Selected Wildlife and Habitat Features: Inventory Manual

for use in Forest Management Planning

VERSION 1.0

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Edited By:

W. Bruce Ranta

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PREFACE

Ontario's approach to the management of wildlife habitat continues to move to one which more explicitly conserves the province's ecosystems and associated biological diversity. To achieve this broad objective there will continue to be a management need to take into consideration the habitat requirementsts of individual species at certain times in particular locations.

Accordingly, these guidelines have been prepared to assist resource managers in the standardized inventory of habitat, and in some cases, populations, of selected species of wildlife that potentially occur within the Crown forests of Ontario. Although this manual is intended to serve particularly as a general reference tool in the preparation of forest management plans, it may also be useful in the context of many other types of resource planning and management.

The information in this manual reflects the best available science and current legislative and policy direction[1]. It is intended to be updated as new concerns arise, as inventory methods are refined and legislation and policies are modified.

We invite your suggestions for additions and improvements to future editions of the Manual.

Using the Manual

Although this manual is intended particularly for use in Crown Land forest management planning, it may be of use in other types of resource management. The manual does not attempt to provide guidance for the inventory of all the species that may be of concern in all portions of the province.

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[1] Legislatively, the Forest Management Planning Manual, as directed by the Crown Forest Sustainability Act, requires the assessment of habitat of "selected wildlife species" as one of the indicators of forest sustainability. However, this Habitat Inventory Manual does not attempt to describe all the inventory techniques for all species that potentially might be "selected" to address the sustainability indicator requirements for a given management unit. In developing inventory methodologies for species not dealt with by this manual, managers should consult the technical literature, and solicit expert opinion.

The current Ministry policy framework dealing with Crown forest management and wildlife interactions consists of Policy WM5.04.01 (Management of Timber for Featured Species) and Policy WM5.01.01 (Wildlife Information for Use in Timber Management). The Featured Species Policy (WM5.04.01) as modified by the Timber EA Decision of April 1994, designates the species that are "provincially featured" (ie, endangered species, threatened species, moose, deer, marten and pileated woodpecker). The habitats of these species must be managed. A "locally featured species" may be designated as such by a District Manager in recognition of the value of that species locally. The manner of making this designation is at the discretion of the local office.

The Wildlife Information Policy (WM5.01.01) indicates in a general way the types of wildlife information that District staff should compile in the preparation of a forest management plan. This manual provides additional guidance on how to go about this task.

Consideration of Statement of Environmental Values

The Ministry of Natural Resources (MNR) is responsible for managing Ontario's natural resources in accordance with the statutes it administers. In 1991, the MNR released a document entitled Direction '90s, which outlines the goal and objectives for the Ministry, based on the concept of sustainable development. Within MNR, policy and program development take their lead from Direction '90s.

In 1994, MNR finalized its Statement of Environmental Values (SEV) under the Environmental Bill of Rights (EBR). The SEV describes how the purposes of the EBR are to be considered whenever decisions that might significantly affect the environment are made in the Ministry. The SEV is based on Direction '90s, as the strategic directions outlined in Direction'90s reflect the purposes of the EBR.

During the development of these guidelines, the MNR has considered both Direction '90s and the SEV. These guidelines are intended to reflect the directions set out in those documents, and to further the objectives of maging our resources on a sustainable basis.

ACKNOWLEDGEMENTS

Many people have contributed to and are responsible for this manual. Dr. James Baker, Wildlife Policy Branch, played a lead role by chairing the Wildlife Habitat Inventory Committee. This committee, comprised mostly of MNR biologists and ecologists, was the principle group responsible for conceptualizing the need for a manual, a manual to assist field staff maintain and manage wildlife habitats into the future. All committee members and the work they did as members of the committee is gratefully acknowledged. Several committee members contributed further by authoring specific inventory methodologies, which are the basis for this manual. Other staff, not members of the committee, also wrote sections of the manual because they were the people acknowledged to be the provincial experts and therefore the best person for the job. All authors are credited for the chapters they wrote. Fiona McKay warrants special thanks for designing the data inventory forms, writing the section on recording observations and for offering numerous suggestions throughout, which helped to improve the manual and its usefulness to its eventual users. Dave Hogg deserves a big thank you for doing the leg work necessary to ensure the manual reached the field. A thanks to Todd Skene for the splendid artwork on the chapter title pages.

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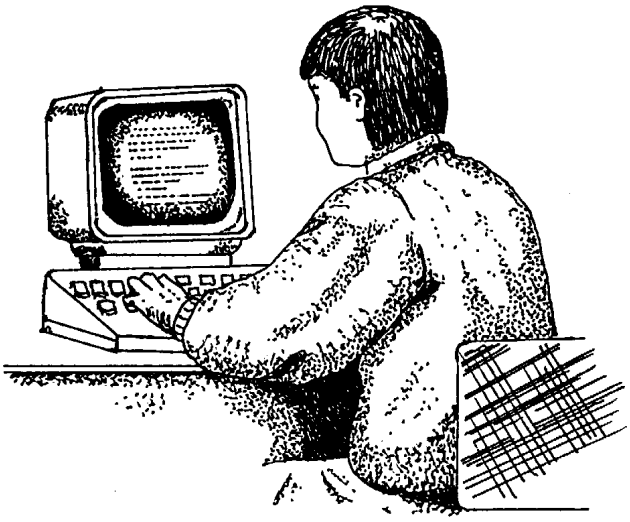
1.0 GENERALIZED METHODS AND TECHNIQUES



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1.1 Who Is Responsible

The management of wildlife habitats requires the collection and application of a wide range of information. Under current policy, information needs vary. Very general species presence/absence information is needed to decide which species or combinations of species will be 'featured' (e.g., moose, bald eagle, furbearers) while more site-specific information is needed when applying management prescriptions. Site-specific information is also variable in detail. For example, information on range and habitat characteristics are used to describe the area where moose (as opposed to deer or caribou) will be featured, while more detailed information is needed to identify the exact location of an eagle nest or a heron colony.

To ensure wildlife habitats are identified and integrated into resource management plans, it is important to identify the duties and responsibilities of MNR at the local level. Generally, District and Area staff will be expected to identify the wildlife species, or combination of species, which will be featured and to identify and inventory the specific habitat components necessary to implement wildlife habitat management principles and guidelines in resource management plans. Natural Resources Management Division, in collaboration with Field Services Division, will decide upon species to be designated as provincially featured.

During the preparation of a Forest Management Plan (FMP), it is the responsibility of the District Manager to identify the provincially featured species and which species or combination of species will be locally featured, and to ensure wildlife related input to forest management planning occurs. This must be done in advance of initial planning.

1.2 Personnel and Training

Usually, there is a wide array of people involved in wildlife habitat management. In fact, almost every MNR employee, as well as interested members of the general public, will occasionally be involved in aspects of wildlife habitat management. This is because wildlife habitats and their management are fundamental to the achievement of **Sustainable Development**, a primary goal of the people of Ontario.

In a more practical sense, there will be a limited number of individuals whose principal duties will involve wildlife habitat inventory. At the District level, Area teams and other MNR and/or public planning teams (e.g., the forest management planning team) will identify duties and, where necessary, individual roles.

It is important skilled, knowledgeable and enthusiastic individuals participate in wildlife habitat inventory and management. Skills and knowledge are needed to do the job accurately and efficiently but, without enthusiasm, the quality of the work performed often suffers. Individuals lacking enthusiasm may fail to develop the search images

needed to "see" wildlife habitat attributes, which can be difficult to describe with purely technical descriptors.

If inventory methodologies are poorly understood or followed, the knowledge gained from these surveys becomes increasingly unreliable. When knowledge is unreliable, poor decisions can result, negatively impacting on both wildlife and the human environment.

The methodology for each 'featured species' described in this manual has specific training needs for the survey crew. These needs are outlined in each species-specific habitat inventory methodology given and should be addressed prior to undertaking field data collection.

Safety must always be a top concern when doing wildlife habitat inventories. The collection of data will require a considerable amount of field work, often in remote locations and sometimes under inclement conditions. Managers, team/group leaders and individuals must be vigilant; each must ensure that proper safety practices and procedures are in place and potentially dangerous situations are identified and avoided.

Learning and training are on-going processes. Those who are interested in participating in wildlife habitat inventory projects should be encouraged to read scientific papers, reports and other material, and to attend courses, workshops, seminars and conferences, when possible. Individuals are encouraged to exchange information with other workers. By constantly learning, exchanging and using knowledge, the resource and everyone benefits.

1.3 Planning Field Surveys

A. General

Field surveys may be expensive and time consuming. Field surveys are, however, instrumental in identifying specific wildlife habitats and wildlife habitat characteristics for use in resource management plan development.

Forest management is usually the main human activity which impacts on wildlife habitat. Other potential human activity impacts on wildlife, such as those associated with mining, highway construction, etc., also require wildlife habitat information if effects are to be avoided or mitigated.

Although the methods outlined in this manual refer primarily to surveys needed in anticipation of forest management activities, the concepts apply to all developments with the potential to impact on wildlife habitats.

One of the goals of this manual is to standardize inventory methodologies to allow comparisons between areas and to allow for easier data tabulation. However, local

conditions or constraints may still require methodologies be 'tailored' to suit the needs of the project. This is certainly acceptable, although changes and modifications to any of the habitat methodologies need to be recorded and all alterations justified.

B. Initial Preparation

- Survey efforts should initially concentrate on Management Units (MU's) where Forest Management Plans (FMP's) are about to commence. In general, MU's will receive funding for wildlife habitat inventory from the appropriate Wildlife Assessment Unit (WAU) based on available funding and the planning schedule. Priority for wildlife habitat surveys is generally lowest in the year of FMP approval and first year of implementation.

- In essence, it's best to time surveys to provide updated information for input into new plans. Otherwise, major amendments may be required to address new information. This results in additional, costly and time-consuming planning.

- Potential habitats attributes for many of the habitat values discussed in this manual can be examined prior to field surveys through modelling. Specifically, the Landscape Ecology Applications Program (LEAP), using criteria from the Strategic Forest Management Model (SFMM), is a spatial tool which can tentatively identify a number of the habitats discussed in this manual. In essence, this manual is the 'ground-truthing' for many wildlife featured species habitats predicted by SFMM and LEAP.

- In many areas, wildlife, in particular cervids (deer, moose, caribou) have been monitored for research and/or management purposes with the aid of radio-collars. This can be very valuable information as it may provide insight as to the habitats preferred in a given area. This information should be examined before prioritizing surveys.

- To predict where forest operations are likely to occur, review the last approved FMP (or TMP, [Timber Management Plan]) for each MU you plan to do surveys in.

- From eligibility maps, which identify stands eligible for harvest in the next 20 year planning period, identify the 100 km^2 Universal Transverse Mercator (UTM) blocks containing stands eligible for harvest or forest renewal activities (see section **1.5** in this Chapter for an explanation of the UTM system).

- If other developmental activities, which have the potential to impact on wildlife habitats, appear to be imminent, and are outside areas targeted for forest management activities, the UTM blocks where these activities are planned should also be identified.

- The 100 km^2 UTM block is the starting point from which areas to be surveyed are determined.

- Any areas within the UTM block unsuitable for the presence of wildlife habitat (e.g., an urban area or open expanse of water) should be eliminated from the planned surveys.

- Eliminate any areas which have previously been surveyed, unless it is time to re-survey (see section '3. Survey Considerations' for re-survey considerations, which are given in each of the survey methodology chapters in this manual).

- Portions of the UTM block not impacted by forest management activities can also be eliminated from any planned surveys.

- The standard survey unit for most wildlife habitat inventories presented in this manual is a 2.5 x 2.5 km^2 cell (Figure 1.1).

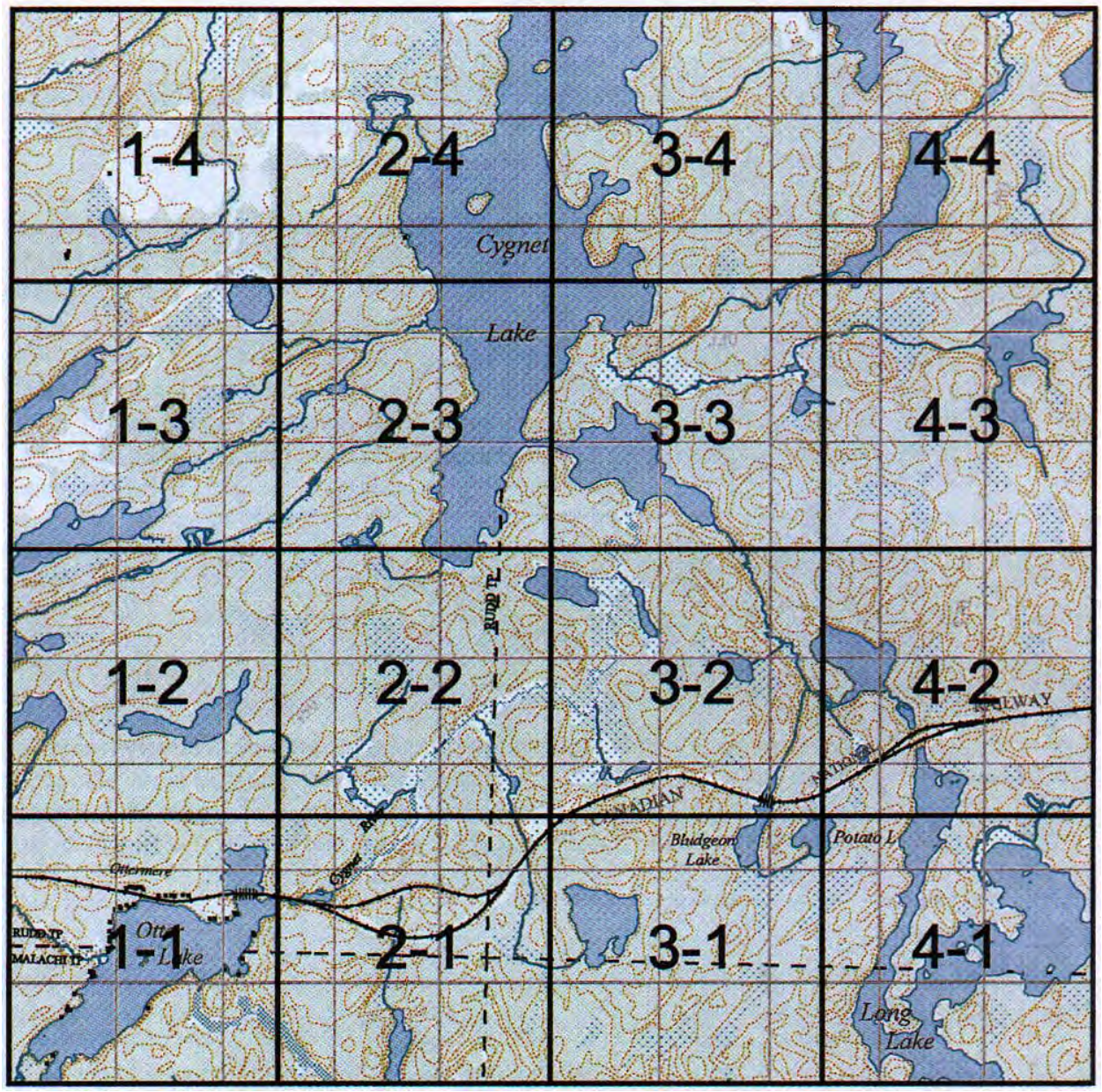
- Use of cells ensures systematic coverage of the landscape.

- Using cells as the basis for surveys is recommended because they are compatible with Wildlife Management Unit data coordinates and wildlife population inventories (e.g., each of 1-, 2-, 3- and 4- cells is the same area as a "moose plot", and uses the same coordinates), and can easily be converted to "official" UTM coordinates.

- In this manual, Figures use the "military" UTM system of identification, as this has generally been the practice in northern Ontario. The MNR standard is the "numeric" UTM (see section **1.5**).

- Try to isolate cells with the highest probabilities for forest management activities in the next FMP (including road building), and plan to sample that subset of cells.

- If funding does not permit all cells with potential operations to be surveyed, cells should be ranked. Planning teams and, when applicable, Advisory or other Committees, should be consulted when prioritizing surveys.



GURE 1.1 UTM Block and Cells

e.g., UF63
Each UTM Block has 16 cells, with
the numbering system as indicated.

- For data recording purposes, use the cell numbering system depicted in Figure 1.1.

- Generally, plan to use 1:50,000 topographic maps in the field during surveys. OBM 1:10,000 or 1:20,000 maps show much more detail and can also be used, if available. Both map formats can be easily incorporated into GIS.

- Greater detail and ease of data recording is enhanced using as large a scale as possible. Photocopy enlargements or large scale GIS generated maps are both good options (Figure 1.2). Always use coloured maps; colour lets you navigate and identify where you are with greater ease.

- Some survey methodologies do not use the standard cell for delineating areas to be searched (e.g., great gray owl surveys). The survey methodologies which do not use the cell method are identified and the rationale for deviating from the standard cell is provided in their respective chapters.

C. Survey Tips

i. General

Many wildlife habitat inventories can be done most effectively from the air. However, this is not always possible, and some, like surveys to locate the nests and habitats of the Red-Shouldered Hawk, need to be done on the ground. In some instances, aerial searches and ground truthing are both required to verify and complete information data bases.

ii. Aerial Surveys

- Always plan to book the number of hours and type of aircraft as early as possible, well before any survey commences, to ensure you get the kind of aircraft you need, when you want it.

- If large sections of maps need to be copied, save time by producing a transparent cell grid overlay. This eliminates the need to draw on the cells you wish to survey on each map copy.

- If maps or photocopies are uncloured, colour all water (e.g., blue), including creeks, on all maps.

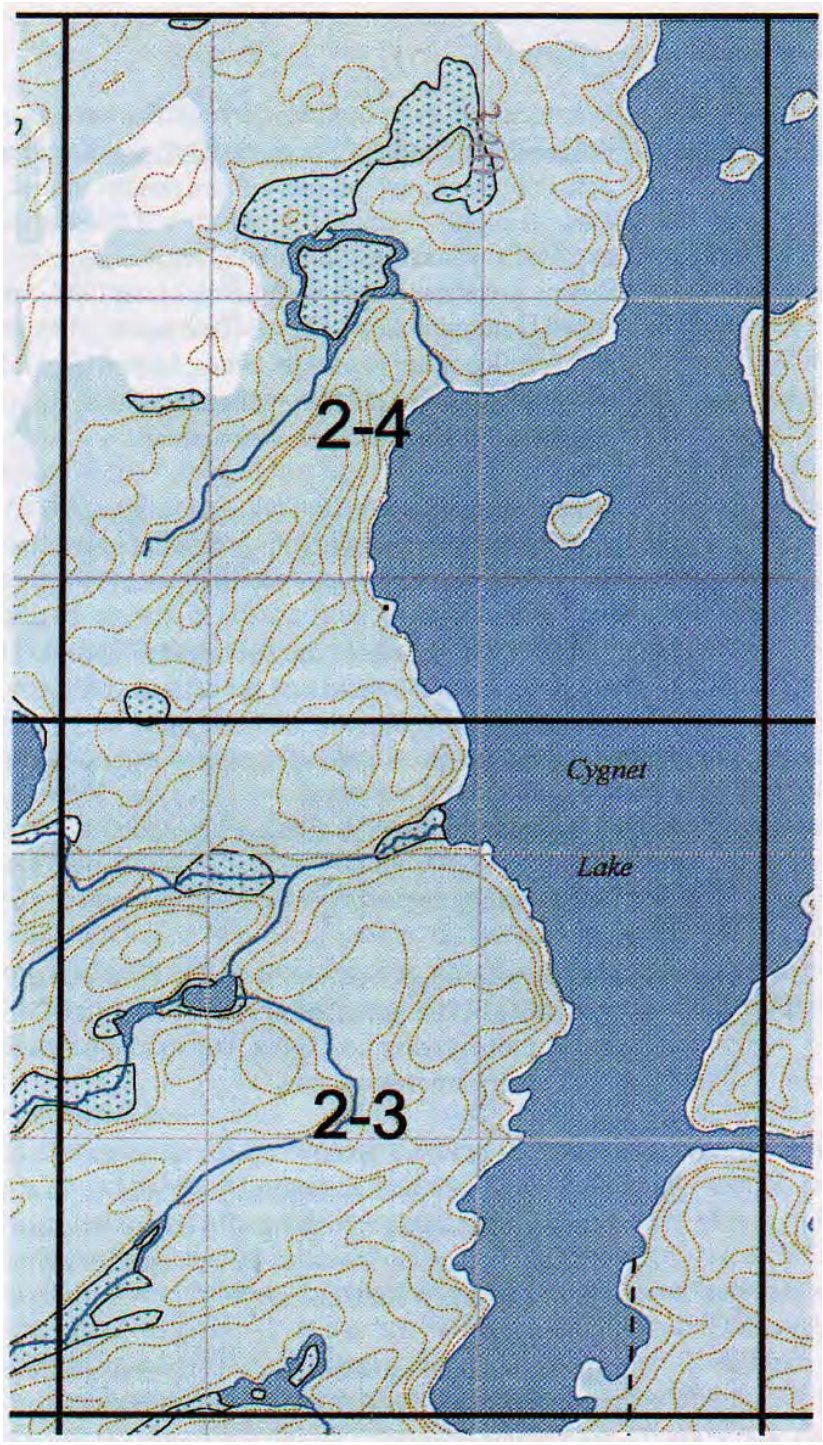


FIGURE 1.2 Photocopy enlargements may make field work easier

- When carrying out transect surveys, the navigator and pilot should ensure the aircraft is following the transect as accurately as possible. Many (most) aircraft are now equipped with Global Positioning Systems (GPS), which is a great help with navigation, especially when long flight lines will be made or when there are few or poor landmarks. In remote areas, GPS data may not be more accurate than +/- 100 m for a point. GPS readouts can usually be corrected at a later date, but in general, GPS should not be relied upon for absolute accuracy (visual location and identification is always recommended).

