2012

Osprey Nest Abundance, Distribution, and Productivity in Casco Bay

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innovative wildlife science

OSPREY NEST ABUNDANCE, DISTRIBUTION AND PRODUCTIVITY IN CASCO BAY: 2012.

CBEP-FUNDED PROJECT: ECOLOGICAL AND CONTAMINANT MONITORING IN CASCO BAY USING OSPREY BIOINDICATORS.

SUBMITTED TO:

The Casco Bay Estuary Partnership

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BACKGROUND

With support from the Casco Bay Estuary Partnership (CBEP), and in collaboration with the Maine Department of Inland Fisheries and Wildlife (MDIFW), Biodiversity Research Institute (BRI) initiated efforts to collect a 3-year (2011-2013) baseline on Osprey nest abundance, distribution, and productivity in Casco Bay. This survey effort represents the first comprehensive inventory ever to be conducted on Ospreys in Casco Bay, and it will enable evaluations of long-term population trends by comparing to existing datasets held by the MDIFW. Findings from the 2011 season are summarized in a full report submitted to CBEP (DeSorbo et al. 2013). Here, we provide a brief summary of the results of the Osprey survey conducted in 2012 (year two). The purpose of this report is to provide a brief summary of preliminary findings from the 2012 season. An in-depth comparison to 2011 findings and a more extensive analysis of the factors contributing to overall patterns observed will be the subject of future reports.

METHODS

We surveyed Ospreys throughout mainland and island shorelines of Casco Bay, from the Fore River (westernmost study area periphery) to the New Meadows River (easternmost study area periphery). All nests were surveyed by fixed-wing aircraft. Nests (i.e, Fore River) that could not be confirmed in the Fore River due to airspace restrictions due to the Portland International Jetport were visited by boat. We conducted a nesting survey to evaluate nest condition and evaluate pair residency (7, 10 May), and a productivity survey (19 July) to count the number of chicks surviving to near fledging age. We recorded and georeferenced survey data using a Lenovo Topseller Thinkpad X30e computer linked to a portable GPS, and a flight log. Extensive details on survey methods, terminology definitions, and a summary of the findings from the 2011 survey are available in DeSorbo et al. (2013).

RESULTS

We checked 164 Osprey nest sites during the 2012 Casco Bay Osprey survey (Table 1). All but two nests checked were deemed intact (Figure 1). Eighty-one percent of intact nests contained potential resident pairs (confirmed breeders + possible, but unconfirmed residents). Of all potential resident pairs, 88% were confirmed breeding pairs and 12% were considered possible residents.

Table 1. Number of Osprey nests, and pairs deemed possible resident and confirmed breeding pairs during surveys of Casco Bay, 2012.

	No. nests		Possible	Confirmed	Potential
Study Area	**Checked**	**Intact**	**Resident Pr.**	**Breeding Pr.**	**Resident Pr.**
Casco Bay	132	131	14	93	107
Fore River	8	7	0	7	7
New Meadows	24	24	2	17	19
ALL	**164**	**162**	**16**	**117**	**133**

* See methods, DeSorbo et al. (2013), for term definitions.

