

Finding the Phantom Spruce Grouse

by
Ron Tozer and Ron Pittaway

Introduction

The Spruce Grouse (*Dendragapus canadensis*) is one of the species most sought after by North American birders. Algonquin Provincial Park may be the most accessible and easiest location for birders to find this elusive grouse in Ontario (Tozer 1990). We have been successful in finding Spruce Grouse in the Park for individuals and groups to see on dozens of occasions over the years. Showing birders (often with many years experience) their first Spruce Grouse gives us a birder's high! We wish now to pass along to a larger audience our experience in finding these retiring birds, and perhaps increase interest in this fascinating species.

This article consists of three sections. First, we review some interesting aspects of Spruce Grouse life history which are relevant to birders seeking these birds in the different seasons. Second, we describe proven techniques used to search for these often inconspicuous grouse. And lastly, we provide detailed site

guides for the best places to find Spruce Grouse in Algonquin Provincial Park.

Life history

Spruce Grouse are most abundant in Ontario within the Boreal Forest Zone, where they inhabit upland black spruce (*Picea mariana*) and pure young jack pine (*Pinus banksiana*) forests with a ground cover of ericaceous plants such as blueberry (*Vaccinium* sp.) and trailing arbutus (*Epigaea repens*) (Szuba and Naylor 1987). Typical Spruce Grouse habitat in Algonquin Park, which is at the southern edge of the species' Ontario range, consists of open-grown, mature black spruce forest bordering large bogs, and extensive jack pine stands on the Park's east side (Strickland 1990).

In spring, adult male Spruce Grouse exhibit elaborate courtship behaviour (Bent 1932; Lumsden 1961; MacDonald 1968; Robinson 1980), including "flutter flights", "strutting", and "tail-swishing" displays, as they defend their territories and attempt to attract

Ron Tozer, Algonquin Park Museum, Box 219, Whitney, Ontario K0J 2M0
Ron Pittaway, Leslie M. Frost Natural Resources Centre, Dorset, Ontario
P0A 1E0



Figure 1: Displaying adult male, and adult female Spruce Grouse. Drawing by Howard Coneybeare.

females. During the "flutter flight", a fairly loud but low-pitched "whirring" sound is produced as the male flutters with rapidly beating wings upwards from the ground to a low perch, or from a perch to the

ground. A "strutting" male inflates "crimson combs" over its eyes, erects neck and upper breast feathers, and holds its tail in an almost vertical position. Each side of the erect tail is alternately

fanned open and shut as the bird struts, producing a "swishing" sound that is clearly audible to human ears at some distance (Figure 1). In Algonquin Park, displaying males are most frequently encountered from late March through mid May, but some individuals actually start in late winter.

Female Spruce Grouse occupy relatively large, exclusive territories of their own during spring (Herzog and Boag 1978). They come to the males' territories only for mating, and do not establish a prolonged pair bond (Ellison 1971). Both sexes are promiscuous. Resident adult females advertise their presence to conspecifics and probably maintain their territories by producing both vocal and nonvocal sounds that peak in intensity during the period of mating and laying (Nugent and Boag 1982). These sounds include an "aggressive call" that is sung from regularly used advertising perches at dawn and dusk, and flight sounds that are produced by flying frequently through the territory at these times (Nugent and Boag 1982). Researchers have concluded that "the territorial behaviour of breeding females, manifested by intrasexual aggression, appeared to play a role in spacing of nests and spring dispersal of some yearlings" (Nugent and Boag 1982).

The "aggressive calls" of females have "abrupt discontinuities", "wide frequency range", and "repetitious

pulses" which appear to be adaptive for communication in the dense forests which they inhabit (Nugent and Boag 1982). The use of elevated singing perches may additionally minimize blockage of sound by thick vegetation. Males are attracted and stimulated by the "aggressive calls" of females. "Vocal advertising by females may inform surrounding males of the females' physiological state as well as stimulate and synchronize sexual behaviour" (Nugent and Boag 1982).

