

Variation in Body Mass and Foraging Effort of Barrow's Goldeneyes (*Bucephala islandica*) During Remigial Molt

Author(s): Danica Hogan, Daniel Esler, and Jonathan E. Thompson

Source: *The Auk*, 130(2):313-322. 2013.

Published By: The American Ornithologists' Union

URL: <http://www.bioone.org/doi/full/10.1525/auk.2013.12048>

BioOne (www.bioone.org) is a nonprofit, online aggregation of core research in the biological, ecological, and environmental sciences. BioOne provides a sustainable online platform for over 170 journals and books published by nonprofit societies, associations, museums, institutions, and presses.

VARIATION IN BODY MASS AND FORAGING EFFORT OF BARROW'S GOLDENEYES (*BUCEPHALA ISLANDICA*) DURING REMIGIAL MOLT

DANICA HOGAN,^{1,4} DANIEL ESLER,² AND JONATHAN E. THOMPSON³

¹*Centre for Wildlife Ecology, Simon Fraser University, 8888 University Drive, Burnaby, British Columbia V5A 1S6, Canada;*

²*Centre for Wildlife Ecology, Simon Fraser University, 5421 Robertson Road, Delta, British Columbia V4K 3N2, Canada; and*

³*Ducks Unlimited Canada, 17915-118 Avenue, Edmonton, Alberta T5S 1L6, Canada*

A .—Molt is a metabolically demanding process in the annual cycle of birds, particularly for species that undergo simultaneous remigial molt because nutritional and energetic costs occur during a short period. Birds that molt remiges simultaneously utilize many different body-mass and foraging strategies to meet the nutritional and energetic costs of remigial

date, molt stage, residual mass, and time since sunrise or sunset (h). Residual mass was calculated by subtracting the predicted mass of each individual (obtained using the model-averaged parameter