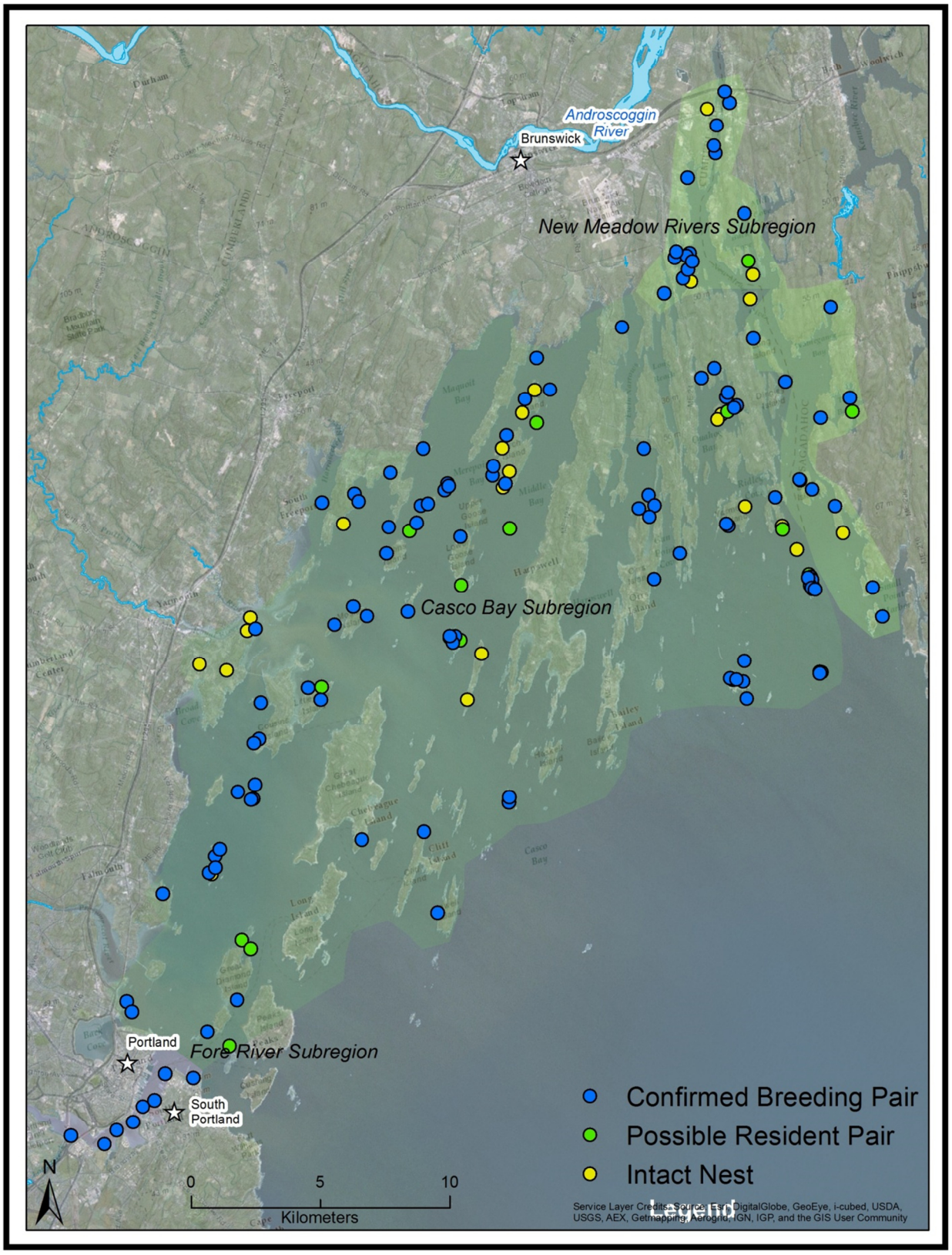

Figure 1. Confirmed breeding and possible resident Osprey pairs detected during population surveys in Casco Bay, 2012.

The 65 successful nests detected produced 84 fledglings in the Casco Bay study area (Table 2). Of the 84 fledglings produced, 86% were from the Casco Bay subregion, 6% were from the Fore River, and 8 % were from the New Meadows subregion.

Table 2. Number of successful nests, fledglings, and brood size for Ospreys in three subregions of the Casco Bay study area surveyed in 2012.

Subregion	Successful Nests (n)	Fledglings (n)
Casco Bay	56	72
Fore River	3	5
New Meadows	6	7
ALL	**65**	**84**

* See methods, DeSorbo et al. (2013), for term definitions.

Nest success measures for Ospreys surveyed in Casco Bay, 2012 was 49% based on potential residents, and 56% based on confirmed breeders only (Table 3). Productivity for the population surveyed was 0.63 young per pair based on potential residents, and 0.72 young per pair based on confirmed breeding pairs. The number of young produced per successful nest (brood size) was 1.29 young per successful nest.

Table 3. Nest Success and productivity estimates for Ospreys in three subregions of the Casco Bay study area surveyed in 2012.

	Nest Success (%) [a]		Young Produced / [a]		
Subregion	Potential Residents	Confirmed Breeders	Potential Residents	Confirmed Breeders	Successful Nests
Casco Bay[c]	52%	60%	0.67	0.77	1.29
Fore River	43%	43%	0.71	0.71	1.67
New Meadows[d]	32%	35%	0.37	0.41	1.17
ALL[e]	**49%**	**56%**	**0.63**	**0.72**	**1.29**

[a] See methods, DeSorbo et al. (2013), for term definitions.

