

# Consumption of amphibian prey by a Piping Plover

Glenn Coady

## Introduction

The Piping Plover (*Charadrius melodus*) is a small migratory shorebird species that breeds in a widespread but scattered and thin distribution on wide, sandy or cobblestone beaches on alkali flats, reservoirs, rivers, lakes, bays and the Atlantic coast of Canada and the United States (Elliott-Smith and Haig 2004). It nests exclusively in North America and overwinters in the southern United States, Mexico and some of the islands of the Caribbean. It is listed as an endangered species under Ontario's *Endangered Species Act, 2007*, Canada's *Species at Risk Act* and the United States' *Endangered Species Act*.

Among the many factors that influence population growth in Piping Plovers, habitat quality and the associated abundance of food resources have been shown to be significant determinants of reproductive success and annual survival rates (Loegering and Fraser 1995, Cohen *et al.* 2009). Despite the obvious importance of diet and food abundance to population recovery, the diet of Piping Plovers is still rather poorly studied. This is due, in part, to the

endangered status of the species placing restrictions on the collection of specimens or disturbance of live birds, resulting in difficulty in direct assessment of species' dietary choices (Elliott-Smith and Haig 2004). Necropsies of salvaged Piping Plover chicks in northern Michigan that died naturally of unknown causes showed that prey items consisted entirely of insects including Coleoptera, Diptera and Hymenoptera (Cuthbert *et al.* 1999).

Observational studies of birds foraging have shown a diet preference for arthropods and marine invertebrates (Elliott-Smith and Haig 2004). A study of plover fecal samples done on the Atlantic coast of Canada revealed prey items to be exclusively invertebrates consisting of scuds (Amphipoda), beetles (Coleoptera) and flies (Diptera) (Majka and Shaffer 2008). Neither of two of the leading researchers on Piping Plovers could recall a published or anecdotal reference to this species including vertebrate prey items in its diet (F. Cuthbert, pers. comm.; S. Haig, pers. comm.). The



This female Piping Plover was observed foraging on very small, newly emerged American Toads. *Glenn Coady*

purpose of this note is to describe an observation of an adult Piping Plover consuming a vertebrate prey item, specifically an American Toad (*Anaxyrus americanus*).

### **Observation**

On 25 July 2016, I was observing an adult female (Figure 1) and four juvenile birds at Darlington Provincial Park in Durham Regional Municipality, Ontario, when I noticed the adult female foraging at the back of a dune near a vegetated edge of the beach. From a distance, she appeared to be capturing small dark prey items that were jumping to evade her, giving me the initial impression of some type of cricket or beetle. However, when I approached the bird more closely, I could tell with binoculars that she was, in fact, capturing and consuming very small and newly emerged American Toads. Earlier that day, I had noticed a mass

emergence of them in the woods near the edge of the marsh at McLaughlin Bay. I observed the adult plover capture and consume three of these toads in rapid succession before it moved back down toward the juvenile birds to feed at the shoreline algae mats. I then found and captured a toad on the beach. I had little for reference to compare it with, but its length was slightly less than half the diameter of a dime (therefore, ca. 8 mm). These early stage toads seemed to be easily caught and dispatched by the plover. Pellet casting has not been described for the Piping Plover (Elliott-Smith and Haig 2004). I continued to observe this adult female for several more hours, but never saw any indication of it forming or casting a pellet. Presumably the plover digestive system is capable of dealing with a skeleton this small and pliable in similar fashion to larger arthropod exoskeletons.

## Discussion

My initial investigations led me to believe that I may have witnessed a novel occurrence of a Piping Plover consuming a vertebrate prey item. However, a recent note has been published on consumption of dead fish, specifically Bay Anchovy (*Anchoa mitchilli*), by Piping Plover chicks and adults nesting on New York barrier islands (Monk *et al.* 2016). In one case, these may have been dropped prey items from a nearby Least Tern (*Sterna antillarum*) colony. In other cases, the fish had washed up dead in the wrack line. Further study will be needed to determine if this was opportunistic foraging or whether plovers regularly consume small fish as a dietary item.

Similarly, the mass emergence of small toads might be nothing more than an opportunistic feeding event at a time when other prey items like midges (Chironomidae) are around in lower numbers than earlier in the season. Interestingly, this female lost its mate the day after its clutch of eggs hatched and had been a sole parent for close to a month at that point (Coady 2016), so perhaps the extra energy demands may have encouraged it not to pass up any potential available prey items. Additionally, two of the juvenile Piping Plovers at the site (one from each of two different nests) were found dead on this beach very late in the season (at 41 days and 48 days old). Necropsies indicated that both were emaciated and likely died of starvation, either due to inadequate food availability or secondarily to pathogens like botulism or salmonella. Their state of emaciation raises the questions of whether the habitat at Darlington offered low food abundance and if so, if that might explain the consumption of non-traditional prey items.

Recent advances in DNA analysis of avian fecal samples provide new non-invasive options for delineating a more complete picture of the variety of dietary items in shorebirds (Pompanon *et al.* 2011). Perhaps in the future, such studies will provide answers to the question of how commonly this species includes vertebrate prey in its diet. Conservation measures and beach maintenance practices that can serve to maximize invertebrate prey abundance in the beaches chosen by Piping Plovers for breeding will be enhanced by additional diet information.

  

# Peele Wings

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It remains to be determined how commonplace vertebrate prey selection is among Piping Plovers throughout their summer and winter range. This appears to be only the second published instance of Piping Plover selecting a vertebrate prey item and the first observation involving such a widespread and ubiquitous freshwater amphibian prey option.

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