

Osprey Biological Status Review Report

October 27, 2017



FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION
620 South Meridian Street
Tallahassee, Florida 32399-1600

**Biological Status Review Report
for the Osprey
(*Pandion haliaetus*)
(Monroe County population only)
October 27, 2017**

EXECUTIVE SUMMARY

The Florida Fish and Wildlife Conservation Commission (FWC) directed staff to evaluate all species listed as Threatened or Species of Special Concern in 2010 that had not undergone a status review in the past decade. The [2011 evaluation](#) found that the osprey (Monroe County population) met multiple listing criteria. After considering reviewers' comments, information received from the public, and the Biological Review Group (BRG) findings, staff concluded that additional information was needed about geographic extent and genetic uniqueness of the southern coastal osprey; staff therefore recommended that the osprey (Monroe County) be maintained as a Species of Special Concern until additional data could be collected. A [Species Action Plan](#) for the osprey (Monroe County) was developed in 2013 and the species was included in the [Imperiled Species Management Plan](#), finalized in 2016. The ISMP identifies the need to re-assess all remaining Species of Special Concern by 2017. In 2017, FWC initiated the request to re-evaluate the osprey (Monroe County).

Public information on the status of the osprey was sought from May 10 to June 26, 2017. No information was received from the public during our information request period. The five-member BRG met on August 16, 2017. Group members were Tim Dellinger (FWC lead), Rebecca Kimball (University of Florida), Michael McMillian (Highlands County Natural Resources), Karl Miller (FWC), and Lori Oberhofer (Everglades National Park) [Appendix 1]. In accordance with rule 68A-27.0012, Florida Administrative Code (F.A.C.), the BRG was charged with evaluating the biological status of the osprey (Monroe County population only) using criteria included in definitions in 68A-27.001, F.A.C., and following the protocols in the *Guidelines for Application of the IUCN Red List Criteria at Regional Levels Version 4.0* and *Guidelines for Using the IUCN Red List Categories and Criteria (Version 13)*. Please visit <http://myfwc.com/wildlifehabitats/imperiled/listing-process/> to view the listing process rule and the criteria found in the definitions.

The 2017 BRG evaluated the osprey (Monroe County) based on historical data and recently collected information on genetics. They noted in their biological assessment that Monroe County osprey, when considered at only the county level, met at least one listing criterion. In the Regional Assessment, however, the group concluded that Monroe County osprey are not genetically distinct from osprey elsewhere in Florida based on results from a recent study (Dellinger et al. 2016). FWC staff recommends Monroe County osprey be removed as a Species of Special Concern from Rule 68A-27.005, F.A.C. as the subpopulation is not distinct and the overall Florida population is stable or increasing.

FWC staff gratefully acknowledges the assistance of the biological review group members and peer reviewers. Staff also would like to thank Terry Doonan for providing guidance with IUCN criteria and Emily Evans for assistance in documenting the meeting.

BIOLOGICAL INFORMATION

Life History References – Poole (1989), Ogden (1996), Snyder (2001), Florida Fish and Wildlife Conservation Commission (2003), Martell et al. (2004), Bierregaard et al. (2016).

Taxonomic Classification – There are generally four recognized subspecies of osprey (Bierregaard et al. 2016): *Pandion haliaetus carolinensis* (North America), *P. h. ridgwayi* (portions of Cuba, portions of the Bahamas, and the coast of southeastern Mexico and Belize), *P. h. haliaetus* (Eurasia), *P. h. leucocephalus* (Australia and southwestern Pacific; formerly *P. h. cristatus*). Osprey breeding in coastal southern Florida (i.e., Monroe and Collier counties) are believed to be non-migratory residents (Poole 1989, Ogden 1996, Houghton and Rymon 1997). Experts have suggested that osprey in Monroe County, Florida are taxonomically affiliated with *P. h. ridgwayi* (J. Ogden, *personal communication*; S. Bass, *personal communication*) because of their physical similarities (e.g., smaller size, pale plumage), and their non-migratory status. Recent analysis, however, suggested *P. h. carolinensis* and *P. h. ridgwayi* may not be genetically distinct (Monti et al. 2015).

Geographic Range and Distribution – The osprey is widely distributed in North America and highly migratory at higher latitudes. Most North American osprey winter in South and Central America (Lott 2006, Bierregaard et al. 2016), with the exception of some non-migratory individuals in Florida, southern California, and the Baja peninsula (Bierregaard et al. 2016, M. McMillian, *personal communication*). In south Florida, a non-migratory resident subpopulation has been well documented and extensively studied in Florida Bay, the southern Everglades, and the Florida Keys (Bass and Kushlan 1982, Kushlan and Bass 1983, Fleming et al. 1989, Poole 1989, Ogden 1996). In addition to non-migratory breeders in Florida and migratory breeders elsewhere in Florida, osprey breeding at more northern latitudes also migrate through, and sometimes winter in, the Florida peninsula (Martell et al. 2004, Lott 2006).

