

**Status of the bald eagle (*Haliaeetus leucocephalus*) breeding population in Florida,  
2009-2014**

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## **Introduction**

The recovery of the bald eagle (*Haliaeetus leucocephalus*) in the past 45 years represents one of the great conservation success stories in history. Populations across the range of the bald eagle continue to increase steadily and surpass both state and federal recovery goals (Saalfield et al. 2009, Smith et al. 2016, Stinson et al. 2007, Watts et al. 2008, U.S. Fish and Wildlife Service [USFWS], 2016). Florida supports one of the largest breeding populations of bald eagles in the continental United States, and consistently high reproductive success of Florida's bald eagle population has allowed for population expansion into neighboring states (USFWS 1989). The Florida Fish and Wildlife Conservation Commission (FWC) staff and others have monitored the bald eagle reproductive population in Florida since 1972. The information gathered during the past 45 years includes the locations of thousands of eagle nests and nesting territories, breeding productivity rates, identification of core nesting areas, reproductive success rates, and population trends. The monitoring program has yielded critical information documenting the recovery of eagles in Florida. This information was also significant in evaluating Florida's eagle population as part of the biological status assessment leading to the removal of eagles from the Florida Endangered and Threatened Species List (Sullivan et al. 2006).

The goal of the FWC Bald Eagle Management Plan (BEMP, April 2008) is "to establish conservation actions that will maintain a stable or increasing population of bald eagles in Florida in perpetuity." Four quantifiable conservation objectives are established in the BEMP to measure progress toward that goal: 1) Maintain a minimum of 1020 active territories per year over the next 24 years (*i.e.*, through 2032), 2) Maintain an average of 68% of the active territories producing  $\geq 1$  nestling per year, 3) Maintain an average reproductive success of  $\geq 1.5$  fledglings per successful nest over 5 years, and 4) Maintain the current area of occupancy ( $>770$  mi<sup>2</sup>), and extent of occurrence (52,979 mi<sup>2</sup>) of bald eagles statewide (FWC 2008). The 2008 BEMP provides detailed information on how each of these conservation objectives was developed. Since the adoption of the BEMP in 2008, 6 years of additional statewide monitoring data (2009-2014) were collected. These data demonstrate that bald eagles continue to meet or exceed each of the 4 conservation objectives from the 2008 BEMP.

## **Monitoring Strategies**

A statewide survey of all known bald eagle nesting territories was conducted annually from 1972–2008 (Nesbitt et al. 1990). Nesting territories are defined as the area associated with 1 breeding pair of bald eagles that contains 1 or more nests (FWC 2008). Due to the growth of the statewide population during this period, it was no longer feasible or cost-effective to survey every nest in the state every year. Therefore, in 2009, FWC implemented a new survey protocol based on a stratified sampling method with coverage of 1/3 of the known nesting territories in the state each year. Active territories show or showed evidence of breeding by bald eagles, such as an adult attending the nest or in incubating position, a clutch of eggs, or a brood of nestlings, at any time during the current or most recent nesting season (FWC 2008). A subset of the surveyed active nests was then revisited to estimate annual statewide productivity. Using these data, an extrapolated population estimate was derived via a model-based approach that combined a current year's data with that collected during the preceding 35 years of occupancy and productivity surveys. Any reported new nests were checked, and in some years, previously unknown nesting territories were located by surveying areas in suitable habitat not previously surveyed. All nesting and productivity data collected was compiled annually and analyzed to

interpret population trends. FWC staff completed 2 surveys of the entire state in the 6-year period of this subsample protocol.

### Assessment of Conservation Objectives from the 2008 FWC Bald Eagle Management Plan

- 1. Maintain a minimum of 1,020 active territories per year over the next 24 years (*i.e.*, through 2032).**

Bald eagles have exceeded the threshold of 1,020 active territories since 1999, 10 years prior to the species' removal from the Florida Endangered and Threatened Species List in 2008 (Figure 1). The number of active territories appears stable or slightly increasing over the last 5 years (Figure 1). The most recent estimate of the number of active territories from the 2013-2014 statewide survey was 1,499 (+/- 21) (Brush et al. 2015).

