Wading Bird Colony Monitoring at Juno Dunes Rookery Using the Flight-line Method

---

Tove S. Rooney. EVR2940, Cooperative Work Experience, Environmental Science Technology, Palm Beach Community College. Instructor: Professor Jessica Miles. Spring Semester 2007

Abstract

Wading bird colonies were monitored at a rookery at Juno Dunes Natural Area from late January through April 2007. The rookery is located in a disturbed tidal swamp community which is designated by Palm Beach County Environmental Resources Management (ERM) as a restoration project. Among the factors considered in the restoration project are the effects on the wading bird rookery (ERM 1999).

The 2007 survey confirmed that the rookery is active. It also provided data that the rookery is used by wading birds that are designated by the Florida Fish and Wildlife Conservation Commission (FWCC) as species of special concern. To monitor the effects on the rookery and establish population trends and unusual declines (ERM 1999), systematic surveys of the wading bird population is needed. The flight-line method used in the survey may provide useful data and serve as a cost effective tool in monitoring the rookery, but needs further testing and improvement.

Introduction

A disturbed tidal swamp community at Juno Dunes Natural Area (Juno Dunes) has historically been used as a rookery for wading birds. The area is part of a 61 acre freshwater sawgrass marsh which was replaced by mangroves and exotic pest plants when drainage and mosquito ditching began in 1962. The tidal swamp area is designated by ERM as a restoration project, but requires further study to determine which of the area should be restored as a productive tidal swamp and which area should be restored to the original freshwater basin marsh. Among the factors ERM is considering in the basin marsh or tidal swamp restoration project is the effects on the wading birds rookery (ERM 1999). Another factor concerning the Juno Dunes rookery is that it is used by species of special concern (FWCC), which require special attention and management. A nest monitoring was conducted in 2005 and Cattle Egrets, Tricolor Herons, Snowy Egrets, and Little Blue Herons were found to nest at the rookery (Table 1). The Little Blue Heron and the Tricolored Heron are designated as species of special concern by FWCC. The monitoring was discontinued in May to avoid disturbance of the nesting activity. Spot checks were conducted in 2006, but I have no data available for that year.

In January 2007, I began my Cooperative Work Experience Internship with ERM. My assignment at ERM was to survey the wading bird colony at the rookery using the flight-line method. The purpose of the project was to determine peak nesting density and primary foraging flight directions and to establish baseline data for future wading bird

surveys at the rookery. I also reviewed studies conducted on nesting requirements for wading birds to determine if the rookery is suitable as a nesting site.

In this paper, I describe my findings from the wading bird colony survey. I then discuss the flight-line method and evaluate the rookery as a nesting site for wading birds.

Material and Methods

Study Area

Juno Dunes Natural Area is located in the Town of Juno Beach in Palm Beach and is part of the Palm Beach County Natural Area System. It is located between the Intracoastal Waterway and the Atlantic Ocean east and west of U.S. Highway 1 and north and south of Donald Ross Road. The natural area is managed by ERM and is one of several environmentally sensitive lands owned or leased by Palm Beach County (ERM 1999). The bird colony monitoring was conducted at a disturbed tidal swamp community east of US Highway 1 and south of Donald Ross Road in the western section of the Natural Area (Figure 1).

Historically, the tidal swamp community was part of large freshwater basin marsh system dominated by sawgrass. After drainage and mosquito-ditching of the marsh system in 1962, the basin marsh was replaced by other wetland communities such as tidal swamps. The drainage and mosquito-ditching caused saltwater intrusion and killed most of the sawgrass and other vegetation associated with basin marsh. Sawgrass has been replaced by mangroves where ground elevation is low enough to permit flooding. A 0.3 acre pond (Figure 2) is situated in the middle of the community and the white mangrove surrounding the pound has historically been used as a rookery (ERM 1999).

The flight-line method

The flight-line method was used to monitor wading birds flying to and from the study area. The flight-line method (Erwin 1981) requires one or two observers to monitor and count the number of birds flying to or from colonies over a period of one to several hours. Previous studies using the flight-line have provided valuable data of wading bird populations without disrupting nesting colonies. When using this method, a total nest count or sampling method is taken to establish a relationship between the number of flights per hour and the number of active nests in the colony (Erwin 1981). Major flight pathways used by the wading birds should be established before making flight-line counts. When the pathways are determined, an observer must be posted in each pathway (Dusi and Dusi 1987).

The flight pathways were not established beforehand, as part of this study was to determine primary foraging flight directions. Erwin (1984) assumed flight directions by birds flying in and out of colonies represent the direction taken to feeding locations. Wading birds may change course after departing from the colony and should be observed for at least 100 m. before establishing their true course (Erwin 1984).