Population Status and Trend – Bierregaard et al. (2016) estimated the 2001 osprey population in the United States (excluding Alaska) at approximately 16,000–19,000 pairs and obviously increasing. Among the contiguous 48 states, Florida, Maine, Virginia, and Maryland have the largest osprey populations (Houghton and Rymon 1997, Bierregaard et al. 2016). Florida's population was estimated at 2,500–3,000 pairs in 1994 (M. Westall, unpublished data cited in Houghton and Rymon 1997) and has likely far surpassed that now. Lake Istokpoga in Highlands County and Blue Cypress Lake in Indian River County have some of the highest nesting densities ever documented for the species. Each have had greater than 300 nests annually during the last two decades (M. McMillian, *personal communication*). Overall osprey are common in Florida and breeding pairs occur along both the Atlantic and Gulf of Mexico coasts, and in the central lakes region of the state (Florida Fish and Wildlife Conservation Commission 2003).

In contrast, the resident Monroe County osprey subpopulation saw a steep decline over three decades. The number of breeding pairs in Florida Bay was reported as stable in the late 1960s and early 1970s (Ogden 1977), but a decline of 58% was observed from 1973 to the early 1980s (Kushlan and Bass 1983). The decline continued from 136 pairs in 1980 (Kushlan and Bass 1983) to 60 pairs in 2007 (S. Bass, *unpublished data*), a 56% decline over a 27-year period. During the same time period osprey also declined in the lower Florida Keys (T. Wilmers,

personal communication). Although the population is not stable, recent count data in Florida Bay indicate an increase in osprey pairs from 60 in 2007 to 88 pairs in 2017 (L. Oberhofer, *personal communication*). Because data accumulated over many decades show Florida Bay consistently accounts for 50–70% of the Monroe County population (S. Bass, *unpublished data*), the BRG conservatively estimated the county-wide population at 150–200 pairs.

Quantitative Analyses – There have been no population viability analysis for osprey in Florida.

BIOLOGICAL STATUS ASSESSMENT

Threats – Use of persistent organochlorine pesticides, particularly DDT, from the late 1940s to early 1970s resulted in bioaccumulation in prey fish and transfer to osprey. Sub-lethal effects included thinning of egg-shells, reduced breeding productivity and subsequent population declines. The osprey population has responded positively since the banning of these chemicals and is increasing throughout most of North America. Currently, there is concern regarding exposure to heavy metals, especially methyl mercury, due to biomagnification in prey items. Mercury has been measured in tissues of juvenile and adult osprey from Florida Bay at levels associated with reduced reproductive success (Lounsbury-Billie et al. 2008, Rumbold et al. 2017). Nestlings in Monroe County had higher mercury concentrations than nestlings from the rest of Florida (Rumbold et al. 2017). Osprey productivity is closely tied to prey abundance, and productivity declines have been associated with reduced fish supplies (Bowman et al. 1989, Fleming et al. 1989). Osprey in Florida Bay (Monroe County) have been declining during the last several decades, possibly because of food stress (Kushlan and Bass 1983, Bowman et al. 1989).

Other causes of mortality, both within and outside of Florida, are collisions with objects (Poole and Agler 1987, Deem et al. 1998), increased interspecific competition with bald eagles (Ogden 1975, Ewins 1997), nest predation by raccoons (Fleming et al. 1989, Ewins 1997) or potentially Burmese pythons (L. Oberhofer, *personal communication*), and losses resulting from adverse weather in breeding areas or along migration routes. Available information suggests the resident, southern coastal Florida osprey subpopulation is mostly contained within Monroe County where it is vulnerable to hurricane events both because of its location and its restricted range. However, the osprey subpopulation in Monroe County nests during the early winter, several months after the season when tropical weather events occur.

Osprey have proven to be relatively tolerant of human disturbance when sensitized (Rodgers and Schwikert 2003) and also have been able to effectively exploit artificial nesting sites, such as channel markers, utility poles, and nesting platforms (e.g., Schreiber and Schreiber 1977). Osprey in the Florida Keys now may be largely dependent on such artificial structures, and it is vital that they be retained.

Population Assessment – Please refer to the Biological Status Review Information Findings Table for the findings by the BRG. The BRG concluded that the osprey (Monroe County population only) met criteria for Population Size and Trend (C1 and C2) and Population Very Small or Restricted (D1).

Regional Assessment of Subpopulations – Please refer to the Biological Status Review Information Table for the regional assessment of the BRG. Although the Monroe County osprey met criteria in the population assessment initial finding, the BRG concluded that the subpopulation could experience significant immigration. The Regional Assessment therefore, indicates that a less imperiled status may be appropriate.