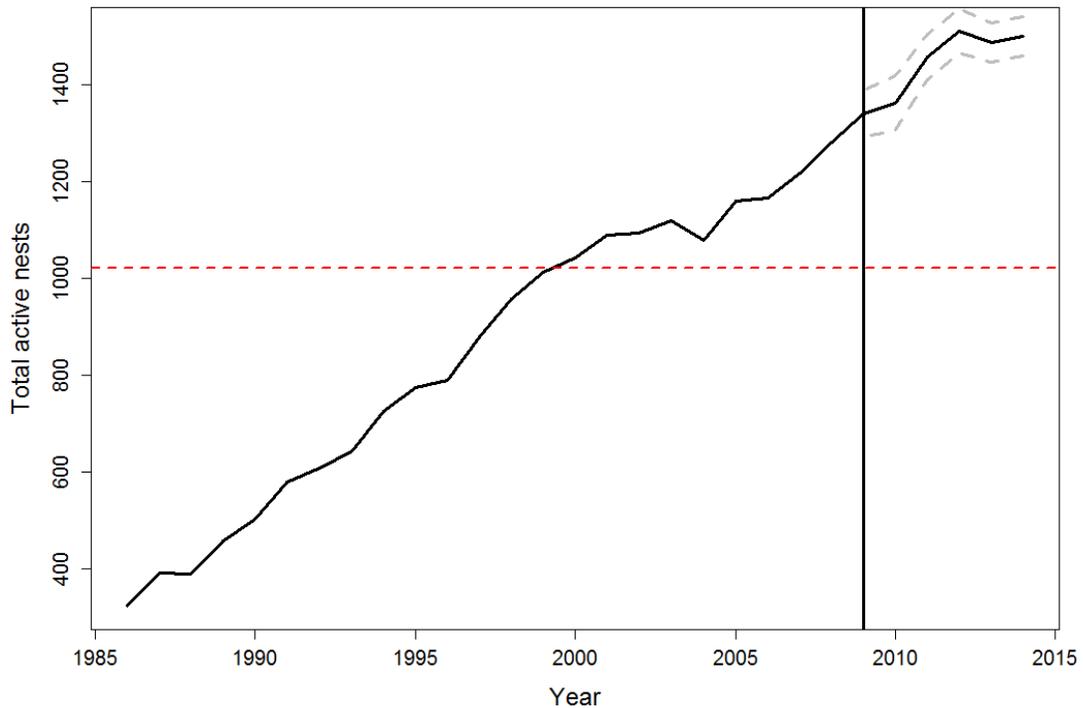


Figure 1. The number of active bald eagle nest territories in Florida from 1986 to 2014. The number of active territories from 2009 to 2014 were estimated (with confidence limits shown) from a subset of all known nest territories. The BEMP was adopted in 2008 and the first bald eagle nesting season after its adoption, 2009, is shown as a black vertical line. The Objective 1 threshold of 1,020 active territories is shown as a horizontal dashed red line.

- 2. Maintain an average of 68% of the active territories producing  $\geq 1$  nestling per year.**

The proportion of successful nests appears to have declined slightly over the past 6 years, but it is not a statistically significant trend. The ratio of successful nests has not fallen below the objective threshold since it was set (Figure 2).

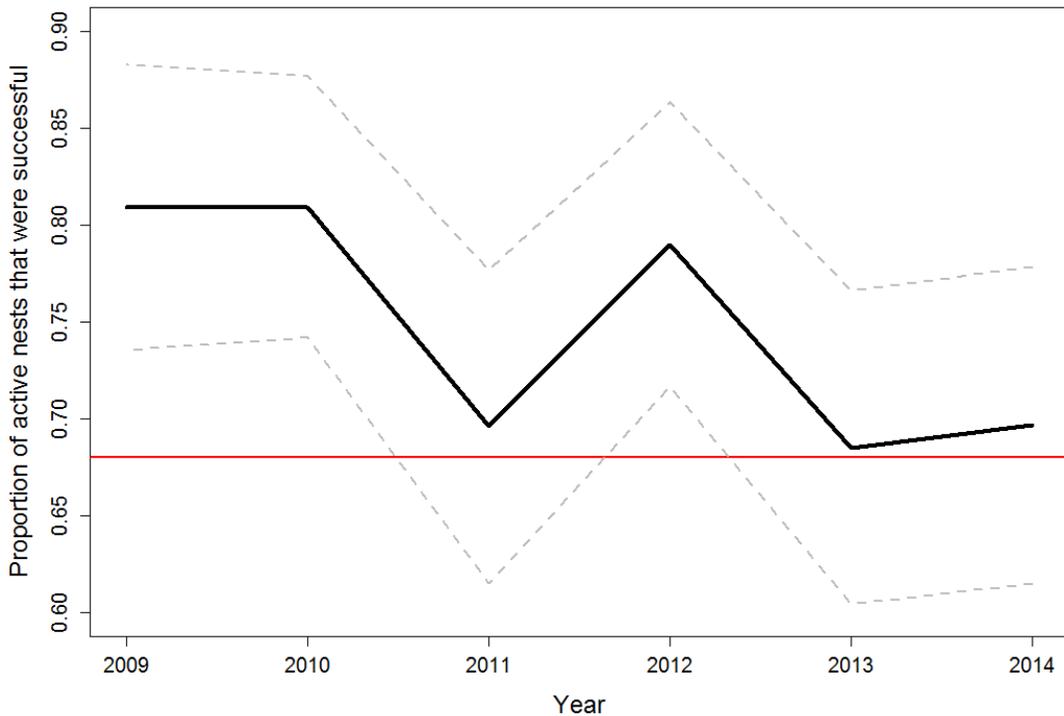


Figure 2. The proportion of successful bald eagle nests (producing  $\geq 1$  fledgling) to total active nests with confidence limits from 2009 to 2014. The Objective 2 threshold of 0.68 (68%) is shown as a red line.