After mating, laying females tend to avoid male display sites, which results in the spacing of nesting females "far from conspicuous activity centres of males" (Nugent and Boag 1982). An adaptive advantage of minimizing association with males after mating could be that female grouse reduce predation risk and maximize concealment (Wittenberger 1978). Territorial defense by females may ensure adequate supplies of food for sustenance during the incubation period (Herzog 1978). Spruce Grouse hens prefer foods that are rich in crude protein and phosphorus in spring, such as tender growing spruce and jack pine needles, moss capsules, trailing arbutus flowers, and blueberry buds (Pendergast and Boag 1971; Naylor and Bendell 1989).

Spruce Grouse nests consist of a depression in the ground, thinly lined with grass and leaves, and are

often placed at the base of a small conifer or under low, sweeping evergreen branches (Peck and James 1983; Godfrey 1986). Clutches average four to seven eggs, and are incubated about 24 days, by the female (Godfrey 1986). In Algonquin Park, nests with eggs have been noted during May, and females with broods of young are typically encountered from mid June to mid August. Broods gradually break up when calls of the young no longer elicit a response by the female (Schroeder and Boag 1985).

Adult Spruce Grouse undergo a complete, but gradual, replacement of all their feathers over two months in the summer, during the warmest time of the year and when high quality food is available to supply increased energy demands to produce new feathers (Robinson 1980). Moulting occurs from mid June to mid August, and at this time adult Spruce Grouse are dispersed, frequently occupy dense ground cover, and remain inconspicuous by refraining from displaying (Ellison 1973). Feeding activity occurs primarily on the ground during the summer period, and involves mushrooms, insects, berries, seeds, and tender leaves of herbaceous plants (Baillie 1956; Pendergast and Boag 1970).

The largest groups of Spruce Grouse (rarely up to 15 birds) may be encountered in early fall (Ellison 1973); "these flocks are made up of a mixture of ages and sexes, and of birds from different broods"

(Robinson 1980). They are frequently observed at good sources of grit such as gravel roads and highway shoulders during the fall. Autumn dispersal of juvenile Spruce Grouse results in males and females settling in areas where they will later attempt to establish themselves as breeding residents (Alway and Boag 1979). Yearling males seek territories in vacant sites, either where adult males have died or the habitat is marginal (Robinson 1980).

During September and October, Spruce Grouse feed increasingly on conifer needles even though other food sources (e.g., ground vegetation) are still readily available (Robinson 1980). The birds gradually undergo physical changes in their internal anatomy (i.e., weight and length of the gastrointestinal tract) as they adapt to a winter diet of pine and spruce needles (Pendergast and Boag 1973). During the fall, tamarack (*Larix laricina*) needles become an important transition food to the winter diet of conifer needles, and Spruce Grouse may be found in these trees over 75 per cent of the time then (Crichton 1963; Allan 1985). Males and females without young may actually begin to feed on tamarack as early as mid summer (Allan 1985). Spruce Grouse gradually spend more time in trees and less on the ground as autumn progresses (Keppie 1977), reaching a peak as snow cover becomes permanent.

During the fall, adult male

Spruce Grouse (Figure 2) actively display again, apparently to reassert their residency, as with the autumn drumming of Ruffed Grouse (*Bonasa umbellus*), according to Herzog and Boag (1978). "Flutter flights", "strutting", and "tail-swishing" may all be observed in September and October (Ellison 1971).

In the winter, Spruce Grouse repeatedly browse or roost in individual trees (called "activity trees" by researchers), while ignoring nearby trees of similar physical characteristics (Hohf *et al.* 1987). Chemical analysis of jack pine needles on activity trees in Michigan showed a significantly higher protein and ash content than needles on adjacent

unbrowsed trees (Gurchinoff and Robinson 1972). It is not known how Spruce Grouse recognize these "superior" trees.

Following snow melt in early spring, Spruce Grouse expand their diet, which has consisted almost entirely of conifer needles during winter. They return to ground feeding in search of new plant growth such as moss capsules, trailing arbutus flowers, expanding buds of blueberry, and bunchberry (*Cornus canadensis*) leaves (Naylor and Bendell 1989).

