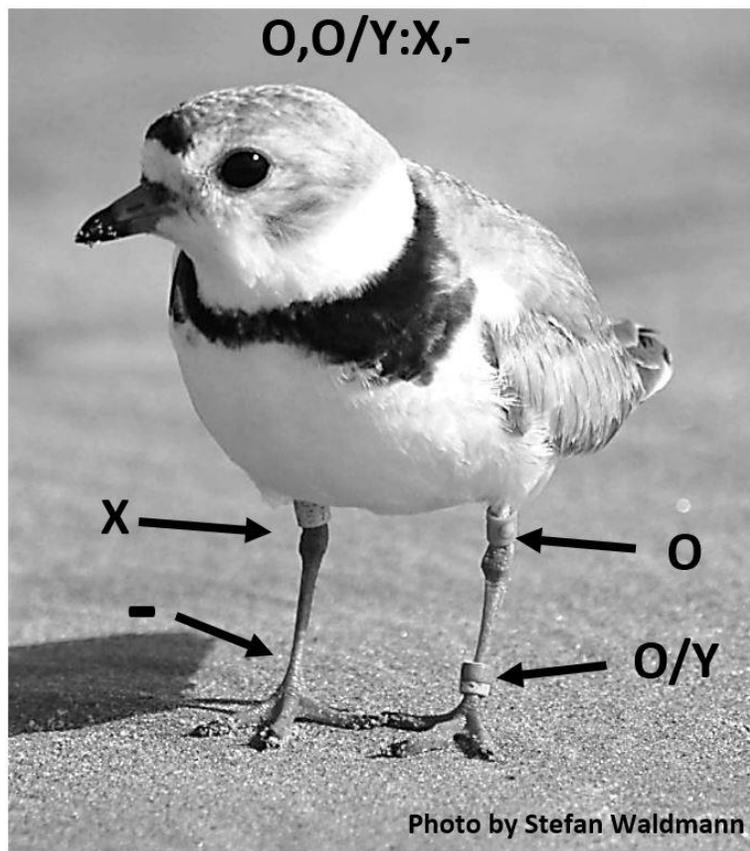


Supplementary Information for Volunteers and Agency Staff

Ontario Piping Plover Conservation Program



The information in this manual should be used in conjunction with the Piping Plover Volunteer Handbook to better understand your role as a volunteer, and to understand how and why Piping Plovers are protected through this program.

Manuals A-C have been prepared by Birds Canada with support from funders and partners credited in Manual A. *Revised April 2019; new revisions will be made available at birdscanada.org.*

The Life of a Piping Plover

Description: Adults are about 17 cm long and weigh 43-64 grams (about 6 toonies). Sand-coloured backs and heads help Piping Plovers stay camouflaged on the beach. In spring-summer, adults have orange legs, an orange bill with a black tip, a white belly, and black bands on their forehead and around their neck. Over the winter, adults lose their black feathers and their beaks turn black.

Distribution and Population: There are three main breeding populations; the Prairie, the Great Lakes, and the Atlantic; all together their total population is under 8000 individuals. The Great Lakes population can be found in Ontario and the United States. In 2018, the Great Lakes had 67 breeding pairs. The plovers that nest at the Lake of the Woods are considered part of the Prairie population.

Piping plovers returned to Ontario's Great Lakes in 2007, after a 30-year absence. Since the establishment of one nest at Sauble beach in 2007 they have expanded to nest on around 5 beaches each year. Thanks to conservation efforts, their population is steadily increasing!

