

**DISTRIBUTION, FEEDING AND HABITAT  
RELATIONSHIPS OF BIRDS OF PREY IN THE  
WESTERN NEWFOUNDLAND MODEL FOREST**

**Original Report  
For/By Western NF  
Model Forest**

by

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## Introduction

The Western Newfoundland Model Forest (WNMF) project was initiated to potentially resolve issues that have arisen between different forest user groups in this region. Traditionally, most attention has been focused on timber production with little emphasis placed upon other resource values of the area. A major objective of the WNMF program is to develop a planning process for integrated resource management that will adequately address all concerns including the sustainable development of renewable natural resources and large scale ecosystem preservation. These objectives will require strong coordination and cooperation from all partners of the Model Forest organization as well as from the general public.

Wildlife have historically been utilized for recreational and economic purposes by many people of Newfoundland. However, with increasing access to remote areas, improved hunting technology, and a growing population of hunters and other wildlife users, the influence of human activities on wildlife has escalated. A second objective of the WNMF program, therefore, is to integrate wildlife and timber management objectives. Since timber management is a major manipulator of habitat, it is important to know the habitat requirements of a variety of species in order to accurately assess impacts of harvesting on wildlife and to design harvesting techniques to achieve and preserve wildlife objectives (WNMF 1993).

A study of the distribution and habitat requirements of birds of prey within the WNMF is an important component of understanding wildlife and forestry interactions in Newfoundland. Ecological study and preservation of top level carnivores offer direct and incisive means with which to understand and maintain biodiversity in terrestrial ecosystems (e.g. Soule and Wilcox 1980; Frankel and Soule 1981). Raptors are vulnerable to both natural and human-induced perturbation (e.g. Poole 1989) and thus are valuable indicator species within boreal forest ecosystems.

## **Study Objectives**

Little is known about the diversity, distribution, and habitat requirements of birds of prey associated with Newfoundland's boreal forests. For these reasons, the objectives are aimed at basic aspects of raptor study techniques and ecology:

1. To generate effective, practical means to census birds of prey in the WNMF.
2. To study species diversity and the relative abundances of raptors in the various habitats within the WNMF.
3. To gain an understanding of the spatial and temporal distributions of raptors in the WNMF.
4. To determine the habitat requirements of raptors in the WNMF.
5. To investigate prey availability associated with different forest habitat types, and to study the feeding ecology of raptors.
6. To identify knowledge gaps with respect to Newfoundland raptors, and in doing so to develop research objectives for future studies.

## **Materials and Methods**

Several methodological modifications will be implemented in the upcoming field season (1994) based upon recent consultation with these committee members and independent observers. These include changes made to the location and length of study sites, reclassification of major habitat types, the focal species within each broad habitat type, and the scale of habitat mensuration.

The main area of interest in 1993 was the region around Little Grand Lake/Marten Pond, however considerable effort was also made surveying for raptors in other sites throughout the Western Newfoundland Model Forest. These included sites near Deer Lake, Cook's Pond, Watson's Pond, Stephenville, George's Lake and Victoria Lake. In an effort to control for factors such as local climate, topography, and raptor prey populations, this year's field work will almost entirely encompass survey routes in old growth forests (the area around Little Grand Lake/Marten Pond, second growth forests (the secondary road from the T.C.H to Gallants) , and several clearcut areas near Cook's Pond (see figure

1). In an effort to gain a more general understanding of the diversity and abundances of raptors within given habitat types, the range of habitats surveyed for birds of prey will be simplified to include three broad categories: 1) old growth forests (80+ yr), 2) second growth forests (30-60 yr) and 3) clearcut areas (1-10 yr). Silvicultured (pre-commercially thinned) areas will be excluded from consideration since the total land area of this habitat type in the Western Newfoundland Model Forest is essentially negligible. In 1994, an equal number of survey routes of comparable distance will be established in the three habitat types. The estimated distance to be surveyed in each habitat type will fall in the range of 20 - 25 kilometres. Increasing the surveying effort for both second growth and clearcut areas will allow comparisons to be made between all habitat types. Efforts will also be made to conduct the same number of surveys for each route in a given habitat.