The geographic extent of the resident population in southern coastal Florida is unknown. Non-migratory, resident osprey have been well studied only in Florida Bay, the southern Everglades, and the Florida Keys, which are primarily or entirely within Monroe County (Kushlan and Bass 1983, Fleming et al. 1989, Ogden 1996). Non-migratory resident status of osprey has been observed locally with less frequency north of Monroe County (M. Westall, *personal communication*; Martell et al. 2004). Thus, non-migratory behavior appears to be clinal, occurring in the peninsula with less frequency as latitude increases, making it difficult to assign geographical bounds or limits. Moreover, regardless of whether non-migratory status were to end gradually (i.e., as evidence suggests) or abruptly north of Monroe County, osprey are distributed throughout the southern peninsula and no local population can be considered spatially isolated.

Osprey that breed in northern Florida and elsewhere in the eastern United States also migrate through, and sometimes winter in, southern Florida (Martell et al. 2004, Lott 2006). Thus, osprey that are resident along the southern coast of Florida may regularly encounter seasonal immigrants for as much as ≥ 6 months of the year (Poole et al. 2002). It is unknown whether osprey dispersing from their natal areas in central or northern Florida form pair bonds with osprey in southern coastal Florida with any frequency, but ample opportunity exists for mixing. Limited telemetry data from osprey banded in peninsular Florida (Martell et al. 2004) revealed a wide variety of non-breeding season movements and strategies, including east-west seasonal migration within the southern peninsula. Similarly, band return data from Monroe County osprey nestlings show that they move widely within the state as 11% of bands were recovered >320 km from their fledging site (BBL; USGS Bird Banding Laboratory 2017; for data: <http://www.pwrc.usgs.gov/BBL/homepage/datarequest.cfm>).

New genetic analysis indicates that Monroe County osprey are not a distinct subspecies (Dellinger et al. 2016). Landscape genetic analysis based on genetic markers did not identify significant subpopulation structure related to latitude or to nesting phenology in osprey nesting in Florida. This finding is consistent with continental-scale analyses, which found little or no genetic structure among osprey populations (Monti et al. 2015, Viverette 2016). Although sample sizes were small, Monti and colleagues (2015) found shared mitochondrial DNA haplotypes between Caribbean samples and samples from the United States, suggesting that *P. h. carolinensis* and the non-migratory *P. h. ridgwayi* may not be genetically distinct.

Although monitoring is not being conducted annually, available data suggest that the Monroe County osprey population is no longer in steep decline (L. Oberhofer, *personal communication*; K. Watts, *personal communication*). Sixty breeding pairs were estimated in Florida Bay in 2007, and a decade later 88 breeding pairs are estimated to use the Bay based on aerial surveys (L. Oberhofer, *personal communication*). Efforts are being made to improve habitat quality in Florida Bay through the [Comprehensive Everglades Restoration Plan](#). This plan provides a framework and guide to restore and protect the water resources of central and

southern Florida, including Florida Bay. With the potential large foraging and nesting area available to osprey in Monroe County, both in Florida Bay and the Keys, the Species Action Plan (FWC 2012) is in place to offer guidance to help restore a more robust population.

LISTING RECOMMENDATION

Based on the BRG findings, the regional assessment, and the recently collected genetic information, FWC staff recommends that the osprey (Monroe County) be removed from the Species of Special Concern list (68A-27.005, F.A.C.) in Florida.

SUMMARY OF THE INDEPENDENT REVIEWS

Independent scientific review of the biological assessment was sought and received from 5 scientists. All 5 agreed that the osprey (Monroe County population) did not meet the criteria for listing as a Threatened species. Several reviewers mentioned the need for continued monitoring of osprey in Florida Bay, and based on the limited survey data, the BRG members also noted in their discussion the need for continued monitoring. Staff will address this concern through the revision of the Species Action Plan; monitoring may incorporate ground or aerial surveys and citizen science. One reviewer noted that road surveys may underestimate the number of birds present in Florida Bay, and the text of the report has been edited to clarify that data are from aerial surveys. One reviewer noted that it was unclear what data are available to indicate that the Monroe County population of osprey are still in decline. The Biological Review Group discussed the limitations of the survey data, and the limited subset of available data from Florida Bay that references a slight increase from 2007 to 2017. Based on BRG member's knowledge of the species in other parts of Monroe County, they felt that there was still a decline but could not quantify the level of decline; the assumption that declines were occurring did not alter the final listing decision. Staff concur with the reviewer that data from the Breeding Bird Survey may be one method to assess trend, and will address the feasibility of this in the Species Action Plan. During incorporation of reviewer comments, staff noted that the Additional Notes section was not included in the peer review version. The Additional Notes include conclusions and assumptions made by the BRG, and has been incorporated into this version.