Techniques for finding Spruce Grouse

Published suggestions for finding Spruce Grouse frequently involve driving or walking long distances



Figure 2. Adult male Spruce Grouse (Franklin's race). Drawing by Howard Coneybeare.

on back roads through vast areas of suitable habitat (Krebs and Krebs 1977; Janssen 1978; Gibson 1983). While such random searching will often result in success given enough time, your chances are greatly improved by looking in areas of limited habitat where Spruce Grouse are present. The "boreal islands" created by large bogs in the hardwood forests of Algonquin's west side, and jack pine stands of the Park's east side, provide ideal areas of limited habitat for Spruce Grouse searches. By employing proven finding techniques, and being aware of Spruce Grouse behaviour in a given season, a birder can have a very good chance of locating this species.

A systematic search should be made in an area where Spruce Grouse have been regularly observed, with the birder walking slowly and making frequent stops. By alternately walking and then stopping, you may spook the bird into making a movement since it may sense detection. Don't expect a Spruce Grouse to flush, however, unless you happen to approach very closely. You must look and listen very carefully in order to detect the slightest movement. For instance, a bird may be revealed by nothing more than the snapping sound made when it clips off needles with its bill. The presence of dust-bathing depressions in exposed sand is another good indicator to watch for when searching for Spruce Grouse. Group searches can be very

effective, with birders walking abreast in a line and spaced about 15m apart. Unlike most birding, it can be helpful to walk towards the sun and look for the distinctive Spruce Grouse silhouette in the dark forests they inhabit.

Contrary to some popular accounts, it is not necessary to peer into the densest, darkest recesses of coniferous trees to find a Spruce Grouse (although occasionally birds will occur there, especially when roosting). Birders with experience in finding Spruce Grouse develop a "search image" for the species, based on the bird's typical shape and habits. As you walk slowly through the habitat, your eyes should constantly "sweep" the ground area first and then up the outer branches of conifers to a height of about 7m. Spruce Grouse can be found at any time of the day, but early morning and evening can be better since the light winds often prevalent then allow easier detection of grouse movements and sounds. The birds are more likely to be actively feeding then, and displays and calls are more frequent at those times.

In addition to the general directions for finding Spruce Grouse noted above, there are specific detection techniques which can be very effectively employed in the different seasons of the year. For instance, during the spring (especially late March through mid May) the "flutter flights" of displaying males can be heard at a great distance, and even "tail-

swishing" is audible on still days — aiding discovery of the birds themselves. The "aggressive calls" of females are available on both the National Geographic and Peterson bird song tapes (National Geographic Society 1983; Cornell Laboratory of Ornithology 1983), and can be played (sparingly) using a portable recorder in spring to attract displaying males and elicit vocal responses from females (MacDonald 1968; Robinson 1980; Szuba and Naylor 1987). As soon as the birds have been located, there should be no further playing of the tape, however. Responsible birders should always strive to disrupt the lives of birds as little as possible. With practice, birders can produce effective imitations (without using tapes) of both the whirring "flutter flight" sound and the "aggressive call" of females — either of which will often be enough to start males displaying.

Unfortunately, many birders end up trying to find Spruce Grouse during the summer when they visit areas with suitable habitat during vacations. This season is usually the least productive for finding these birds since they often feed on the ground in thick vegetation, females are secretive with their broods, and these grouse are even more retiring than usual during their moult. Our only advice for this season would be to undertake extensive searching in suitable habitat during the more active feeding periods (early morning and evening), and to get lucky! The birds usually do not

respond to display stimuli in summer, so you have to just search carefully until you find one.

We consider the autumn to be an excellent time for finding Spruce Grouse, second only to spring. Although less enthusiastically than in spring, males will frequently display and females will often call in response to tapes of the female "aggressive call" played during September and October. Patches of tamarack within Spruce Grouse habitat should be searched from September to mid October, when these grouse regularly feed on this tree's needles. Spruce Grouse are also often found along road edges and trails as they pick up grit during the fall.

Looking for Spruce Grouse in winter can be either frustrating or very rewarding! At times, areas that have produced in the past seem totally devoid of these birds. But return to the same site later in the day or the next day, and you may find a whole flock! They have been found on 11 of the 17 Algonquin Park Christmas Bird Counts, and during count week in four more years. There are some factors to be aware of which can help you find Spruce Grouse in winter, however.