Because of logistical limitations and periods of inclement weather, the number of surveys that can realistically be conducted becomes greatly reduced. Results from 1993 indicates that Merlins did not respond to conspecific vocalization playbacks in either habitat, however incidental sightings were recorded for each habitat. Because of their apparent lack of response to vocalizations, playbacks for this species will not be broadcast in 1994. In 1993 Great Horned Owls and Northern Goshawks were also undetected using conspecific vocalizations. This may be attributable to the lack of surveying effort spent in second growth forests. Both of these species prey largely on snowshoe hare and ruffed grouse which are normally associated with younger successional stages. Playbacks for these two species will again be broadcast in 1994 as the surveying effort in second growth forests will be comparable to that in old growth forests and clearcuts. Both Boreal Owls and Sharp-shinned hawks did respond to conspecific vocalization playbacks in 1993. Broadcasts for these species in each habitat type will be repeated in 1994. In contrast to the methods followed in 1993, nocturnal surveys will involve broadcasting playbacks for both Boreal and Great Horned Owls during the same night. In the three habitat types to be surveyed, the vocalization playback for each owl species will be broadcast at every second 800 m stop along the survey route. This method will also be implemented for diurnal surveys of which the focal species include the Northern Hawk-Owl, Sharp-shinned Hawk, and Northern Goshawk. In this instance, the playbacks for any individual species will be broadcast at every third 800 m stop along the survey routes. This method will

control for variations in weather conditions that may otherwise influence the detectability of the different raptor species on successive days. Data will also be collected for the occurrence of raptors other than those of primary interest in any given habitat. In addition to the species listed above, these may include Merlins, American Kestrels, Ospreys, and Rough-legged Hawks.

During the field season in 1993, habitat analysis included measurements taken at a site of high raptor activity (i.e. nest, roost, or plucking post) and a corresponding random plot at a distance of 50 m from the raptor site. Since birds of prey typically have large home ranges, habitat data in 1994 will be collected at the raptor site, a 50 m random control plot, and for a second random control plot at a distance of 400 m from the raptor site. Control plots will be determined by selecting random map coordinates from 1:50,000 scale topographic maps with the constraints that they are 1) located in the same habitat type (i.e. old growth forest) as the raptor site and 2) at 400 m from the raptor site. Ground location will be verified using a GPS pathfinder and map and compass. Habitat mensuration at a second random plot should provide further inference into habitat selection by birds of prey. Additional habitat analyses will be carried out at each 800 m stop along survey routes. 11.3 m plots will be measured at a distance of 50 m from a randomly selected side of the road. Where survey routes follow lake shorelines, habitat measurements will be made at a distance of 50 m from the shoreline. These measurements will allow comparison of habitat parameters using a discriminant function analysis at sites where raptors are either present or absent.



## Results

### Summary of 1993 field season

Between 15 May and 11 August 1993, efforts were made to develop standardized study and survey methods, as well as to record habitat, feeding ecology and natural history data from birds of prey. Surveys involving playbacks of raptor vocalizations commenced at about 0600h for diurnal raptors and at about 2200h for nocturnal ones. Playbacks were made at 800 m intervals along forest roads. The method of using playback vocalizations was not entirely successful, however 65 raptors were detected by using this method and by coincidental encounters. Eight species of raptors were sighted in the study area: Sharp-shinned Hawk (*Accipiter striatus*), Rough-legged Hawk (*Buteo lagopus*), Osprey (*Pandion haliaetus*), Merlin (*Falco columbarius*), American Kestrel (*Falco sparverius*), Boreal Owl (*Aegolius funereus*), Great Horned Owl (*Bubo virginianus*) and Northern Hawk-Owl (*Surnia ulula*). Rough-legged Hawks and Merlins were the most frequently sighted species. Table 1 summarizes the number of sightings and the associated habitat type for the eight species listed above. Results seem to support contentions that both Sharp-shinned Hawks and Boreal Owls inhabit old growth forests. Furthermore, it is possible that Rough-legged Hawks, mainly a tundra dwelling species, may be utilizing clearcut areas for hunting purposes. Merlins were sighted in all habitat types except old growth forests. Results from habitat mensuration will provide insight as to the specific habitat requirements of birds of prey within the Model Forest. Small mammal surveys indicated that the Meadow Vole (*Microtus pennsylvanicus*) was the most common rodent in 2 of the 3 survey areas (herbicide clearcut and old growth forest), while the Deer Mouse (*Peromyscus maniculatus*) was the most frequent at the third site (unsprayed clearcut). A dietary analysis of Sharp-shinned Hawk prey showed that the main prey evident at plucking posts were thrushes and warblers.