The complete scientific reviews are provided in Appendix 3. Staff of the FWC gratefully acknowledge the assistance of the members of the Biological Review Group and of the Independent Reviewers.

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Biological Status Review Information
Findings

Species/taxon: Osprey (*P. haliaetus*; Monroe Co. population only)

Date: 08/16/17

Assessors: T. Dellinger, R. Kimball, M. McMillian, K. Miller,
L. Oberhofer

Generation length: 6-7 years

Criterion/Listing Measure	Data/Information	Data Type*	Criterion Met?	References
*Data Types - observed (O), estimated (E), inferred (I), suspected (S), or projected (P). Criterion met - yes (Y) or no (N).				
(A) Population Size Reduction, ANY of				
(a)1. An observed, estimated, inferred or suspected population size reduction of at least 50% over the last 10 years or 3 generations, whichever is longer, where the causes of the reduction are clearly reversible and understood and ceased ¹			N	
(a)2. An observed, estimated, inferred or suspected population size reduction of at least 30% over the last 10 years or 3 generations, whichever is longer, where the reduction or its causes may not have ceased or may not be understood or may not be reversible ¹	Data from last four decades show Florida Bay consistently accounts for 50-70% of countywide population. Counts of nesting pairs in Florida Bay declined from 136 in 1980 to 60 in 2007, a 56% decline over a 27-year period. Nesting pairs in lower Florida Keys also declining during this period. Causes of decline were not well understood and may have not ceased. Florida Bay estimates in 2017 up to 88 pairs from 60 pairs in 2007.	O, E	N	Kushlan and Bass (1983); Fleming et al. (1989); S. Bass, unpublished data; T. Wilmers, personal communication. L. Oberhofer unpubl. Data. Bass confirms 2007 area surveyed same as 2017 area.
(a)3. A population size reduction of at least 30% projected or suspected to be met within the next 10 years or 3 generations, whichever is longer (up to a maximum of 100 years) ¹	High rate of population decline seems to have ended. Population believed to still be declining, but not at 30%. Productivity in Florida Bay in last 10 years is unknown. Habitat mitigation efforts are in place and so habitat quality may improve in Florida Bay and the lower Everglades. Seeing high levels mercury in juvenile osprey in Monroe and Collier counties.	O, P	N	Kushlan and Bass (1983); Bowman et al. (1989); Fleming et al. (1989); Poole (1989); Lounsbury-Billie et al. (2008); S. Bass, unpublished data. Rumbold et al. (2017)

(a)4. An observed, estimated, inferred, projected or suspected population size reduction of at least 30% over any 10 year or 3 generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, and where the reduction or its causes may not have ceased or may not be understood or may not be reversible. ¹	Same as A2 and A3 above.	O, E, P	N	Same as A2 and A3 above.
¹ based on (and specifying) any of the following: (a) direct observation; (b) an index of abundance appropriate to the taxon; (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat; (d) actual or potential levels of exploitation; (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.				
(B) Geographic Range, EITHER				
(b)1. Extent of occurrence < 20,000 km ² (7,722 mi ²) OR	Monroe County area, land and water combined, < 9,700 km ²	O	Y	FWC land cover map of Florida. Caveat: This doesn't include areas where some percentage of pop. disperse to outside of the county
(b)2. Area of occupancy < 2,000 km ² (772 mi ²)			N	
AND at least 2 of the following:				
a. Severely fragmented or exist in ≤ 10 locations	Exist in limited number of "locations" where tropical weather events could severely impact all breeding individuals; however, mitigated by the fact that tropical storms occur several months prior to winter nesting season.		N	
b. Continuing decline, observed, inferred or projected in any of the following: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent, and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals	See A3 above. Habitat quality uncertain in western Florida Bay; habitat elsewhere may be improving, but some of that area not assessed. Documented high levels of mercury in juvenile osprey associated with reduced reproductive success.	E, I, P	Y (iii, v)	Kushlan and Bass (1983); Bowman et al. (1989); Poole (1989); Lounsbury-Billie et al. (2008); S. Bass, unpublished data. Rumbold et al. (2017). Numbers of matures likely still declining, but not at rates called for above in A. Dieoffs of seagrass affecting AOO (ENP unpubl tech report.)
c. Extreme fluctuations in any of the following: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals			N	