Try to pick a time with little wind soon after a snowfall. The birds may be more active and visible as they feed on conifer needles after a snowstorm. Grouse moving slowly along a branch will dislodge snow, which the alert birder will detect as it falls on a still day. Try to

find out from other birders the exact area where Spruce Grouse have been recently seen — since the birds will return to favoured “activity trees” to feed on the superior foliage. Watch for droppings on the snow, which can indicate feeding or roosting sites. Ruffed Grouse often occupy the same habitat, so don't mistake their droppings for those of Spruce Grouse. The latter are greener (due to the needle diet) and slightly smaller in diameter than Ruffed Grouse droppings.

In late winter or early spring, when a crust has formed on the snow, Spruce Grouse frequently leave the trees to walk on this hard surface. We have often followed

their tracks to locate the birds after a light snowfall. But don't forget your snowshoes; it is difficult enough to find Spruce Grouse in winter, without wallowing through deep snow.

Site guides

Algonquin Provincial Park, nearly 7600km² in size, is located on the southern edge of the Canadian Shield between Georgian Bay and the Ottawa River. The southern part of the Park may be accessed via Highway 60, while the eastern portion can be reached by secondary roads off Highway 17. Spruce Grouse are regularly observed at a number of locations in Algonquin (see Tozer 1990), but what we believe to be the three best areas are featured here.

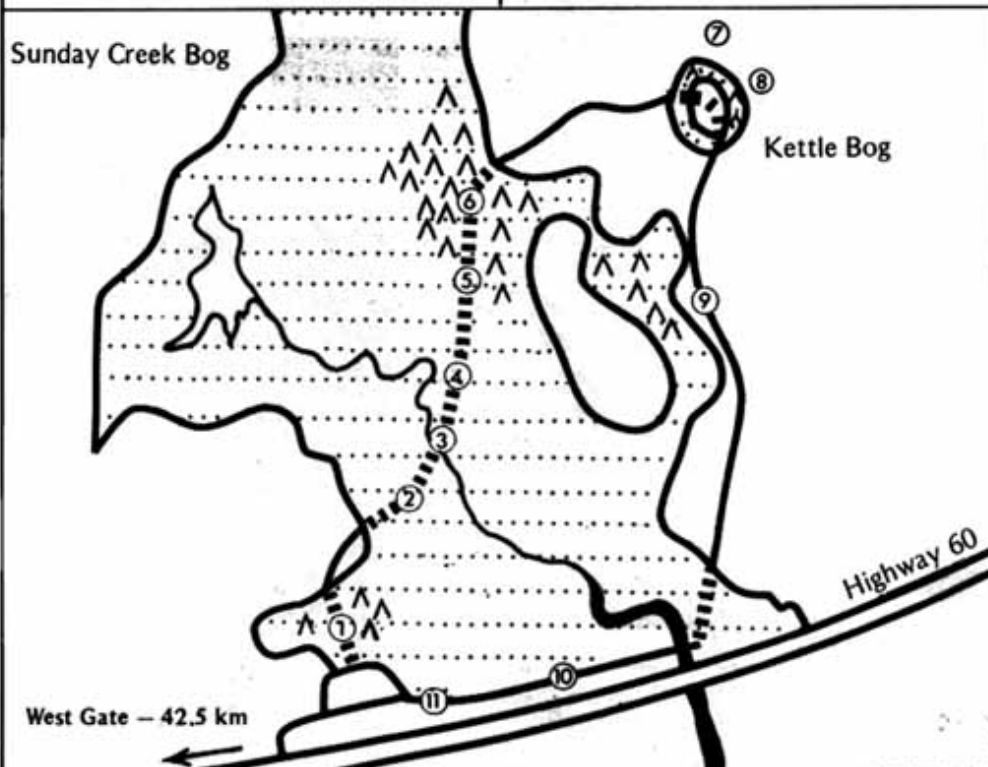


Figure 3. Spruce Bog Boardwalk map

(1) Spruce Bog Boardwalk

This walking trail is a 1.5km loop, with about half the distance on boardwalk, through black spruce bog and drier, open coniferous forest. It is located along the

Highway 60 Corridor at a point 42.5km from the Park's West Gate. Spruce Grouse are frequently seen here at all seasons, and nests and broods of young have been found.