- Consider using the Visual Navigation Program (VNP) for help in navigation and data recording. See the next section (**1.4**) for a more complete discussion about this technology.

- Ensure the intercom in the aircraft is in good working condition. Communication is essential for data recording, whenever observations require discussions concerning interpretation and when consensus is needed to clarify what was actually observed.

- It is important that the navigator contact the pilot in advance of flights to ensure all preparations are complete and procedures understood.

- At this writing, A Star and Bell 206 Long Ranger helicopters will generally be the preferred choice of aircraft. Commercial helicopters usually cost more, but should be used when MNR helicopters are unavailable.

- For some surveys, fixed wing aircraft may be adequate. If in doubt as to whatever available aircraft is suitable for the needs of the survey, discuss the situation with others who are experienced with wildlife habitat inventories, as well as with Aviation, Fire and Flood Management Control.

- Surveys should be done only when winds are relatively light [e.g., not exceeding 25 km/h (15 mi/h)] and not gusty. High winds can be dangerous when low altitude flying. In addition, a ‘bumpy’ flight tends to result in missed observations - ill observers don't see much.

- Pilot, navigator and observer(s) need proper sleep before flying. Take occasional breaks by landing and resting for a few minutes during the day.

1.4 Wildlife Habitat Inventory and Geographic Information System (GIS) Technology

The wildlife habitat inventory methods presented in this manual have been designed to be compatible with GIS technology. Most methodologies require a map to be produced in addition to attribute tables. Maps are important as they can be used to delineate boundaries of general and specific habitat types. Habitat attribute tables also provide locational information and in most instances will provide additional information on the quality of the habitat, which is essential for both temporal and spatial comparisons.

Background

In 1994, MNR approved ESRI's ARC/Info as the corporate GIS software standard on the UNIX platform. It also approved ESRI's desktop software ArcView for the PC platform. A major initiative was undertaken to establish UNIX sites within each region, set up ArcView stations within Districts, and train interested staff either through the 8-month Sir Sanford Fleming College GIS program or through ESRI-held courses. The degree of use of the technology in Regions and Districts across the province is variable, from extensive "high-tech" (e.g., using GPS) to minimal. Generally, the use of the technology has been a reflection of the numbers and capabilities of staff within a particular office or unit. In general, most of the recent developments have occurred within the Science & Technology units. More sophisticated techniques of data capture and recording continue to become available. Two of the most important developments have been with respect to Remote Sensing (RS) imagery and Global Positioning System (GPS) satellites. RS has allowed for extensive landscape interpretation and classification without the need to sample the entire area, and GPS has allowed for accurate spatial data referencing in remote locations at an affordable cost. Some examples of use of both systems are listed below, under ‘Local Initiatives’.

Corporate Initiatives

In 1995, in response to the Forest Management Business Plan, the MNR undertook a project to capture selected important forest values in a GIS (i.e., spatial, graphic) environment. Attributes focused on Values identifies in Forest Management Planning, Fire and Municipal Planning exercises. The Natural Resource Values Information System (NRVIS) was designed to provide common services such as data security, integrity and data distribution. It has been built on ARC/Info and Oracle but runs on Windows PC's in field offices, as well as DEC Alpha servers. Data input is occurring across the province in accordance with the schedule for upcoming Forest Management Plans. It is important to note NRVIS does not include observation type data. However, because of the common underlying spatial framework, any databases designed to contain observation data should be compatible with this GIS model.

A number of wildlife and habitat features will be recognized in NRVIS as wildlife values. Due to system planning requirements, many of the habitat values have been pulled together under common headings. A summary of the wildlife habitat values currently recognized in NRVIS is shown on Table 1.4.1.

TABLE 1.4.1. **WILDLIFE HABITAT VALUES CURRENTLY RECOGNIZED BY THE NATURAL RESOURCE VALUES INFORMATION SYSTEM (NRVIS)**[1]

Aquatic Feeding Area
Breeding Area
Calving Fawning Site
Den Site
Feeding Area
Habitat Planning Range
Mast Producing Area
Mineral Lick
Nesting Site
Nursery Area
Resting Area
Species Occurrence
Staging Area
Travel Corridor
Wintering Area

[1] Each of the Values listed (described as a 'Concrete Class Name' in NRVIS) can be specific to a single or many wildlife species. For example, a 'Calving Fawning Site' may refer to such a site for deer, moose or caribou, and likely elk as well.

Concrete class names each have a description as to what they refer to, a 'feature type', which identifies how the value will be shown on the GIS map (i.e., a polygon or a point) and the species appropriate for each concrete class. Each species also is described as to what exactly is being recorded.

Local Initiatives

In preparing this manual, Regional and District Offices (including Areas) were solicited for information on specific exercises where GIS and related technologies were applied in field situations. The following is a brief synopsis of such activities as reported. This manual has been designed in recognition of GIS and related technologies, but it was also recognized expertise and access to GIS and related technologies vary considerably across Ontario. Thus the information below is presented to assist in choosing technology options when planning wildlife habitat inventories.

Global Positioning Systems

The former Central Region has available to all Districts one or more GPS units for navigation or data collection. GPS base stations are located in North Bay and Pembroke. Coverage of the Region, by these stations, is extensive but not complete. Accuracy of locations is 2-10 m for differentially corrected data and 50-100 m for uncorrected data. GPS has been used for mapping wildlife, fisheries and forest values, roads, snowmobile trails, burns, harvest areas and silvicultural activities. The Central Region Science and Technology Development Unit (CRSTDU) has used GPS to map many of its field trial and permanent sample plot locations.

A number of Districts in the former Central Region have used the Visual Navigation Program (VNP) for aerial moose surveys. Other areas of the Province have also begun to use the system. VNP is a PC compatible application developed by CRSTDU. The application accepts GPS data and displays the current position of either fixed or rotary wing aircraft with respect to the predetermined flight path, although it is reputed to work better with rotary aircraft. The application also allows the entry of moose attribute data. The accuracy of the survey is 50-100 m.

Kirkland Lake, Kenora and others have used GPS as a location identifier with respect to bird stick nest locations. Base stations are being established in the Northwestern and Northeastern Regions.

Remote Sensing

Remote sensing has been used on a very limited scale throughout the former Central Region. Although it provides a quick data collection method, its acquisition and software/hardware costs limit its feasibility. It has been used primarily in special projects. A cooperative project between CRSTDU and the consulting firm Dendron used satellite imagery and large scale photography to identify late winter cover in the Loring Deer Yard. Two applications developed with the Ontario Forest Research Institute (OFRI), the Landscape Ecology Analysis Program (LEAP) and GRASP, used satellite imagery for general forest classification.

Land sat imagery, classified by OFRI to identify ages of clear-cuts, has been used in a population modelling exercise for examining a marten habitat supply model. The original coverage was modified with GIS to produce time-lapsed age-class patterns covering a 100 year period. Coverage series were then moved to the PC platform, where the population

modelling was done. The project was conducted by the former Terrestrial Ecosystems Branch of Policy and Program Division, and continued by Forest Management Branch and Lands & Natural Heritage Branch of the Natural Resource Management Division.

GAP Analysis

GAP analysis is the process of examining spatially displayed information to delineate areas with or without common or specified features; i.e., identifying 'gaps' in the landscape. It is often used to determine whether established areas are accomplishing their purpose. For example, are protected areas actually protecting the features they were designed to protect? It is also used to identify other areas with similar characteristics; e.g., what other areas qualify for protection or further examination?

Sault Ste. Marie District is developing a methodology to determine the location of 'best representative sites' of Hill's Site District 4E-2. The technique uses several layers including OBMs, FRI, biophysical sub-units, a flora observation layer, a wildlife observation layer, disturbance (mainly cuts and fire) layer, values layer and a wildlife range layer.

The Lands & Natural Heritage Branch, Policy Division, will also be using GAP analysis to identify natural heritage area candidates.

1.5 Recording the Location of Your Observation

A. Background

There are two primary methods used to record the location of an observation from a map:

i. latitude/longitude; and
ii. The Universal Transverse Mercator (UTM) reference system (grid).

Both methods are found on all National Topographic System (NTS) maps, Ontario Base Maps (OBM) and MNR Wildlife Management Unit (WMU) maps.

The MNR standard for recording locations is the 6^0 UTM reference system, adopted in 1974. Within this system, there are two recognized formats for recording a point location.

The conventional way is a numeric code for zone/easting/northing which we will refer to as the 'numeric' format. The alternative method is known as the 'Military' version, which is a combination of alpha-numeric characters describing a zone/sub-zone/block/easting/northing. The Military 100 km^2 alpha codes appear

on NTS maps as a result of STANAG, an international agreement of NATO. Both systems are directly convertible to the other.

The MNR standard is the 'numeric' format. However, prior to this corporate standard being adopted, Wildlife Branch had decided to use UTMs as their reference framework for recording big game harvest data and developing the WMU maps. Therefore the system conforms to the MNR standard but the format does not.

Big game harvest data, and other information Wildlife Branch collects, records information at a scale of 1:506,880 (e.g., the scale on a WMU map), which is clean and simple to use. Even some new initiatives, such as the Northern and Southern Wetlands Evaluation System, have decided to use the Military alpha-numeric format.

Other branches within MNR have gone with the numeric format. The task force created to look at Water Body identifiers (1988) recommended this format and it is likely it will be recommended for the Ontario Fisheries Information System (OFIS). More importantly, OBM uses this format. In fact, OBM does not have the Military codes printed on it. This has led to much confusion.

B. Where to From Here?

The concern over which recording method is used has arisen out of the new technologies being developed today (e.g., corporate databases, GIS) and the increased demand for data sharing. Data sharing emphasises the need for data standards and consistency. Any new undertakings should reflect these corporate standards and new systems developed should be required to meet them.

However, the reality is that we're not likely to change some of the older established systems, such as how big game harvest data is recorded.

Also, with the capabilities of database software today, it is feasible to allow the user to enter specific data in one of several formats (but entered only once) and have the computer, unseen to the user, convert it and store it in the standard format.

C. The Bottom Line

What is most important in recording the location of an observation is the accuracy of that location. Some people feel that one format results in less errors than the other. We feel that it is the confusion between the two formats which causes errors and that people properly instructed in both formats should be able to record in either one with minimal mistakes.

Therefore, you will find that in this manual we have used both formats. Depending on the type of inventory and size of sampling unit or resolution of observation you will find one or both types of format used. You must choose one of the formats and enter only one location.

It is recommended that users adopt the MNR standard (numeric) format whenever possible. Table 1.5.1, at the end of this section, gives the easting and northing numeric format equivalents for the military alpha codes that exist in Ontario.

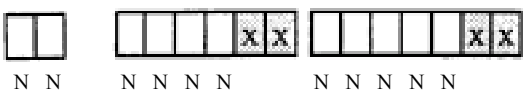
It is recommended that any new databases developed store the locational information in the numeric format, although the data may be entered and reports produced using the military format.

D. How to Read Your Map

- The following methodology describes how to read your observation's coordinates from your map and then how to record that information on your data entry form, where required.
- The two formats are described and presented parallel to each other so that direct comparisons may be made. The instructions have been derived using a 1:50,000 scale map.

UTM "*Numeric*" Format

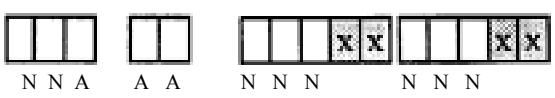
Your observation's location has two components:



A series of digits are used to identify the observation. A 2-digit number identifies the zone. A 4-digit easting and 5-digit northing coordinate pinpoints your observation to a 100m X 100m cell (*This is the finest level of resolution that can be obtained from a 1:50,000 scale map*.) The Grid Zone

UTM "*Military*" Format

Your observation's location has three components:



A series of alpha-numeric codes are used to identify the observation. A 3-digit alpha-numeric code identifies the 100km X 100km square grid block within which the observation lies. From there, a 3-digit easting and 3-digit northing coordinate pinpoints your observation to a $100m^2$ cell

Designation code is the same as that used for the "military" format except that the alpha-character sub-zone is not used here.

The 1st two digits on your easting, and 1st three digits on your northing, describe your 100km X 100km square grid block.

From your map sheet:
1. mark your observation on the map.
2. obtain the numeric grid zone designation (found in the legend, usually along the right- or left-side vertical margins). Enter the 2-digit number on the form.
3. obtain your easting, followed by the northing, from the map.

easting:
1)Look to the left-or right-side of the horizontal margin of the map. Locate the 6-digit number, in blue with the 2nd and 3rd digits slightly larger than the others. The 1st (lefthand) digit is the first # of your easting.
2) Locate your observation. Read the # on the grid line immediately to the left of the observation (these are your 2nd and 3rd digits).
3) * Estimate the tenths of a square from this line eastward to your observation (this is the 4th digit of the easting).

northing:
1) Look to the top- or bottom-side of the vertical margin of the map. Locate the 7-digit number, in blue with the 3rd and 4th digits slightly larger than the others. The 1st and 2nd (lefthand) #s are the first 2 #s of your northing.

(*This is the finest level of resolution that can be obtained from a 1:50,000 scale map*.)
The Grid Zone Designation code is the same as that used for the "numeric" format except that the alpha-character sub-zone is included here.

From your map sheet:
1. mark your observation on the map.
2. obtain the grid zone designation (found in the legend, usually along the right- or left-side vertical margins). Enter the 3-character alpha numeric code on the form.
3. obtain the alpha 100km square identifier, found in the same place, or found on the map by reading along any "00" grid line within which your observation is found. Enter the 2-character alpha-code on the form.
4. obtain your easting, followed by the northing, from the map.

easting:
1) Read the number on the grid line immediately to the left of the observation (these are the 1st and 2nd digits).
2) * Estimate the tenths of a square from this line eastward to your observation (this is your 3rd reference point digit).

northing:
1) Read the number on the grid line immediately below the observation (these are the 1st and 2nd digits).
2) * Estimate the tenths of a square from this line northward to your observation (this is the 3rd reference point digit).

2) Locate your observation. Read the number on the grid line immediately below the observation (these are the 3rd and 4th digits).
3) * Estimate the tenths of a square from this line northward to your observation (this is the 5th digit of the northing).

The forms provide for a maximum of 6-easting and 7-northing digits with the last two boxes shaded in and X-ed. This full number represents the coordinate if we were using maps whose resolution was to 1m. However, the best detail that can be obtained from a 1:50,000 map is a 100m X 100m square.

If you are using a higher scale map and can determine the 10m or 1m coordinate, then continue on from * , using the same procedure, to obtain your eastings and northings and record them in the appropriate shaded X-box on your form.

The forms provide for a maximum of 7-easting and 5-northing digits with the last two boxes shaded in and X-ed. This full number represents the coordinate if we were using maps whose resolution was to 1m. However, the best detail that can be obtained from a 1:50,000 map is a 100m by 100m square.

If you are using a higher scale map and can determine the 10m or 1m coordinate, then continue on from *, using the same procedure, to obtain your eastings and northings and record them in the appropriate shaded X-block on your form.

On some of the forms you are asked for the UTM Block #, a 4-character 2-alpha, 2-digit code. This refers to the 10km x 10km cell alpha-numeric identifier found on Wildlife Management Unit maps (printed in purple). It can also be determined on 1:50,000 maps by using the 2-alpha 100km x 100km identifier code and adding to it the 1st digit of the easting and northing.

Table 1.5.1 **UTM MILITARY TO NUMERIC FORMAT CONVERSIONS FOR EASTINGS AND NORTHINGS**

ZONE	EASTING		NORTHING	
15	U	3	N	62
	V	4	M	61
	W	5	L	60
	X	6	K	59
	Y	7	J	58
			H	57
			G	56
			F	55
			E	54
			D	53
16	B	2	U	63
	C	3	T	62
	D	4	S	61
	E	5	R	60
	F	6	Q	59
	G	7	P	58
			N	57
			M	56
			L	55
			K	54
			J	53
			H	52
			G	51
17	K	2	M	61
	L	3	L	60
	M	4	K	59
	N	5	J	58
	P	6	H	57
	Q	7	G	56
			F	55
			E	54
			D	53
			C	52
			B	51
			A	50
			V	49
			U	48
			T	47
			S	46
18	T	2	G	51
	U	3	F	50
	V	4	E	49
	W	5	D	48

2.0 METHODOLOGIES TO IDENTIFY AND DELINEATE FEATURED SPECIES HABITATS

BACKGROUND

At the present time, all wild life species in Ontario identified to be **Endangered or Threatened**[2] in addition to moose (Alces alces), white-tailed deer (Odocoileus virginianus), marten (Martes americana) and pileated woodpecker (Dryocopus piliatus) are termed by MNR policy to be provincially featured species.

Habitats for all species which are provincially featured must be managed. With respect to moose, deer, marten and pileated woodpecker, this means all of the forested landscape within the area of the province subject to Crown land forest management must be managed for one or a combination of these species. Generally, two species are chosen, one of either moose or deer in addition to either the pileated woodpecker or marten. Exceptions to this are when lands are taken up for industrial, agricultural or settlement purposes, or when another locally featured species takes priority (for example, woodland caribou habitat may be managed for instead of moose or deer), or if there are compelling reasons to manage more than two of moose, deer, pileated woodpecker and marten on the same landbase.

Endangered and Threatened species habitats are also provincially featured and need to be managed for in all applicable situations. As many of these species may not be present in a particular District or Area, nor are likely to ever be present, large geographical areas may not have any habitats identified or managed for Endangered or Threatened species. If historical accounts suggest an Endangered or Threatened species used to be in the District or Area and may still be present, or there is a reasonable expectation they may become re-established, then an attempt should be made to manage habitat for that species.

Locally featured species may be individual species or combinations of species and can be animals or plants. They include species of particular aesthetic or scientific value (e.g., osprey, great blue herons, purple-fringed orchis), recreational value (e.g., waterfowl) or commercial value (e.g., wild rice, furbearers). Provincially Vulnerable[1] species can also be locally featured species. A Vulnerable species should be a high priority when deciding which species are to be locally featured. Habitats for Vulnerable species which have been extirpated from an area and which are unlikely to re-colonize existing or future habitats, do not need to be managed for that species.

The methodologies to identify provincially featured species and locally featured species are presented in separate sections with some exceptions. One such exception is the

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[2] The Vulnerable, Threatened or Endangered species referred to in this document are those listed by the Ministry's Wildlife Section of the Fish and Wildlife Branch and which occur or potentially occur within the part of the province subject to Crown land forest management. Some of these species are at significant added risk from forest management activities while some are not. For some species, no systematic inventory survey methodologies have been formulated.

methodology to identify and delineate moose aquatic feeding areas, bald eagle and osprey nests and great blue heron colonies. Since it is possible to identify all of these habitat values in a single aerial survey, the methodology is presented as a single chapter in the section identifying provincially featured species. In the same chapter, an option is also presented and described to allow field staff to do these surveys separately.

Finally, some habitats of provincially and locally featured species may occassionally be found when other surveys are being conducted (e.g., stick nests can be encountered during almost any aerial survey or reconnaissance flight). A seperate inventory form has been designed to track habitat occurrences found incidentally (Appendix I).

2.1 PROVINCIALLY FEATURED SPECIES

2.1.1 General

To manage for provincially featured species, a primary task is to first delineate the area (a portion or all of the landscape) where the habitat of the appropriate featured species will be managed. Although the methodology to accomplish this task (as outlined below) is in reference to forest management planning within a Management Unit, other land bases (e.g., county) may be used as the planning base and other activities can be assessed as to impact(s) on habitat (e.g., settlement).

Featured species management is one of a number of tools to ensure ecosystem principles are met in forest management practices. By focusing on the short and long term habitat requirements of featured species, it is hoped the habitats which all wildlife species require will continue to be healthy and sustainable over time.

Forest management guidelines are in development which will help forest managers to emulate patterns and vegetative characteristics of terrestrial forest ecosystems driven by natural disturbances (e.g., fire). These will eventually replace, in whole or part, the need for some of the current species specific guidelines. By mimicking natural vegetation patterns to the extent possible, managers can have a reasonable expectation that the habitat needs (quantity, quality and location) of most species will be met. However, managers will still have to know *where* suitable habitat exists for some particular species of concern or interest. This is necessary so that important habitat components which require special consideration can be maintained/protected during forest management activities. In addition, species specific management in certain locations will still be required for socio-economic reasons and a knowledge of species specific habitat requirements will need to be understood by managers. This manual will provide the guidance necessary for the identification of these special habitats.

The following directives will help match the appropriate environmental guideline and featured species to the planning unit being considered.

- Within the planning unit (usually a Forest Management Unit) the area where Endangered or Threatened species, moose, deer, marten and pileated woodpecker are to be featured must be delineated. This is best done at a District level, in concert with adjacent Districts. This is to ensure consistency in application of the featured species policy and to ensure the planning decisions, as to where and which species are to be featured, are consistent with those of adjoining Areas and Districts.

