

Great Lakes Piping Plover family using habitat outside protected area

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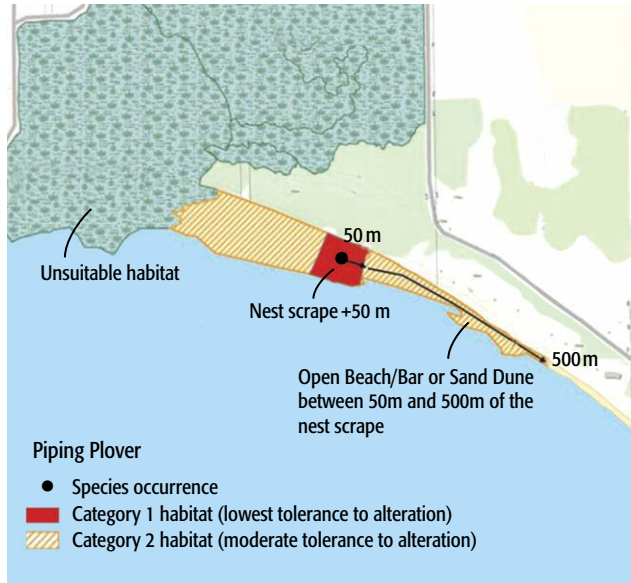
Figure 1: Perimeter fencing installed at Darlington Provincial Park to establish a 50 m buffer on each side of the 2020 Piping Plover nest. Photo taken looking west. Photo: M. Fromberger

Introduction

The Piping Plover (*Charadrius melodus*) is a migratory shorebird that occurs in three geographically distinct populations in North America including the Atlantic Coast (*C. m. melodus*), Northern Great Plains and the Great Lakes (*C. m. circumcinctus*; Kirk 2013). It is listed as an endangered species and protected under both Ontario's *Endangered Species Act*, 2007 (ESA) and Canada's *Species at Risk Act* (SARA; Environment Canada 2013, Kirk 2013). Piping Plovers were once locally extinct (extirpated) on the Great Lakes in Ontario, returning to breed in 2007 after a 30 year absence (Coady 2016, Birds Canada 2020). Known threats that contribute to their reduced populations include habitat loss and degradation, human disturbance, predation, and increased storm and flooding events (Kirk 2013, Coady 2016).

Figure 2: Example application of habitat protection for Piping Plovers provided by OMECP (2019a) where 500 m of protected habitat would stretch out from each side of the nest to protect 1 km of beach (centered around the nest).

Figure adapted from OMECP (2019a)



In Ontario, conservation efforts to protect Piping Plovers and their nests are based on the methods used in other breeding locations in North America, including the Great Plains and Atlantic Coast (Birds Canada 2019). Nest protections and perimeter fencing are assembled to protect the nest and birds from both predation and human disturbance (e.g., recreational activities; Kirk 2013, Birds Canada 2019). Perimeter fencing is installed to protect a 50 m buffer on each side of the nest (Figure 1; Birds Canada 2019). In addition to the 50 m nest buffer, a 500 m buffer area on each side of the nest is also protected as habitat (Figure 2). Within this 500 m buffer, beach maintenance activities, such as raking and grooming, and other habitat-altering activities are considered to be not compatible with Piping Plovers and their associated habitat as defined in the