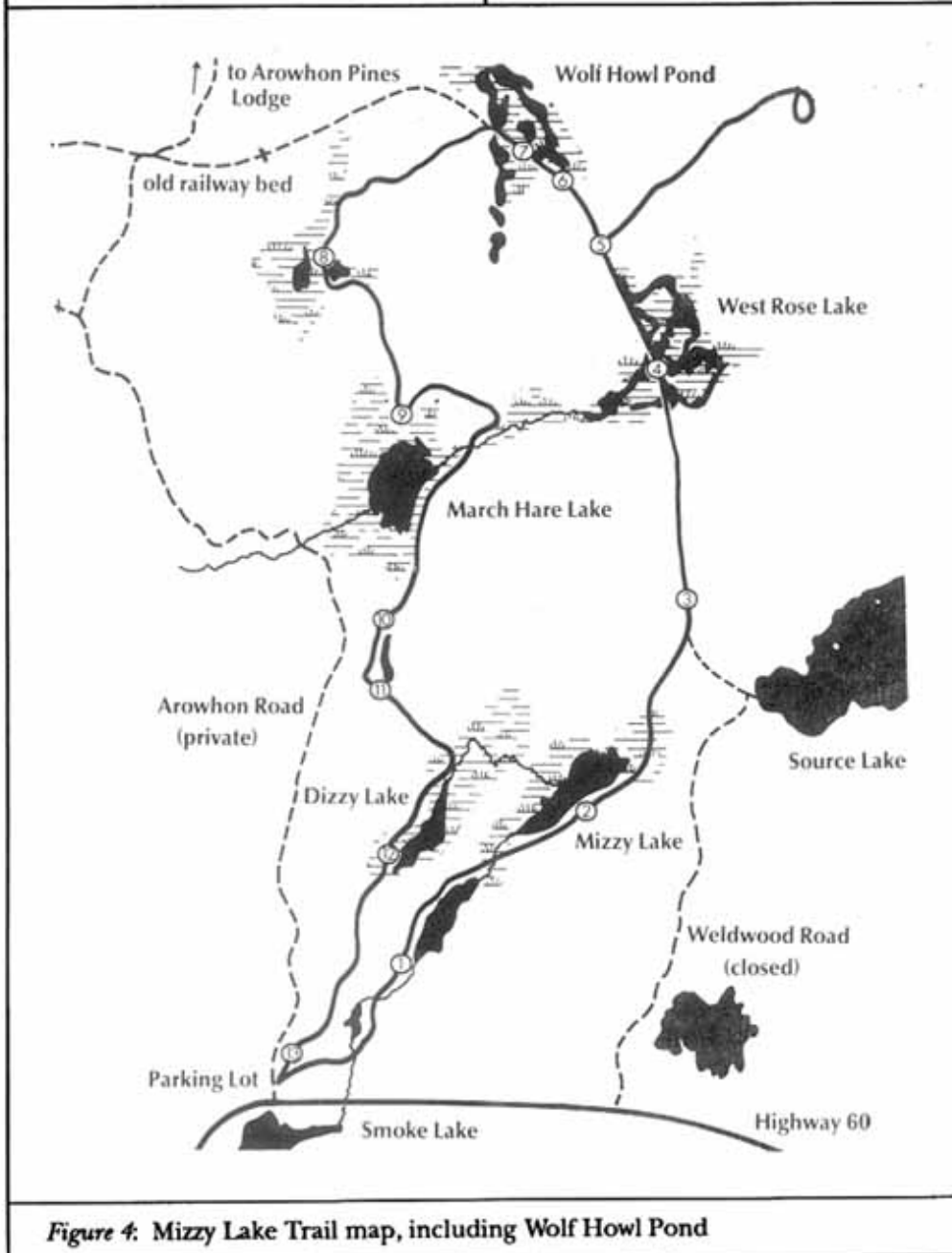


Figure 4: Mizzy Lake Trail map, including Wolf Howl Pond

The numbered sections in a trail guide booklet (available at the entrance) correspond to numbered posts along the trail (Strickland 1989). Good places (see Figure 3) to check carefully for Spruce Grouse include the dry area of spruce-pine-fir forest on your left (north) as you leave the short boardwalk which has Post #1. Feel free to leave the trail to search this area (which is laced with grouse seeker paths!) since it is surrounded by open bog, unsuitable deciduous forest, and the main trail itself — which along with highway noise should prevent you from getting lost. Also check the area near the trail register box between Posts #6 and #7, and at the kettle bog near Post #8. However, the birds are often seen right on the trail, anywhere along its route.