Wading bird colony monitoring at Juno Dunes

I was positioned at the edge of the colony, about 400 ft away from the rookery. From January 30 to March 15, 2007, one to two hour observations were made twice weekly during morning and evening. The morning observations would start at sunrise and the evening observations 1-½ hours before sunset. From March 15 to April 19th, I conducted one morning observations weekly starting 15 – 30 minutes before sunrise. The flight directions were recorded estimating eight main cardinal directions: N, NE, E, SE, S, SW, W, and NW. Number of birds, species, and flight directions were recorded on a data sheet (Table 2).

Results

Wading bird colonies were monitored weekly from January 30th to April 19th, 2007, at Juno Dunes rookery using the flight-line method. A nest count monitoring in 2005 confirmed that wading birds were using the rookery that year (Table 1). The 2005 monitoring established that nesting began in early April with peak nesting beginning early May through July, 22, when observations were discontinued to avoid disturbing the colony. A total of 50 nests were counted on July 22nd, 2005. Cattle Egrets accounted for an estimated 30%, and Tri-colored Herons, Snowy Egrets, and little Blue Herons accounted for the remaining 70%.

During my observations in 2007 using the flight-line method, I recorded 87 individuals of 5 species of wading birds, with a mean count of 33 individuals per count (Table 2). I observed Great Egrets, Little Blue Herons, Great Blue Herons, Cattle Egrets, and Tricolored Herons (Table 2). Little Blue Herons and Great Egrets were the dominant species. The wading birds began arriving at the rookery in late March. This data coincide with the 2005 data where roosting and some nesting began in early April. I attempted a nest count on April 19, but extremely dense vegetation restricted my view of the rookery. I did, however, observe 11 Little Blue Herons and 1 Cattle Egret roosting.
My observations were discontinued April 24, 2007, which marked the end of the school semester. Although I was not able to establish peak nesting activity due to time constraints and inaccessibility to the rookery, the results did establish data that the Juno Beach rookery is still active and used by wading birds.

Discussion

The rookery at the Juno Dunes is located in a disturbed tidal swamp community that is designated by ERM as a restoration project. Further study is needed to decide whether the area should be restored as a productive tidal swamp or returned to the original freshwater basin marsh. Among the factors ERM is considering is the effect the restoration will have on the rookery. The 2005 monitoring confirmed that the rookery was used as a nesting site. Due to time constraints, the 2007 study was discontinued before the active nesting season began, but wading birds were observed using the rookery beginning in late March. Results from both surveys confirmed that the rookery is active and used by wading birds and provides useful data for future management and restoration

projects. The results also verify that two species listed by FWCC as species of special concern are using the rookery and require special attention and management. The two species are Little Blue Heron and Tricolored Heron.

Nesting Requirements of Wading Birds

The rookery at Juno Dunes contains many of the basic requirements needed by wading birds for reproduction. Hafner (1997) note that different species of wading birds vary in their habitat preferences, diet and behavior, but share certain fundamental requirements during reproduction.

A fundamental nesting requirement for wading birds is a security zone from land predators such as raccoons and rats (Hafner 1997). The preferred nesting site for many species of wading birds is islands where water provides the natural security zone. Protection can also be provided by extensive areas of barriers and dense undergrowth (Hafner 1997). The Juno Dunes rookery is not situated on an island and lacks the security zone provided by surrounding water. However, the vegetation surrounding the 0.3 acre pond is high with dense undergrowth and may provide an adequate security barrier from land predators. It has also been suggested that alligators may deter terrestrial predators and that a mutual benefit for alligators and wading birds coexist at colonies (White et al 2003). Two alligators have been previously recorded by ERM employees and I observed one large alligators when attempting a nest count on April 19th.

Another important nesting requirement is protection from human disturbance. Some wading birds are more impacted by disturbance during breeding season than others. If disturbed early in the season, birds may abandon nesting completely. If birds are disturbed later in the breeding season it can result in abandonment of eggs and nestlings, which in turn increases predation or result in premature fledging (White et al 2005). Rodger and Smith (1995) recommend buffer zones or set-back distances of at least 100 m. (328 ft) and should be based on the most sensitive species in the colony (Rodger and Smith 1995). The Juno Dunes rookery is 600 ft from the closest residential area and well within the recommended 100 m (328 ft) set-back distance. The rookery is also buffered by dense vegetation which makes it almost inaccessible to humans. ERM has also protected the rookery further by routing hiking trails away from its location and limited management activities around the rookery during the nesting season from February to August (ERM 1999).