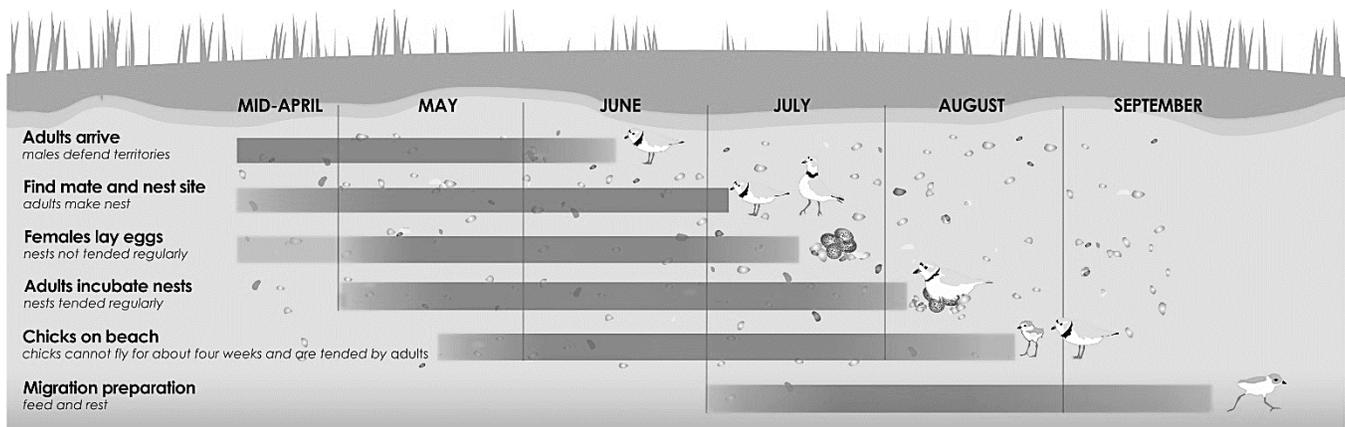
Migration: In spring, adults return to Ontario to breed in late April and May. When nesting is complete, adults leave for migration. This begins in mid-July and most plovers are gone by early September. Great Lakes Piping Plovers usually overwinter in Florida and South Carolina, but can go as far as Mexico and the Caribbean. Sometimes they are seen in flocks of over 50 individuals!

Where do plovers nest? Piping Plovers nest on wide sand, gravel, or cobble beaches, sand spits, or peninsulas. The male and makes "scrapes", a shallow depression (10 cm wide) in the sand. One of these will become the nest. Their camouflaged eggs are difficult to see on the sand, thus people, dogs or vehicles can crush them by accident. On average their nests contain four eggs.

Nest incubation: Male and female share duties over a period of roughly 27 days. Young may hatch starting in late May or early June onwards, depending on when nesting was initiated. If eggs are lost before hatching the pair may attempt a new nest. Re-nesting attempts can occur up to early July.

Chick-rearing: Precocial chicks are able to walk, run and feed themselves within hours of hatching. Chicks are brooded by both parents for the first few weeks. Females usually leave after 1-3 weeks, leaving the male to care for chicks. Chicks fledge when they are 3-4 weeks old.

Diet: The diet of the Piping Plover include flies and fly larvae, beetles, other small invertebrates. Plovers capture prey using a "stop, run, peck" style of foraging, using their keen eyes to spot prey and their beak to quickly catch prey. Some of the best foraging is along the shore.



Threats to Piping Plovers

Habitat Loss and Degradation: Development along beaches has destroyed, degraded and reduced breeding habitat. Additionally, ongoing beach management activities; such as raking to remove vegetation and the wrack line, damages habitat and removes valuable food sources. Changes in water levels and vegetation can impact the amount of habitat that is available. Beaches that become too steep and narrow from erosion or plant cover are not suitable for Piping Plovers. Finally, water control projects (i.e. dams) can cause water levels to increase over the summer, and may cause nests to flood. This is a not a threat in the Great Lakes, but does impact Lake of the Woods populations.

Predators: Eggs and chicks may be predated by gulls, crows, or mammals such as foxes, weasels or raccoons. Adults are most often predated by Merlins, but other raptors such as owls are also a threat. Domestic cats and dogs can also kill plovers. When a predator is near, one or both adults will try to distract it away from the chicks or nest. They will make alarm calls, telling the chicks to crouch or hide. They have lots of experience protecting themselves without our help. Remember, plovers can also perceive humans as a threat. Never approach a plover, and never try to scare predators away. You may unintentionally put the chicks at risk.