- Area/Planning Teams need to gather all relevant data to delineate the specific areas needed to protect habitats for featured species. This includes: FRI maps; soil maps; surficial geology maps; population or occurrence inventories; habitat maps and/or surveys; and especially site specific knowledge from staff and outside sources (e.g., trappers, hunters, naturalists, tourist outfitters).

- Wherever possible, readily identifiable landscape features (e.g., highways, pipelines and other corridors, river and lake shores) should be used as boundaries delineating where featured species management is to occur.

- Once boundaries are agreed upon by area/planning teams, the areas where featured species habitats are to be protected will be indicated on the District Values Map.

- Featured species habitat may be identified as site-specific (e.g., a bald eagle nest) or on a broader, landscape basis (e.g., moose range). Within the planning range of a species, site-specific habitat management requires detailed planning as opposed to broad-based habitat management at the landscape scale. Habitat management prescriptions may be combinations of prescriptions for two or more habitat attributes. Use of the guidelines to emulate patch disturbance patterns (in development) will alleviate most of the problems which occur when species specific guidelines conflict.

- Provincially featured Threatened or Endangered species which are potentially present in areas where forest management operations are likely to occur and whether their habitats are at risk because of forest management activities, are listed on Table 2.1.1.

- Once the guidelines to emulate patch disturbance patterns are available, the need to delineate range occurrence of individual featured species may not be as great. This is especially true of cervid management as it relates to clear-cut size.

- Some of the species in this section and the habitats they occur in may be of interest to other agencies, in particular the Natural Heritage Information Centre (NHIC) and, with respect to bird nests, the Royal Ontario Museum (ROM). Be sure to establish contact with both to ensure the information needs of everyone are met.

2.1.2 Identification of Habitat Attributes

Within the areas where provincially featured species are to be managed, specific habitat attributes for those species must be identified and delineated. To assist resource managers manage wildlife habitats, the MNR has a number of resource/environmental manuals (Table 2.1.2). Not all species or communities which can be featured for management have had guidelines developed, while other species not often featured for management have had guidelines prepared. Again, the use of the guidelines to emulate patch disturbance patterns (in development) will help ensure ecosystem-based forest management practices are implemented.

In this document, the habitat methodologies presented attempt to detail how to locate, identify and delineate specific habitat attributes that are mentioned in individual guidelines. However, the methodologies have not yet been devised for some of the

habitats used by these species. In these cases, managers should exercise their professional judgment and consult with colleagues and other experts in devising inventory techniques or habitat protection strategies.

One of the methodologies in this section describes how habitat for several species can be identified during a single survey. Both provincially featured (moose and bald eagle) and locally featured (osprey and great blue heron) species habitat attributes can be collected using this survey methodology.

For the Threatened and Endangered species for which habitat guidelines have not been developed, this manual briefly describes the habitat characteristics believed to be critical for their survival and outlines methods as to how these habitats can be identified. Future revisions to this manual will incorporate any new or better information that has become available since this version.

TABLE 2.1.1. ENDANGERED AND THREATENED SPECIES WHICH OCCUR, OR POTENTIALLY OCCUR, IN CROWN LAND FORESTED AREAS OF ONTARIO

BIRDS

SPECIES NAME	SCIENTIFIC NAME	AT RISK FROM FOREST MANAGEMENT ACTIVITIES?
Endangered	(Provincially Featured)	
White Pelican	Pelecanus erythrprhynchus	No
Bald Eagle	Haliaeetus Leucocephalus alascanus	Yes
Golden Eagle	Aquila chrysaetus	No
Peregrine Falcon	Falco peregrinus	Yes
Piping Plover	Charadrius melodus	No
Kirtland's Warbler	Dendroica kirtlandii	No
Threatened	(Provincially Featured)	
Common Barn Owl	Tyto alba	No
Loggerhead Shrike	Lanius ludoxicianus migrans	No

MAMMALS

SPECIES NAME	SCIENTIFIC NAME	AT RISK FROM FOREST MANAGEMENT ACTIVITIES?
Endangered		
Eastern Cougar	Felis concolor cougar	No

TABLE 2.1.1. ENDANGERED AND THREATENED SPECIES (continued)

HERPTILES

SPECIES NAME	SCIENTIFIC NAME	AT RISK FROM FOREST MANAGEMENT ACTIVITIES?
Threatened	(Provincially Featured)	
Eastern Spiny Softshell	Trionyx spiniferus spiniferus	No
Eastern Massasauga Rattlesnake	Sistrurus catenatus catenatus	No

PLANTS

SPECIES NAME	SCIENTIFIC NAME	AT RISK FROM FOREST MANAGEMENT ACTIVITIES?
Endangered	(Provincially Featured)	
Small White Lady's Slipper Orchid	Cypridpedium candidum	Yes
Threatened	(Provincially Featured)	
Ginseng	Panax quinquefolium	Yes
Pitcher's Thistle	Cirsium pitcheri	No

TABLE 2.1.2. **LIST OF MNR RESOURCE/ENVIRONMENTAL MANUALS TO ASSIST IN THE MANAGEMENT OF WILDLIFE HABITATS**

Management Guidelines and Recommendations for Osprey in Ontario, June 1983.

Habitat Management for Ontario's Forest Nesting Accipiters, Buteos, and Eagles, March 1984.

Habitat Management Guidelines for Cavity Nesting Birds in Ontario, March 1984.

Management Guidelines for the Protection of Heronries in Ontario, 1984.

Habitat Management Guidelines for Warblers of Ontario's Northern Coniferous Forests, Mixed Forests or Southern Hardwood Forests, March 1984.

Habitat Management Guidelines for Bats of Ontario, August 1984.

Habitat Management Guidelines for Birds of Ontario Wetlands including Marshes, Swamps, and Fens or Bogs of various types (excluding waterfowl), March 1985.

Habitat Management Guidelines for Waterfowl in Ontario (for use in Timber Management), March 1985.

Bald Eagle Habitat Management Guidelines, June 1987.

Golden Eagle Habitat Management Guidelines, November 1987.

Peregrine Falcon Habitat Management Guidelines, December 1987.

Crown Land Timber Management and Rare, Threatened or Endangered Species in Ontario, December 1987.

Guidelines for Providing Furbearer Habitat in Timber Management, March 1986.

Timber Management Guidelines for the Provision of Moose Habitat, February, 1988..

Timber Management Guidelines for the Provision of Woodland Caribou Habitat, 1993.

Forest Management Guidelines for the Provision of Marten Habitat, May, 1996.

Forest Management Guidelines for the Provision of Pileated Woodpecker Habitat, May, 1996.

Forest Management Guidelines for the Provision of White-tailed Deer Habitat, August, 1997.

2.1.a IDENTIFICATION AND RANKING OF MOOSE AQUATIC FEEDING AREAS (MAFAs); AND LOCATING BALD EAGLE NESTS, OSPREY NESTS AND GREAT BLUE HERON COLONIES

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1. Introduction

i. Background

The approach used to inventory, identify and rank moose aquatic feeding sites (MAFAs) and inventory and identify bald eagle, osprey and great blue heron nest sites (for convenience, referred to as 'stick nests' in this section) is based on surveys designed by various research biologists.

Extensive field testing of the methods by MNR field staff have modified the methods to suit the data needs of Ontario wildlife managers and to reflect local habitat conditions.

ii. Moose Aquatic Feeding Areas

Moose aquatic feeding areas are generally found (or at least are of higher value) on coolwater lakes, on medium-sized and shallow rivers and on shallow basins of coldwater lakes.

Many MAFAs are also associated with beaver ponds, although these sites usually have a low life expectancy. Individual beaver ponds thus have short-term, temporal benefits to local moose herds.

Aquatic plants moose use are also found in areas of flooded dead timber.

Generally, MAFAs do not occur if water is stagnant or if flows are considerable. Most MAFAs are typified by slow moving water.

Food preferences may differ among areas depending on availability and what the local moose population uses.

Generally, water lilies (Nymphaea spp, Nuphar spp), pondweeds (Potamogeton filiformis, Potamogeton foliosus, other Potamogeton spp), marestail (Hippuris vulgaris) and milfoil (Myriophylum alternifolium) are preferred. Others, such as horsetail (Equisetum spp), certain pondweeds (e.g. P. natans), cattails (Typha spp) and bulrushes (Scirpus spp) tend not to be as attractive to moose and are used less frequently. See Table 2.1.3 for more information.

As a rule, favoured vegetation species are present in lakes where the floating leaves of aquatic plants can be seen. The only exception to this is in bog lakes. Floating leaves may be visible on bog lakes, but these lakes seldom produce heavy concentrations of submerged aquatics. Good areas are not dominated by graminoids (i.e., grasses, sedges, rushes) but rather they are dominated by submerged species.

Table 2.1.3.

SUMMARY OF AQUATIC PLANTS PREFERRED BY MOOSE IN NORTH AMERICA

LOCATION	MAJOR PLANTS USED	REFERENCE
Bowron Lake, B.C.	Swamp horsetail, burreed, pondweeds	Ritcey & Verbeek, 1969
Wells Gray Park, B.C.	Burreed	Ritcey & Verbeek, 1969
Little Missinaibi Lake, Ontario	Horsetail, eelgrass, pondweed yellowpond lily, bullrush	DeVos, 1958
St. Ignace, Ontario	Pondweeds	Peterson, 1955
Sibley Provincial Park Ontario	Water milfoil, bladderwort, pondweed, bullrush	Fraser et al,1984
	Pondweeds, yellowpond lily	Cobus, 1972
Isle Royale	Swamp horsetail, pondweeds sedges, yellowpond lily, sweet-scented pond lily	Murie, 1934
	Green algae, pondweeds, spike rush, horsetail	Belovsky and Jordan, 1978
Cook Lake, Chapleau Game Preserve, Ontario	Burreed, cattail, pondweeds, arrowhead, yellowwater lily	Fraser et al, 1980
Algonquin Park, Ontario	Yellowpond lily, watershield sweet-scented pond lily	Peterson, 1955
Yellowstone National Park	Mud plaintain, water, milfoil, bladderwort, pondweeds	McMillan, 1953
Alaska	Horsetail, rush, pondweed, burreed	Palmer (in Hosley, 1949)
Jackson Hole, Wyoming	Water crowfoot, leafy pondweed hornwort, green algae	Houston, 1968
NE Minnesota	Yellowpond lily, wild rice, burreed	Peek, 1971

Obviously, it is best if observers are reasonably adept at aquatic vegetation taxonomy. Less trained observers can still be used but data may be less reliable. **As a rule of thumb, light green submergent vegetation is usually preferred by moose over dark green emergent vegetation.**

The timing of surveys for MAFAs depends primarily on the phenology of the aquatic plants moose feed upon. Normally, moose aquatic feeding surveys can be scheduled in northern and central Ontario from the first week of June to the 2nd week of July. **Surveys should, as a general rule, start earliest in the south and later in the north.** If surveys are scheduled too early in summer, submergents may not be visible, especially if the water is coloured or stained.

Some people have observed white-tailed deer feeding in aquatic plant communities while doing MAFA's. Since deer have very similar physiological requirements with respect to sodium and other elements as do moose, moose aquatic feeing areas (MAFAs) are likely synonymous with deer aquatic feeding areas (DAFAs). In areas where deer are featured, managers should consider doing DAFA surveys, using the same methodology as described for MAFAs.

Recently, the Northwest Region Science and Technology Unit has developed a Wetland Ecosystem Classification (WEC) system and an ecosite classification system for northwestern Ontario. These classification systems will allow wetlands to be classified to type based on vegetative characteristics. Although correlations between MAFA rankings and WEC/ecosite types has not been thoroughly tested, general conclusions are apparent and will be referred to in this chapter.

iii. Stick Nests

<u>Bald Eagle</u>

Bald Eagle surveys should also be done during the same time period MAFAs are flown. Flying earlier in the year results in nests by birds like ravens (which can be confused with eagle nests) to be more frequently encountered (by June, foliage has obscured them), whereas after the middle of July nestlings have often left. Flying during the preferred time period also allows productivity estimates of eagle nest sites to be made.

Grier et al. (1981) compared efficacy of doing eagle surveys in two time periods - late winter (April, with some snow still on the ground) and early summer (first week of June to mid-July). They concluded there was no positive visibility bias in finding nests between the two times. Their study was done in the extreme western portion of the present Northwest Region of Ontario, in areas

predominated by conifers and where white pine is the preferred nesting tree. Aspen were also commonly used by eagles in some portions of the study area.

However, in the east, where very few eagle nests occur in pine and where aspen is the nest tree most frequently chosen and aspen stands can be extensive, MNR staff have found early summer eagle nest surveys to be less desireable. Best results have been obtained in mid-winter, before snow melt has commenced to any significant degree. Therefore, in aspen dominated landscapes, it is an option to do eagle nest surveys in mid-winter. The best results are obtained when nests have snow in them, because this makes them quite visible from the air (nests resemble a huge ice-cream cone).

Surveys in late winter usually do not allow the occupant of a stick nest to be positively identified. They also usually do not provide an activity status, although eagles will occasionally be seen in or near a nest as early as March. Productivity estimates will not be possible. Because of the importance of all of this 'missed' information to FMPs and other aspects of wildlife management (for example, eagle nests occasionally become occupied by ospreys, and development guidelines for these two species are different), ground checks need to be scheduled in early summer (or aerial checks can be made during the summer).

Confirmation of nest occupancy by species is part of the planning process.

Great Blue Heron

Great Blue Heron inventories can also be done when doing combined moose aquatic and eagle nest surveys as the timing is compatible (Bowman and Siderius 1984). Conversely, mid-winter surveys are also viable. It will be difficult to estimate the exact number of heron nests in a colony from the air and productivity information will also be difficult to obtain (especially if the colony is found in the winter!). If more accurate data is required, ground censuses should be conducted according to the "Management Guidelines for the Protection of Heronries in Ontario" (Bowman and Siderius 1984). Again, aerial confirmation when surveying for MAFAs can be done if colonies were located in winter.

Osprey

Osprey nest in the same general land/water interface the above surveys encompass. They too can be inventoried during either time period. **When osprey nests are located, keep aircraft time minimized near the nest.** Young osprey are difficult to see (they are small and blend into the nest) and, if near fledgling age and 'buzzed' by aircraft, they have been known to prematurely jump out of the nest. This problem increases as survey time in summer advances into July (Penak 1983). If detailed information is necessary and the information cannot be gained

from the air (i.e., a mid-winter or late summer survey), plan on doing ground inventories with binoculars or a spotting scope.

In areas where bald eagle numbers are very low or absent, osprey nests tend to be very near open water. Where eagles are abundant, osprey often nest a considerable distance from open water (Addison, pers. comm.)

2. Initial Preparation

- Identify cells to be surveyed as per **'1.0 GENERALIZED METHODS AND TECHNIQUES'**. See Figure 1.1.

- Once survey cells have been identified, plan to survey shorelines of all waterbodies, including all creeks and wetlands within each cell, regardless of how much of the land base is actually eligible for harvest except as indicated below.

- When planning a survey, all of the area within a cell should be surveyed. Good prior knowledge might suggest portions of the landscape could be eliminated, possibly because of extremely rugged terrain where creeks seldom attract moose, eagles, osprey or herons. This does, however, increase the risk that some MAFAs or nests will be missed, and is not recommended.

- For each cell to be surveyed, obtain at least two copies of the corresponding map. One copy may suffice depending on the neatness of the recorder and the needs of the pilot. Some pilots like to have a map specifically for navigation.

- Mark any known MAFAs or stick nests on the map and ensure the flight path will cover these sites. This will verify their location and use or potential use.

- Consider useing the Visual Navigation Program (VNP) for mapping MAFA's and stick nest locations. Be aware of accuracy limitations, especially in the far north, where base stations are not set up and OBM coverage is unavailable.

3. Survey Considerations

i. Survey Crew and Training

- It is preferred to have a survey crew consisting of one pilot, one navigator and a right and a left observer.

- If desired, each crew member can have a set of maps. One observer can be responsible for all information pertaining to MAFAs, the other responsible for stick nest data. However, experience may show one

observer can mark all values. Some crews have found it's best if the navigator is also the data recorder for all values.

- Because terrain features are often unpredictable and because variables like wind can influence flight paths, it is not advisable to pre-mark the flight path. This should be done as the cell is being searched.

- Use of VNP is encouraged, although at the present time its use as a tool to record information for this survey methodology is limited.

a. MAFAs

If possible, arrange for a field trip/training session to examine aquatic vegetation and moose preferences prior to the actual survey. Plan on obtaining a good field manual to help identify aquatic vegetation or aquatic communities (e.g., the wetland ecosystem classification manuals). Starting a District collection of aquatic plants (i.e., an aquatic herbarium), with appropriate notes as to where the plants are usually found along with any other pertinent information, is also an option.

If available, photographs and/or video tape of MAFAs can help prepare and train observers. If photographs or video of MAFAs typical to the District are not available, it's worthwhile to consider preparing such material. Visual records can be very useful as reference material as well as for training.

Areas are ranked based only on potential. However, moose activity should be recorded when ranking the site. Moose use is identified mainly by the presence of tracks, trails or moose.

Other than tracks, trails and, of course, moose themselves, look for floating stems of aquatic vegetation and muddy (stirred up) bottoms in areas of aquatics. Make sure the activity is the result of moose activity and not a beaver colony.

Areas where moose use has been heavy for years will have well-established trail systems that are usually easily visible.

b. Stick Nests

Finding stick nests requires thorough searching. The following points will help observers develop a good search image, which in turn should result in fewer 'missed' nests.

- Look for stick nests in tree-tops within a strip 100-200 m (300-600 feet) in width from the water's edge. Most cells will be empty of stick nests - don't be discouraged.

- Areas that are boggy, rocky or burned-out have few potential nest trees. However, don't bypass these areas.

Bald Eagles

Look for eagle nests in super-dominant trees (i.e., trees that stand tall above the forest canopy), especially in white pine, red pine and trembling aspen. Few eagle nests are found in other tree species but any large tree may be used. Eagle nests are generally nestled 10 m (30 feet) or so down from the top of the tree.

In addition to nests, look for the presence of adult eagles. The presence of adult birds can be a good clue a nest is nearby. The white head of an eagle is very visible amongst the greenery. Look for birds flying and perched.

A single pair of Bald Eagles often have more than one nest in close proximity to one another. Up to three nests within a kilometre (0.6 miles) or so is not unusual and may constitute one nesting pair's territory.

Osprey

Osprey tend to nest in the very tops of dead trees, or in trees with dead tops, and their nests are somewhat smaller than eagle nests (however, they sometimes construct nests in the crowns of live conifer, and are then **very** difficult to spot). Nests can be on the perimeter of dense forest or in open beaver meadows and marshes. They are often in the same 100-200 m (300-600 feet) strip of woods, near water courses, where eagle nests are found. Sometimes, osprey use abandoned eagle nests.

Great Blue Herons

Great Blue Herons usually nest in colonies of between 15 and 100 nests, although colonies may be smaller. Generally, the further north the smaller the size of the colony. Occasionally, a single nest is found.

Herons also nest inland and in beaver meadows and marshes. Both live trees and dead trees are used. Live trees take a lot of abuse from nesting herons and usually begin to die, or appear sick, shortly after colonization.

ii. Time of Year

- Schedule MAFAs and stick nest surveys between the first week of June to the 2nd week of July, except where forests are dominated by aspen. In aspen-dominated landscapes, fly stick nest surveys separate from MAFAs, in mid-winter (prior to late-winter snow melting).

- When stick nest surveys are flown in mid-winter, re-visit the nests in summer (mid-June to early July) to identify occupancy status and collect productivity information.

- In general, fly MAFAs and stick nest surveys earliest in the south and later in the north.

- Flying early in June may be unsatisfactory if areas of aquatic vegetation are not developed.

- Flying late in July may result in lost productivity data if birds have fledged. Recently, Grier et. al (1996) has recommended a cut-off date of July 10 for bald eagle nest productivity estimates for northwestern Ontario.

iii. Time of Day

- Flights for both MAFAs and stick nests can be flown from 2 hours after sunrise to 2 hours before sunset. This minimizes early morning and late evening problems from shadows and sun glare.

- If fire crews are using helicopters, surveys can (rarely) be scheduled without conflict from 2 hours after sunrise to about 0930 hours and again from 1900 hours to 2 hours before sunset. However, don't count on

getting access to the chopper, and even if you do, the latter period may only provide about an hour of survey time.

- o Moose (and deer) tend to be creatures of early morning and late evening. By scheduling flights for morning and late afternoon/evening, there is a much greater chance of seeing animals, which makes the flight more enjoyable and gives one greater confidence in ranking of aquatic vegetation types. However, moose aquatic feeding sites surveyed during mid-day can still be ranked. This is because we are ranking potential MAFAs, and using moose activity only as a confirmation that moose are currently using the site.

iv. Type of Day

- o Surveys should be done when skies are clear to lightly overcast and when winds are calm [i.e., less than 16 km/h (10 mi/h)].

- o Aquatic plants are difficult to see when skies are highly overcast or if winds are high. High winds also compromise safety and comfort.

- o Sun glare can be reduced considerably and aquatic plants observed more accurately if observers wear polarized sunglasses.

v. Flight Altitude and Speed

- o Fly 20-100 m (60-300 feet) above tree tops. In some types of aircraft, safety regulations may require surveys to be flown slightly higher.