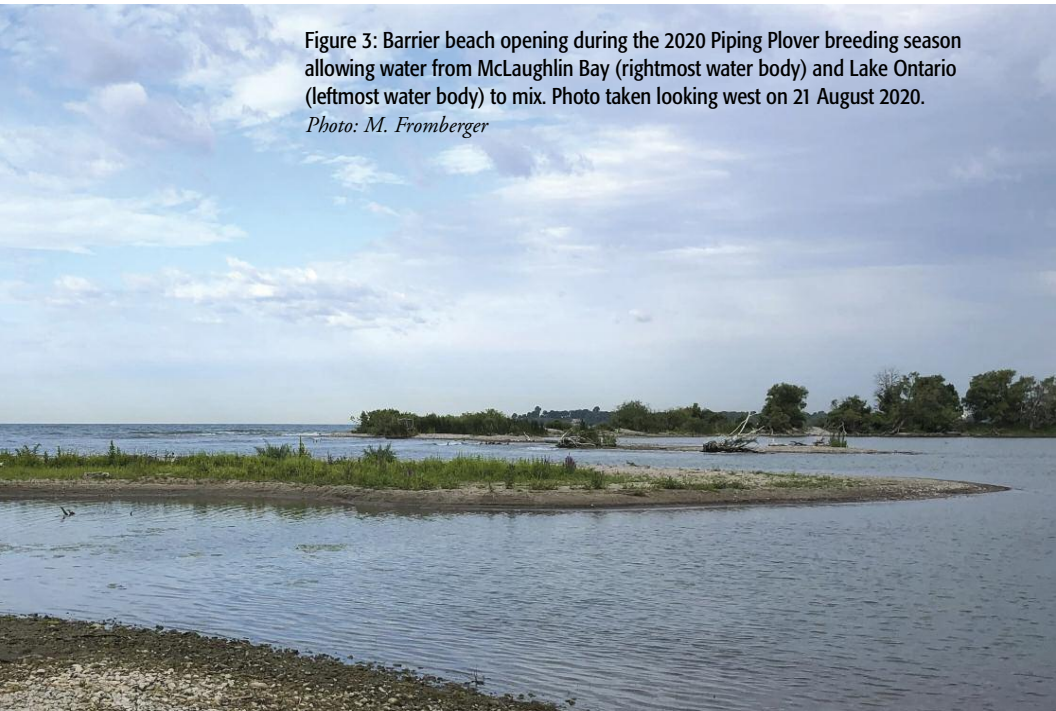
General Habitat Description (Figure 2; OMECP 2019a). Past observations of Ontario's Piping Plovers found that the birds used anywhere between 400 m to 1 km of shoreline for nesting, feeding and chick rearing during the breeding season, on which the 500 m buffer is based (Environment Canada 2013).

In 2020, a single breeding pair of Piping Plovers produced four fledglings at Darlington Provincial Park, Bowmanville, Ontario, making it the fifth consecutive season Piping Plovers have nested at the park (OMECP 2019b). Despite the unprecedented circumstances related to the COVID-19 pandemic, including delayed field work surveys and the cancellation of the

volunteer monitoring program due health and safety concerns, the breeding pair had an excellent season, successfully rearing all four chicks under the watchful eye of Ontario Parks staff, Taryn Lourie (Piping Plover Biologist and Volunteer Co-ordinator for the Southeast Parks Zone), Carley Gougeon and myself (Aquatic/Wildlife Biologist Summer Students), as well as Birds Canada staff member, Rebekah Persad (Ontario Piping Plover Technician). The Darlington fledglings were four out of eight total Piping Plover fledglings produced this year in Ontario (Ontario Piping Plover Program 2020), and we are hopeful they will survive their first winter and return to Ontario to be first-time

Figure 3: Barrier beach opening during the 2020 Piping Plover breeding season allowing water from McLaughlin Bay (rightmost water body) and Lake Ontario (leftmost water body) to mix. Photo taken looking west on 21 August 2020.

Photo: M. Fromberger



parents next year. The overall objective of this paper is to document the use of habitat outside the 500 m protected area (as described above) by the 2020 Darlington Piping Plover family.

Observation

We monitored the 2020 Darlington Piping Plovers seven days/week, recording behavioural and predator observations, and surveyed suitable habitat areas for additional Piping Plovers. During the 2020 breeding season, Darlington's

Piping Plover family was observed regularly foraging in habitat located approximately 630 m west of their nest.

In 2020, the barrier beach separating McLaughlin Bay and Lake Ontario breached and allowed water from the Bay and Lake to mix; a phenomenon that has been confirmed on two other occasions (1954 and 2005; Hoskin 2020) (Figure 3). On either side of the newly breached opening, small sand spits were created and protruded northward into the Bay (approximately 750 m² in size; Figure 4).

Figure 4: Sand spit habitat used by the 2020 Darlington Provincial Park Piping Plovers approximately 630 m west of their nest. Photo taken on 21 August 2020 after the plovers had left, looking north over McLaughlin Bay. Breached opening was to the left, out of the frame. *Photo: M. Fromberger*





Figure 5: Male Piping Plover from the nest at Darlington Provincial Park foraging out on the sand spit habitat on 7 June 2020. Photo: M. Fromberger

These areas provided the Piping Plovers with new undisturbed foraging habitat west of their nest. Many other species were also observed using this sand spit habitat including: Black-bellied Plover (*Pluvialis squatarola*), Black Tern (*Chlidonias nigra*), Caspian Tern (*Hydroprogne caspia*), Common Tern (*Sterna hirundo*), Killdeer (*Charadrius vociferus*), Least Sandpiper (*Calidris minutilla*), Lesser Yellowlegs (*Tringa flavipes*), Red Knot (*Calidris canutus*), Ruddy Turnstone (*Arenaria interpres*), Sanderling (*Calidris alba*), Semipalmated Plover (*Charadrius semipalmatus*), Semipalmated Sandpiper (*Calidris pusilla*), Spotted Sandpiper (*Actitis macularius*) and Whimbrel (*Numenius phaeopus*).