(C) Population Size and Trend				
Population size estimate to number fewer than 10,000 mature individuals AND EITHER	Total county population conservatively estimated at <250 pairs.	E, I	Y	S.Bass, unpublished data; T. Wilmers, pers. comm, L. Oberhofer unpubl. data .
(c)1. An estimated continuing decline of at least 10% in 10 years or 3 generations, whichever is longer (up to a maximum of 100 years in the future) OR	Population not stable and may continue to decline. See A3 and B above. Habitat quality uncertain in western Florida Bay; habitat elsewhere may be improving, but some of that area not assessed. High levels of mercury continue to be documented in juveniles and may be associated with reduced reproductive success.	S, P	Y	Kushlan and Bass (1983); Bowman et al. (1989); Fleming et al. (1989); Poole (1989); Lounsbury-Billie et al. (2008); S. Bass, unpublished data. Rumbold et al. (2017). (ENP unpubl tech report.).
(c)2. A continuing decline, observed, projected, or inferred in numbers of mature individuals AND at least one of the following:	See A3, Bb, and C1 above.	P	Y	
a. Population structure in the form of EITHER	Total county population conservatively estimated at <250 pairs.	E, I	Y	S.Bass, unpublished data; T. Wilmers, pers. comm, L. Oberhofer unpubl. data .
(i) No subpopulation estimated to contain more than 1000 mature individuals; OR				
(ii) All mature individuals are in one subpopulation			N	
b. Extreme fluctuations in number of mature individuals			N	
(D) Population Very Small or Restricted, EITHER				
(d)1. Population estimated to number fewer than 1,000 mature individuals; OR	Total county population conservatively estimated at <250 pairs.	E, I	Y	S.Bass, unpublished data; T. Wilmers, pers. comm, L. Oberhofer unpubl. data .
(d)2. Population with a very restricted area of occupancy (typically less than 20 km ² [8 mi ²]) or number of locations (typically 5 or fewer) such that it is prone to the effects of human activities or stochastic events within a short time period in an uncertain future			N	
(E) Quantitative Analyses				
e1. Showing the probability of extinction in the wild is at least 10% within 100 years			N	None available.

Initial Finding (Meets at least one of the criteria OR Does not meet any of the criteria)		Reason (which criteria are met)	
Meets multiple criteria.		C1, C2a, D1	
Is species/taxon endemic to Florida? (Y/N)		n/a	
If Yes, your initial finding is your final finding. Copy the initial finding and reason to the final finding space below. If No, complete the regional assessment sheet and copy the final finding from that sheet to the space below.			
Final Finding (Meets at least one of the criteria OR Does not meet any of the criteria)		Reason (which criteria are met)	
Does not meet criteria.		Given the results of the regional assessment.	

Note that immigration of propagules is possible.

Biological Status Review Information
Regional Assessment

Species/taxon: Osprey (*P. haliaetus*; Monroe Co. population only)
Date: 8/16/17
Assessors: T. Dellinger, R. Kimball, M. McMillian, K. Miller,
L. Oberhofer

Initial finding	Meets multiple criteria.
2a. Is the species/taxon a non-breeding visitor? (Y/N/DK). If 2a is YES, go to line 18. If 2a is NO or DO NOT KNOW, go to line 11.	No
2b. Does the Florida population experience any significant immigration of propagules capable of reproducing in Florida? (Y/N/DK). If 2b is YES, go to line 12. If 2b is NO or DO NOT KNOW, go to line 17.	Yes
2c. Is the immigration expected to decrease? (Y/N/DK). If 2c is YES or DO NOT KNOW, go to line 13. If 2c is NO go to line 16.	No
2d. Is the regional population a sink? (Y/N/DK). If 2d is YES, go to line 14. If 2d is NO or DO NOT KNOW, go to line 15.	
If 2d is YES - Upgrade from initial finding (more imperiled)	
If 2d is NO or DO NOT KNOW - No change from initial finding	
If 2c is NO or DO NOT KNOW - Downgrade from initial finding (less imperiled)	Downgrade
If 2b is NO or DO NOT KNOW - No change from initial finding	
2e. Are the conditions outside Florida deteriorating? (Y/N/DK). If 2e is YES or DO NOT KNOW, go to line 24. If 2e is NO go to line 19.	
2f. Are the conditions within Florida deteriorating? (Y/N/DK). If 2f is YES or DO NOT KNOW, go to line 23. If 2f is NO, go to line 20.	
2g. Can the breeding population rescue the Florida population should it decline? (Y/N/DK). If 2g is YES, go to line 21. If 2g is NO or DO NOT KNOW, go to line 22.	
If 2g is YES - Downgrade from initial finding (less imperiled)	
If 2g is NO or DO NOT KNOW - No change from initial finding	
If 2f is YES or DO NOT KNOW - No change from initial finding	
If 2e is YES or DO NOT KNOW - No change from initial finding	
Final finding	Does not meet criteria.

