



The Mysterious Life of Piping Plovers: Nesting Behaviors of a Threatened Species

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Introduction

- ◆ Piping Plovers (*Charadrius melodus*) are small federally threatened shorebirds that breed in North Dakota.
- ◆ Nesting habitat includes open shorelines, beaches, mud flats, and sparsely vegetated sandbars in the Northern Great Plains.
- ◆ This open nesting habitat makes plovers prone to human disturbances and destruction, flooding, and predation.
- ◆ Little is understood about nesting behaviors of Piping Plovers due to logistical challenges with monitoring.
- ◆ Cameras allow biologists to observe behaviors with less time spent at the nesting site.



Piping Plover nest



Adult Piping Plover



Suitable Piping Plover nesting habitat

Objectives and Hypotheses

The objectives of this study are to examine if and how various nesting behaviors exhibited by the two parents change throughout the day, including:

1. Frequency and duration of foraging events on and around the nest.
 - ◆ Hypothesis: Foraging occurs more in morning and evenings than afternoon.
2. Number of parental nest exchanges occurring at and near the nest.
 - ◆ Hypothesis: Nest exchanges occur more in morning and evenings than afternoon.
3. Duration of incubation versus absence from the nest.
 - ◆ Hypothesis: Absences from nest occur more frequently and for longer durations in morning and evening than afternoon.

Methods

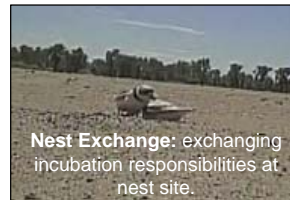
- ◆ Nests on the Upper Missouri River were monitored throughout the 2013 summer field season.
- ◆ Surveillance cameras were installed at 30 nests.
- ◆ For one nest, videos were viewed and behaviors were analyzed (16 days).
 - ◆ Examples of behaviors analyzed below:



Incubating: sitting on eggs



Absence: not incubating



Nest Exchange: exchanging incubation responsibilities at nest site.



Foraging: touching beak to sand to consume invertebrates.



On nest

Preliminary Results

Foraging:

- ◆ Piping plovers were foraging on the nest during the morning (0500 – 1100) and evening (1700 – 2300).
- ◆ Plovers foraged off the nest (still in the video frame) in the afternoon (1100 – 1700; Figure 1).

Nest Exchanges:

- ◆ Most nest exchanges observed on camera occurred during the afternoon (1100 – 1700; Figure 2).

Absences:

- ◆ Median time spent absent from the nest was similar throughout the day (Figure 3).

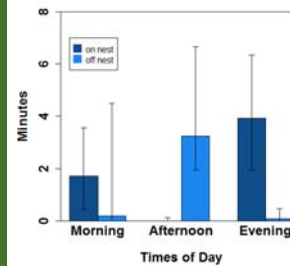


Figure 1. Median total time spent foraging throughout the day, with corresponding Q1 and Q3.

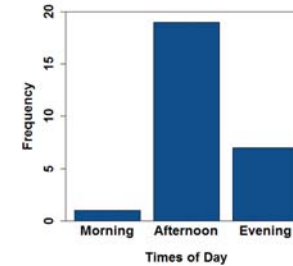


Figure 2. Frequency of nest exchanges observed on nest camera over 16 days of incubation.

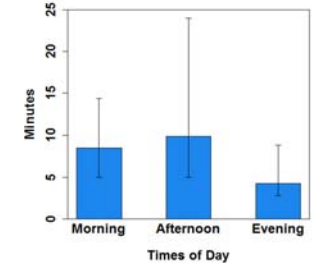


Figure 3. Median total time spent absent from nest throughout the day, with corresponding Q1 and Q3.

Discussion

- ◆ Pair exhibited different foraging and nest exchanges in the afternoon compared to the morning and evening.
 - ◆ Nest monitored was initiated early in the nesting season (late May – early June) when afternoon temperatures were moderate compared to later in the nesting season, which may have influenced nesting behaviors.
- ◆ Study Caveats:
 - ◆ Time required to evaluate behaviors resulted in small sample size.
 - ◆ Observations based on field of camera view, limiting knowledge of off-camera behaviors.
 - ◆ Inability to differentiate sex of parents on camera to explore differential parental investment.

Future Directions

- ◆ Continue video analysis and summer field data collection to increase sample size.
 - ◆ Streamline behavioral observations to increase efficiency of analysis.
- ◆ Examine temperature variation relative to behaviors.
- ◆ Examine relationship between nest defense and nest survival.

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