Human Disturbance: People are often unaware that they are disturbing breeding plovers because Piping Plover adults, nests and chicks are hard to see. Piping Plovers may abandon their nests if there is too much human activity in their nesting area. After nests hatch, it is important for adults to be able to tend to their chicks, with minimal disturbances. The following types of activities can harm plovers:

- Feeding wildlife, and leaving trash on the beach, increases the abundance of predators
- Off-leash dogs at the beach can chase plovers, disturb incubating adults, or kill flightless chicks.
- High numbers of people walking along the shoreline can prevent plovers access to the water
- Balls thrown into the perimeter may scare plovers off their nests. Kites can mimic avian predators.
- Collecting driftwood for art projects removes habitat that chicks rely on

Natural Threats: Piping Plovers may get illnesses, or become injured in disputes with predators or other Piping Plovers. If you see a Piping Plover that exhibits signs of botulism (Page 9), or appears injured or ill, inform your Volunteer Coordinator right away. Agency Staff will determine the best course of action.

Nest Abandonment: Occasionally nests are abandoned. This usually happens when an adult disappears, has been predated, or if disturbance is too frequent. If you suspect the nest is abandoned, contact your Volunteer Coordinator. Agency Staff will use a number of clues to determine if the nest is abandoned:

- Adults are making a new scrape elsewhere, or are not defending their nest
- Adults are not incubating for over 2 hours, unless obvious disturbance is keeping them away
- Both adults are absent from the territory for over 30 minutes (used in conjunction with other criteria)
- Adults are not attending the nest at night
- The nest is blown in by sand, or has water in the nest bowl
- The adults may abandon unhatched eggs. If they are tending to chicks and have not returned to incubate for over 2 hours, they may have abandoned the remaining eggs

Legislation and Permits

Here is a guide to legislation that relates to Piping Plovers.

Federal Legislation

Species at Risk Act (SARA):

- Prevent wildlife species from being extirpated or becoming extinct
- Provides for the recovery of wildlife species that are extirpated, endangered or threatened as a result of human activity
- Manage species of special concern to prevent them from becoming endangered or threatened

The Piping Plover is listed as an endangered species under this Act. It is illegal to kill, harm, harass, capture or take a Piping Plover. It is also illegal to possess, buy, sell or trade this species, and to damage or destroy its residence.

Migratory Birds Convention Act, 1994 (MBCA):

As migratory birds, Piping Plovers receive protection under this Act. Some of the predators, including gulls, are also protected.

- It is illegal to be in possession of, to buy and sell, or to willfully destroy or disturb a migratory bird, its nest, or its eggs
- Scientists can apply for permits to conduct research or to help conservation efforts

Provincial Legislation

Ontario Endangered Species Act (ESA):

The Piping Plover is listed as endangered under this Act.

- Prohibits killing, harming, harassing, capturing, taking, possessing, collecting, buying, selling, leasing, or trading any endangered or threatened species.
- Illegal to damage or destroy the habitat of an endangered or threatened species.
- Permits must be obtained before certain protection and recovery activities are undertaken.

Ontario's Provincial Parks and Conservation Reserves Act, 2006

- Superintendents of Ontario Parks can close any area of a provincial park or conservation reserve to protect species or the environment
- Park wardens can charge and/or arrest anyone who trespasses into a closed area

Permits: Permits are designed to ensure all conservation activities are completed quickly and effectively, by people with the proper background and expertise. This is to ensure no harm comes to Piping Plovers or their habitat. Do not undertake any activity requiring a permit unless a permitted individual is present and you have been asked to assist them. **Volunteers and members of the public are not permitted to complete any of the following activities:**

- Approach a nest, band plovers, collect eggs, handle chicks (for any purpose), handle dead or injured Piping Plovers, collect nests, nest materials or parts of birds, install fencing or enclosures (without direct supervision from a permitted individual).

Conservation Activities

Note; Agency Staff refers to individuals that have been listed on permits to complete conservation activities. Agency Staff may work for Birds Canada, Canadian Wildlife Service, Ministry of Environment Conservation and Parks, Ontario Parks, or Stewardship Groups.

