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Mammals, Birds, and Butterflies at Sodium Sources in Northern Ontario Forests¹

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Wildlife seen at natural sodium-rich springs and at roadside pools contaminated by highway de-icing salt in northern Ontario included two species of wild ungulates, one species of rodent, three species of birds, and two species of butterflies. The three birds were finches of the sub-family Carduelinae, noted for feeding almost exclusively on plant material. The mammalian species were also herbivorous. Apart from Porcupines (*Erethizon dorsatum*), small mammals were rarely seen at the saltwater locations, perhaps because of their apparent preference to ingest salt in solid form rather than in water.

Key Words: Mammals, birds, butterflies, sodium, salt, feeding behavior.

Much of the forested area of northern Ontario is underlain by the granitic rocks of the Precambrian Shield and is relatively poor in environmental sodium (Na). Two significant sources of Na in that area are natural mineral springs and roadside pools contaminated by highway de-icing salt. Previously we have documented that Moose (*Alces alces*) and White-tailed Deer (*Odocoileus virginianus*) are attracted to such sites (Fraser and Hristienko 1981; Fraser and Thomas 1982). While doing those studies, my co-workers and I recorded observations of other mammals, birds, and butterflies at the saltwater sources.

Methods

One study was conducted on a 156-km section of the Trans-Canada Highway near Wawa, Ontario (48°N, 84°45'W). Each winter, de-icing salt (NaCl) is spread on the highway at an estimated rate of 30-40 tonnes/km. As a result, many pools of stagnant water near the roadside have a high Na content (100-600 ppm). Because the roadside areas are laden with salt, many pools are recharged with brine at each rainfall and show little tendency for Na levels to decline during the summer (Fraser and Thomas 1982). The study involved a selection of 56 such pools inspected every second day from 16 May to 10 August 1980. Evidence of Moose activity was recorded in detail (Fraser and Thomas 1982). Records were also kept on any other mammals, birds or aggregations of insects seen at the pools.

The second study involved two natural mineral springs (licks) in Sibley Provincial Park, Ontario (48°25'N, 88°45'W). Water in the licks contains 50-200 ppm Na plus high levels of some other minerals. A selection experiment at one site showed that

Moose and White-tailed Deer at the lick were attracted specifically to Na (Fraser and Reardon 1980). The study included 1798 h of scheduled observations mainly between 0600 and 2100 EDT, between May and September of 1977-80. The observer normally watched from a tent pitched near the licks and recorded all visits by Moose and White-tailed Deer. Other users of the licks were also noted when seen, but the records likely underestimate the actual number of visits by the smaller species.

Results

Moose were seen 41 times at the roadside pools in the Wawa area, and tracks indicated regular use at many sites. White-tailed Deer, which were rare in the area, were seen only once at such pools, but tracks indicated several other visits. A Woodchuck (*Marmota monax*) was seen once, and Snowshoe Hares (*Lepus americanus*) were seen twice in or near pools, but their behavior at the sites could not be seen clearly. However, Woodchucks were frequently seen licking roadside gravel in the area during May and June.

Most sightings of birds at roadside pools were confined to three species: Evening Grosbeaks, Purple Finches, and Pine Siskins (Table 1). Those birds were commonly in groups of two or more, pecking in areas of damp soil near the salty water. Most sightings of these species were made in June and the first week of July. The few sightings of other bird species were probably unrelated to the high salt content of the pools, although Cedar Waxwings were occasionally seen pecking at mud in the pools.

Tiger Swallowtail butterflies (*Papilio glaucus*) were seen 58 times and White Admiral butterflies (*Limenitis arthemis*) three times at pools, usually on the damp

TABLE 1. Species of birds seen more than once at saltwater roadside pools in northern Ontario

| Species | Number of sightings |
|---|---------------------|
| Evening Grosbeak (<i>Coccothraustes vespertina</i>) | 157 |
| Purple Finch (<i>Carpodacus purpureus</i>) | 56 |
| Pine Siskin (<i>Carduelis pinus</i>) | 48 |
| Cedar Waxwing (<i>Bombycilla cedrorum</i>) | 5 |
| Ruffed Grouse (<i>Bonasa umbellus</i>) | 2 |
| Chipping Sparrow (<i>Spizella passerina</i>) | 2 |

mud. No other butterfly species and no unusual aggregations of other insects were noted at the sites.

At the natural mineral licks, there were 260 visits by Moose and 134 by White-tailed Deer during scheduled observations in 1977-80 (Fraser and Hristienko 1981). In most cases the animals drank for long periods, mainly from the spring source area. Other mammals included 28 visits by Porcupines (*Erethizon dorsatum*) and two by Red Squirrels (*Tamiasciurus hudsonicus*). Unlike the ungulates, the Porcupines and Squirrels did not drink the mineral-rich water, but licked the surface of exposed mud and rocks where salty water had presumably evaporated. Black Bears (*Ursus americanus*), Red Foxes (*Vulpes vulpes*) and Snowshoe Hares were occasionally seen at licks, but they simply passed by without feeding or drinking. However, Snowshoe Hares and Porcupines were commonly seen licking roadside gravel in the Sibley area.