Table 1 Adult raptor sightings in the Western Newfoundland Model Forest from 24 May to 11 Aug, 1993.

SPECIES	NUMBER OF SIGHTINGS (est.#individuals)	TYPICAL HABITAT
Sharp-Shinned Hawk <i>Accipiter striatus</i>	13 (9)	Mature and old forests, small clearings
Rough-legged Hawk <i>Buteo lagopus</i>	22 (18)	Open ground, tundra, clearcuts, cliff faces
Boreal Owl <i>Aegolius funereus</i>	8 (5)	Mature and old forests
Great Horned Owl <i>Bubo virginianus</i>	2 (2)	Second growth forest
Northern Hawk-owl <i>Surnia ulna</i>	10 (5)	Clearcuts
Merlin <i>Falco columbarius</i>	25 (14)	Most habitats except old growth
American Kestrel <i>Falco sparverius</i>	9 (8)	Clearcuts
Osprey <i>Pandion haliaetus</i>	5 (4)	Near large water bodies, several habitat types

### *Summary of 1994 field season*

From 3 June to 8 July, 1994, seven species of raptors have been recorded in the study area outlined in the materials and methods section. Table 2 indicates the number of sightings and the associated habitat for each species. Some noteworthy differences concerning raptor abundances are apparent between 1993 and 1994. Rough-legged hawks were abundant in Western Newfoundland in 1993 (see table 1), however to date in 1994 they have not been recorded. This species typically breeds at more northern latitudes (i.e. tundra) in Labrador, and are apparently more numerous in this region in 1994 (J.Brazil, pers.comm). This may be attributable to the increase in the densities of small mammals (their principal prey) in Labrador in 1994 compared to 1993. The low densities of small mammals in Labrador in 1993 may have caused a southward migration of Rough-legged Hawks in search of more optimum breeding conditions. Further data on both small mammal and Rough-legged Hawk populations will shed some light on this situation.

An increased surveying effort in second growth forests has suggested that Sharp-shinned Hawks also select older successional forest stages in addition to old growth forests for nesting and foraging. This result may have important implications for the management of this species. To date 3 nest sites have been identified and various others reported. The measurement of habitat parameters at areas of high raptor activity will be conducted beginning at about 20 July.

Table 2 Adult raptor sightings in the Western Newfoundland Model Forest from 3 June to 8 July, 1994.

Species	Number of Sightings (est. # of individuals)	Typical Habitat
Sharp-Shinned Hawk <i>Accipiter striatus</i>	9 (7)	Old 2 <sup>nd</sup> Growth, Old Growth Forests
Northern Goshawk <i>Accipiter gentilis</i>	4 (1)	Mature & Old Growth Forests
Boreal Owl <i>Aegolius funereus</i>	1 (1)	Old Growth Forests
Northern Hawk Owl <i>Surnia ulula</i>	5 (3)	Clearcuts
Merlin <i>Falco columbarius</i>	8 (5)	Clearcuts, Old Growth, Old 2 <sup>nd</sup> Growth
American Kestrel <i>Falco sparverius</i>	4 (4)	Clearcuts
Osprey <i>Pandion haliaetus</i>	5 (2)	Old Growth Near Bodies of Water

#### Recommendations for further study

In order to attain sufficient data for the analysis of habitat characteristics at areas of high raptor activity (i.e. nest sites, plucking posts), verified locations outside of the Model Forest region will be investigated. These will include sites in the Codroy Valley, Deer Lake, Grand Falls, and Whitbourne. Historical nest sites recorded at the Memorial

University database will also be considered.

An effort will also be made to outfit raptors with radio-telemetry to allow the study of raptor movements and habitat utilization. This technique may also aid in the location of nest sites, roosting sites, and plucking posts.

### References

Frankel, O.H. and Soule, M.E. 1981. *Conservation and Evolution*. Cambridge University Press, Cambridge.

Soule, M.E. and Wilson, B.A. (eds.) 1980: *Conservation and Biology: An Evolutionary-Ecological Perspective*. Sinauer, Sunderland, Massachusetts.