Additional Notes –

In 2014 study, feathers from osprey throughout FL, looked at relatedness by distance and genetic clustering: no significant population structure, no strong evidence that they are subpopulation, found that they are not a distinct subspecies. BRG discussed if is this an isolated population.

- from the literature, breeding phenology in Baha birds, suggests plastic response to day length, temperature, not a fixed genetic response

- Observations of birds that stay, disperse: surveys start in January. Only 1 nest in 30 years in December.

No compelling evidence of spatially or temporally isolated

- Idea that phenomenon of some pops in FL increasing or decreasing doesn't indicate that pops are separate, usually indicate they are actually connected. Likely they are leaving to find resources in other areas. (referencing White paper, FWC assessment). Understand they are behaviorally different, but likely that behavioral changes in any other species. Not observing big fixed genetic differences. Consensus that genetically not isolated. Regional Assessment: - Immigration of propagules is possible. Reviewing IUCN guideline table Breeding populations

- o Other pops outside of this, yes

- o Metapop, yes

- o Dispersal impeded, no

- o Long distance pop, yes

- o Sufficient to rescue regional pop, yes

APPENDIX 1. Brief biographies of the Osprey Biological Review Group members.

Tim A. Dellinger received his M.S. degree in Wildlife and Fisheries Resources from West Virginia University. Dellinger has more than 13 years of experience with research and monitoring projects on imperiled species in Florida, including raptors, wading birds, and cranes. He has spent 5 years working with whooping cranes in Florida, and his primary research interest is in the ecology and conservation of imperiled avian species. Dellinger served as a member of the Species Action Plan team for the osprey of Monroe County.

Rebecca Kimball received a Ph.D. from the University of New Mexico, where her dissertation focused on sexual selection in House Sparrows. After postdoctoral work at University of New Mexico and Ohio State University, she became a faculty member at the University of Florida in 2001, where she is now a Professor in the Department of Biology and an Affiliate Associate Professor with the Florida Museum of Natural History. She has published more than 80 scientific papers in the areas of evolutionary biology and behavioral ecology. One of her specific areas of interest is avian phylogenetics, where she has focused on reconstructing the evolutionary history among all birds as well as in specific orders. She is currently a collaborator on FWC's investigation into the subspecies designations of seaside sparrows on Florida's gulf coast.

Michael A. McMillian received his M.S. degree in Biological Sciences from the University of West Florida and is currently working as an Environmental Specialist for Highlands County Natural Resources. McMillian's expertise is with birds of prey, especially osprey of Florida. He has focused on the nesting osprey of Lake Istokpoga since 1989, the osprey of Lake Arbuckle since 1998, and the osprey of Blue Cypress Lake from 2004-2008.

Karl E. Miller received his Ph.D. from the University of Florida and is currently the Upland Nongame Bird Leader for FWC's Fish and Wildlife Research Institute. Miller has more than 20 years experience implementing research and monitoring projects for imperiled birds and mammals in Florida, with more than 45 articles or chapters published in scientific journals or popular magazines. Miller's expertise is focused on the population ecology and habitat requirements of raptors, woodpeckers, and songbirds. Karl served as team lead for the 2010 Biological Review Group for the osprey of Monroe County.

Lori Oberhofer has worked as a wildlife biologist with the South Florida Natural Resources Center at Everglades National Park for the past 16 years and leads the park's long-term wildlife inventory and monitoring projects. With a graduate degree from the University of Montana, Oberhofer's focus and expertise includes restoration ecology, invasive species management, and conservation biology of wading birds, Cape Sable seaside sparrows, bald eagles, and osprey.

APPENDIX 2: Summary of letters and emails received during the solicitation of information from the public period of May 10 to June 26, 2017

No information was received from the public.

APPENDIX 3: Peer Reviews of Independent Scientists

From: [Sunquist, Claire](#)
To: [Imperiled](#)
Subject: FW: Osprey review
Date: Monday, October 23, 2017 11:09:57 AM

From: Rob Bierregaard [mailto:rbierreg@gmail.com]
Sent: Monday, October 23, 2017 11:09 AM
To: Sunquist, Claire <Claire.Sunquist@MyFWC.com>
Subject: Re: Osprey review

At the request of Melissa Tucker, Assistant Section Leader, Species Conservation Planning, I have reviewed the **Biological Status Review Report for the Osprey** (*Pandion haliaetus*) (Monroe County population only).

The Osprey Biological Review Group members are all highly qualified to perform this review. Their analysis of the relevant scientific literature was thorough and their conclusions firmly based on both good science and an understanding of the species in question.

I agree with their conclusion that the Monroe County osprey population should be downlisted from a Species of Special Concern.

Respectfully submitted,

Richard O. Bierregaard, Ph.D.

Research Associate

Ornithology Department

The Academy of Natural Sciences of Drexel University

Philadelphia PA.