- o When using a helicopter, take all the time necessary (e.g., 'hover') to accurately search and delineate values.

- o Ground speeds in fixed wing aircraft should, as a general rule, be as slow as safety will allow or as slow as the pilot is comfortable with. Use of fixed wing aircraft will require considerable circling to properly identify and delineate values. A helicopter is the preferred aircraft.

4. Survey Procedure

i. General

- **o If MAFAs and stick nest surveys are to be done concurrently, use of a helicopter is mandatory. If helicopters are unavailable, or a full**

complement of navigators and observers are unavailable, then MAFAs surveys and stick nest surveys must be done separately. Trying to do them concurrently in fixed wing aircraft, or with too few observers regardless of aircraft type, has proven to be virtually impossible due to constant circling, confusion, or both.

- o Write down the date, temperature, cloud conditions and the names of the pilot, navigator and all observers directly on the map(s). If using VNP, data can be entered directly into the program.

- o For each cell or group of cells surveyed, indicate the time the survey began and the time it ended.

- o Each section of shoreline should be thoroughly searched before moving on. It's vitally important to ensure areas of aquatic vegetation are properly delineated and assessed and no nests have been missed. This may be the only opportunity to document values before forest operations occur.

- o **Use discretion when observing moose, birds around nests or other wildlife.** Moose, or other animals, may panic when approached by aircraft, and injuries are possible. Eagles, osprey and herons will usually tolerate aircraft for brief periods, although osprey may rise to 'attack' the aircraft. Stay in the vicinity of the nest(s) only long enough to record the information you need.

- o For both MAFAs and stick nests, there is 'mandatory' habitat information and 'optional' habitat information. See the data recording form at the back of this chapter. Mandatory information is the minimum data set required to be collected.

- o It's best to be familiar with all optional habitat information requirements and record these when possible, as it will enhance the value of the survey.

ii. Moose (deer) Aquatic Feeding Areas

- o Mark all information about MAFAs directly on the map. Generally, only survey the area inside cells, since this information will be analyzed on an area basis. If a small area of aquatic vegetation appears to be 'on the line' between two (2) cells assign the entire MAFA to the cell possessing more than 50% of the vegetation.

- o Rank MAFAs according to size, accessibility and vegetation characteristics only.

- Rank MAFAs as 1, 2, 3 or 4 according to criteria given below and delineate their locations on the map.

- Figure 2.1.1 is a simple flow chart that can be used to aid in ranking of MAFAs.

- Figure 2.1.2 gives some examples of how to rank MAFAs based on visual characteristics.

- Areas with no potential will be assumed to be 'zero' (0) which means the area was checked, but no areas of aquatic vegetation were identified. You may find it desirable to delineate 'zero' areas, although it is not mandatory to do so.

- Note all moose trails, mark them on the map and identify them with a "T". Moose trails usually run along shorelines, especially in sedge mat fringes which are often present. Moose and deer trails tend to run parallel to the shore - beaver trails in general run perpendicular.

- Record any moose and deer seen and, if possible, their age and sex [e.g., moose (m):cow [c], calf [cf], bull [b]; deer (d): doe (d), buck (b), fawn (f)].

- Moose with calves may indicate a calving/nursery area - note these areas.

- Look for tracks in mud flats and in the shallow water. These can also be denoted with a "T ".

- Inherent problems in ranking areas of aquatic vegetation are: difficulties associated with assessing vegetation density and; delineating the area to be ranked.

Ranking

0 - nil potential. Areas of lakes, creeks and rivers with no aquatic vegetation.

1 - low potential. Bog lakes or areas to which moose would have substantial difficulty in accessing. Examples of access restrictions include being surrounded by steep cliffs or relatively high intensity, human development.

2 - moderate potential. Some aquatic plants available. The area is usually less than 1 ha in size, or if larger, coupled with some limiting factor such as mine waste, steep cliffs or high density cottage subdivisions that would likely inhibit, but not prohibit, use

FIGURE 2.1.1

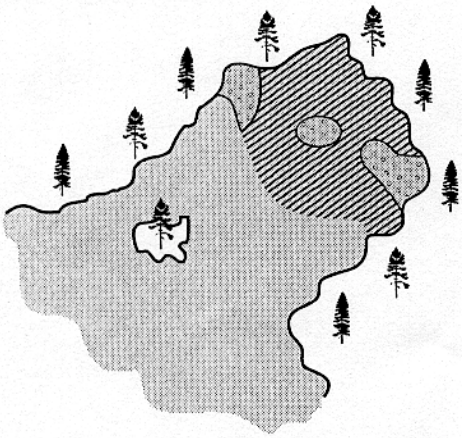
Key for Classifying Moose Aquatic Feeding Areas [1, 2, 3] (modified from Thompson, pers. comm.).

1. For beaver ponds, take the rating and subtract one (1).
2. If areas are accessible, but access is restricted, take the rating and subtract one (1).
3. If vegetation is very sparse, reduce the ranking by one (1).

SOME EXAMPLES OF RANKING MOOSE AQUATIC FEEDING AREAS BASED ON VISUAL CHARACTERISTICS

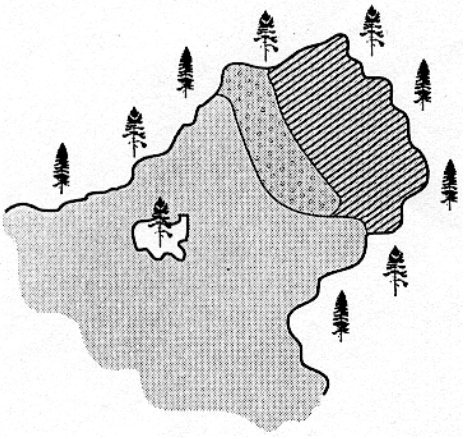
non-preferred vegetation preferred vegetation

a) Area = 0.8 ha



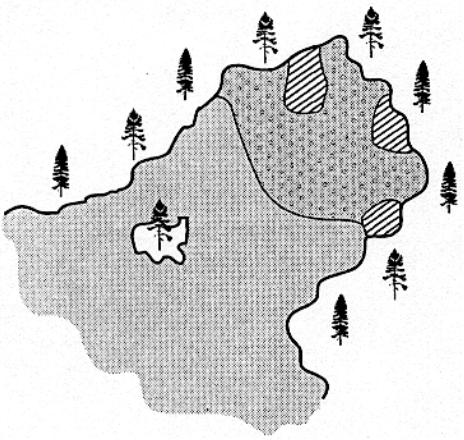
In this case we have a 0.8 ha area of vegetation in which preferred species cover 0.2 ha. This would be ranked as "2" in the new system since it is less than 1 ha. If vegetation is sparce, the area is ranked a "1".

b) Area = 2.0 ha



In this case we have a 2.0 ha area in which preferred species cover 0.8 ha. If the non-preferred species were mostly graminoids, then the area would rank a "2". If the area of non-preferred species is mostly non-graminoids, the site could rank a "3".

c) Area = 2.0 ha



In this case we have a 2.0 ha area in which preferred species cover 1.4 ha. This would probably be ranked as "4" since it is >1 ha in size with >50% preferred species. However, as in example (b), if the non-preferred species were largely graminoids, then the area would rank a "3".

FIGURE 2.1.2

by moose. Larger, accessible areas dominated by graminoids are likely a "2".

If the stand composition along the shoreline is primarily black spruce and jackpine (e.g., black spruce/jackpine working groups) the site is usually only fair moose aquatic habitat, and would not rank higher than "2". Black spruce and jack pine are generally indicative of nutrient poor sites.

3 - high potential. Areas receiving a "3" ranking are larger than one (1) ha and have only a few limiting factors. Sites ranked as "3" characteristically have less than 50% of the aquatic vegetation comprised of preferred species (or more than 50% graminoids). A large site, with excellent vegetation characteristics but with terrain features which would somewhat inhibit use by moose, might suggest a "3" rather than a "4" ranking. Beaver ponds, because of their temporary nature, should not be classed higher than a "3", even if they have all the other favourable characteristics, since their contribution to moose needs have severe time limitations.

4 - very high potential. These are large areas (e.g., more than 1 ha, in some areas of the Province [i.e., Northwest Region], aquatic feeding areas may be 30 or more ha) with all of the characteristics moose find favourable (e.g., none of the limiting factors of "2" and "3". More than 50% of the aquatic vegetation should be comprised of preferred species. Areas to be ranked as "4" should also have less than 25% of the area covered with graminoids. All "4"s should have the potential to be excellent moose aquatic feeding sites.

- o Generally, if the vegetation appears to be sparse, reduce the rank by one (1). Whether the site is ‘sparse’ or ‘dense’ or something in between will require a judgement call. Judgement will also be required when delineating the MAFA, especially if shorelines of lakes and rivers have ‘weed beds’ stretching for considerable distances.

iii. Bald Eagle Nests, Osprey Nests, and Great Blue Heron Colonies

- o Identify the bird that owns the nest(s): E - Bald Eagle; O - Osprey, H - Great Blue Heron.

- o Eagle and osprey nests should be marked with a dot directly on the map and labelled with an E or an O, respectively. Delineate the perimeter of

the heronry and mark with an H. Other pertinent information (see below) can be marked directly on the map.

- o If desired, all information can be entered directly on the data inventory recording form while at the site. This lessens the clutter on the map(s) and will help ensure all data is recorded. It's easier to use the form if it is photo-copy enlarged. Data can be transferred to a clean form later.

- o Record all eagles seen and their location.

- o For all stick nests, record the number of eggs or young seen (for heronries try to do an estimate).

- o Record the tree species the nest(s) was in.

- o Record the tree condition (e.g., alive, dead, dead at top) of the nest tree(s).

- o When a stick nest(s) is/are found, circle the nest(s) and write down on the map a brief description of topographical features. Items of particular importance include aspect, the presence of cliffs, potential feeding areas, perching trees and the presence/absence of other potential nest trees. This information is important when applying guidelines, especially with respect to restrictions on 'outer zones'.

- o From the flight path, a photograph of the nest or heronry can be taken. This is useful when trying to find the nest later and when trying to determine whether a nest or heronry has vanished.

- o Check a shoreline thoroughly before continuing the survey to ensure no nests are missed.

5. Interpretation

Some Districts which have been doing moose aquatic feeding surveys for many years have been using a three point ranking system. The four point system presented here evolved from the original, based largely on comments by the author who devised the original ranking (Dr. Ian Thompson). These areas **do not** have to be resurveyed. If an area has been surveyed, but the survey was many years in the past (e.g., more than ten), resurveys are recommended. The four point system is recommended for all new surveys.

The ranking of moose aquatic feeding areas (MAFAs) is essentially a wildlife wetlands classification system for the featured species policy as expressed through the Timber Management Guidelines for the Provision of Moose Habitat (OMNR 1988). While the guidelines do not differentiate the degree of protection MAFAs should get based on a

ranking, managers **need to take** rank into consideration when deciding how much protection to provide. If MAFAs are rare in an area, a low ranking may warrant maximum protection; conversely, where MAFAs are widespread and abundant, lesser protection to low-ranked MAFAs may suffice. Stastistical anaysis as to the number of MAFA's, their average size, ranking, etc., per cell, may help to guide and justify planning decisions.

Although the protection of aquatic feeding areas are not a requirement when deer are the featured ungulate species, they can still be considered a value because of their importance to other wild life species. As mentioned earlier, they may also be more valuable to deer than previously thought. Certainly, temporary and semi-permanent wetlands play a role in the creation of forest openings (e.g., abandoned beaver meadows), which are known to be an important component of deer habitat in forested areas.

Management of stick nests and their surroundings should take into account terrain features and habitat attributes (e.g., the presence of adjacent snags for perching, adjacent feeding areas, rugged terrain which would limit access, etc.). When stick nests are found, the more detailed the information collected for the nest and its surroundings, the higher the potential for better planning and management of the site. Using the 'concentric circle' approach will work, but ensures only the minimum of sophistication and flexibility.

6. Data Compilation and Storage

- File the field map for future reference - it may be necessary to prepare a 'clean' version to ensure it is readable. Figure 2.1.3 is an example of a clean map showing both MAFA and stick nest information.

- As soon as possible after the flight(s), transfer all data from the field map to the appropriate Inventory Form.

- Inventory Forms are designed to record data in a standardized fashion for future analysis. Data should be readily retrievable.

- Information should also be recorded on the District Values map. Figure 2.1.4 is an example of a GIS map showing MAFA's of various ranks.

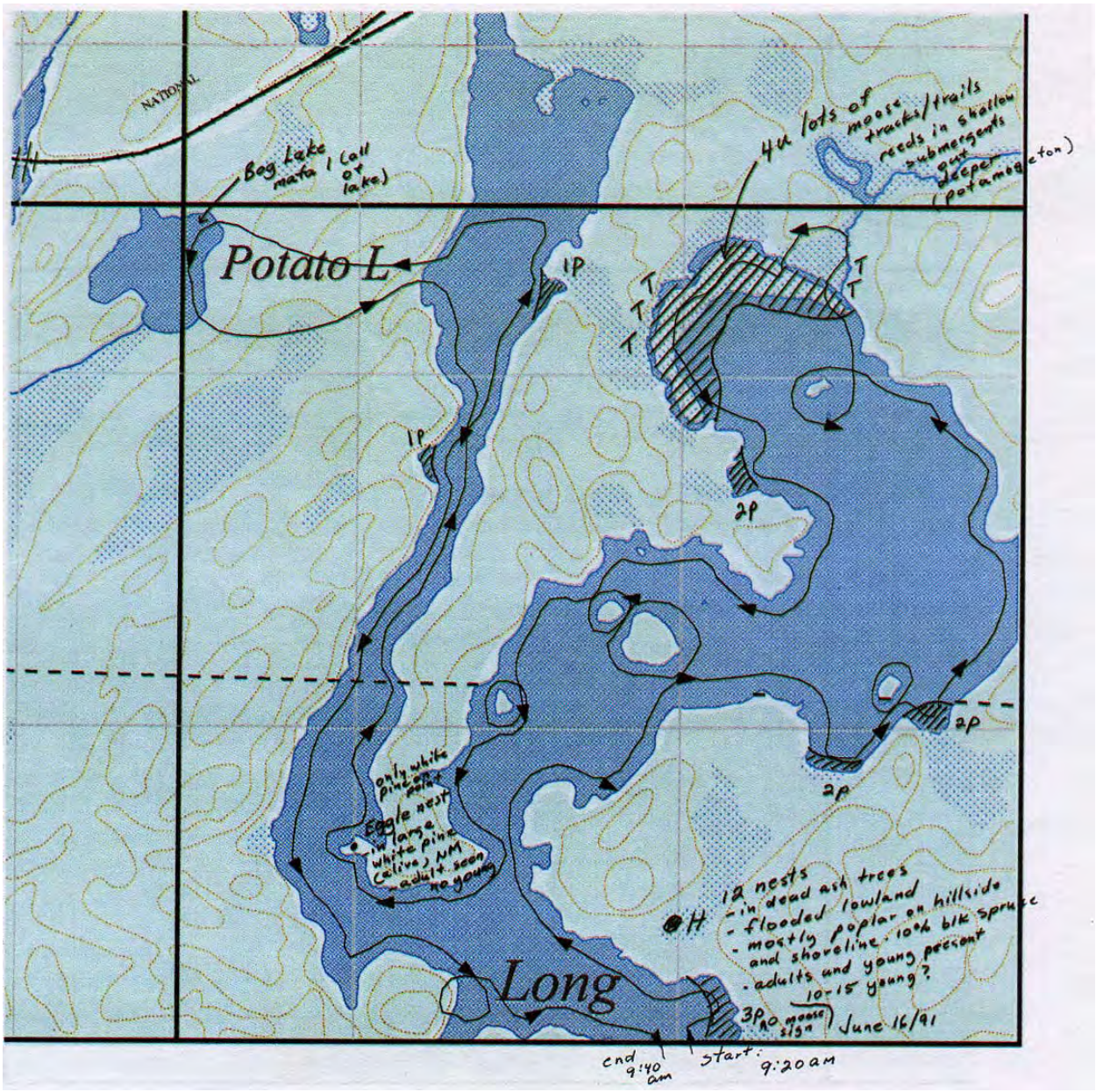
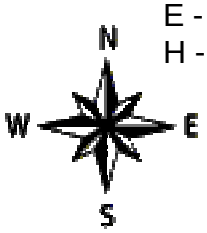


FIGURE 2.1.3 Example of Delineating MAFAs and Stick Nests

UTM Block# - UF63
Cell 4-1
E - Bald Eagle Nest
H - Heronry

Extent of MAFA
T - Moose tracks, trails
P - Potential
U - Mose use evident



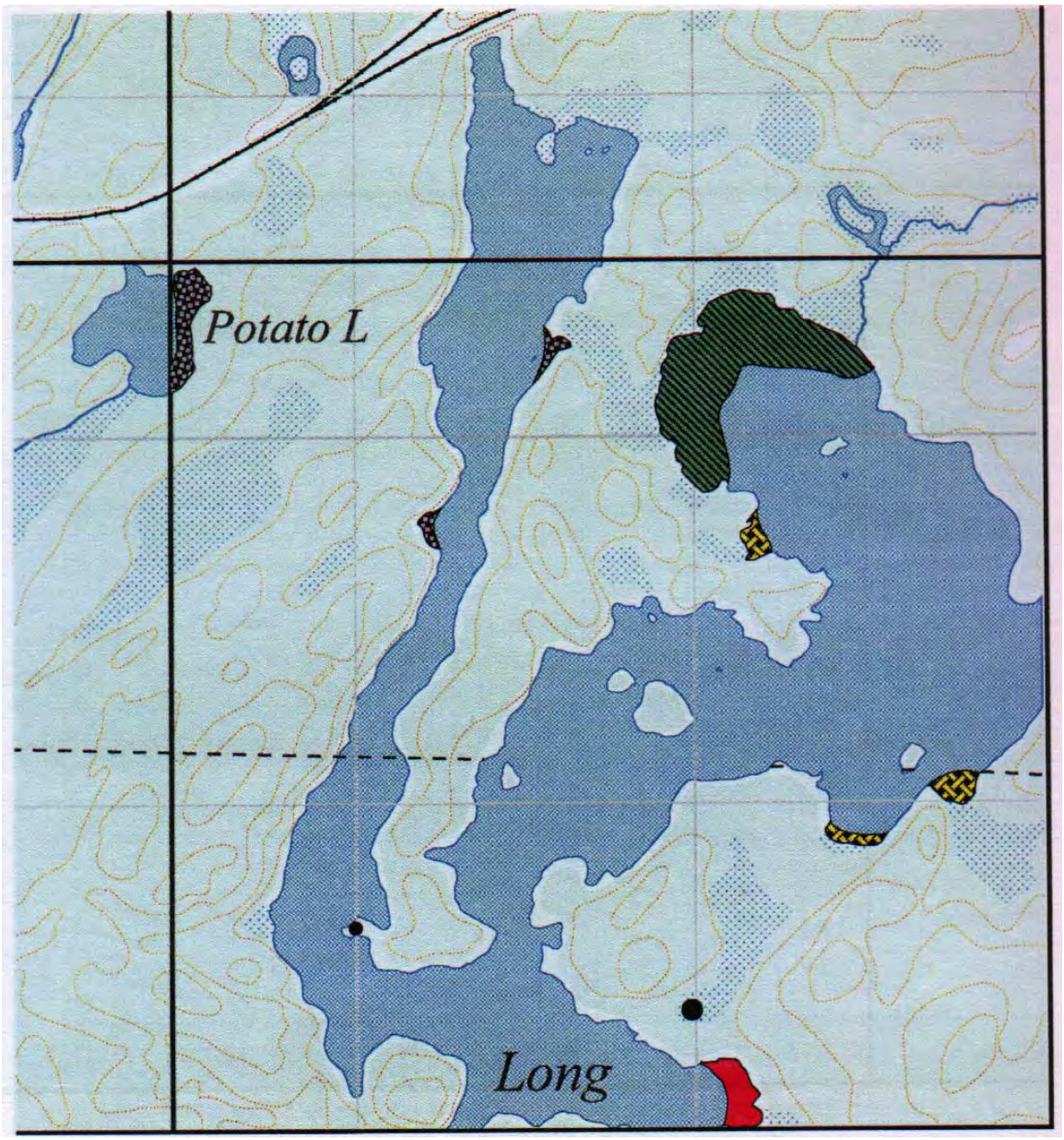
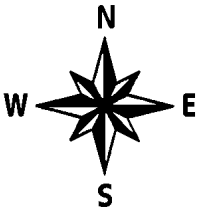


FIGURE 2.1.4 Map of Stick Nests and MAFAs of Various Ranks
UTM Block #UF63, Cell 4-1



Bald Eagle Nest
Heronry Nest
MAFA rank 4
MAFA rank 3
MAFA rank 2
MAFA rank 1

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INVENTORY FORM

MOOSE AQUATIC FEEDING AREAS (MAFAS)
DEER AQUATIC FEEDING AREAS (DAFAS)

Date: ☐☐ ☐☐ ☐☐ (YY MM DD) Aircraft: ☐

Experience Code:

Pilot: ☐ L. Obs: ☐ Nav: ☐ R. Obs: ☐

Aircraft Crew Identification: Pilot: _____ Navigator: _____

Left Observer: _____ Right Observer: _____

Wildlife Management Unit # ☐☐☐ (N N A) UTM Block # ☐☐☐☐ (A A N N)

Cell Searched (circle) 1-1 1-2 1-3 1-4 2-1 2-2 2-3 2-4 3-1 3-2 3-3 3-4 4-1 4-2 4-3 4-4

Mandatory Information														Optional Information			
MAFA #	Cell #	Waterbody Name	Moose Sign Evident Rank	Moose Sign Evident (Y/N)	# Animals Seen (default: Moose) B	C	CF	unk	(✓) D	Aquatic Veg Type	Size of MAFA (ha)	Dominant Aquatic Species (One only)	Waterfowl E-type	Waterfowl Present (Y/N)	Adjacent Forest V-type	Adjacent Forest FRI stand #

Additional Comments:

AIRCRAFT CODES

(1) 2 seater fixed wing aircraft (e.g. Piper, Citabrea, etc.)
(2) 4 seater fixed wing aircraft (e.g. Cessna 172, Cessna 180, Cessna 185)
(3) Turbo Beaver
(4) Piston Beaver
(5) Otter
(6) Twin Otter
(7) 4 or 6 seater helicopter (e.g. Bell 206 Long Ranger)
(8) 2 seater helicopter (e.g. Robinson)
(9) Other (specify)

When information on MAFAs from a single UTM # exceeds space available, simply fill in Mandatory / Optional information on other data sheets. Be sure to record page number and total number of pages used at the top of all pages.

