3°C and -6°C isotherms. At some of these open water sites, the swans remain because they are fed, at others they survive on their own on natural food. This zone in the United States includes all of the Atlantic States where there are areas with spring water or currents which prevent ice formation.

The swans that leave Ontario mostly stay between the 0°C and -3°C isotherms. If we look further at this climate zone, we find that it includes Indiana, Ohio, Michigan, New York, Pennsylvania, north-eastern West Virginia, northern Maryland, northern New Jersey, Connecticut, Rhode Island, Massachusetts, southern New Hampshire, coastal Maine, southern New Brunswick, Nova Scotia and most of Newfoundland. Further south between the +3° C to 0° C isotherms , the rest of West Virginia, Virginia, southern Maryland, Delaware and southern New Jersey are included. That swans wintered in New Hampshire, Connecticut and Massachusetts in the early years of settlement is reported by Banko (1960). More recently, Ontario wing-tagged Trumpeter Swans have been identified in New York, Pennsylvania, Maryland and Delaware and untagged swans, reported as Trumpeter Swans, wintered in New Jersey, Connecticut and Maine.

The restored Trumpeter Swan population in Ontario is now self-sustaining.

There is very extensive unoccupied breeding range in northern Ontario and to the east in Quebec where they have started to nest recently. As the population builds, these birds will occupy increasingly larger parts of this range and will likely spread their winter range into the Atlantic States and Maritime Provinces.

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