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TERRITORY QUALITY AND REPRODUCTIVE SUCCESS OF BLACK OYSTERCATCHERS IN BRITISH COLUMBIA

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ABSTRACT.—I investigated the relationship between the physical characteristics of breeding territories and the reproductive success of Black Oystercatchers (*Haematopus bachmani*) in British Columbia. I compared measures of the threat of egg and brood depredation, conspecific competition, and food supply with measures

on territories near Glaucous-winged Gull (*Larus glaucescens*) colonies had smaller first clutches than pairs free of neighboring gulls. Oystercatcher pairs hatched and consequently produced more young on shallow sloping intertidal shoreline sites compared to steep-sloped islets and shorelines. *Received 28 Feb. 2001, accepted 25 Nov. 2001.*

Variation in reproductive success is believed to result when there is variation in resources available to individuals (Noordwijk and De Jong 1986). For avian species that defend breeding territories where the majority of

(Hartwick 1974, Groves 1984, Andres 1999, Hazlitt and Butler 2001). Some factors related to hatching success, fledging success, and productivity of oystercatchers include protection of nest sites from predators and from surf

TABLE 1. Characteristics of 38 Black Oystercatcher breeding territories in the southern Gulf Islands, Strait of Georgia, British Columbia, 1996 and 1997.

Territory characteristic	Mean	Median	SD	Range	CV (%)
Length of shoreline (m)	75	53	53	25–245	71.2
Intertidal slope (degrees)	20	18	10	9–45	51.1
Presence of breeding gulls[a]	0.5	1.0	0.5	0–1	96.1
Number of neighboring territories	1.3	2.0	0.9	0–2	68.1
Distance to mainland/forested island (m)	943	960	574	0–1760	60.8

[a] Indicates proximity to Glaucous-winged Gull breeding colony (0 = no colony, 1 = colony on same island).

cover, were searched between 21 April and 30 May

ing pairs of Black Oystercatchers. All islands were cir-

first clutch, size of replacement clutch, hatching suc-

fledging success (percent hatchlings fledged), and pair

TABLE 2. Correlation matrix (Spearman's r^2 values) of Black Oystercatcher breeding territory (n = 38) characteristics in the southern Gulf Islands, Strait of Georgia, British Columbia, 1996 and 1997.

	Intertidal slope	Distance to mainland	Presence of breeding gulls	Number of neighboring territories
Length of shoreline	0.03	−0.00	0.04	−0.18
Intertidal slope	—	[illegible]	[illegible]	[illegible]
Distance to mainland	—	—	0.56**	0.19
Presence of breeding gulls	—	—	—	0.40*

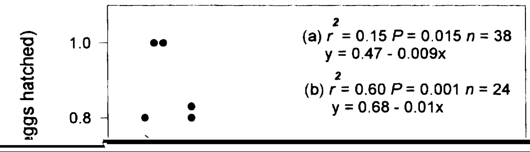
* Indicates a significant correlation of $P < 0.05$.
** Indicates a significant correlation of $P < 0.0001$.

neighboring oystercatcher breeding pairs. Both the number of neighboring oystercatcher territories and the distance from the mainland or nearest forested island were significantly positively correlated with the presence of Glaucous-winged Gulls (Table 2). Also, the number of neighboring oystercatcher territories was significantly negatively correlated with intertidal slope, therefore territories along shallow sloping shorelines had more neighboring pairs compared to steep sloping shoreline territories (Table 2).

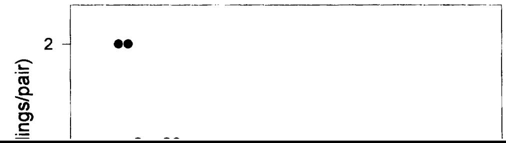
The only significant predictor of first clutch size, for both years, was the presence of breeding Glaucous-winged Gulls (1996: n = 30, r^2 = 0.14, F = 4.56, P = 0.042; 1997: n [illegible]

gulls: 2.3 ± 1.0 SD, n = 7; Wilcoxon test, Z = 1.5, P = 0.10). The incidence of complete clutch loss on territories near Glaucous-winged Gull colonies (25 of 48 clutches lost) was similar to territories free from neighboring gulls (23 of 48 clutches lost). Replacement clutches were laid on both gull and gull-free territories (seven without gulls and nine with gulls).

Hatching success was significantly and negatively related to intertidal slope of a territory (Table 3, Fig. 1). This relationship was strongest among territories that hatched ≥1 chick (Fig. 1). Thus, pairs occupying steep territories had significantly smaller brood sizes than pairs on shallow territories (Table 3). Intertidal [illegible]



(a) r² = 0.15 P = 0.015 n = 38
y = 0.47 - 0.009x
(b) r² = 0.60 P = 0.001 n = 24
y = 0.68 - 0.01x
1.0
0.8
ggs hatched)



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lings/pair)

and gulls in Alaska (B. A. Andres pers. comm.). In this study, oystercatchers that bred at the edge of gull colonies either laid a significantly smaller first clutch, or more likely, these pairs experienced higher partial clutch depredation during the laying period. Black

Oystercatcher eggs are incubated only 30% of the time until clutch completion, and single eggs lost from a clutch are not replaced (Purdy and Miller 1988). For the Eurasian Oystercatcher (*H. ostralegus*), 40% of the first-laid eggs were lost before the second eggs were laid (del Hoyo et al. 1996). Egg loss to gulls or corvids during the laying period, before full incubation begins, is a probable explanation for smaller first clutch sizes on territories with nearby Glaucous-winged Gulls.

significant predictor of hatching success, particularly among pairs that hatched at least one chick. Steep-sloped territories were associated with small, steep islets that usually lacked any horizontal cover, such as logs or concealing vegetation (Andres 1998). Evidence for nest

mobile young and the contents of the nest scrape.

None of the territory characteristics measured in this study significantly predicted fledging success or productivity. Sometimes oystercatchers use feeding areas outside of the

territory (Hartwick 1978; B. A. Andres pers. comm.), which could be a factor. However, provisioning behavior observed during this study revealed that these forays were infrequent and are most likely function for self feeding rather than provisioning young (Hazlitt 1999). Nol (1989) found that the size and location of the intertidal foraging area relative to the nest site was more important than the actual density of prey during the chick-rearing period in American Oystercatchers (*H. palli-*

eas fledged more young over a three-year period compared to pairs on territories with small, distant feeding areas. She proposed that better American Oystercatcher territories permitted parents to watch for predators of the young while foraging.

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