

FEATURE ARTICLES

SLAVE TO THE TIDES: SPATIOTEMPORAL FORAGING DYNAMICS OF SPRING STAGING BLACK BRANT

JEFFREY E. MOORE^{1,2} AND JEFFREY M. BLACK¹

¹*Waterfowl Ecology Research Group, Department of Wildlife, Humboldt State University, Arcata, CA 95521*

Manuscript received 16 June 2005; accepted 24 March 2006.

² Present address: Duke University Center for Marine Conservation, Duke University Marine Laboratory, 135 Duke Marine Lab Road, Beaufort, NC 28516. E-mail: jemoore@duke.edu

Abstract. Arctic-nesting geese depend on nutrients acquired during spring migration for reproduction, and thus should attempt to maximize nutrient intake while on staging areas. We investigated site use of Black Brant (*Branta bernicla nigricans*) at an important staging location—Humboldt Bay, California—to determine whether birds selected the most profitable feeding areas available. Migrating Brant feed almost exclusively on eelgrass (*Zostera marina*), which is restricted in availability due to daily and seasonal tidal cycles. We mapped foraging Brant locations during low tides and collected eelgrass samples to describe food resources in 31 areas in the bay. We used negative binomial regression to evaluate goose densities during different tidal levels and times of season as a function of food biomass and nutrient content, distance from grit sites, and substrate elevation. Results varied by time of season and tidal depth, but Brant densities were positively correlated with eelgrass protein, calcium, and biomass in most analyses. Brant usually fed in the deepest possible areas permitted by tides, and closer to tidal channels, where biomass and nutrient content of eelgrass were greater and where depletion from grazing was probably less. During higher low tides, Brant fed closer to previously visited grit sites. Tide cycles change over the course of the Brant's staging period on the bay, enabling longer and more frequent access to deeper eelgrass meadows as spring progresses. These seasonal changes in tidal pattern coincide with seasonal changes in Brant use of the bay. Thus, migration patterns for estuarine bird species might be shaped by latitudinal gradients in both food phenology and seasonal tidal patterns.

Key words: Brant, eelgrass, food availability, Humboldt Bay, staging, tides.