On 29 May 2020, approximately one week after Darlington's Piping Plovers had completed their clutch of four eggs, four adult Piping Plovers were observed in a territorial dispute over the sand spit before they flew off. The breeding male was confirmed foraging and defending the sand spit habitat on 6 June (Figure 5). From then on, he was often observed using the sand spit when he was not incubating. The breeding female was confirmed foraging at the sand spit by mid-June. The sand spit was approximately 630 m from the nest.

The eggs started hatching on 14 June, and by 17 June all four chicks were observed. On 16 June, the male was observed foraging and defending the sand spit area from a single adult Piping Plover.

Figure 6: Three of the four Piping Plover fledglings loafing at the sand spit habitat on Darlington Provincial Park's beach. Photo was taken on 18 July 2020 through spotting scope (digiscoped).

Photo: M. Fromberger

Both parents stayed close to the chicks during the first few days after hatching and were not confirmed at the sand spit again until 19 June when the breeding female was observed foraging. The breeding male was observed foraging at the sand spit periodically throughout late June. Between 29 June and 11 July, neither parent was confirmed at the sand spit, however each was often observed flying back to the chicks (unable to fly very far or at all during this time) from the west and were likely returning from the sand spit area. All four chicks were fully fledged (flighted) as of 10 July and the breeding female was last observed on 11 July, likely starting her migration south. It was not until 12 July that the plovers were confirmed foraging at the sand spit again when the breeding male and two of the four fledglings were observed. Over the next two days, all four fledglings and the breeding male were observed foraging at the sand spit together. On 15 July, only three of the four fledglings were observed foraging at the sand spit and we later concluded the breeding male and one fledgling had left, likely starting their migration south. The remaining three fledglings almost exclusively stayed out at the sand spit for the



rest of their time at Darlington (Figure 6). The final fledgling was last seen at the sand spit on 17 August, at which time we concluded that all four fledglings had finally left the park and started their migration south for the winter.

Overall, we observed the 2020 Darlington Piping Plovers using a total of approximately 930 m of shoreline during the breeding season. Although there was 500 m of suitable habitat on either side of their nest, the Darlington plovers used habitat approximately 630 m to the west of their nest (area closed to humans) and about 300 m to the east of their nest (main recreational beach area).



Discussion

The amount of shoreline which Great Lakes Piping Plovers use during the breeding season is not well documented (Haffner *et al.* 2009). This information is necessary to evaluate the potential effects of habitat fragmentation on reproductive success, better estimate maximum nest densities for suitable habitat area and more accurately estimate population targets based on overall carrying capacity (Haffner *et al.* 2009). Haffner *et al.* (2009) investigated space use of Great Lakes Piping Plovers in Michigan during the breeding season and found that the nesting plovers used on average $475 \pm$

53 m of linear shoreline over the entire breeding season. This average falls within the range of shoreline length usage documented in past observations of Ontario's Piping Plovers (400 m to 1 km; Environment Canada 2013), but is less than the 630 m distance we observed the Darlington Piping Plovers using on the west side of their nest alone.

Interestingly, Haffner *et al.* (2009) note that in another study, the space used by breeding Piping Plovers on Long Island, New York (Cohen 2005), increased to include new intertidal foraging areas that were created by storm events.

This is similar to our observations of the Darlington Piping Plovers increasing their use of space outside the protected 500 m area to include the sand spit habitat newly available this year. It is probable that in both cases the plovers increased their use of space to take advantage of a good foraging opportunity. Haffner *et al.* (2009) also note that Atlantic Coast Piping Plovers preferred areas with fewer people, where the amount of time they spent vigilant and not foraging was directly related to the number of people in close proximity. Similarly, the Darlington Piping Plovers were observed only using about 300 m out of the 500 m protected area on the east side of their nest, likely to avoid the large number of visitors that were present there enjoying Darlington's main beach area, compared to the undisturbed area on the west side of their nest.

Our observations reveal that Piping Plovers will use habitat outside of the protected 500 m area on either side of their nest during the breeding season. Therefore, while basing protected areas

on the assumption that plovers will use a symmetrical space of 500 m on each side of their nest is a good rule of thumb, it is oversimplified given plovers will likely use the best habitat in the area surrounding their nest. Overall, our observation demonstrates the importance of recognizing the potential variability in the space use of Ontario's Piping Plovers when assessing habitat suitability and identifying protected areas in the future.

Acknowledgements

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