DISCUSSION

Data collected during this survey summarizes the second year of an intended 3-year inventory of Osprey nest abundance, distribution, and productivity in Casco Bay. Our surveys detected 162 intact Osprey nests. Breeding pairs were confirmed at 88% of the nest sites deemed to hold potential residents, while the remainder were occupied by possible resident pairs (non-breeders, failed breeders, see DeSorbo et al. 2013).

Nest success measures indicated that 56% of the confirmed breeders raised ≥1 young to near fledging age and 44% failed to successfully raise young. Productivity for the Casco Bay Osprey population was 0.72 young per confirmed breeding pair. This productivity level has declined compared to the level documented in the same study area during the 2011 survey (0.93 young per confirmed breeding pair). The productivity level considered required to maintain

population stability ranges from 0.80 – 0.90 young per active nest (breeding pairs in our study). The number of young produced per successful nest (brood size) was 1.29 young per successful nest; a decline compared to the measure in 2011 (1.5 young per successful nest; DeSorbo et al. 2013).

We detected a greater number of intact Osprey nests in 2012 compared to 2011 (164 vs. 107). We also detected more confirmed breeding pairs in 2012 compared to 2011 (117 vs. 86), and the number of pairs deemed potential resident pars (breeders + non-breeders) was notably higher in 2012 compared to 2011 (133 vs. 98).

Our two years of consecutive surveys suggest that the breeding portion of the Casco Bay Osprey population expanded significantly during 2012 compared to 2011, but productivity (0.71 young per confirmed breeding pair) declined overall. It does not appear that the non-breeding or failed breeding portion of the population (possible resident pairs) changed significantly between years; 13% of the pairs were considered possible breeding pairs in 2012, compared to 12% in 2011. Declines in nest success and productivity measures were most apparent within the Fore River and New Meadows River subregions. The small sample of nests in the Fore River was highly successful in producing large broods in 2011, which inflated nest success and productivity figures for this subregion. In 2012, nest success for the 7 pairs in the Fore River had dropped to 43%, and productivity dropped to 0.71. The New Meadows River subregion had notably lower nest success in 2012 compared to 2011 (32% vs. 59%), and very low productivity in 2012 (0.39 young per confirmed breeding pair). Nest success was relatively unchanged in the Casco Bay subregion between the two survey years; as for the other two subregions, and productivity declined from 0.86 in 2011 to 0.77 young per breeding pair in 2012.

Surveys conducted in Casco Bay during 2012 demonstrated that assessments of Osprey population abundance and reproduction can exhibit significant annual variability. Thus, population assessments conducted over multiple years will provide more accurate measures of population status compared to single-year estimates.

A complex range of factors influence patterns of Osprey nest distribution, abundance and reproduction. Weather may have had a significant influence on the changes in patterns of Osprey abundance and reproduction observed between 2011 and 2012 seasons. The winter of 2011-2012 was characterized by generally high temperatures and little snowfall. The spring thaw occurred earlier than many 'typical' years, and Ospreys nested up to 2 weeks earlier during the 2012 nesting season compared to 2011. Maine's breeding Bald Eagles also nested earlier in 2012 compared to timing during most years. The observed increase in the number of confirmed breeding pairs and potential resident pairs between 2011 and 2012 suggests that the availability of nest sites may not be the primary factor limiting expansion of the Casco Bay Osprey population. In 2012, the observed increase in the number of breeding pairs did not translate into a proportional increase in fledglings, resulting in a decrease in productivity measures overall.

Declines in reproduction parameters between years were more notable for Ospreys nesting in the Fore River and New Meadows River subregions. The failure of pairs to successfully produce fledgling-aged young in 2012 may be related to a variety of factors, including food limitation, inexperienced breeders, or an increase in use of sub-optimal nest sites. Causes for observed changes between years will be further explored in subsequent analyses of 2012 survey data.

Referenced Report: DeSorbo, C. R., R. Gray, and I. Johnson. 2013. Osprey abundance, nest distribution, and productivity in Casco Bay, 2011. Report BRI 2013-08 submitted to The Casco Bay Estuary Partnership, Portland, Maine. Biodiversity Research Institute, Gorham, Maine. 21 pp.

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