The conservation methods that are used in Ontario are based off activities that have been proven successful with Piping Plover populations in the United States, the Atlantic, and the Great Plains.

We usually only intervene in cases where humans are the cause of the disturbance. Humans can unintentionally cause a number of disturbances and can even impact the presence and behaviour of predators. The following section provides an overview of conservation strategies used in Ontario, and the reasons for their use.

Perimeter Fencing also called Psychological Fencing or Symbolic Fencing

- Fencing is installed as soon as a nest is found to protect it from human disturbances. Fencing is not used in remote areas where human disturbance is minimal.
- Fencing protects a 50 meter distance around the nest, using t-posts, rope and flagging tape. On busy beaches, snow fencing is sometimes used to create an additional barrier which protects the nest from human activities.
- When installing the fence, Agency Staff may vary its shape and size dependent on water levels, beach entrances, and other human obstacles. Agency Staff are trained to identify when Piping Plovers are disturbed; and may increase the size of the protected area if there is any indication that 50 meters is not enough space for the nesting pair.
- Agency Staff may remove fencing if the nest fails, or fencing may stay in place until after chicks have fledged, to provide a safe place for them to rest before migration.

Installing perimeters requires a permit. Volunteers may be asked to assist with installing or removing perimeter fences. Always wait for Agency Staff to be present, and follow all instructions carefully. This task is fairly labor intensive, and your assistance is not mandatory. Your safety and comfort always comes first!

Signage is installed at the same time as the fence. Signs encourage compliance, and educate beach goers when volunteers are not present. Signs encourage beach goers to limit the time spent between the shore and the fence, so that plovers can easily access the water. When the nest hatches, Agency Staff will install 'Chicks on Beach' signs; these signs may be moved to new locations depending on where chicks are. Whiteboards may also be installed at a nest with information about the nesting pair and expected hatch date.

- Check with your Volunteer Coordinator if volunteers are permitted to move 'Chicks on Beach' signs
- Check with your Volunteer Coordinator to see if whiteboards require updating at your beach.

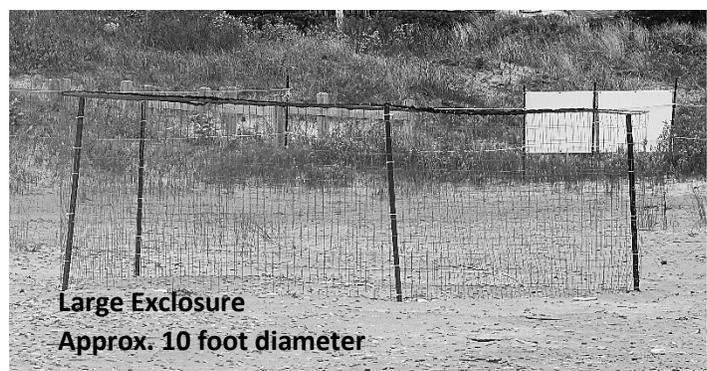
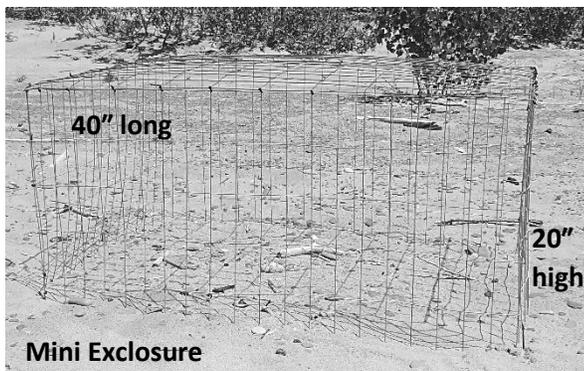


Predator Enclosures; Enclosures protect the nest and the adults from predators and humans. Agency Staff will determine if a mini or large enclosure is appropriate. Piping Plovers are very tolerant of enclosures, and the odds of the nest successfully hatching are greatly increased when enclosures are used. Enclosures will usually remain in place until the perimeter fence is removed. On occasion, staff may choose to remove an enclosure if there is indication predators are attracted to it.

