Biotic and abiotic habitat characteristics of black oystercatcher breeding territories

Brooke A. McFarland[1], Brenda Konar[1], Michael I. Goldstein[2]

[1]University of Alaska, Fairbanks, School of Fisheries and Ocean Sciences, Fairbanks, 99775

[2]USDA Forest Service, Alaska Region, Juneau, 99802

ABSTRACT

Predictive models of preferred breeding habitat were developed for black oystercatchers (*Haematopus bachmani*) in Alaska to target survey efforts. Breeding sites (n=148) in Kenai Fjords National Park (KEFJ) and western Prince William Sound (PWS) were paired with random available sites (n=148) and analyzed for physical and biological parameters. A subset of sites (n=60) were field-sampled for intertidal community composition and local-scale physical habitat characteristics. While similar communities were found at breeding and random sites, isolation from predators was found to be the most important factor in breeding territory selection.

INTRODUCTION

Over 60% of the world's population of black oystercatchers (*Haematopus bachmani*) breed in Alaska (Alaska Shorebird Working Group 2000). These birds rely on the intertidal zone for forage habitat and typically nest immediately above this zone in a defended composite breeding/foraging territory. Some birds forage away from their territories (Andres and Falxa 1995), however the ability of chicks to accompany foraging adults to feeding areas can result in higher provisioning rates to chicks (Hazlitt 1995). Breeding territory selection may also be influenced by vulnerability to predation (Andres 1996). This study sought to analyze intertidal habitat (biotic and abiotic) in conjunction with previously identified relevant terrestrial habitat features to create an integrated model for territory selection of black oystercatchers in south-central Alaska.

WORKS CITED available on handout

ACKNOWLEDGEMENTS

Bill Thompson, Meg Hahr, Dan Schultz, Caroline Jezierski, NPS
Aaron Poe, Bridget Brown, Sadie Youngstrom, and Thor Eide, USFS
Derek DeRaps, UAS
Jamie Thomton

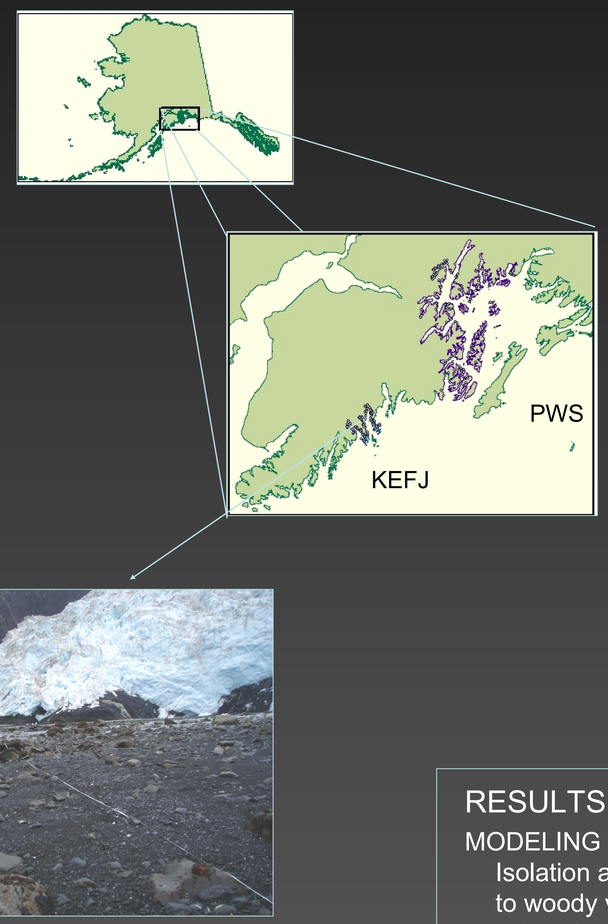

Figure 1. Map of study areas in south-central Alaska, Kenai Fjords National Park (KEFJ) and Prince William Sound (PWS), with black oystercatcher breeding territory field site in KEFJ.

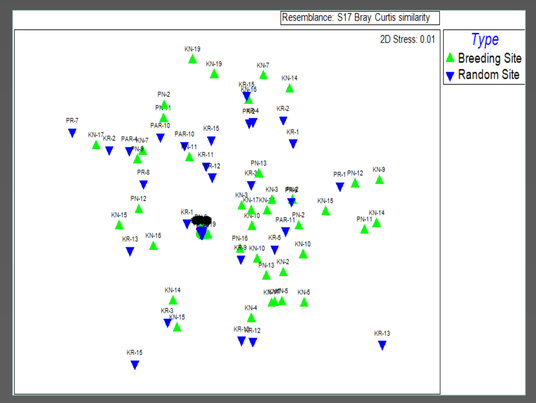

Figure 2. MDS plot of intertidal invertebrate composition at breeding sites and random sites.

MATERIALS AND METHODS

MODELING

Remotely-sensed data

- Data collected for all sites: summer sea-surface temperature, chlorophyll-a concentration, slope, aspect, distance to freshwater, modified effective fetch and isolation.
- Data collected for KEFJ only: distance to blue mussel bands, kelp and eelgrass beds.
- Sites are all known unique breeding locations (n=148) with paired random sites (n=148) in Kenai Fjords National Park (KEFJ) and Prince William Sound (PWS) (Fig.1).

Field data

- Field data collected: rugosity (surface complexity), distance to woody vegetation and to freshwater, aspect, slope/ tidal width.
- Sites are a subset of breeding and paired random (n=60) sites (Fig. 1).

INTERTIDAL COMMUNITY COMPOSITION

- Sampled at field sites along 100m transects at high, mid and low tidal heights.

RESULTS AND CONCLUSIONS

MODELING

Isolation and distance to woody vegetation, both related to predator avoidance, consistently appeared in the most supported models in all stages of evaluation (initial evaluation, verification in KEFJ and in south-east Alaska). Models with all available parameters also performed well (Table 1).

Table 1. Top performing models with area under the curve (AOC) values and rankings according to Akaike's Information Criterion for small sample size (AICc) at new sites in KEFJ and new sites outside of the study area in south-east Alaska (SEAK).

MODEL	PARAMETERS	AUC	AICc RANK (new KEFJ)	AICc RANK (SEAK)
Field predator avoidance model	Isolation, distance to woody vegetation	0.79 ±0.06	1	2
Field global model	All field parameters	0.80 ±0.06	2	1
Remotely-sensed data global model	All remotely-sensed parameters	0.72 ±0.04	3	3

INTERTIDAL COMMUNITY COMPOSITION

Algal and invertebrate communities were similar at breeding sites and random sites at all locations and at transects (Fig.2).

Predator avoidance appears to be a more consistent and common factor in breeding territory selection for black oystercatchers than intertidal forage pressures.

Future studies should consider intertidal community composition at remote forage locations and use and pair history at breeding sites.