Using the Flight-line Method

The flight-line data has provided previous data of wading bird populations without disrupting nesting colonies. Dusi and Dusi found the method useful for smaller colonies (50 to 100 nests) and encountered little difficulty during surveys. When comparing the flight-line method to other survey techniques for wading birds, it is low-cost and provides reasonable estimates of nesting colonies. It is recommended that a nest count is completed in conjunction with the flight-line count, but it was not completed in this study due to time limitations.

Although the flight-line method used in this study was incomplete, I found it useful in establishing data that the rookery is still active and used by wading birds. It also

established a time frame when wading birds arrived at the rookery and which species of birds are using the rookery. It also gave insight into primary foraging flight directions and what time of day is most suitable for observations. I found that morning flight-line observations are best suited at the Juno Dunes rookery. Evening flight-line counts were difficult primarily because the observer must face west where the sun is setting which hinders the use of binoculars. Morning observations should begin 15 minutes before sunrise. I found wading birds would start departing the colony 10 to 15 minutes before sunrise and peak activity would last for 30 to 40 minutes. All 8 cardinal flight directions were used by the wading birds, but the primary flight directions were west and northwest. The least used flight direction was eastward. I did observe several birds change course after departing the colony, which concur with Erwin (1984) who noted that birds should be observed for at least 100 m. before establishing their true course.

An important factor when using the flight-line method is to interpret changes in numbers of flights throughout the breeding season. When nesting season progresses, young that fly may become part of the foraging flight and would account for the increase in counts later in the season. Observations of Cattle Egrets have found this to be true. The opposite has been found in Little Blue Herons who may leave the colony and disperse after their active nesting season, which would explain a decrease in their numbers (Dusi & Dusi)

Conclusion

Systematic surveys are needed to track population trends and monitor the rookery at Juno Dunes Natural Area. Surveys conducted in 2005 and 2007 confirm that the rookery is active and used by wading birds. These surveys also confirmed that species of special concern are using the rookery, including Little Blue Heron and Tricolored Heron. The flight-line method used in the 2007 survey provided data that the rookery is being used, but did not assess the quantity of nests at the rookery. If used systematic, it may be a valuable tool in the management of the rookery. It is cost effective and practical and can be completed with the assistance of volunteers from the community or students completing internship programs. Further testing and improvement of the method is necessary to evaluate its usefulness.

Acknowledgement

I would like to thank Ginny Powell from Palm Beach County Environmental Resources Management for her support and guidance throughout the project. I am also grateful to Michael Cheek, Melissa Tolbert, and Barbara Bobsein from Palm Beach County Environmental Resources Management for assisting me with the wading bird monitoring. I would also like to thank Professor Jessica Miles for helping me complete my Cooperative Work Experience with Palm Beach County Environmental Resources Management.

References

Dusi, Julian L.; Dusi, Rosemary D. “Survey Methods Used for Wading Bird Studies in Alabama”. Alabama. Date unknown.

Palm Beach County Department of Environmental Resources Management; The Institute for Regional Conservation; The Nature Conservancy. “Management Plan for Juno Dunes Natural Area”. West Palm Beach, Florida (December 1999)

Erwin, R. Michael.”Censusing wading bird colonies; An update on the ‘flight-line’ count method”. Colonial Waterbirds; journal of the Colonial Waterbird Group. Volume 4, (1981): 91-95

Erwin, R. Michael.”Feeding Flights of Nesting Wading Birds at a Virginia Colony”. Colonial Waterbirds. Volume 7, (1984): 77-76

Hafner, Heinz. “Ecology of Wading Birds”. Colonial Waterbirds. Volume 20, No. 1. (1997), pp 115-120.

McCrimmon Jr., Donald A.; Fryska, Slawomir T.; Odgden, John C., Butcher, Gregory S. Nonlinear Population Dynamics of Six Species of Florida Ciconiiformes Assessed by Assessed by Christmas Bird Counts”. Ecological Applications. Volume 7, No. 2 (May 1997), pp. 581-592. http://links.jstor.org 2 March, 2007

Nellis, David W. Common Coastal Birds of Florida & The Caribbean. Pineapple Press, Inc., Sarasota, Florida, 2004.

Rodgers Jr., James A.; Smith, Henry T. Set-Back Distances to Protect Nesting Bird Colonies from Human Disturbances in Florida. Conservation Biology . Volume 9, No. 1, 1995.

White, C. Leann; Frederick, Peter C.; Main, Martin B; Rodgers Jr., James A. “Nesting Island Creation for Wading Birds”. University of Florida/IFAS extension. 2005. <http;//edis.ifas.ufl.edu/UW223>. 11 Jan. 2007