(2) Wolf Howl Pond

The Wolf Howl Pond area is another excellent place to see Spruce Grouse. It is located on the Mizzy Lake Trail, an 11 km loop beginning on the Arowhon Road, just in from Kilometre 15.4 on Highway 60 (measured from the Park's West Gate). This walking trail also has an interpretive trail guide booklet (Strickland 1988), available at the entrance. Wolf Howl Pond is most easily visited from spring through fall, when birders may avoid the long hike (see Figure 4) by driving up the Arowhon Road to the old railway bed, turning right (east) and proceeding to a locked gate. Park there (not blocking the

road!). From the gate, walk approximately 1 km down the railway bed to the area just past a rockcut where it joins the Mizzy Lake Trail at Wolf Howl Pond.

Coniferous forest bordering the railway bed on both sides of Wolf Howl Pond should be thoroughly searched for Spruce Grouse. The birds are often seen right on the railbed, where they pick up grit. A tamarack grove near Post #6 is frequently productive in late summer and fall. Other species you may encounter at Wolf Howl Pond include Black-backed Woodpecker (*Picoides arcticus*), Gray Jay (*Perisoreus canadensis*), and Boreal Chickadee (*Parus hudsonicus*).

(3) Lake Travers

This area is located on the east side of Algonquin Park and may be reached by the Grand Lake-Lake Travers Road from spring through fall, and in winter as well during years when logging operations are underway. Access to this part of the park is via the Sand Lake Gate which is reached as follows: turn south off Highway 17 on to County Road 26, about 9 km west of Pembroke; travel 300 m, then turn right at the Achray Road and drive 26 km to the gate. The Lake Travers area is another 53 km into the Park beyond the Sand Lake Gate (see Figure 5).

Spruce Grouse are common throughout a large area of jack pine near Lake Travers. The birds are often seen feeding in the jack pines or picking up grit during the early

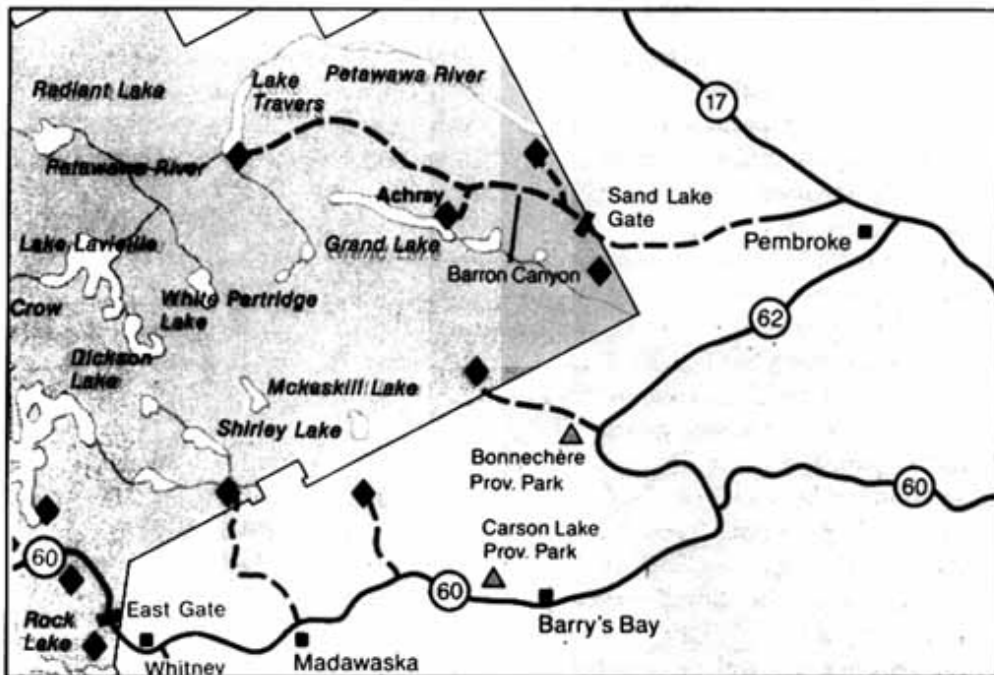


Figure 5: Algonquin Provincial Park "east side" map, including Lake Travers-Grand Lake Road

morning right along the main road, especially between Kilometre markers #62 and #68. Several sideroads through the pine stands can be walked in search of these grouse, as well.