Mini Enclosures are installed before the pair begins incubating, it is often installed with the discovery of the nest. On beaches with very high levels of human disturbance, mini enclosures do not provide enough protection for the whole incubation period. Mini enclosures take less than 2 minutes to install, and will protect the nest until it has a full clutch (usually 4 eggs).

Large Enclosures are used on beaches with high levels of human disturbance. They are installed after the pair has begun incubating, usually when 4 eggs are in the nest. Large enclosures take up to 20 minutes to install and require a team of approximately 5 people. At some beaches 'fox aprons' are buried along the edge of large enclosures. This is essentially garden lattice that prevents digging predators from reaching the nest.

Installing enclosures requires a permit. In some circumstances, Agency Staff may request your assistance to install or remove a large enclosure. ALWAYS follow all instructions carefully, and do not undertake any activities without direct supervision.



Predator Mitigation; Predator mitigation activities require a permit. Agency Staff will determine appropriate measures to use at each nest.

- **Predator Decoys;** look like dead Ring-billed Gulls. These have some success in preventing gulls from loafing within nest perimeters, but are often not effective.
- **Chick huts or added driftwood;** chick huts look like wooded tents, they can be added to nesting areas to provide more shelter for chicks from predators and extreme weather. Driftwood may also be added for the same purpose. These tools may be used when a nest area has very little natural cover or vegetation.
- **Removal of trash or carcasses;** trash and carcasses of dead fish or birds may attract predators to a nesting area. Volunteers can help by picking up litter outside of protected areas. Report dead wildlife to your Volunteer Coordinator.
- **Bird spikes;** plastic spikes may be added to sign posts that are near nesting sites. This is to prevent perching predators, such as Merlins, from lingering in the area.

Some predator mitigation strategies DO NOT WORK and are not approved to be used in Ontario:

- Noise deterrents and Mylar flags can be used to scare predators away. However, these activities can also disturb Piping Plovers, and would need to be tested more before being used.
- Physically chasing predators often has unintended consequences. Piping Plovers perceive humans to be a larger threat than birds, and may leave their chicks or nests unattended which creates opportunities for predators to attack chicks. Never chase predators.
- Predators are sometimes captured and relocated from Piping Plover sites in the United States. This activity often disturbs predators that are also protected species. It is costly, and not consistently effective. This is not an approved activity in Ontario.

Nest Translocation; Permits required. Nest translocations are used at Lake of the Woods nesting sites, where nests face the risk of flooding due to man-made dams. Nest elevation data and water level forecasts are used to determine the risk level. Nest translocations are usually successful, but do come with some risks:

- Agency staff is trained to observe Piping Plovers for signs that they may abandon the nest. If the nest is moved too quickly, or too far from the original site, the pair may abandon.
- Frequent moves and human activity in the area could draw curious predators. Care is taken to sweep human footsteps away.
- Each time the nest is moved, there is a slight risk of human error (e.g. eggs could be dropped). Therefore it is important not to move nests unless absolutely necessary.

Great Lakes nests are not moved. When these nests are at risk, it is not because of dams or water control projects, it is because the pair nested too close to the water. Piping Plovers can learn over time—moving nests may prevent that natural process from happening.

Chick Banding; Chicks are banded in Ontario when they're around 4-14 days old. Agency Staff with banding permits will capture chicks on the beach and give them metal and colour bands. Band combos are provided by the U.S. Recovery Team, so that all Great Lakes PIPLs have the same types of bands. Chick banding in Ontario is led by CWS. Adults are not rebanded in Ontario.

It is the Volunteer Coordinator's job to check bands every time they visit a nest, and every time they see a single or transient plover. Once pairs are established, Volunteer Coordinators will provide volunteers with the band combos for the birds at each nest. Volunteer Coordinators should never assume the identity of a plover based only on its location; that may result in single and transient birds being missed.