Purple Finches (49 sightings) and Pine Siskins (4 sightings) were seen at the licks. Generally they pecked bare mud in the lick area for many minutes at a time. There was no apparent use by other bird species. Evening Grosbeaks were not seen in the study area.

Tiger Swallowtail butterflies, often in aggregations of 5 to 10, were commonly seen on damp soil in the licks. No other butterflies and no aggregations of other insects were noted.

Discussion

In view of the high levels of Na in the licks and roadside pools, and the scarcity of this element in other parts of the environment, it seems likely that Na was the major attraction for the various types of wildlife recorded. Birds might use soil or gravel areas as a source of calcium or grit, but calcium is readily available in soil, and grit could be obtained easily from the large areas of bare gravel and soil near the roads. Hence, neither of these possibilities could likely explain the concentration of wildlife at the localized Na-rich sites.

Attraction to Na sources appears to be exceptional

among insects. Only Tiger Swallowtail butterflies have a demonstrated attraction to Na (Arms et al. 1974). That species and White Admiral butterflies accounted for all the unusual insect activity noted in the present study. Shiras (1936), the only other author to record insects at wildlife licks, mentioned only two butterfly species. From his descriptions and photograph, those appear to have been Tiger Swallowtails and White Admirals.

Among birds, attraction to Na sources was limited to finches of the subfamily Carduelinae and possibly a few Cedar Waxwings. The many species of warblers, thrushes, flycatchers, and other groups in the area showed no evidence of attraction to Na. Similarly, previous reports of attraction to Na are largely limited to the cardueline finches (Tordoff 1954; Dawson et al. 1965). Those birds are unusual in feeding, and rearing their young, almost exclusively on vegetable material [seeds of trees] (Newton 1972). The Na-poor vegetarian diet probably accounts for the attraction to Na (Tordoff 1954).

Many herbivorous mammals show evidence of Na-deficiency or an attraction to Na in areas where the element is scarce. Species include Snowshoe Hares (Smith et al. 1978), Woodchucks (Weeks and Kirkpatrick 1978), and some microtine rodents (Aumann and Emlen 1965), as well as the large ungulates. In this study, however, only the ungulates (and Porcupines to a lesser extent) made heavy use of the licks and pools. The difference may be due in part to the greater mobility of the ungulates. For example, Moose will travel long distances to mineral licks (Best et al. 1977). Presumably that would be much less feasible for the smaller mammals.

A more basic factor may be the manner in which the different species typically ingest salt. Evidently, the Moose and White-tailed Deer were willing to consume large amounts of water in order to obtain the dissolved minerals. By contrast, the smaller mammals at the licks (Porcupines and Red Squirrels) appeared to be seeking more concentrated minerals where lick water had evaporated. Also, Snowshoe Hares, Woodchucks and Porcupines were frequently seen licking roadside gravel, perhaps to obtain salt in solid form. The smaller mammals may lack the physiological capability to extract salt from large volumes of water. As the pools and licks mainly provide Na-rich water, with crystalline deposits occurring only incidentally, they may have limited attraction for small mammals.

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Fisher, *Martes pennanti*, Behavior in Proximity to Human Activity

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Johnson, William A., and Arlen W. Todd. 1985. Fisher, *Martes pennanti*, behavior in proximity to human activity. *Canadian Field-Naturalist* 99(3): 367-369.

Accounts are given of three direct observations of the Fisher (*Martes pennanti*) in the wild. These accounts suggest the Fisher is less sensitive to human disturbance than reported in some of the traditional mammalogical literature.

Key Words: Fisher, *Martes pennanti*, behavior, human disturbance.

There are few published accounts of observations of the Fisher (*Martes pennanti*) in the wild. Some mammalogists have considered mustelids such as the Marten (*Martes americana*) and Fisher to be "secretive" (Banfield 1974: 318) or inherently shy, "almost fanatically retiring" (Soper 1964: 294-299), implying that these species are extremely sensitive to human disturbance. However, Halvorson (1961) attributed the lack of sight records of these species to their general scarcity and occurrence in more remote areas, as well as possible inherent shyness. Two accounts of the Fisher in sanctuaries suggest the animal may not be as shy as believed. Hubbard (1943) described a Fisher in Sequoia National Park seemingly showing unconcern in the near presence of man until the animal appar-

ently caught his scent. Pittaway (1978) recounted two observations of Fishers chasing Snowshoe Hares (*Lepus americanus*) along highways in Algonquin Provincial Park and summarized observations of a Fisher habituated to a window feeder. Wildlife species are typically less shy in sanctuaries however, and there is a paucity of direct observations of Fishers outside such protected areas. This paper describes three observations of Fishers in proximity to human activity, but where Fisher trapping is allowed. There is very little scientific information published on the effects of disturbances on Fisher.

On 25 September 1982 a Fisher was observed in a mixed woods stand which borders on farmland 22 km north of Peace River, Alberta (55°25'N, 117°13'W).