This area can be very good (in season) for species such as Merlin (*Falco columbarius*), Gray Jay, Pine Warbler (*Dendroica pinus*), Lincoln's Sparrow (*Melospiza lincolni*), and Red Crossbill (*Loxia curvirostra*). The lake itself attracts many migrants, including Red-necked Grebe (*Podiceps grisegena*), Oldsquaw (*Clangula hyemalis*), scoters (*Melanitta spp.*), Red-breasted Merganser (*Mergus serrator*), and Bonaparte's Gull (*Larus philadelphia*).

Gas, food and supplies are not

available along the Grand Lake-Lake Travers Road within Algonquin Park. However, these items can be obtained at a store about 20km before the Park entrance. A campground (spring through fall) is located at Achray on Grand Lake, and there are many good motels and restaurants in the Pembroke area.

Additional information

For more information about finding Spruce Grouse, Park publications, accommodations, and services available, contact: Park Naturalist, Algonquin Park Museum, Box 219, Whitney, Ontario K0J 2M0. Enquiries may be made by telephone (705-633-5592 or 633-5505) on weekdays during office hours.

Algonquin Park interpretive publications may be obtained from: The Friends of Algonquin Park, Box 248, Whitney, Ontario K0J 2M0. Of particular interest to birders are: "Checklist and Seasonal Status of the Birds of Algonquin Provincial Park" (includes abundance, breeding status, and bar graphs showing arrival and departure dates for the Park's 258 species) at \$1.25; and "Birds of Algonquin Provincial Park" (with information on the behaviour, adaptations and ecology of 77 common Algonquin birds, and full colour photographs of each) at \$2.95. (Add GST and 95 cents to your order for postage and handling.)

Birders are encouraged to visit the Algonquin Park Museum (located at Kilometre 20 on Highway 60, measured from the West Gate of the Park) to obtain detailed directions on the latest Spruce Grouse sightings and other species, and to report their bird observations. The Museum exhibits and bookstore are open on weekends from mid May to mid June, and then daily to early October. During the time of year when the Museum is not open, the Naturalist Staff may be contacted at their offices in the basement (enter by a door at the rear of the building) on weekdays between 0800h and 1630h.

Acknowledgements

We would like to thank "Stu" MacDonald, formerly Curator of

Vertebrate Ethology at the National Museum of Natural Sciences, for awakening our interest in the behaviour and ways of Spruce Grouse. We also appreciate the suggestions of Michael Runtz and Dan Strickland of the Algonquin Park Museum, who reviewed the manuscript. Dan Brunton, Chris Lemieux, and Rory MacKay provided comments on an earlier draft. Peter Burke kindly prepared an illustration specifically for this article, and Howard Coneybeare allowed us to publish his drawings; we are deeply indebted to them both. Finally, thanks are due to Phill Holder for providing a reference photograph, and to Patricia Tozer for computer assistance.

Literature cited

- Allan, T. A. 1985. Seasonal changes in habitat use by Maine Spruce Grouse. *Canadian Journal of Zoology* 63:2738-2742.
- Alway, J. H. and D. A. Boag. 1979. Behaviour of captive Spruce Grouse at the time broods break up and juveniles disperse. *Canadian Journal of Zoology* 57:1311-1317.
- Baillie, J. L. 1956. Ontario Grouse. Royal Ontario Museum, Toronto.
- Bent, A. C. 1932. Life Histories of North American Gallinaceous Birds. United States National Museum Bulletin 162, Washington, D.C.
- Cornell Laboratory of Ornithology. 1983. A Field Guide to Bird Songs of Eastern and Central North America. Houghton Mifflin Co., Boston.
- Crichton, V. 1963. Autumn and winter foods of the Spruce Grouse in central Ontario. *Journal of Wildlife Management* 27: 597.
- Ellison, L. N. 1971. Territoriality in Alaskan Spruce Grouse. *Auk* 88:652-664.
- Ellison, L. N. 1973. Seasonal social organization and movements of Spruce Grouse. *Condor* 75:375-385.
- Gibson, J. 1983. Grouse, Spruce (Aroostook