– min day⁻¹

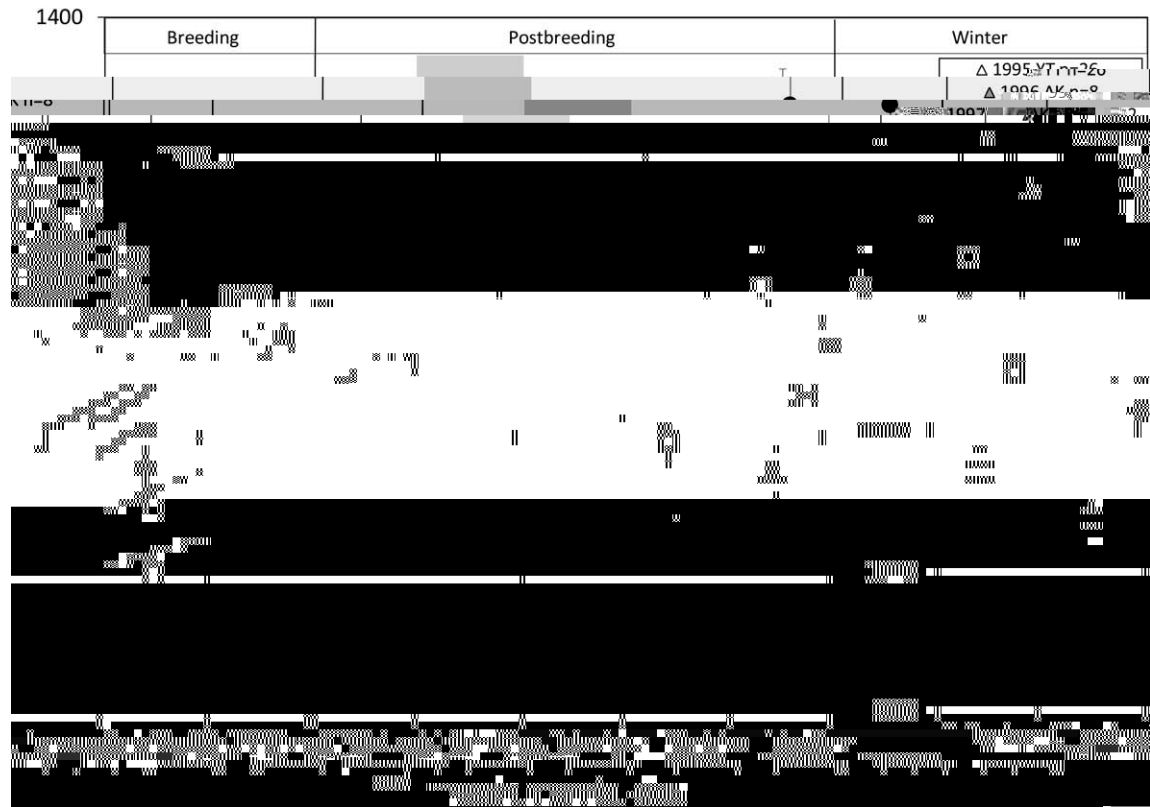


FIG. 3.

birds from the United Kingdom lost mass and decreased foraging effort in another study by Portugal et al. (). In addition, wintering American Black Ducks (*A. rubripes*) exhibited different protein-mass dynamics in Maine and Virginia (Morton et al.); spring-staging male Lesser Scaup maintained constant lipid reserves in the lower Great Lakes, but increased lipid reserves at more northern staging sites (Badzinski and Petrie); and wintering Blue-winged Teal and Northern Pintails weighed less in Yucatan, Mexico, than at more northern wintering sites in the southern United States (Tomponson and Baldassarre). Intraspecific variation in mass and foraging strategies thus appear to be common among waterfowl taxa throughout their annual cycle.

Cohort variation in mass.—Accounting for size differences, male goldeneyes showed a large difference in mass between age classes (~ g), with SY males being ~ % lighter than ASY males. Age-class difference in mass is common in many species and presumably results from subadult birds having yet to achieve their full adult mass (Morton et al. , Rhodes et al.). This may also help to explain why SY males gained slightly more mass per day during molt than ASY males; they were still growing.

Female goldeneyes exhibited a small, biologically insignificant difference in mass between age classes (~ g [$< 1\%$]). The similarity between SY and ASY female mass might be attributed to differences

foraged primarily at night. Possible explanations for this difference in foraging behavior are that () the perceived risk from diurnal predators was higher on Leddy, causing birds to be more vigilant on Leddy Lake during the day and leaving less time for foraging (Evans and Day); and/or () daily activity patterns of prey organisms differed between lakes, with Leddy Lake prey being more available at night. Survival of molting birds on both Cardinal and Leddy lakes was high (. . ; Hogan et al.) and avian predators were rarely observed on either lake during remigial molt (D. Hogan pers. obs.). However, the small size and almost continuous forest cover of Leddy Lake compared with Cardinal Lake (km vs. km) may have caused birds to perceive a higher risk of predation on Leddy as a result of being closer to shore (Merkel and Mosbech). Biweekly benthic invertebrate sampling of the lakes during the molting period (early August to early September, D-net sweep) suggested that invertebrate communities were similar, consistingr40 Td (-12(e)-2 5(r)4)4(v)5(e)-1(JTJ 0 Tc -0.02s f)7(o)1(r)1(e)0

LITERATURE CITED

A , P. A., G. J. R , I. L. J . . Time-activity budgets of Harlequin Ducks molting in the Gannet Islands, Labrador. *Condor* : - .

A , A. D., S. L. P . . Incubation and brood care. Pages - in *Ecology and Management of Breeding Waterfowl* (B. D. J. Batt, A. D. Afton, M. G. Anderson, C. D. Ankney, D. H.

JohuP (o)- DP (o)- DP (o)- DP5e31(n)6)-s2n Du4oags(m30)r(y)1apuoy rt (-)5C. D.4ts oeTj -0.002 Tc 0(y bu)3w -2437 -TD [(L)-22(a)48 budgetedlm