EXPERIENCE CODES for MAFA Inventory (Hours, in last 5 years)

(1) 0-10 (2) 11-50 (3) 51+ (9) no observer

WATERBODY RANK CODES

(0) nil potential
(1) low potential
(2) moderate potential
(3) high potential
(4) very high potential

ANIMALS SEEN

B - Bull / Buck
C - Cow / Doe
CF - Calf / Fawn
unk - unknown
D - Deer

AQUATIC VEGETATION TYPE

(**e**) emergent vegetation
(**f**) floating
(**s**) mostly submergent vegetation

E-TYPE

See the appropriate ecosite manual for your region

INVENTORY FORM

STICK NESTS

Date: ☐☐ ☐☐ ☐☐ (Y Y MM D D) Aircraft: ☐ Page No. ☐ of ☐☐ pages

Experience Code: **Aircraft Crew Identification:**

Pilot: ☐ L. Obs: ☐ Pilot: _____ Navigator: _____

Nav: ☐ R. Obs: ☐ Left Observer: _____ Right Observer: _____

Wildlife Management Unit # ☐☐☐ (N N A) UTM BLOCK # ☐☐☐☐ (A A N N)

Cells Searched (circle) 1-1 1-2 1-3 1-4 2-1 2-2 2-3 2-4 3-1 3-2 3-3 3-4 4-1 4-2 4-3 4-4

Cell #	Waterbody Name	UTM Coordinates Easting	UTM Coordinates Northing	Bird Info Sp. Code	Bird Info Adults Seen	Bird Info # Eggs	Bird Info # Young	Bird Info # Nests	Tree Sp.	Tree Condition	Optional Young Stage	Optional Nest Condition
		X X	X X									
		X X	X X									
		X X	X X									
		X X	X X									
		X X	X X									
		X X	X X									
		X X	X X									
		X X	X X									
		X X	X X									
		X X	X X									

Wildlife Management Unit # ☐☐☐ (N N A) UTM BLOCK # ☐☐☐☐ (A A N N)

Cells Searched (circle) 1-1 1-2 1-3 1-4 2-1 2-2 2-3 2-4 3-1 3-2 3-3 3-4 4-1 4-2 4-3 4-4

Cell #	Waterbody Name	UTM Coordinates Easting	UTM Coordinates Northing	Bird Info Sp. Code	Bird Info Adults Seen	Bird Info # Eggs	Bird Info # Young	Bird Info # Nests	Tree Sp.	Tree Condition	Optional Young Stage	Optional Nest Condition
		X X	X X									
		X X	X X									
		X X	X X									
		X X	X X									
		X X	X X									
		X X	X X									
		X X	X X									
		X X	X X									
		X X	X X									
		X X	X X									

Additional Comments:

Codes:

Adults seen: Y / N

Young stage: d / pf / ff

Sp. Code: E / O / H / U

Tree condition: D / T / A

Nest condition: nm / nnm / pf / ag / g

For more detailed explanation of codes, see reverse

AIRCRAFT CODES

(1) 2 seater fixed wing aircraft (e.g. Piper, Citabrea, etc.)
(2) 4 seater fixed wing aircraft (e.g. Cessna 172, Cessna 180, Cessna 185)
(3) Turbo Beaver
(4) Piston Beaver
(5) Otter
(6) Twin Otter
(7) 4 or 6 seater helicopter (e.g. Bell 206 Long Ranger)
(8) 2 seater helicopter (e.g. Robinson)
(9) Other (specify)

EXPERIENCE CODES for INCIDENTAL STICK NEST SIGHTINGS (Hours, in last 5 years)

(1) 0-10 (2) 11-50 (3) 51+ (9) no observer

UTM COORDINATES

To identify the nest to the 100m point coordinate:
1. Identify the UTM block # (e.g., XE70)
2. Locate the 1 km^2 block. From the lower left-hand corner of the UTM (e.g., SW corner), there are ten blocjk numbers 0-9. From the same point are numbers 0-9 to the north. Thus a nest that was in the centre UTM 1km^2 block of XE70 would read XE7505.
3. Then use the same numbering methodology to estimate to the 100m point coordinate. If the nest is 30m west of the SW corner and 50m north, then the UTM coordinate would be XE753055.
4. The GIS applications used requre point locations to be accurate to the 1m. Spaces allocated on the data form allow for this.
   Note: use of easting and northing - fill in spaces from left to right and fill additional precision values with zeros.

SP. CODE
E - Eagle
O - Osprey
H - Heron
U - unknown

ADULTS SEEN: **Y** - Yes **N** - No

 # EGGS AND # YOUNG: For Heronries, estimate the total number for the entire colony

TREE CONDITION: **D** - Dead **T** - Dead at top **A** - Alive

YOUNG STAGE:
d - Downy (ligh grey in colour)
pf - Partly feathered (grey and black)
ff - Fully feathered (totally black)

NEST CONDITION:
nm - New material
nnm - Good with no new material
pf - Partly fallen
ag - Almost gone
g - Gone (for repeat surveys)

Eagles will often attend to nests but not lay in them. Nests frequented will often be free of debris and growing grass and will not usually be visible (as compared to nnm).

2.1.b IDENTIFICATION OF EARLY WINTER AND LATE WINTER MOOSE HABITAT

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ADM Operations

Dr. James Baker
Wildlife Ecologist
Wildlife Policy

1. Introduction

i. Background

The major objective of applying the Moose Habitat Guidelines in Forest Management (OMNR 1988) is to improve or maintain moose habitat and to provide suitable habitat for other species in the forest that co-exist with moose. A consistent approach in applying the guidelines on the FMP area and a consistent methodology in conducting inventories of current habitat conditions is required to reach this objective. Although guidelines to emulate patch disturbance patterns are to 'supercede' Featured Species Guidelines, there will still be a need to know and assess moose habitat.

The purpose of these instructions is to provide a consistent approach to the inventory of early and late winter habitat for moose. It is recommended this approach be used in areas where moose are the featured species, or where moose and deer are both featured (or at least managed for).

The identification and delineation of early and late winter moose habitat is based primarily on current cover and browse characteristics. Because moose numbers on their core ranges are as a rule much less dense than deer on their core ranges, relying on the presence of animals will likely result in large areas of importance to moose not being identified as moose habitat. **Areas where no moose were seen during the survey may still be very important to moose.**

It is often extremely difficult to see moose or moose sign in late winter from the air, even in areas where moose are abundant. Surveyors **must** become adept at categorizing habitat without the aid of moose or moose sign, and must be cognizant of regional differences as to what constitutes moose habitat across the Province.

Prior to undertaking field surveys to delineate and rank moose habitat, it is recommended the publication "Moose Habitat Interpretation in Ontario" (Jackson et al 1991) be read. This excellent publication should allow local managers to tailor the ranking system presented here to the particular ecosites to be surveyed.

Also included in this section are methods to rank and assess both early winter and late winter moose habitat. These methods were derived from a report by Koskela and Laws (1991).

ii. Early Winter Habitat

Early winter habitat consists of (1) mature or over-mature[3], open canopy, mixed-wood stands of relatively low stocking (less than 60 percent) and (2) burns and cutovers, usually from 5 to 20 years of age. These areas usually provide abundant browse on upland sites (sometimes lowland sites) and are used by moose until snow and/or crust conditions, or other factors, force them into heavy conifer cover. Thus, moose early winter habitats are not strictly a function of time of year and they might not differ from areas used by moose in late summer and fall.

Early winter habitat generally contains a greater proportion of browse than other areas. In uncut situations, this habitat has some cover and abundant woody browse. The Northwest Forest Ecosystem Classification V types (Sims et al. 1989) that correspond to early winter habitat include 1, 6, 7, 8, 9, 10, 12, 14, 15, 17. Other V types that are associated with this habitat include 4 and 5 but use of these depends on other conditions (Racey et al. 1989, Jackson et al. 1991).

The Clay Belt Forest Ecosystem Classification (Jones et al. 1983) operational groups corresponding to early winter habitat include 6, 7, 9 with high potential and 3, 10 with medium potential (D. Phoenix pers. comm.). These operational groups were derived for Kapuskasing District but should apply across the Clay Belt.

iii. Late Winter Habitat

Late winter habitat consists of well stocked stands of mature conifer (>70% stocking) with good (>75%) crown closure. Mixed stands with >50% mature conifer should also be considered as late winter habitat if pure conifer stands are not present. Upland sites are preferred. Late winter habitats, however, are also used extensively by moose in late spring and summer, at least in part because of the shade provided by this habitat type. In summer, lowland sites are often preferred.

The Northwest Forest Ecosystem Classification (Sims et al. 1989) V types that correspond to late winter habitat include V types 11, 13, 16, 19, 25, 26, 31, 34, 35. Other V types that are occasionally associated, depending on the proportion of conifers, include 10, 14, 15, 17, 21, 24. In some specific cases V types 18, 20,

[3] we refer to mature and over-mature forest from a successional perspective. In a mature stand, trees are large and are nearing the end of the lifespan, but very few are dead or dying. In an over-mature stand, a substantial portion of the trees are either dead or dying, and there is usually a dense understory layer of shrubs or young trees.

29, 32 and 33 may also have value as late winter habitat (Racey et al. 1989, Jackson et al. 1991).

The Clay Belt Forest Ecosystem Classification (Jones et al. 1983) operational groups corresponding to late winter habitat include 5, 6, 7, 8 and 9 with high potential and 3, 4 and 11 with medium potential (D.Phoenix pers. comm.). These operational groups were derived for Kapuskasing District but should apply across the Clay Belt.

None of the V types or operating groups have been verified through field studies.

Ecosite classifications, which have been recently developed for northern and central Ontario, may prove to be a good tool for identifying early and late winter habitat (ecosites are mappable units). However, interpretations as to which ecosites constitute valuable wildlife habitat, including moose habitat, have not yet been tested and verified.

iv. Problems In Identifying Early Winter Habitat

The characteristics used to describe stands used as early winter habitat are relatively imprecise compared to characteristics used to describe late winter habitat. It is thus necessary to have considerable flexibility when identifying potential early winter habitat.

In areas where large tracts of tolerant hardwoods exist, identifying early winter habitat might best be accomplished by first identifying old stands and stands where selection management is aggressively being practiced. Both result in plenty of good quality browse due to an abundance of 'holes' in the canopy.

At present, many biologists use the presence of tracks to help identify early winter concentration areas. Although tracks verify moose do use the area, the mere **presence or absence** of tracks is insufficient evidence to use to categorize habitat.
The inherent problem with using the presence of tracks or sightings of moose to identify these is that on any given survey (even if it is conducted in early winter), tracks or moose may not be observed because deep snow or crust conditions may have already forced moose into heavier cover. Conversely, moose may simply not be using that area on the day (or year) that the survey is conducted. Thus, it is necessary to standardize the methodology for identifying early winter habitat independently of the observance of moose or tracks in a particular stand.

v. Ranking Early and Late Winter Habitat

Ranking may be a useful tool when negotiating disturbance patterns during the forest management planning process. However, ranking is a subjective exercise and some important characteristics may not be readily apparent from the air. Site class according to FRI information and other data which are available should be used to confirm rankings. Ranking is presented here only as an optional activity to assist in management decisions.

a. Early Winter Habitat

1 - low potential. These are usually recent cutovers or burns with little apparent woody browse. Often associated with thin soil or rocky sites.

2 - moderate potential. As above but with patches of woody browse evident. On some deep, mineral soil sites, extensive and dense conifer regen may be apparent.

3 - high potential. Cutovers or recent burns with a great amount of woody browse readily apparent. Overmature, mixed-wood stands may also have high potential, provided there are relatively few standing conifers and the understory is primarily woody browse.

4 - very high potential. These are large areas which have no or few limiting factors. The topography is gentle (as opposed to rugged), and there are usually patches of mature conifer scattered throughout, which can provide shelter during severe weather. Very high potential areas are always associated with moderately deep or deep soils, and prior to having been cut or burnt, supported stands of mixed deciduous/coniferous trees. Undisturbed, overmature mixed-wood stands can also be excellent early winter moose habitat.

b. Late Winter Habitat

1. low potential. These are usually small (less than 10 ha) and meet the minimum stocking requirements. Trees may be dead or dying, or have sparse foliage. Larger stands with blowdown may also be low potential late winter habitat.

2 - moderate potential. Cover and density meet or exceed minimum stocking requirements and the stands are healthy. Small stands (up to 10 ha), despite good stand characteristics, may have only moderate potential as late winter habitat. Larger stands may only be of moderate potential if conifer cover is patchy or the location very rugged.

3 - high potential. High potential stands have excellent conifer cover and crown closure exceeding 75%. They are usually large stands (>50 ha) and occur on gentle or moderately rugged sites.

4 - very high potential. As per '3' above, but these are generally stands dominated by very large trees which often form a 'super-canopy' above the rest of the stand. Typical 'super-canopy' trees which are often associated with excellent late winter moose habitat are white pine, hemlock and white spruce. In the far north, large jack pine and black spruce on deep soil sites are more likely to be associated with high potential late winter habitat than other species. Almost all very high potential areas are associated with deep soil sites and in addition to the a dense conifer canopy, have abundant browse supplies (which may not be easily visible during aerial reconnaissance).

2. Initial Preparation

- From the last approved FMP, review the eligibility maps which identify stands eligible for harvest in the 20 planning period. Check to ensure that fire, budworm or blowdown have not changed the eligibility forecast.

- Outline eligible harvest areas on 1:15,840 FRI maps and, if desired, on 1:50,000. Both map types will be needed during the survey.

- The 1:50,000 topographical maps are used primarily for navigation. Larger scale maps (e.g., 1:20,000) or photocopy enlargements will enhance detail and will make navigation easier. FRI maps are the working maps.

- Once the eligible harvest areas have been outlined on the maps, identify stands to be harvested that seem to qualify as early or late winter habitats.

- Identify cells to be surveyed as per '**1.0 GENERALIZED METHODS AND TECHNIQUES'**. See Figure 1.1.

- Data which helps identify stands as early or late winter moose habitat can include 1) FRI maps, 2) FEC or ecosite maps (if available), 3) FEC cruise information, 4) cover type maps produced by remote sensing, 5) operational cruise data and 6) the latest aerial photographs.

- From all information available, delineate any burns and cutovers adjacent to harvest blocks which are up to 20 years old.

- To identify those stands which are potentially late winter habitat, start by delineating stands which contain a minimum 50% conifer component with 70%

stocking or greater. These stands, at a minimum, need to be assessed as to whether or not they are late winter moose habitat. If such stands are rare, then areas with a minimum 60% stocking should be considered as useful late winter moose habitat.

- On different areas of any given FMP, the relative amount and distribution of early and late winter habitat can range from:

  a) a lot of late winter with little early winter;
  b) an equal amount of both; or
  c) a lot of early winter with little late winter.

  "A lot" is roughly equivalent to a ratio of 60:40 or greater.

- To help locate the winter habitat component that is in short supply, it is helpful to colour those stands on the FRI map that potentially provide both early and late winter habitats. In areas where there is an equal amount and distribution of both habitats, different colours can be used to clearly identify the two habitat types on the map. The interspersion of the two components will thus be clearly visible.

- All stands eligible as late winter moose habitat and all stands eligible and immediately adjacent to early winter moose habitat, should be confirmed through aerial inventory.

- In areas where there is an obvious short supply of one type of habitat, and funds are limited, surveys should be conducted to confirm that the habitat type in shorter supply exists.

- As the second priority, confirm that the habitat type in greatest supply is of good quality.

- Where there are relatively equal amounts of late and early winter habitats, it will likely be necessary to systematically survey all allocated areas.

- The survey area(s) should be marked with transects spaced 0.5 km apart on all maps. Topographic maps are used for navigation and FRI maps are used for habitat delineation. Because areas searched will often be large, it is recommended that maps be cut into manageable sections. Attaching the maps to Bristol board will aid in labeling and storage in the aircraft.

3. Survey Considerations

i. Survey Crew and Training

- The survey crew need only consist of one pilot and a combined navigator/recorder/observer. However, right and left observers, in addition to the navigator/recorder, can be used to collect additional information on moose activity as well as recording other pertinent observations (e.g., recording numbers and/or locations of moose, deer, stick nests, etc.).

- With other crew members, it may also help to use VNP, especially in initial stages while one is becoming familiar with the technology. Some of the crew can collect information in the conventional manner using maps and pens, while others record certain data sets on VNP.

- Survey crew members should make training flights to acquaint themselves with habitat and track identification. Crew members should review Section E. - Tracks, in "A Manual for Aerial Observers of Moose" (Oswald 1982).

- Figure 2.1.5 should be consulted as an aid when determining crown closure percentages. An inherent difficulty when looking at crown closure arises in dead or dying stands, such as those which have been subjected to heavy infestations by spruce budworm. Damaged stands may have a reduced crown closure percentage (another subjective evaluation as to 'how much reduced is it?') but still is functional in terms of a snow interceptor and provision of thermal cover.

- Crew members should always carry maps for additional areas in reasonably close proximity to the selected survey area. This is done in case all or part of the original area cannot be surveyed, or if time allows more area to be surveyed than was planned. The survey design should try and minimize ferrying time whenever possible.

- A further reduction in survey time can be achieved by confirming only those areas where early and late winter habitat are positioned in close proximity to one another.

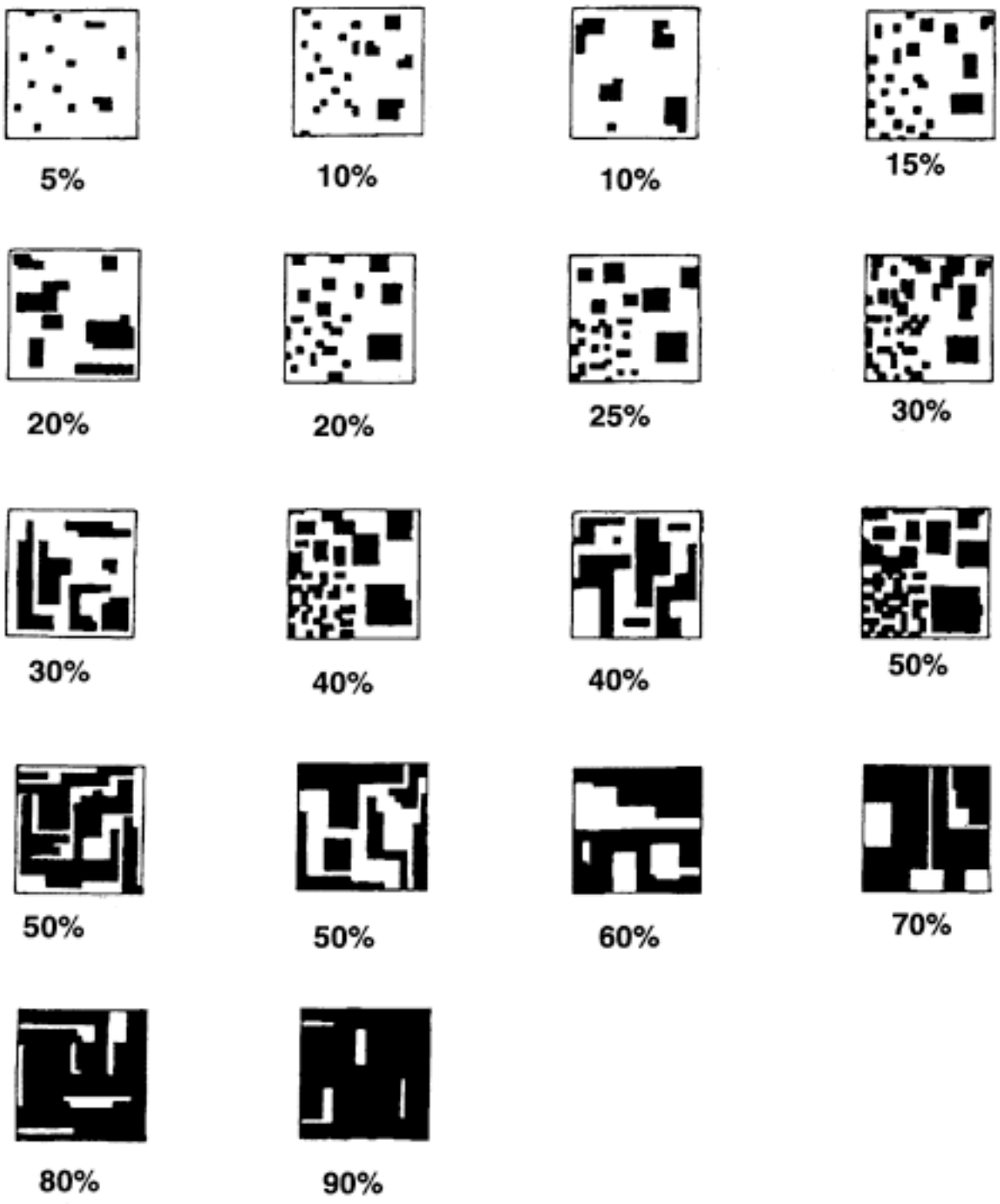
ii. Time of Year

- Flights can be conducted any time after the first permanent snow, but before snow reaches 80-90 cm (30-35 in) in depth. Conducting habitat survey flights with these snow conditions will allow observers to assess the amount of upland and riparian deciduous growth that could potentially

Figure 2.1.5

ESTIMATION OF CROWN CLOSURE (%)

Some percentages are shown with two examples in an attempt to show natural variability



Modified from Ontario Inst. of Pedology (1985) in Sims et al (1989)

provide browse for moose. Early winter (prior to about Feb. 15 is preferable, as moose are usually still in early winter habitats).

