

## Notes

### Frogs Consumed by Whimbrels, *Numenius phaeopus*, on Breeding Grounds at Churchill, Manitoba

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The gizzards of three female Whimbrels collected on breeding grounds at Churchill, Manitoba, contained the bones of Wood Frogs. This is the first record of Whimbrels feeding on vertebrates of any kind in America.

Key Words: Whimbrel, *Numenius phaeopus*, diet, Wood Frog, *Rana sylvatica*, breeding, Manitoba.

The Whimbrel, *Numenius phaeopus*, breeds in America from western and northern Alaska east to the western side of Hudson Bay and James Bay (Johnsgard 1981). At Churchill, Manitoba, it nests in hummock-bog, sedge-meadow and dry heath tundra areas. Higher nesting density and complexity of habitat contributes to a higher nesting success in hummock-bog habitats (Skeel 1983).

Upon their arrival on the breeding grounds, Whimbrels feed on a variety of previous summer's berries including Black Crowberry, *Empetrum nigrum*, Bog Blueberry, *Vaccinium uliginosum*, Mountain Cranberry, *Vaccinium vitis-idaea*, and Bearberry, *Arctostaphylos* spp., before switching to insects, mainly Diptera, Hymenoptera and Coleoptera, as they become abundant. Until the new berry crop becomes available, Whimbrels may supplement their diet with gastropods and the flowers of ericaceous plants. Through the rest of the year, the diet consists of crabs and other crustaceans, bivalves, gastropods, polychaetes, insects, and ripening berries (Bent 1929; Phelps and Meyer de Schauensee 1978; Skeel and Mallory 1996).

The gizzards of Whimbrels collected for a parasitological study during the nesting period at Churchill, Manitoba (58°45' N, 94°00' W), in mid-June 1991 were casually examined for food items. They contained a variety of berries and seeds, flowers and other plant material, and insect and crustacean parts. However, three of 10 gizzards, all from female Whimbrels, contained what appeared to be bones of amphibians. The bones were sent to Canadian Museum of Nature in Ottawa, Ontario, where they were identified as being from the Wood Frog, *Rana sylvatica*. The quantity of bones recovered suggested that the Whimbrels had each consumed at least two

Wood Frogs. The only other North American curlew species previously known to feed on amphibians was the Long-billed Curlew, *Numenius americanus* (Bent 1929 in Johnsgard 1981).

The Wood Frog is one of only two frog species found in the Churchill area. (Preston 1982; Cook 1984), the other being the much smaller Boreal Chorus Frog, *Pseudacris maculata* (nomenclature after Weller and Green 1997). Both species are associated with open ponds and wet tundra, especially during the breeding season (Russell and Bauer 1993). Though the calling dates of the two species overlap and vary somewhat from year to year, at Churchill, Wood Frogs call for a shorter period of time than Boreal Chorus Frogs (W. B. Preston, personal communication). It is not known whether Whimbrels rely on the calling of Wood Frogs to locate their prey although data provided by W. B. Preston suggest the breeding season for Wood Frogs would have been at or near an end by the dates the Whimbrels were collected.

This is the first record of Whimbrels from North America (*Numenius phaeopus hudsonicus* Latham) consuming vertebrates of any kind. Kumari (1958) reported finding the lizard *Lacerta vivipara* in stomachs of several breeding *N. p. phaeopus* (Linnaeus) in Estonia, the only other known instance of vertebrates being consumed by Whimbrels.

The discovery of amphibian bones in gizzards of female Whimbrels from Churchill, Manitoba, suggests these vertebrates may serve as a means of supplementing calcium intake when calcium demand is high for the production of eggs and bone growth. MacLean (1974) suggested as much for several calidrine sandpiper species in Alaska.



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# Red Squirrel, *Tamiasciurus hudsonicus*, Population Density in the Southern Appalachian Mountains

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Stevens, Richard T., and Michael L. Kennedy. 1999. Red Squirrel, *Tamiasciurus hudsonicus*, population density in the southern Appalachian Mountains. *Canadian Field-Naturalist* 113(4): 664–667.

Population density of Red Squirrels (*Tamiasciurus hudsonicus*) was estimated at a mixed conifer-hardwood forest in the southern Appalachian Mountains of eastern Tennessee during three seasons (winter 1996, spring 1996, and winter 1997) from mark-recapture data using a modified Lincoln-Peterson estimator and program CAPTURE. Density was estimated at 1.30 squirrels/ha and 1.53 squirrels/ha using Lincoln-Peterson and program CAPTURE, respectively, during both winter 1996 and spring 1996. No squirrels were captured in winter 1997. Winter and spring 1996 density estimates approached those reported for Red Squirrel populations in boreal spruce (*Picea* sp.) forest, which is regarded as optimal habitat. The cause of the population decline between spring 1996 and winter 1997 was unknown.

Key Words: Red Squirrel, *Tamiasciurus hudsonicus*, population density, Tennessee, southern Appalachian Mountains.

The Red Squirrel (*Tamiasciurus hudsonicus*) is found throughout northern North America, and along the Appalachian Mountains south to Georgia and along the Rocky Mountains south to New Mexico (Flyger and Gates 1982). Throughout the range of

the species, Red Squirrels prefer coniferous forest, especially spruce (*Picea* sp.)-fir (*Abies* sp.) forest, but are also found in conifer-hardwood mixtures and pure hardwood forest (Kemp and Keith 1970; Rusch and Reeder 1978; Flyger and Gates 1982). While





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