Great Lakes Rebanded Adults have an orange flag above the joint on one leg and a USGS metal band on the other leg. Below the flag there will be two colour-bands. Below the USGS there will be one colour-band.

Great Lakes Chicks (or adults that haven't been re-banded) have an orange band above or below the joint on one leg and a USGS metal band above the joint on the opposite leg, and one or two coloured bands on the lower legs.

Captive-reared Chicks are banded like rebanded adults, plus they have a split band somewhere in their combination.

Research; There are many research efforts underway to learn more about Piping Plovers. Color bands are one example of an ongoing study.

Some other studies are researching:

- How plovers behave differently on beaches with lots of human disturbance vs. undisturbed beaches
- Habitat requirements in wintering and breeding grounds; can we predict where they will nest? Can we create ideal habitats for them? How do hurricanes impact their population?
- Food requirements; do they pick beaches based on food availability?

The **International Piping Plover Census** takes place every 5 years since 1991 (2016, 2021, etc.). An effort is made to survey all potential habitats on breeding and wintering grounds.

During volunteer training, your Agency Staff will inform you of studies that are ongoing in Ontario. You may encounter these researchers on the beach. **Researchers are expected to introduce themselves to volunteers and Agency Staff before they begin collecting data.** If you are unsure that someone is a researcher, ask them about their work, or contact your Volunteer Coordinator.

Social Media and Sharing Guidelines

Piping Plovers are very rare in Ontario, and many wildlife enthusiasts will go out of their way to observe plovers if given the opportunity. This increase in traffic can cause disturbance to plovers.

We will generally welcome you to share posts on social media about Piping Plovers and your time as a volunteer. But please follow these simple guidelines:

Do Not share Piping Plover sightings to websites or hotlines (Facebook, eBird, etc.), without first asking the Provincial Coordinator or Volunteer Coordinator. Most of Ontario's nests are in high traffic areas, where the nest will be public knowledge, and you will be allowed to share sightings, but if you are uncertain PLEASE check first.

NEVER share Piping Plover nest locations if the perimeter fence has not been installed. Curious people may unintentionally trample a nest when looking for it.

Please do not share photos of injured, or dead Piping Plovers. Do not share negative stories, insults, or rumours. Please do not approach Piping Plovers or their nests to take a photo.

Ask program participants and Agency Staff for consent before taking and sharing their picture.

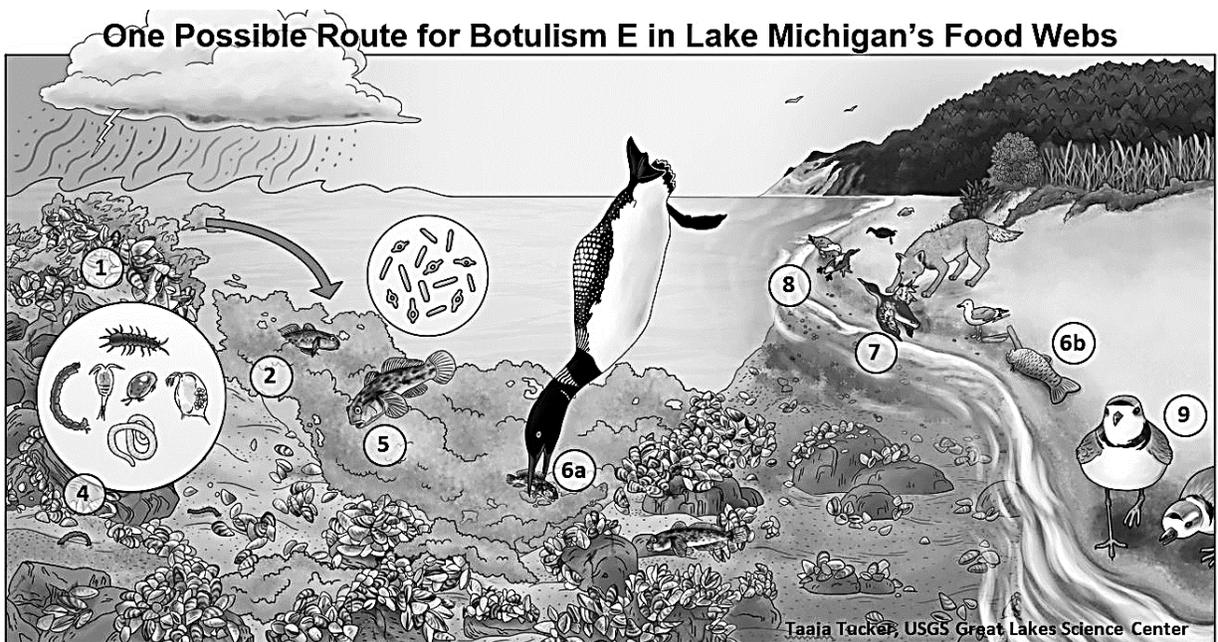
Please DO share positive stories, cute plover pictures, and photos of yourself volunteering. Enthusiasm is contagious!