- o If snow depths are greater than 80-90 cm (30-35 in) or if surveys are done in late winter, regardless of snow depth, moose will not be observed in early winter habitat. They will most likely be associated with dense conifer cover - late winter moose habitat.

iii. Time of Day

- o As a rule, flights should occur between 1000 and 1500 hours.
- o Flights earlier or later than the above increase the risk of improper assessment because shadows in the forest make identification of understorey characteristics difficult.

iv. Type of Day

- o Surveys should be done under clear, bright conditions. High, very light overcast or scattered, thin clouds are also acceptable but increased observer fatigue may result.
- o Sun glare can be reduced considerably if observers wear polarized sunglasses. Yellow 'shooting' glasses are often helpful to increase contrast on high haze days.
- o High winds [20-25 km/h (12-16 mi/h) or more] compromise safety and comfort and tend to result in a poor survey.

v. Flight Altitude and Speed

- o The flight should be conducted between 60 and 150 m (200 and 500 ft) elevation depending on surrounding terrain.
- o Ground speeds between 130-190 km/h (80-115 mi/h) are recommended. A helicopter can be advantageous when a closer inspection of forest characteristics is required.

4. Survey Procedure

- Write down the date of each flight directly on the map along with snow depth, crust conditions (Passmore 1953), cloud conditions and temperature. Also record the names of the pilot, navigator and all observers.

- As mentioned earlier, consider using VNP to record and delineate the moose habitat attributes and other survey requirements as described below.

- Write down the time the survey began and the time it ended.

- The survey crew needs to confirm that the stands exist on the ground with the same characteristics described by FRI. If yes, mark with a Y or simply check it off on the map.

- If the stand described on the FRI map is different than what exists, in terms of either boundaries or composition, briefly describe the stand on the map and re-draw the boundaries.

- In mixed-wood and open canopied forests and stands, visually assess and confirm whether or not the area qualifies as early winter moose habitat.

- Similarly, conifer dominated stands must be confirmed as to their suitability as late winter moose habitat.

- Areas are only confirmed as early winter moose habitat or late winter moose habitat if they display the characteristics as outlined in '**1. Introduction',** and/or those in "Moose Habitat Interpretation in Ontario" (Jackson et al. 1991).

- Delineate stands which were not initially identified as early winter moose habitats and late winter moose habitats, but which qualify based upon your observations, directly on the map. Use any convention you wish.

- Rank all early and late winter habitats as per the criteria given.

- Moose and/or tracks can be recorded if you wish. However, the presence or absence of moose/track observations is not needed to justify protection or to prescribe modified cutting to any potential early winter habitat (see **5. Interpretation)**.

5. Interpretation

Moose habitat is dynamic; the early winter concentration area identified this year can become late winter habitat 30 years from now. Late winter habitat can become early winter habitat five years after cutting. The challenge to biologists and foresters is to maintain or create (where possible) a vegetative mosaic over time through the TMP process to sustain moose and other wildlife species. Consult Allen et al. (1987) for a discussion on spatial relationships for the needs of moose with respect to habitat.

Tracks and actual sightings of moose can be useful should it be necessary to establish priorities for management prescriptions in early winter moose habitat. For example, if a number of areas are identified for harvest, wood supply is critical and it appears the area categorized as early winter habitat is likely adequate, then those stands containing more observed moose and/or tracks could be considered the highest priority for retention.

On the other hand, it is extremely difficult to observe moose or tracks in late winter habitat even when surveyed under ideal conditions. Emphasis, or justification, of decisions based on actual presence or absence of animals is unwarranted.

Some managers have used this method to help when assessing deer habitat (Ranta pers. comm.), especially on those portions of the landscape where moose and deer are co-featured.

6. Data Compilation and Storage

- If the information cannot be inputted into the District GIS, be sure to prepare a final map delineating the area surveyed, the early and late winter moose habitat and rankings as found, as soon as possible after the flight.

- Figure 2.1.6 shows an example of a GIS product with moose early and late winter habitat mapped according to rank.

- Also as soon as possible after the flight, transfer information to the "Early and Late Winter Moose Habitat" Inventory Form. **Do not attempt to complete the Inventory Forms in the field. All information needed to fill in the forms can be deduced from the completed maps.**

- Inventory Forms are designed to store data in a standardized fashion for future analysis. Data should be readily retrievable.

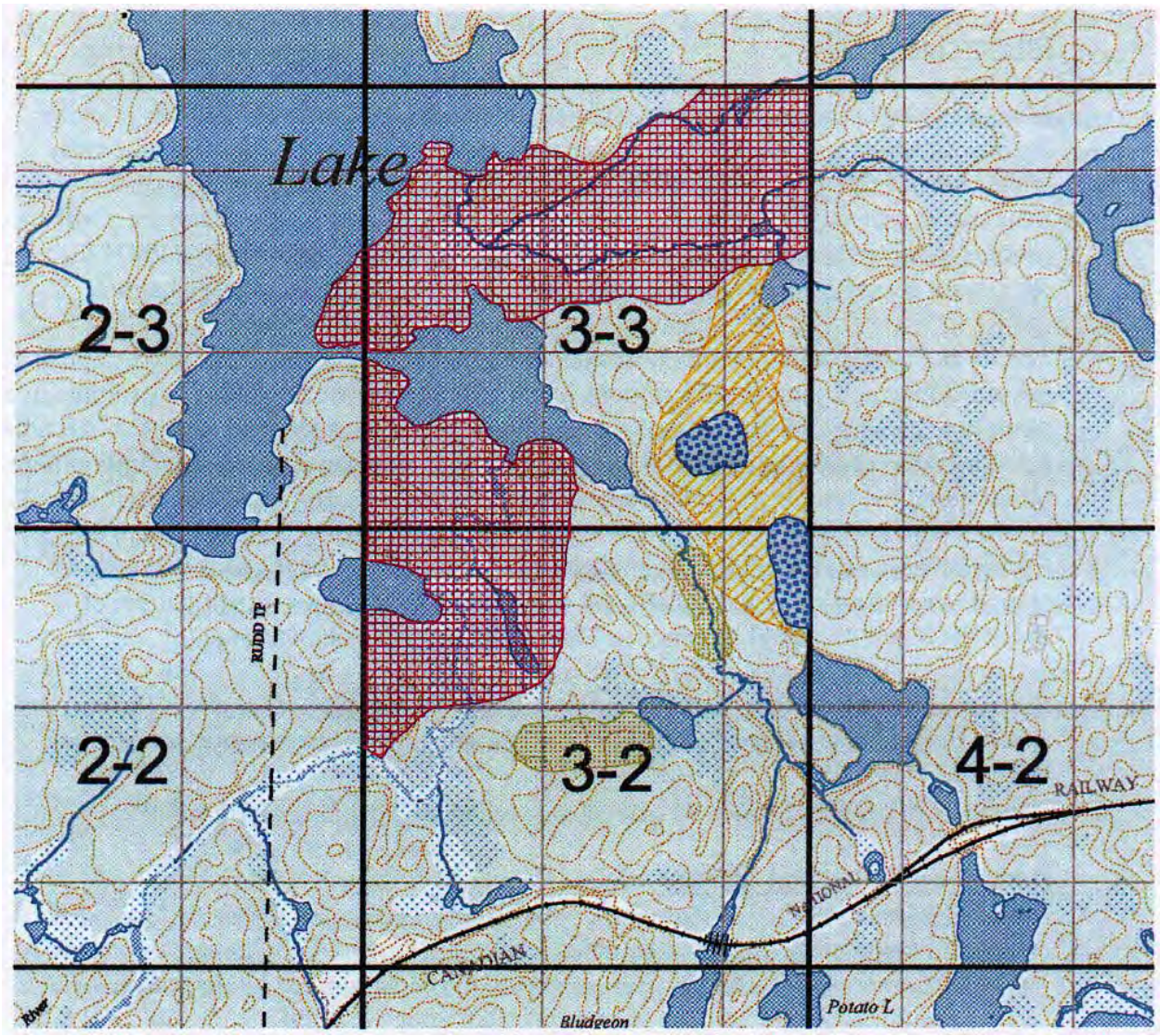


FIGURE 2.1.6 Mapping Early and Late Winter Moose Habitat
(cells 3-2 and 3-3 surveyed)

- rating 1 (low potential early winter moose habitat)
- rating 2 (moderate potential early winter moose habitat)
- rating 1 (low potential late winter moose habitat)
- rating 2 (high potential late winter moose habitat)

7. Literature Cited

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INVENTORY FORM

EARLY AND LATE WINTER MOOSE HABITAT

Date: ☐☐ ☐☐ ☐☐ (YY MM DD) Aircraft: ☐

Experience Code:

Pilot: ☐ L. Obs: ☐

Nav: ☐ R. Obs: ☐

Climate:

Cloud Conditions: ☐

Temperature: + - ☐☐ °C

Snow Depth: ☐☐☐ cm

Snow Crust: ☐

Hours last Snowfall: ☐

Aircraft Crew Identification:

Pilot: _____ Navigator: _____

Left Observer: _____ Right Observer: _____

Wildlife Management Unit # ☐☐☐ (N N A)

UTM Block # ☐☐☐☐ (A A N N)

Cell Searched (circle)	Early Winter (E) or Late Winter (L) Moose Habitat Present ? (Y▌ N▯)		Moose and/or Tracks Recorded T - Track Conc's (Y▌N▯) # - record # moose seen (optional)		Moose Habitat Ranks Present (Y▌ N▯)					Additional Comments:
	(E)	(L)	(T)	(#)	1	2	3	4	??	
1-1	☐	☐	☐	☐☐	☐	☐	☐	☐	☐	
1-2	☐	☐	☐	☐☐	☐	☐	☐	☐	☐	
1-3	☐	☐	☐	☐☐	☐	☐	☐	☐	☐	
1-4	☐	☐	☐	☐☐	☐	☐	☐	☐	☐	
2-1	☐	☐	☐	☐☐	☐	☐	☐	☐	☐	
2-2	☐	☐	☐	☐☐	☐	☐	☐	☐	☐	
2-3	☐	☐	☐	☐☐	☐	☐	☐	☐	☐	
2-4	☐	☐	☐	☐☐	☐	☐	☐	☐	☐	
3-1	☐	☐	☐	☐☐	☐	☐	☐	☐	☐	
3-2	☐	☐	☐	☐☐	☐	☐	☐	☐	☐	
3-3	☐	☐	☐	☐☐	☐	☐	☐	☐	☐	
3-4	☐	☐	☐	☐☐	☐	☐	☐	☐	☐	
4-1	☐	☐	☐	☐☐	☐	☐	☐	☐	☐	
4-2	☐	☐	☐	☐☐	☐	☐	☐	☐	☐	
4-3	☐	☐	☐	☐☐	☐	☐	☐	☐	☐	
4-4	☐	☐	☐	☐☐	☐	☐	☐	☐	☐	

AIRCRAFT CODES

(1) 2 seater fixed wing aircraft (e.g. Piper, Citabrea, etc.)
(2) 4 seater fixed wing aircraft (e.g. Cessna 172, Cessna 180, Cessna 185)
(3) Turbo Beaver
(4) Piston Beaver
(5) Otter
(6) Twin Otter
(7) 4 or 6 seater helicopter (e.g. Bell 206 Long Ranger)
(8) 2 seater helicopter (e.g. Robinson)
(9) Other (specify)

EXPERIENCE CODES for WINTER MOOSE HABITAT INVENTORY (Hours, in last 5 years)

(1) 0-10 (2) 11-50 (3) 51+ (9) no observer

CLOUD CONDITION CODES

(1) Bright
(2) Hazy Bright (distinct shadows)
(3) Cloudy Bright
(4) Moderate Overcast (dull)
(5) Heavy Overcast (dark)

HOURS SINCE LAST SNOWFALL CODE (Hours)

(1) 1-6 (2) 7-12 (3) 13-24 (4) 25-48 (5) 49-72 (6) 73+

SNOW CRUST CONDITIONS

A no crust
B light crust in upper portion of snow column
C heavy crust - will support an adult on snowshoes

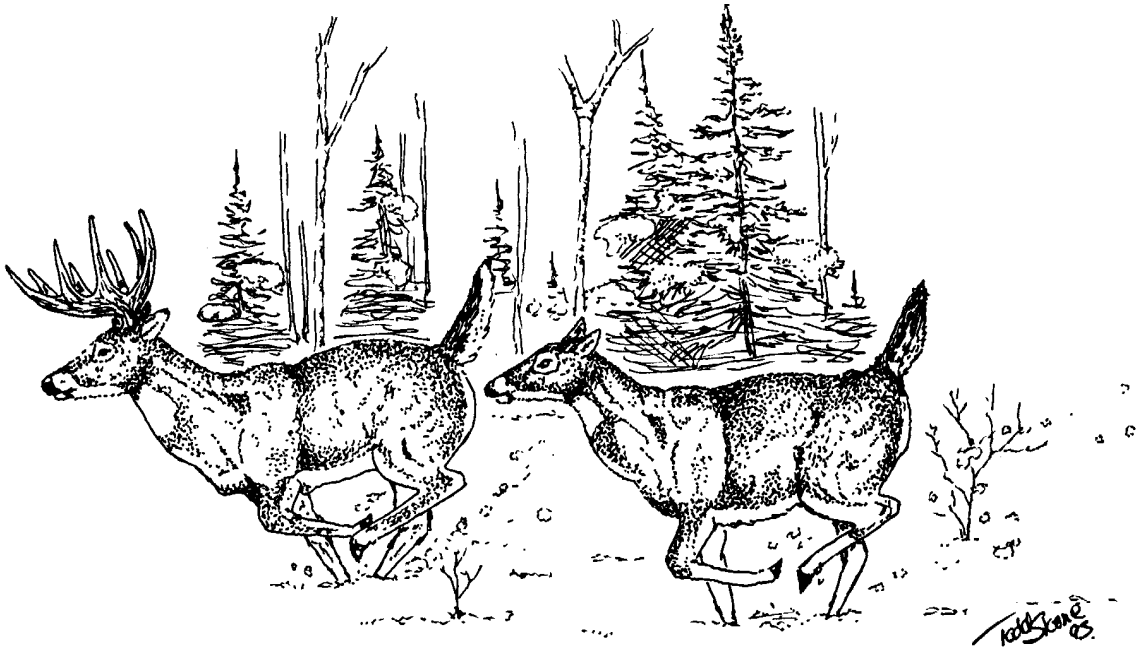
MOOSE HABITAT RANKS (refer to WHI Manual for descriptions)

(1) low potential
(2) moderate potential
(3) high potential
(4) very high potential

2.1.c IDENTIFICATION AND DELINEATION OF

WHITE-TAILED DEER

WINTER HABITAT



Mike Buss
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(old) Central Region

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Wildlife Specialist/Ecologist
Southcentral Region

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District Wildlife Biologist
Algonquin Park

1. Introduction

i. Background

The purpose of these instructions is to describe a basic technique for delineation of white-tailed deer winter habitat which is used as winter concentration areas (deer yards) based on current observed use. There is no implied assessment as to the relative capability of the habitat to support deer for habitats identified using this technique. Appendix I of the draft OMNR document "White-tailed Deer Habitat in Ontario: Background to Guidelines" (Voigt 1992a) provides methods for the assessment of deer habitat, based on criteria other than use.

A low-level photographic interpretation method of identifying conifer stands which might contain deer yards was field-tested in the former Algonquin Region (Anonymous 1991). It was thought to be useful tool there when used to do an initial screening for potential yards. However, since the technique did not define current deer yarding areas on the basis of observed use, it was not considered for inclusion in these instructions.

There are four basic reasons for surveying and mapping winter concentrations of white-tailed deer:

- to establish the size and location of concentration areas in order to stratify deer range for conducting pellet group surveys, browse biomass and consumption estimates and conifer shelter assessments;

- for the planning of specific deer habitat management projects such as browse enhancement, cover species enhancement, protection from conflicting or detrimental land uses, etc.;

- for plan input and review of forest management activities as well as developmental plans on private and municipal lands; and

- for data input in the Ontario Deer Model used for planning and management decisions.

This survey depends on locating, identifying and mapping deer tracks and trails. Like winter aerial surveys for moose, wolves or other animals, observers must be able to distinguish animal tracks from aircraft flying at a low level and low speed. Unlike most population inventory surveys, the sighting of deer is not necessary to accomplish the primary objective of this survey, which is to identify and delineate habitat. Therefore most

four-seater, single engine, fixed-winged aircraft capable of low speed flight are acceptable. Rotary-winged aircraft are preferred.

ii. Deer Habitat Stratum

Deer habitat stratum is a way to describe the areas used by deer during the course of a calendar year. Use of habitats by deer during winter is of particular concern to deer managers. Winter habitats are considered to be a limiting factor on all northern and central Ontario deer ranges.

Stratum I or Stratum A

Stratum I (A) is often referred to as the 'core' of a deer 'yard'. It is the most used portion of a deer winter concentration area. In general, deer mobility and use of habitat types is most restricted under severe winter conditions (especially with respect to snow depth and occasionally crust conditions). Such conditions can occur at any time during the winter, but are most often encountered mid to late winter when snow has accumulated to maximum depths and deer are in a stressed condition. During mild winters with little snow, deer **will not** be restricted to Stratum 1 habitats. Snow depths must exceed an average depth of 46-50 cm if Stratum I is to be differentiated from Stratum II. Stratum I also contributes to the area necessary to complete data input for the Ontario Deer Model.

Stratum II or Stratum B

Shortly after the onset of winter, or occasionally all winter during 'mild' winters, deer can be found in 'the yarding area'. This can also be thought of as the winter concentration area in its entirety, and is what constitutes Stratum II (B). As a general rule, the perimeter of Stratum II must be determined prior to snow depths reaching 20 cm. If snow is very light and fluffy, deer may continue to occupy all of the yard until snow depths reach about 30 cm. The Stratum II area, in addition to Stratum I, constitutes the data necessary to develop K_w (winter carrying capacity) for the Ontario Deer Model.

Stratum III or Stratum C

Year-round deer range, that is the range deer occupy during a calendar year, is Stratum III (C). Stratum I and II are subsets of Stratum III, or, put another way, Stratum III is inclusive of all Stratum. This represents the area necessary to complete data requirements for calculating K_s (summer carrying capacity) for the Ontario Deer Model.

To interpret survey results and classify deer range into strata one must evaluate the survey conditions and results carefully. Snow depth, temperature, crust conditions and time of year all affect deer distribution on their winter range. See the discussion under '3. Survey considerations'.

2. Initial Preparation

- Delineate the year-round deer range (the area deer occupy during the course of a calendar year). As a rule, this is only necessary where deer and moose are both relatively abundant within the WMU under consideration or where urban or industrial sprawl preclude the presence of deer.

- Identify cells to be surveyed as per **'1.0 GENERALIZED METHODS AND TECHNIQUES'**. See Figure 1.1.

- The map scale most appropriate for recording observations in most instances will be 1:50,000. Larger scale maps (e.g., 1:20,000) or photocopy enlargements may be preferred. Because areas searched will often be large, it is recommended that the maps be cut into manageable sections. Attaching the maps to Bristol board of an appropriate size will aid in labeling and storage in the aircraft.

- Obtain at least two map copies of each cell to be surveyed. One copy may suffice depending on the needs of the pilot and navigator. Some pilots and navigators need a map specifically for navigation - others record data on the map used to navigate.

- Determine percent tree cover, in broad categories, over the breadth of the area to be surveyed.

- Plan to delineate and survey areas according to the following broad categories:

    1. less than 40% tree cover;
    2. between 40-80% tree cover; and
    3. more than 80% tree cover.

- Delineate percent tree cover into the above categories from aerial photos, FRI maps or any other information available.

- For areas identified to have more than 80% tree cover, plan a grid survey.