- County, ME). *Birding* 15:166 (S)-166(T).
- Godfrey, W. E. 1986. *The Birds of Canada*. Revised edition. National Museum of Natural Sciences, Ottawa.
- Gurchinoff, S. and W. L. Robinson. 1972. Chemical characteristics of jackpine needles selected by feeding Spruce Grouse. *Journal of Wildlife Management* 36:80-87.
- Herzog, P. W. 1978. Food selection by female Spruce Grouse during incubation. *Journal of Wildlife Management* 42:632-636.
- Herzog, P. W. and D. A. Boag. 1978. Dispersion and mobility in a local population of Spruce Grouse. *Journal of Wildlife Management* 42:853-865.
- Hof, R. S., J. T. Ratti, and R. Croteau. 1987. Experimental analysis of winter food selection by Spruce Grouse. *Journal of Wildlife Management* 51:159-167.
- Keppie, D. M. 1977. Snow cover and the use of trees by Spruce Grouse in autumn. *Condor* 79:382-384.
- Krebs, J. and B. Krebs. 1977. Grouse, Spruce (Piscataquis County, Maine). *Birding* 9:77-78.
- Janssen, R. B. 1978. The enigma of the Spruce. *Birding* 10:97-99.
- Lumsden, H. G. 1961. Displays of the Spruce Grouse. *Canadian Field-Naturalist* 75:152-160.
- MacDonald, S. D. 1968. The courtship and territorial behavior of Franklin's race of the Spruce Grouse. *Living Bird* 7:5-25.
- National Geographic Society. 1983. *Guide to Bird Sounds*. National Geographic Society, Washington, D.C.
- Naylor, B. J. and J. F. Bendall. 1989. Clutch size and egg size of Spruce Grouse in relation to spring diet, food supply, and endogenous reserves. *Canadian Journal of Zoology* 67:969-980.
- Nugent, D. P. and D. A. Boag. 1982. Communication among territorial female Spruce Grouse. *Canadian Journal of Zoology* 60:2624-2632.
- Peck, C. K. and R. D. James. 1983. *Breeding Birds of Ontario: Nidology and Distribution*. Volume 1: Nonpasserines. Life Sciences Miscellaneous Publication, Royal Ontario Museum, Toronto.
- Pendergast, B. A. and D. A. Boag. 1970. Seasonal changes in diet of Spruce Grouse in central Alberta. *Journal of Wildlife Management* 34:605-611.
- Pendergast, B. A. and D. A. Boag. 1971. Nutritional aspects of the diet of Spruce Grouse in central Alberta. *Condor* 73:437-443.
- Pendergast, B. A. and D. A. Boag. 1973. Seasonal changes in the internal anatomy of Spruce Grouse in Alberta. *Auk* 90:307-317.
- Robinson, W. L. 1980. *Fool Hen: The Spruce Grouse on the Yellow Dog Plains*. University of Wisconsin Press, Madison.
- Schroeder, M. A. and D. A. Boag. 1985. Behaviour of Spruce Grouse broods in the field. *Canadian Journal of Zoology* 63:2494-2500.
- Strickland, D. 1988. *Mizzy Lake Trail: Wildlife in Algonquin*. The Friends of Algonquin Park, Whitney, Ontario.
- Strickland, D. 1989. *Spruce Bog Boardwalk: Algonquin Spruce Bog Ecology*. The Friends of Algonquin Park, Whitney, Ontario.
- Strickland, D. 1990. *Birds of Algonquin Provincial Park*. The Friends of Algonquin Park, Whitney, Ontario.
- Stuba, K. J. and B. J. Naylor. 1987. Spruce Grouse. pp. 136-137. In Cadman, M. D., P. F. J. Eagles, and F. M. Helleiner (eds). *Atlas of the Breeding Birds of Ontario*. University of Waterloo Press, Waterloo.
- Toner, R. 1990. *Checklist and Seasonal Status of the Birds of Algonquin Provincial Park*. The Friends of Algonquin Park, Whitney, Ontario.
- Wittenberger, J. F. 1978. The evolution of mating systems in grouse. *Condor* 80:126-137.