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Review of: Osprey Biological Status Review Report, FWC

This report proposes to change the FWC status of the Osprey (*Pandion haliaetus*) from Species of Special Concern (Monroe County) to non-listed. The Osprey population from Monroe County was listed in 2011 by the FWC because of population declines, with stated goals being to assess the taxonomic distinctiveness of these birds and its distribution within Florida. Unlike the migratory and summer breeding populations of Osprey in most of North America (*P. h. carolinensis*), the Ospreys in south Florida were known to be resident that bred in winter. They were thought to be smaller and paler, and perhaps affiliated with the subspecies in the Caribbean (*P. h. ridgwayi*), which also is non-migratory.

One of the foremost prerequisites for conservation is identifying the taxonomic and distributional boundaries of the taxon of concern. The morphometric and plumage distinctiveness of the south Florida populations were unpublished, and have not been further studied. In recent reports, the subspecies in the Caribbean (*ridgwayi*) was found to not be different in mtDNA from North American birds (*carolinensis*) (Monti et al. 2015). Within the Florida peninsula, there was low geographic structure to variability in both nuclearDNA and mtDNA (Dellinger et al 2016). These studies indicate that the south Florida Osprey population is not genetically distinct from the north Florida birds, at least in the markers studied. It is possible that genetic distinctiveness may be found in other markers, but the results indicate that these populations are very closely related. The biogeographical extent of the winter breeding/resident population remains unknown. These birds have only been studied in the Florida Bay/Florida Keys area. Telemetry and bird banding recovery indicates birds from both populations range widely, and it seems unlikely that the southern population is not geographically isolated from more northern birds.

Monitoring indicates that the decline in the Osprey population in south Florida has flattened out or is on the upswing. Ongoing efforts to improve habitat quality in south Florida (Everglades restoration etc.) will likely have positive effects on the Osprey population.

The recent studies published since the 2011 listing of the Monroe County population of the Osprey indicate that this population is likely not genetically distinct from more northern or Caribbean populations. This population has not shown to be distinct in morphometrics or plumage. The non-migratory status may be behavioral adaptations to different environments in south Florida without a genetic basis. Lacking genetic and phenotypic distinctiveness, the FWC proposal to remove the Monroe County Osprey population from the list of Species of Special Concern seems warranted.

Andrew Kratter
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352-273-1973

Review of *Osprey Biological Status Review Report*

Brian A. Millsap, National Raptor Coordinator, Division of Migratory Bird Management, U.S. Fish and Wildlife Service

Completeness and Accuracy of the Biological Information and Data Analyses in the BSR

The assessors have done a nice job pulling together most of the relevant biological data on this local population of osprey. The report is well-written and concise, and in most cases I believe the assessors have accurately interpreted the available data.

One shortcoming with respect to completeness, in my opinion, is the absence of any reference to or analysis of Breeding Bird Survey (BBS) data for osprey in peninsular Florida and Monroe County (https://www.mbr-pwrc.usgs.gov/bbs/trend/rtehtm15a_nlcd.html). The BBS results for the Peninsular Florida Bird Conservation Region obviously pool data for the target population with data from other parts of peninsular Florida, but the generally increasing trend for osprey in that region over the full and most recent span of BBS records is a relevant quantitative measure of the species' status. Additionally, route-specific BBS records in and near Monroe County (e.g., Sugarloaf Key, Card Sound, Plantation Key, etc.) provide data that could be pooled to assess the trend of the target population (or at least evaluated to determine if data are sufficient for a trend assessment). Counts of occupied nests is not an ideal measure of trend for species like osprey, for which > 50% of the population may not be associated with nests (e.g., juveniles, subadults, and floating adults). The BBS is one readily available data set that can be used to assess trends in the whole population, even if that assessment is limited by data quantity. Although BBS data have historically been considered inappropriate for use in raptor status assessments, several recent published papers contradict that interpretation.

Reasonableness of Our Assumptions, Interpretations of the Data, and Conclusions

In general, I felt that the assessors did a good job explaining their assessment of the data, and their conclusions are reasonable. Data as presented support the conclusion it is implausible that the Monroe County osprey population is isolated, and because it is juxtaposed against an increasing source population, it is unlikely to be imperiled. As written, the BSR implies that Monroe County may represent a sink area within the regional osprey metapopulation, but such a situation is not, in and of itself, basis for an imperiled determination.

Although I agree with the final determination, it is unclear to me what data indicate or imply the Monroe County osprey population is still in decline (and thus a sink). The only data presented (for criterion a(2)) are nest count data that show a 28-nest increase from 2007 – 2017. There is also a statement in the Biological Information – Population Status and Trend section that “Although the population is not stable, recent count data in Florida Bay indicate an increase in osprey pairs from 60 in 2007 to 88 pairs in 2017.” Thus, the count data presented don't support the inference that the population was in decline over the most recent 10-year period, and further explanation of that conclusion is warranted even though this point has no effect on the ultimate determination.