Botulism E

There have been confirmed deaths in the U.S. Great Lakes Piping Plover population. The most likely source of Botulism toxin affecting Piping Plovers is ingestion of maggots, from carcasses of birds or fish that died of botulism poisoning. If you see an injured or sick Piping Plover, contact Agency Staff or your Volunteer Coordinator immediately.

How to recognize a Botulism E outbreak: Observe high numbers of dead birds on the beach; Ring-billed Gulls, Double-crested Cormorants, Caspian Terns, Sanderlings and, later in the summer, Horned Grebes, Common Loons and diving ducks. Botulism E poisoning in birds is initially seen as paralysis. Affected birds will be unable to hold their wings in the folded position. The wings will hang low and the bird will continually try to pull them up. As the paralysis progresses birds are unable to walk and finally can only move their heads weakly. Water birds usually drown off-shore when they are unable to hold up their heads, and are seldom seen sick. Sanderlings seem to lose use of their legs first and will fly from, and land in, a sitting position.

Prevention: Staff will remove and bury carcasses found in plover habitat before maggots can develop.



1. Non-native mussels filter water, allowing more light to reach algae on the lake bottom; their excrement fertilizes the algae.
2. Cladophora (a native alga) flourishes and forms dense mats in response to the increased light and nutrients.
3. Native botulism E bacteria thrive in the anaerobic conditions created when Cladophora dies and decomposes.
4. Mussels and other invertebrates ingest botulism E toxin and concentrate it in their tissues.
5. Non-native round gobies and other fish eat the mussels and are poisoned by botulism toxin.
- 6a/b. Birds eat the dying round gobies and are poisoned. Fish also eat the dying gobies and are poisoned.
7. Scavengers eat the dead birds and fish, and are exposed to botulism E toxin.
8. Flies lay eggs and maggots develop on dead birds and fish.
9. Shorebirds (including Piping Plovers) and other birds can be poisoned by eating the maggots.

Surveying Beaches

If you are interested in surveying for Piping Plovers, please contact your Volunteer Coordinator or Birds Canada. Surveys will be coordinated by Birds Canada to ensure suitable habitat is not repeatedly disturbed by well-meaning surveyors. Please do not undertake surveys unless directed. Always ensure you have permission from land owners if surveying on private land.

Surveyors must have strong knowledge of Piping Plover identification and behaviours, a high level of birding skill, their own transportation and equipment, and a willingness to follow instructions.

Surveyors are looking for Piping Plovers, but also recording human activities and predators on the beach. The data you collect will be used to determine management strategies if a nest is found on the beach this year, or in years to come.

When to survey beaches:

- Surveying may begin in mid-April, when plovers are arriving in Ontario; they will be establishing territories and looking for mates.
- Early morning is when plovers are most active. Late afternoon is also an acceptable time to survey. Bands are easier to read in the early morning and later afternoon, with the sun behind you.
- Optimum weather is 15-25C. Avoid extreme temperatures, rain, and wind above 40km/hr.