- Transects for the grid survey should be flown on 1 kilometre UTM grid lines, or lines 1 kilometre apart perpendicular to the predominant topographic features.

- On smaller units of land, or when greater detail is necessary (i.e., where stands of dense conifer cover are small and separated by very open habitats), reduce the distance between flight lines. Except in unusual circumstances, it should not be necessary to reduce flight lines to less than 0.5 km apart.

- Non-grid surveys are most practical where tree cover is less than 80 percent (i.e., categories 1 and 2, above). Reconnaissance via a couple of passes or circles through these areas will usually be suffice to confirm the presence or absence of tracks. If tracks are numerous and the area is large, a grid survey may be necessary.

- On very small areas, where grid lines are inappropriate, survey the area by reconnaissance, i.e., circling.

3. Survey Considerations

i. Survey Crew and Training

- The survey crew should consist of one pilot, one navigator, and a right and a left observer.

- Survey crew members should make training flights over occupied deer winter habitat to acquaint themselves with track identification and differentiation.

- Ideally, training flights should be made on the day of the survey. Existing condition will therefore be taken into account. Crew members should review Section E. - Tracks, in "A Manual For Aerial Observers Of Moose" (Oswald 1982) for a discussion of track identification from the air.

ii. Time of Year

- Timing and frequency of survey flights depends on the purpose of the survey. If the purpose is to stratify deer winter range, two survey flights may be necessary.

- The first flight should be conducted in mid-January. Snow depths should not exceed 20-30 cm (8-12 inches). This has the greatest potential to delineate Stratum II (including Stratum I) winter range.

- The second flight is conducted when snow depth reaches 46-50 cm (18-20 inches) or more and there is no crust, or an unsupportive crust [A or B crust as per winter severity criterion (Passmore 1953)]. In Ontario, this is usually in early February on to early March. These conditions are most conducive in delineating Stratum I (core deer yard) from Stratum II.

- If funding or time restrictions allow for only a single survey, timing of the flight will depend upon the management objectives. For example, flights could be done at any time after snow depths reach 20-30 cm (8-12 inches), which is most often the situation after mid-January, if the objective was to delineate overall winter deer habitat (i.e., Stratum II or B). To delineate the 'core' of the yard, adjust timing accordingly.

iii. Time of Day

- As a general rule, flights should occur between 1000 and 1500 hours.

- Flights earlier or later than above increase the risk of missing tracks because of shadows caused by the low position of the sun on the horizon.

- Flights late in winter (e.g., March) have a greater 'window of opportunity' each day because of lengthening daylight hours. Conversely, flights early in winter (e.g., December, January) may not be possible within the total time period identified.

iv. Type of Day

- Surveys should be done under clear, bright conditions. High, very light overcast or scattered, thin clouds are also acceptable, but increased observer fatigue may result.

- Tracks are most easily observed when the shadows created in them are strong, i.e., when there is bright sunlight.

- Under clear, bright conditions, sun glare can be a problem. Glare can be reduced and fewer tracks will be missed if observers wear polarized sunglasses. Yellow 'shooting' glasses are often helpful to increase contrast on high haze days.

- High winds [20-25 km/h (12-16 mi/h) or more] compromise safety and comfort and can cause drifting in of tracks, all of which can contribute to poor survey results.

- Flights should not be conducted until 48 hours after a snowfall. Otherwise, most tracks, except for major trails, will be undetectable.

v. Flight Altitude and Speed

- Flights should be conducted between 60 and 150 m (200 and 500 ft) elevation, depending on surrounding terrain.

- Ground speeds between 130-190 km/h (80-120 mph) are recommended. A helicopter can be advantageous when closer inspection of tracks or forest characteristics is required.

- On a featureless landscape, it may be difficult to determine when you have flown a kilometre (and need to record a track rating). Use the ground speed the aircraft is flying to estimate distances.

4. Survey Procedure

- Write down the date of each flight directly on the map along with snow depth, crust conditions (Passmore 1953), cloud conditions, temperature and the time the survey began and the time it ended. Also record the names of the survey crew.

- For the purpose of defining Stratum, observers may want to estimate 'age' of tracks ('age' of deer tracks, snow depth and Stratum are often inter-related). Old tracks are tracks which are visible but have lost 'sharpness' due to snowfall or have deteriorated from sun and wind. With a little experience, it is relatively easy to tell new tracks from old ones.

- Five deer track densities are recognized and recorded (the same rating system is used for both old tracks and new tracks):

  0 = no deer tracks visible;

1 = a few track aggregates or a single trail;

2 = more than a few track aggregates and/or a few trails, but much of the kilometre of forest had little or no deer activity;

3 = numerous track aggregates which may or may not be associated with major trails and much of the kilometre had deer activity;

4 = heavily tracked area, many track aggregates, deer often visible.

- If tracks are present in areas with less than 80% tree cover, delineate the area deer are frequenting. For areas <100 ha, assign a track density rating for the entire area. If the area is >100 ha, plan to do a more thorough grid survey.

- For grid surveys, track density is recorded as follows:

  The navigator calls out as each intersection of grid lines is crossed. After each grid (1 km^2 block) is flown, observers tell the navigator what the track density rating was. One observer should be designated to report first to minimize confusion and allow for consistent recording;

  Care must be taken to ensure bias is not introduced by one experienced observer influencing the judgements of a less experienced observer. A test run before the survey begins is suggested in order to come to a mutual understanding on how to rank. To help avoid bias, observers should alternate their recording sequence.

  If track densities are desired on a finer scale, the observers may call out information at their discretion.

- The navigator records the appropriate track density number on the flight maps for each side of the transect line (Figure 2.1.7).

- Flight direction on the transect should also be recorded with arrows.

- When rugged topography makes flying perpendicular to the relief pattern impractical (due to extreme differences in elevation) it may be more feasible to fly parallel to the predominant pattern.

- Grid surveys like this one can sometimes find a lot of stick nests. These should also be recorded as to location, type of tree, etc. Write the information on the map and also take a GPS recording (if possible). Record the information using the data form in Appendix 1.

5. Interpretation

Most districts in Ontario's white-tailed deer range have at some time, and often with some regularity, mapped winter deer habitat. This may have been done to provide information for one of the reasons identified in **'1. Introduction'**. Whichever the reason, the value of information obtained under the above-noted conditions is enhanced when a series of consecutive survey results are overlaid. This procedure provides for interpretation beyond the current survey year's results. The interpretation of any results should take into account winter severity prior to survey date. A comparison of Winter Severity Index for locations close to the survey area should be made in evaluating any results.

Using several years of data is also preferable because of changes that occur as a result of changes in deer density, habitat suitability and other factors that are temporal in nature.

The map of the area surveyed with deer distribution patterns shown will be of great help when needing to make decisions regarding proposed land-use developments. These include forest harvest operations, subdivision developments or any other land-use planning initiatives.

Often referred to as 'critical winter habitat. 'core' yarding areas will become more precisely defined with the overlay of multiple survey results. Shifts in habitat use of this 'critical' habitat type can thus be monitored and newly developing or reoccupation of former habitat can be identified. When these observed-use patterns are documented, it is easier to justify decisions regarding the need for protection or implementation of mitigation when developments are proposed within core areas. Correlation with existing vegetation descriptions can also be made which will help in habitat planning and modeling. In addition, it is these correlation's which form the basis for management decisions to issues that are addressed in other provincial policies and guidelines.

For a detailed description of methods to assess winter deer habitat consult Appendix I, Methods for Assessing Deer Habitat found in "White-tailed Deer Habitat in Ontario, Background to Guidelines" (Voigt 1992b).

6. Data Compilation and Storage

- As soon as possible after the flight, a map delineating deer track densities should be prepared.

- Drafting the map will include drawing isopleths around areas of similar track densities.

- The isopleths of this map should be drawn as a layer on the District GIS Values map (if GIS capability exists), using color or shading to identify deer density rankings (Figure 2.1.8).

- Include on the GIS layer the extent of the area surveyed.

- If the data is to be recorded for each 1 km^2 UTM mercator block, then a single value for each block can be assigned from the two ratings made. Assigning a single value is necessary for the purposes of data form recording.

- Each block will usually have two recorded ratings, and if the ratings are the same then obviously that is the single value to be assigned the block. If ratings differ, the single rating will be an average or one of the two ratings or on a subjective evaluation of the overall pattern observed, including environmental factors (e.g., the extent of non-deer habitat or poor deer habitat in the block). Half values need not be used.

- Transfer all data to and complete the "White-tailed Deer Winter Habitat" Inventory Form as soon as possible after the flight(s). **Do not attempt to complete the Inventory Forms in the field. All information needed to fill in the forms can be deduced from the completed maps.** Information should also be recorded on the District Values map.

- Inventory Forms using are designed to store data in a standardized fashion for future analysis. Data should be readily retrievable.

- Over time, several GIS layers of deer yard mapping will accumulate. If GIS capability is not yet at hand, recording yard boundaries on acetates will facilitate making composite overlays. In most cases, these acetates would be at 1:50,000 scale to coincide with the original flight maps.

- For best results, winter deer habitat delineation will take several surveys over a number of years under differing winter conditions. A single survey is only a start.

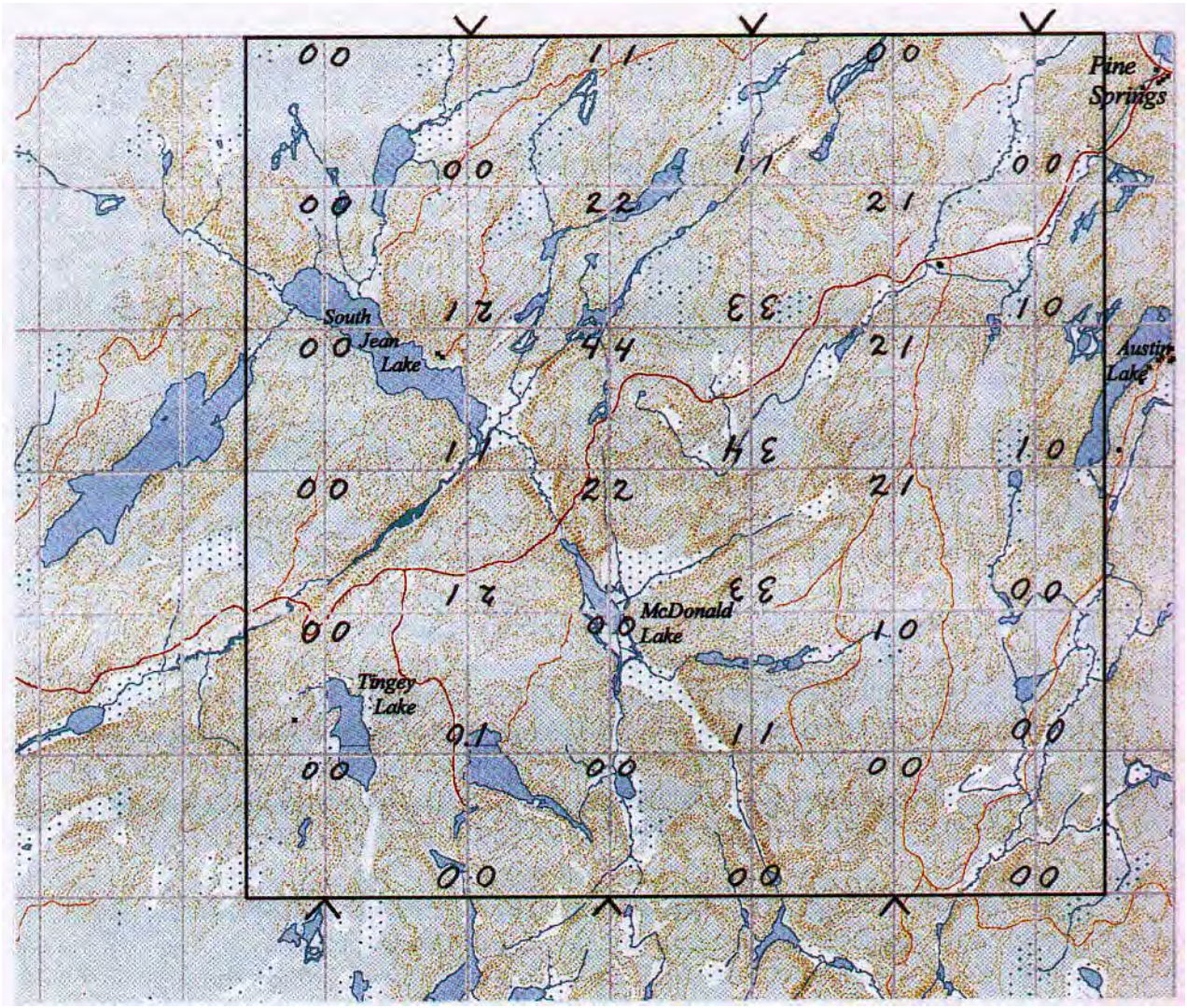
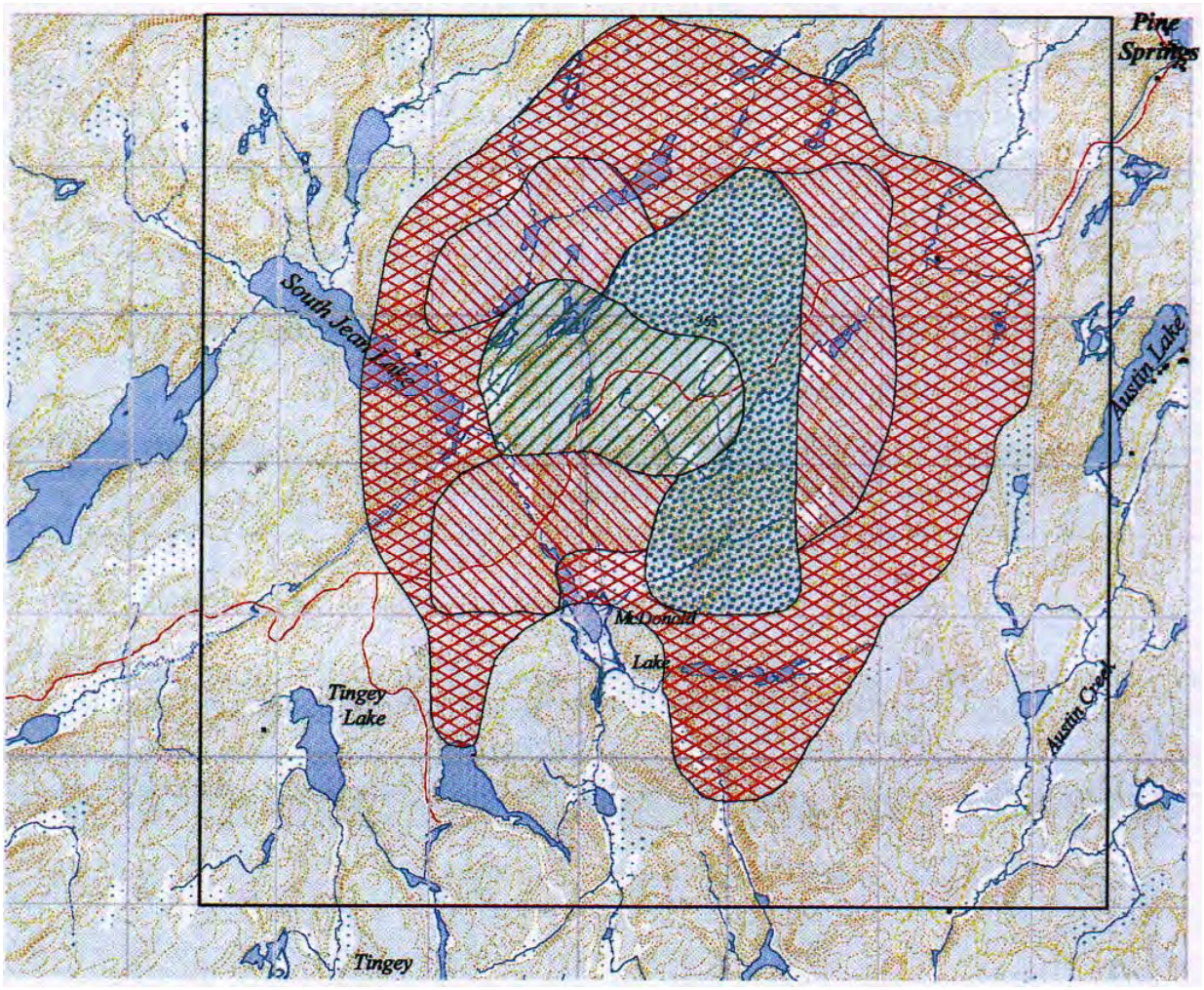


FIGURE 2.1.7 Sample Grid System with Track Densities Recorded

1-2-3 -track density rating

⋀ -direction of flight



track density rating 4
track density rating 3
track density rating 2
track density rating 1
area surveyed

FIGURE 2.1.8 Sample of Final Map Including Isopleths

7. Literature Cited

Anonymous. 1991. Forest cover mapping of deer yards. Vol. 1. Winter Deer Yard Study. Dendron Resource Surveys Ltd.

Jones, S.L. 1981. How to conduct deer fecal counts or what you always wanted to know about doing a spring survey but were afraid to ask. OMNR. Unpub. Draft Rept. 44 pp.

Oswald, K. 1982. A manual for aerial observations of moose. OMNR, Wawa District. Ms Rep. 103 pp.

Passmore, R.C. 1953. Snow conditions in relation to big game in Ontario during the winter of 1952-53. Ont. Dept. Lands and For., Wildl. Res. Rep. No. 2. 12 pp.

Voigt, D. 1992a. Draft timber management guidelines for the provision of deer habitat. Ont. Min. of Nat. Resour. 5 pp.

Voigt, D. 1992b. White-tailed deer habitat in Ontario, background document to guidelines. Ont. Min. of Nat. Resour. 36 pp.

INVENTORY FORM

WHITE-TAILED DEER WINTER HABITAT (DEER YARDS)

for UTM Block # ☐☐☐☐ **only**
A A N N

Date: ☐☐ ☐☐ ☐☐ Aircraft: ☐ Page ☐ of ☐ Pages.
YY MM DD

Experience Code:

Pilot: ☐ L. Obs: ☐

Nav: ☐ R. Obs: ☐

Climate:

Cloud Conditions: ☐

Temperature: ☐ ☐☐ °C

Snow Depth: ☐☐☐ cm

Snow Crust: ☐

Hours last Snowfall: ☐

Aircraft Crew Identification: Pilot: _____ Navigator: _____

Left Observer: _____ Right Observer: _____

Wildlife Management Unit # ☐☐☐
N N A

Cell Searched (circle)

1-1 1-2 1-3 1-4 2-1 2-2 2-3 2-4 3-1 3-2 3-3 3-4 4-1 4-2 4-3 4-4

Ranking coverage for above cell complete (all 1km² grid cells ranked) *(check)*

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

1 KM² UTM CELL		**RANK**	**1 KM² UTM CELL**		**RANK**
easting	*northing*		*easting*	*northing*	
XX	XX		XX	XX	
XX	XX		XX	XX	
XX	XX		XX	XX	
XX	XX		XX	XX	
XX	XX		XX	XX	
XX	XX		XX	XX	
XX	XX		XX	XX	
XX	XX		XX	XX	
XX	XX		XX	XX	
XX	XX		XX	XX	
XX	XX		XX	XX	

Additional Comments:

USING MERCATOR GRIDS

1. List the letter (alpha, 2) and number (numeric, 2) codes from the southwest (lower left-hand) corner of the 100 x 100 km grid block). See Figure 1, for an example, which is UF63.
2. List the easting distance using the 1.0 km grid line (A number which is 0-9). This number appears after UF6.)
3. Similarily, list the northing distance on the 1.0 km grid line (This complete number is UF6_3_.)

AIRCRAFT CODES

(1) 2 seater fixed wing aircraft (e.g. Piper, Citabrea, etc.)
(2) 4 seater fixed wing aircraft (e.g. Cessna 172, Cessna 180, Cessna 185)
(3) Turbo Beaver
(4) Piston Beaver
(5) Otter
(6) Twin Otter
(7) 4 or 6 seater helicopter (e.g. Bell 206 Long Ranger)
(8) 2 seater helicopter (e.g. Robinson)
(9) Other (specify)

EXPERIENCE CODES for WINTER MOOSE HABITAT INVENTORY (Hours, in last 5 years)

(1) 0-10 (2) 11-50 (3) 51+ (9) no observer

CLOUD CONDITION CODES

(1) Bright
(2) Hazy Bright (distinct shadows)
(3) Cloudy Bright
(4) Moderate Overcast (dull)
(5) Heavy Overcast (dark)

HOURS SINCE LAST SNOWFALL CODE (Hours)

(1) 1-6 (2) 7-12 (3) 13-24 (4) 25-48 (5) 49-72 (6) 73+

SNOW CRUST CONDITIONS

A no crust
B light crust in upper portion of snow column
C heavy crust - will support an adult on snowshoes

RANK

(0) no deer tracks visible
(1) few trak aggregates or a single trail
(2) more than a few track aggregates and/or trails; not much of the km with deer activity
(3) numerous track aggregates which may or may not be associated with major trails, most of the km with deer activity
(4) heavily tracked area, many aggregates, deer often visable

2.1.d OTHER PROVINCIALLY FEATURED SPECIES

OTHER PROVINCIALLY FEATURED SPECIES

General

'Other Provincially Featured Species' (i.e., species which are classified as Endangered or Threatened) are very localized in occurrence and where they do occur, their presence is generally well known by District MNR staff. Most of these species have some form of a monitoring program in place already, and these programs are likely to continue. Evidence of these species should be recorded on the form located at the end of this chapter and locations of occurrence should be on the District Values map (Figure 2.1.9). However, because these habitats are sensitive to disturbance, they are not usually identified precisely when Values maps are made available to the public.