From: [Alan F. Poole](#)
To: [Imperiled](#)
Subject: Poole - Ospreys - Monroe Co. status review
Date: Friday, September 22, 2017 12:13:46 PM

To Whom It May Concern:

As requested, I have reviewed your Biological Status Review Report for the Osprey (Monroe County population). Comments follow:

1) "Completeness and accuracy of the biological information and data analysis" — I think you are pretty much on track here, although it wasn't clear to me how population numbers were assessed. I'm assuming aerial surveys in FL Bay, with citizen science ground surveys (mostly highway) in the Keys....? A quick note here: surveys of nesting Ospreys in coastal Belize showed me ca. 2x as many active nests when checked from the water (boat) than from the air. So you may not be getting all the Bay nests if you are just looking from a plane. And I gotta wonder how accurately the Keys have been surveyed.... there's a lot of habitat away from roads there (although, to be fair, most of your Ospreys are probably nesting near developed areas, taking advantage of artificial nest sites). But that said, your numbers for the Keys may be conservative. That's OK — it doesn't change your conclusions, in fact it reinforces them.

2) "Reasonableness" of conclusions — I think you're right. There is no good biological reason to keep Ospreys on a Threatened/Of Concern list in your county. There are at least 4-5,000 pairs of Ospreys currently nesting in the state of Florida, which means >10,000 individual birds. No reason to think of Monroe Co. as isolated from this robust population — there's surely some interchange between Monroe Co. Ospreys and those in other parts of the state, esp. the southern third. So even though your numbers may be low compared to the rest of Florida, yours are part of a larger population that's thriving — helping to lessen concern for the vulnerability of your birds. If all the Ospreys in Monroe Co. were killed by this last hurricane (Lord forbid, and of course not the least bit likely), you could still expect to have your habitat recolonized over the next few decades by Ospreys from farther north (and likely a few from the Caribbean).

It's not clear to me how the proposed change in status will affect future surveys of Ospreys in Monroe Co., but I'd like to make the case that you not drop these birds entirely. Few US populations have been as well studied (esp. FL Bay), so you have great baseline data to work from. A nesting survey once every 5 years, even once a decade, would, I think, prove of real value, both for keeping a finger on the pulse of your Ospreys but also (as a good indicator species) the habitat they depend on. I know concern of the health of FL Bay continues; as I hardly need tell you, Ospreys are a v. good barometer for that.

Lastly, and at the risk of showing my ignorance here, I'm wondering if there are good (better?) ways to harness the power of citizen scientists in the Keys to monitor Ospreys nesting there. This takes on particular urgency with the recent hurricane — would be fascinating to see what impacts that major storm had on Ospreys and how they recover. If there's a way to facilitate/encourage a citizen science effort there, focused on Ospreys, you could learn a lot about those birds.

Hope this helps... and happy to continue the conversation...

ALAN POOLE

Retired Editor, *Birds of North America Online*; Associate, Cornell Lab of Ornithology

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Tom Wilmers
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Melissa Tucker
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Florida Fish and Wildlife Conservation Commission
620 S. Meridian Street
Mail Station 2A
Tallahassee, FL 32399

October 22, 2017

RE: Osprey Biological Status Review (Monroe County population)

Dear Ms. Tucker:

Thank you for the opportunity to provide comments on the Osprey Biological Status Review (OBSR) submitted by your team of biologists. They have produced an excellent manuscript that provides sound, incontrovertible reasons for removing the Species of Special Concern (SSC) designation for the Monroe County (MC) osprey population. The salutary genetic analysis work by Dellinger et al. (2016) disproved that MC ospreys were a distinct subspecies. This, coupled with the fact that, as noted by the authors, MC ospreys are not spatially isolated, renders their population status/trend (dismal though it may or may not be) — independent of the Florida population as a whole — a moot point regards SSC designation.

The Biological Information section of the OBSR is revealing. The number of personal communications cited is itself an indication of the fragmentary and incomplete information available for the MC osprey population over time, including the expansive Florida Bay portion of MC where most work has been done.

Clearly, data on the MC osprey population lack the rigor needed for assessment of population trend. Thus, in the Biological Assessment, subheading Population Assessment, the BRG's contention that MC osprey population met criteria for Population Size and Trend criteria, seems conjectural, at best. Moreover, as the authors noted, there may be significant osprey immigration into MC.

In sum, the OBSR authors have provided a compelling argument for removal of the SSC designation for ospreys in Monroe County. I commend their work.

Sincerely,

Tom Wilmers
Wildlife Biologist