What to bring:

- High quality optics; binoculars (8x40 or 10x50), and/or a spotting scope
- Ontario Piping Plover Nest Monitoring Form; provided by Birds Canada
- A GPS unit or compass
- A camera
- Appropriate clothing and lots of water

How to survey:

It is best to work in pairs. One person walks along the water's edge, and another person walks between the high water mark and the foredune. Walk parallel to the shoreline, slowly. Listen and watch for birds. You will often hear them before seeing them. If you are alone, walk down the middle of the beach, or walk along the water one way, and walk above the high water mark on the return trip. Use extra caution.

- Pay attention to the ground. Plovers make distinctive tracks in the sand. If you see an area where tracks become dense, stop immediately; look and listen for plovers in the area. Areas with dense tracks often lead to scrapes or nests. These are very difficult to see.
- Watch for flight displays and foraging along the shore. Refer to Page 10-12 of Piping Plover Volunteer Handbook for detailed descriptions of behaviours and common sounds.
- Fill out the data sheet as you walk; take notes of predators and human activities.

A nest may be present if:

- A Piping Plover is agitated enough to perform a broken wing display or make alarm calls
- Very dense tracks are present; they may converge around scrapes or nests
- A Piping Plover is sitting on the sand above the high water mark. Resting plovers will hold themselves differently from incubating plovers; it may take practice to tell the difference.

When a Piping Plover is observed or a nest is suspected, the person on the upper beach moves slowly away to join the person at the shore (always watching for nests while walking). Retreat at least 50m away from the bird, and observe it to make sure it resumes normal activities. If the bird does not resume normal activities, retreat an additional 25m. Use a spotting scope to observe plovers from a safe distance.

Never approach a suspected nest. You may attract clever predators, or you may step on the nest, as they are extremely well camouflaged.

As long as the birds show no sign of disturbance, observe them to confirm breeding behaviours:

- Courtship behaviours; flight displays, scraping, tilt display, goose stepping, copulation.
- Incubation; adults may rock from side to side as they settle on a nest, or they may switch incubation duties with their partner.
- Plovers may not be breeding; lack attachment to the area, flying away, foraging and preening, not attentive to humans or predators on the beach.

If you suspect breeding, **DO NOT report the sighting on eBird or other hotlines**. Protecting the nest is the first priority. Sharing the information publically may cause unnecessary disturbance and lead to nest abandonment.

If you observe a Piping Plover or a nest, report it immediately to Birds Canada and your Volunteer Coordinator (if relevant). If you are in a National or Provincial Park, inform Birds Canada and Park Staff.

Email: ontarioplovers@birdscanada.org

Phone: 519-586-3531 ext. 128

When reporting the sighting, you may be asked about:

- The number of adults and key characteristics to confirm correct identification
- The location from which the nest or plover was observed. Try to share a coordinate or compass bearing and approximate distance to the nest. Alternatively, use clear landmarks to describe the location (e.g. beach bathrooms, lifeguard posts, street names). Be as specific as possible.
- Key behaviours, breeding characteristics, number of eggs (if you were able to observe using a scope)
- Band combinations (if you were able to see them using a scope, or with a camera zoom lens)
- If you are leaving a message or sending an email, be sure to include your name and contact information and the time and date of the sighting.

Additionally, if you survey a beach and do not see Piping Plovers, please still report that information to ontarioplovers@birdscanada.org. Include your name, date and time of survey, and a detailed description or coordinates of the area surveyed. You may also fill out an Ontario Piping Plover Nest Monitoring Form; the data on this form will help us determine threats if plovers nest on the beach in the future.

Things to Remember

- Never approach a Piping Plover or their nest. It is OK if you cannot see bands, sex, or number of eggs.
- Do not interfere with nest site selection, even if you think they are choosing a poor spot. They will re-nest if necessary.
- If a Piping Plover ever reacts to your presence with a broken wing display, you are too close! Walk away slowly, while checking for nests as you walk.
- Do not publically share nest locations. On most beaches, nest locations may be shared after they've been protected with exclosures and perimeter fences. Remote nesting sites are never to be shared.