**3. Maintain an average reproductive success of  $\geq 1.5$  fledglings per successful nest over 5 years.**

*(Note: The 2008 BEMP incorrectly refers to average reproductive success in terms of fledglings per active nest instead of fledglings per successful nest because of a transcription error. FWC has always used the latter metric for this conservation objective, so we report that here.)*

A successful nest produces at least 1 fledgling in a given year (FWC 2008). Throughout Florida, the number of fledglings per successful nest annually has not fallen below the objective threshold and has remained stable over the 6-year period from 2009-2014. The most recent 5-year average of fledglings per successful nest was 1.54, which is above the objective of 1.5 fledglings per successful nest and identical to historical averages (1.54 fledglings per successful nest during 1973 – 2004; FWC 2008).

**4. Maintain the current area of occupancy of >770 mi<sup>2</sup> and extent of occurrence of 52,979 mi<sup>2</sup> of bald eagles statewide.**

The area of occupancy is defined as the smallest area of suitable habitat essential at any stage to the survival of bald eagles in Florida, based on the presumption that each active nesting territory contains 0.62– 1.24 mi<sup>2</sup> (Sullivan et al. 2006). Using the smallest (and thus most conservative) estimate of bald eagle territory size (0.62 mi<sup>2</sup>), the area of occupancy (906 mi<sup>2</sup>) exceeds the BEMP objective of >770 mi<sup>2</sup> (Figure 3).

The extent of occurrence is defined as the area contained within a minimum convex polygon encompassing all known nesting territories. The current extent of occurrence of 53,875 mi<sup>2</sup> exceeded the BEMP objective of 52,979 mi<sup>2</sup> (Figure 3).

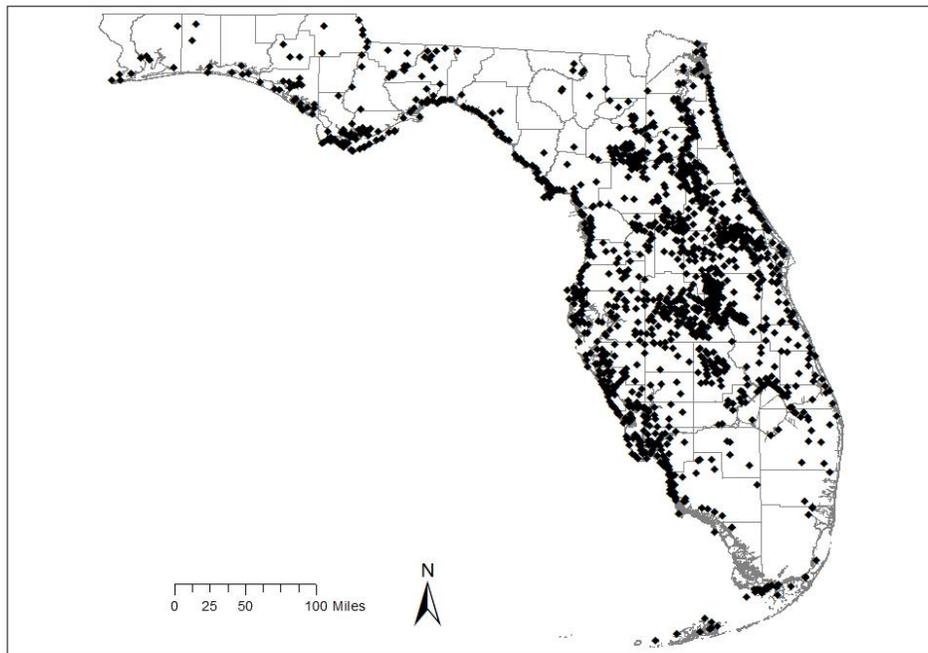


Figure 3. The distribution of active bald eagle territories (shown as black diamonds) in Florida, 2012-2014.

**Conclusion**

The Florida bald eagle population has met or exceeded all 4 of the conservation objectives identified in the FWC Bald Eagle Management Plan since the species was removed from the state list of imperiled

species. All evidence indicates that the breeding population of eagles in Florida remains stable or growing. The bald eagle population's growth over the past 45 years has occurred despite substantial concurrent habitat conversion associated with human population growth, which is consistent with their known propensity to habituate to (Guinn 2013), and thrive in (Millsap et al. 2004) human-dominated landscapes. The current trajectory of the population and productivity metrics listed in this document, coupled with the species' demonstrated resilience to land-use change in Florida, suggest that Florida's bald eagle population continues to be secure.

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