Information gathered on Other Provincially Featured Species should routinely be made available to the appropriate Wildlife Assessment Unit (WAU) and/or the Natural Heritage Information Centre (NHIC), especially if a new occurrence is found. For information which is to be forwarded to the NHIC, it is recommended their data form be completed (a copy of their form is provided in Appendix II at the end of this manual).

Bird nests are of special interest to the Royal Ontario Museum (ROM). A special ROM nest recording form is available; contact ROM @ Ontario Nest Records Scheme, Dept. of Ornithology, ROM< 100 Queen's Park, Toronto, Ont. M5S 2C6.

Only those species thought to occur in the Area of the Undertaking, as defined in the Class EA for Timber Management, are identified as Provincially Featured Species in this manual.

BIRDS

White Pelican

1. Background

The white pelican (Pelecanus erthrprynchus) is officially designated as Endangered in Ontario. Until recently, the only known colony in Ontario nested on small islands in Lake of the Woods. Recently, a colony has become established on Lake Nipigon and nesting birds have been found elsewhere. Forest management activities are not believed to pose much of a threat to white pelicans at this time.

2. Survey Considerations

As mentioned above, the only known colony of white pelicans in Ontario until recently was on Lake of the Woods in Kenora District. This population is monitored by the Lake of the Woods Fisheries Assessment Unit in partnership with a retired MNR staffer (Val Macins). Structured surveys by other District or Area staff are unnecessary. Interested staff should be aware of the presence of any pelicans and should try and develop partnerships with interested groups or individuals who can help in determining whether a colony becomes established.

3. Data Compilation and Storage

Nests or colonies that are found must be recorded and filed on the form for 'Other Provincially Featured Species' located at the end of this chapter. Forward information to the appropriate WAU and the NHIC.

Golden Eagle

1. Background

The golden eagle (Aquila chrysaëtos) is officially classified as Endangered in Ontario. The habitats of the golden eagle are mainly grasslands and sparse shrubland, especially when found on slopes and plateaus. In forested areas, nesting territories usually contain large openings (e.g., burns, marshes, bogs, hillside meadows, bald knobs, railroad right-of-ways). Home ranges have been recorded from 41 to 251 km^2, depending on habitat occupied and prey base. Ranges in eastern North America's forested area are estimated to average 500 km^2. Nest sites are usually large trees or cliff ledges with extensive view. In general, Ontario does not have good golden eagle habitat and populations are likely to remain small.

2. Survey Considerations

According to the Atlas of the Breeding Birds of Ontario, there has only been one record of possible breeding evidence of golden eagles within the area of the undertaking. As such, searching for nests is unnecessary. In addition, the impact of forest management activities is not expected to negatively affect the population of golden eagles utilizing the boreal forest.

Golden eagles are seen most years in Ontario, with the majority of sightings associated with spring and fall migrations. Immature or non-breeding golden eagles may be seen in Ontario at any time, and breeding adults may also be encountered fairly regularly once the breeding season is over. Interested staff are encouraged to report any sightings of golden eagles (and, of course, evidence of nesting) to the Area Biologist.

3. Data Compilation and Storage

Any nests that are found must be recorded and filed on the form for 'Other Provincially Featured Species' located at the end of this chapter. Forward information to the appropriate WAU and the NHIC.

Peregrine Falcon

1. Background

The peregrine falcon (Falco peregrinus) is officially designated as Endangered in Ontario. Peregrines, particularly in eastern North America, were negatively impacted by pesticide use, especially DDT, and in general, have a long way to go to achieve former levels of abundance. However, in Ontario, peregrine falcon population levels prior to DDT are largely an unknown.

Peregrine falcons depend mainly on medium-sized birds as prey and nest almost exclusively on cliff faces. In large cities, ledges on skyscrapers appear to be a suitable substitute for a cliff.

2. Survey Considerations

In Ontario, provincial surveys are conducted every five years for this Endangered species. District and area offices should have records of all known nest sites. No other surveys are necessary.

3. Data Compilation and Storage

Information from provincial surveys is made available to the relevant District/Area offices. The Peregrine Falcon Habitat Management Guidelines call for each nest site identified to have a management plan. The location of nests are to be kept confidential.

Piping Plover

1. Background

The piping plover (Charadrus melodus) is officially designated as Endangered in Ontario. These birds depend upon large, sandy beaches on large lakes for breeding purposes and are threatened little by forest management activities. Known former nesting sites along Great Lakes shorelines are no longer being used. Recreational pressures and natural predation appear to be the main threat to their survival.

2. Survey Considerations

The majority of the piping plover nesting sites in Ontario are believed to be known and are monitored annually, for both use and breeding success, through a provincially coordinated effort. The 1991 International Piping Plover Breeding Survey failed to document additional nest sites in Ontario. No other formalized surveys are necessary.

3. Data Compilation and Storage

Information from provincial surveys is made available to the relevant District/Area offices. A Provincial Draft Recovery Plan is in place which dovetails with the Federal, Canadian Wildlife Service, Prairie Piping Plover Recovery Plan.

Kirtland's Warbler

1. Background

Kirtland's warbler (Dendroica kirtlandii) is officially designated as Endangered in Ontario. Virtually all known breeding by Kirtland's warbler occurs in the state of Michigan. There, Kirtland's warbler select, as nest sites, relatively pure jack pine stands, or plantations, of more than 20 ha on well-drained sands or shallow soils with trees two to seven metres tall.

No breeding by Kirtland's warblers has been confirmed in Ontario, although at least on one occasion near Pembroke, a singing male was heard in the spring in habitat similar to their known breeding range in Michigan. In 1986, an intensive survey across Ontario revealed no breeding pairs of Kirtland's Warblers. In 1990, surveys

in Algonquin Park checked jack pine stands, but again no evidence of use by Kirtland's warbler was recorded.

2. Survey Considerations

Given the rarity of Kirtland's warbler in Ontario, no systematic surveys in preferred habitats are suggested.

3. Data Compilation and Storage

Any information from staff or the public indicating the presence of a Kirtland's warbler should be brought to the attention of the Area Biologist. Accurate records of any evidence of Kirtland's warblers (a sighting, presence of a singing male, a nest) must be maintained and recorded on the form 'Other Provincially Featured Species'. Forward information to the appropriate WAU and the NHIC.

Loggerhead Shrike (Endangered) and Common Barn Owl (Threatened)

No habitat surveys have been developed for these two species. Neither appear to be at risk from forest management activities. Information needs and appropriate management strategies need to be developed. Regional, District and Area offices are encouraged to maintain files which document the presence and habitats of these two species wherever they occur. All occurrences should be recorded on the form 'Other Provincially Featured Species' and forwarded to the appropriate WAU and the NHIC.

MAMMALS

Eastern Cougar

Habitat surveys have not been developed for this Endangered species. It is likely the species is at least somewhat dependent upon the presence of white-tailed deer. Forest management activities do not appear to be a threat to its existence. Regional, District and Area offices are encouraged to record occurrences on the 'Other Provincially Featured Species' form and to maintain current files which report sightings or any other evidence of the presence of this species. Information should be forwarded to the appropriate WAU and the NHIC.

AMPHIBIANS AND REPTILES

Eastern Spiny Softshell Turtle and Eastern Massasauga Rattlesnake

Neither of these two Threatened species appear to be at risk because of forest management activities. In addition, habitat inventory methodologies applicable to the present needs of resource managers have not been developed for these species. Regional, District and Area offices are encouraged to maintain files documenting the presence of these two species wherever they occur. Information should be recorded on the 'Other Provincially Featured Species' form and forwarded to the appropriate WAU and the NHIC.

PLANTS

Ginseng

1. Background

Wild ginseng (Panax quinquefolium) is a slow growing, perennial plant. Wild ginseng plants do not usually reproduce successfully until they are about 8 years old. Fruits develop following the June/July flowering and do not ripen until August/September. Germination takes place 18 - 22 months after the ripe fruit drops to the ground.

Once considered abundant in Ontario and Quebec, the wild ginseng plant is felt to have declined drastically since the onset of European settlement. There are two major causes of this decline; habitat destruction and over-harvesting. If the plants are harvested prior to reproductive maturity), they cannot reseed themselves and will rapidly be eradicated from the site.

The majority of wild ginseng is exported to the orient where it is used as an herbal medicine in a large variety of forms. Although cultivated ginseng is also used, in the mid 1980's in the U.S., over 26% of exported ginseng was of the wild form. CITES restrictions on the export of ginseng became effective in 1977 and will hopefully deter overzealous diggers.

This Threatened plant can be found in moist, deciduous, mature forests that are well shaded. It is often associated with deep leaf litter over rich soils, but also seems to do especially well on rocky, cool slopes. Forest cover is characteristically dominated by sugar

cool slopes. Forest cover is characteristically dominated by sugar maple and soils must have adequate moisture and drainage (base of hill, seepage area, banks of intermittent streams). White (1988 COSEWIC status report) suggests P. quinquefolius grows best in undisturbed moist deciduous forest.

2. Survey Considerations

Due to the sensitivity and vulnerability of this species, the regional

ecologist/specialist should be consulted if population inventories are desired. Occurrences should be reported to the NHIC.

Small White Lady's Slipper

Habitat surveys have not been developed for this Endangered species. It is unknown what the impact of forest management activities are on the species. Regional, District and Area offices are encouraged to maintain files documenting any evidence of the presence of this orchid using the 'Other Provincially Featured Species' form and to report occurrences to the NHIC.

Pitcher's Thistle

Habitat surveys have not been developed for this Threatened species. It is not believed to be at risk from forest management activities. Regional, District and Area offices are encouraged to maintain files documenting any evidence of the presence of this thistle using the 'Other Provincially Featured Species' form and to report occurrences to the NHIC.

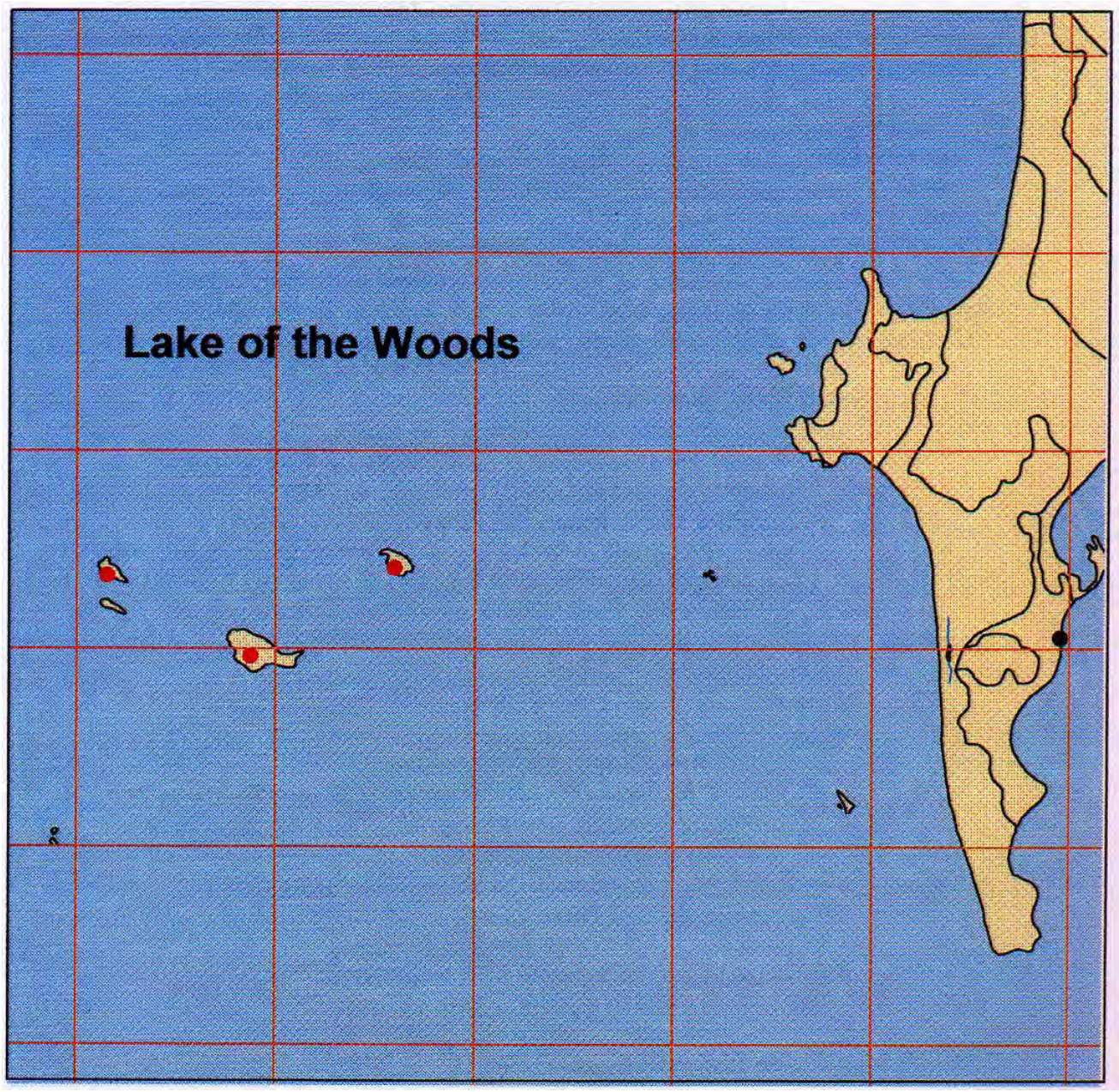


FIGURE 2.1.9 Mapping Other Provincially Featured Species

Suggested References

Denny, G.C. 198_. American Ginseng. Ohio DNR, Div. of Natural Areas and Preserves.

Macins, V. 1991. Status of the white pelican in Ontario: 1991 update. Lake of the Woods Fisheries Assm. Unit Rep. 1991:02. MNR, Kenora. 28 pp.

OMNR. 1987. Golden eagle habitat management guidelines. OMNR unpub. rep. 2 pp.

OMNR. 1987. Peregrine falcon habitat management guidelines. OMNR unpub. rep. 9 pp.

White, D.J. 1988. Ecological Study and Status Report on American Ginseng, Panax quinquefolium L., a threatened species in Canada. Committee on Status of Endangered Wildlife in Canada. CWS. Ottawa. Unpubl. 165 pp.

INVENTORY FORM

'OTHER' PROVINCIALLY FEATURED SPECIES

Date of Survey: ☐☐ ☐☐ ☐☐ (YY MM DD)

Species Code: ☐☐

Survey Crew Identification:

_____

_____

_____

_____

Species Codes:

01 - White Pelican
02 - Golden Eagle
03 - Peregrine Falcon
04 - Piping Plover
05 - Kirtland's Warbler
06 - Barn Owl
07 - Loggerhead Shrike
08 - Eastern Cougar
09 - Eastern Spiny Softshell Turtle
10 - Eastern Massasauga Rattlesnake
11 - Ginseng
12 - Small White Lady's Slipper
13 - Pitcher's Thistle

Wildlife Management Unit #: ☐☐☐ (N N A)

Cell #: ☐☐

UTM Coordinate: ☐☐ ☐☐☐☐XX ☐☐☐☐☐XX

Nature of Sighting: ☐☐☐☐☐☐☐☐☐ *(check)* (1 2 3 4 5 6 7 8 9)

Nature of Sighting Codes:

1 - Adult seen
2 - Young seen
3 - Adult with Young
4 - Group of Individuals, ages unknown
5 - Evidence of Breeding (e.g. nest, lactation)
6 - Tracks
7 - Scat
8 - Specimen in hand
9 - With Flower and/or Seed (plants only)

Number of Individuals Seen: ☐☐☐

Adults ☐☐☐ # each Sex M ☐ F ☐ Unk ☐

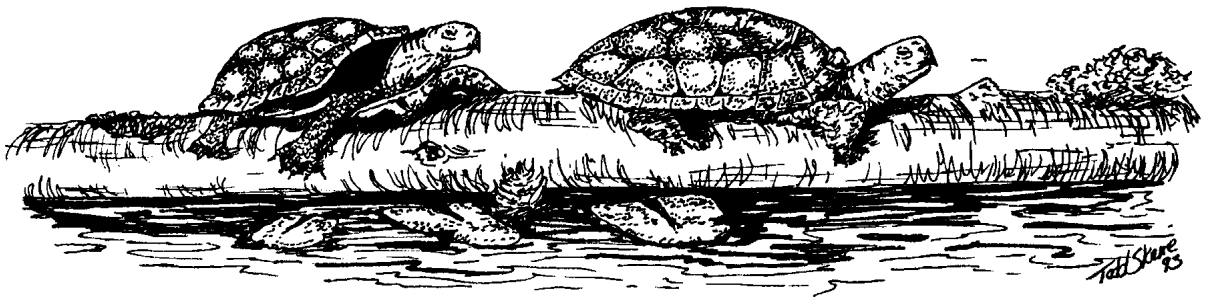
Young ☐☐☐

FRI Stand(s) sighting near/in: ☐☐☐ ☐☐☐ ☐☐☐ ☐☐☐ ☐☐☐ ☐☐☐

Map Included? *(circle)*: Yes No

Comments:

2.2 LOCALLY FEATURED SPECIES



2.2.1 General

The species or combinations of species to be locally featured should be based on recommendations made by Area, District or Forest Management Plan planning teams, or possibly District Advisory Committees, Local Citizenship Committees, etc., to the District Manager. As a rule, any species which has been classified provincially as Vulnerable and which occurs or is likely to occur in the planning area, or has a reasonable expectation of becoming re-established, should be locally featured. As mentioned elsewhere, locally featured species may also include species of particular aesthetic, scientific, recreational or commercial value. They may be individual species or combinations of species and can be animals or plants.

- In general, identify the area(s) where species are to be locally featured in a similar fashion as you would for provincially featured species.

- Within the planning unit (usually a Forest Management Unit), the area, if any, where species are to be locally featured needs to be delineated. To do this, planning teams must review information from a variety of sources including District Land Use Guidelines, FRI maps, data from any previous population or habitat surveys, approved guidelines, resource manuals, technical reports and the scientific literature. In-house knowledge (i.e., MNR staff) is also an important source of information.

- Consultation with knowledgeable individuals from the public is necessary.

- Similar to habitat management for provincially featured species, habitat management for locally featured species can be either site-specific (e.g., the immediate area surrounding a nest) or on a broader, landscape basis (e.g., year-round caribou range).

- All Vulnerable species that need to be considered as locally featured species, the areas where they are likely to occur (identified by FMU) and whether or not they are at risk because of forest management activities are presented on Table 2.2.1.

- Other agencies, notably the Natural Heritage Information Centre (NHIC) and the Royal Ontario Museum (with respect to bird nests), may also be interested in information on locally featured species. Be sure to establish contact with both to ensure the information needs of all are met.

TABLE 2.2.1 VULNERABLE SPECIES WHICH OCCUR,OR POTENTIALLY OCCUR, IN CROWN LAND FORESTED AREAS OF ONTARIO

BIRDS

SPECIES NAME	SCIENTIFIC NAME	AT RISK FROM FOREST MANAGEMENT ACTIVITIES?
Least Bittern	Ixobrychun exilis	No
Cooper's Hawk	Accipiter cooperii	Yes
Red-Shouldered Hawk	Buteo lineatus	Yes
Black Tern	Childonias niger	No
Caspian Tern	Sterna caspia	No
Louisiana Waterthrush	Seiurus motacilla	No
Great Gray Owl	Strix nebulosa	Yes
Red-Headed Woodpecker	Melanerpes erythrocephalus	Yes
Eastern Bluebird	Sialia sialis	No
Prairie Warbler	Dendroica discolor	No

MAMMALS

SPECIES NAME	SCIENTIFIC NAME	AT RISK FROM FOREST MANAGEMENT ACTIVITIES?
Grey Fox	Urocyon cinereoargenteus	No
Southern Flying Squirrel	Glaucomya volans	Yes
Wolverine	Gulo gulo	No

TABLE 2.2.1 VULNERABLE SPECIES (continued)

INVERTEBRATES

SPECIES NAME	SCIENTIFIC NAME	AT RISK FROM FOREST MANAGEMENT ACTIVITIES?
West Virginia White Butterfly	Artogeia virginiensis (Pieris virginiensis)	Yes

SPECIES NAME	SCIENTIFIC NAME	AT RISK FROM FOREST MANAGEMENT ACTIVITIES?
Small Mouth Salamander	Ambystoma texanum	No
Spotted Turtle	Slemmys guttata	No
Wood Turtle	Clemmys insculpta	Yes
Eastern Hognose Snake	Heterodon platyrhinos (H. platirhinos)	Yes

PLANTS

SPECIES NAME	SCIENTIFIC NAME	AT RISK FROM FOREST MANAGEMENT ACTIVITIES?
Hill's Pondweed	Potamogeton hillii	No
Western Silver Leaf Aster	Virgulus sericeus	No

2.2.2 Identification of Habitat Attributes

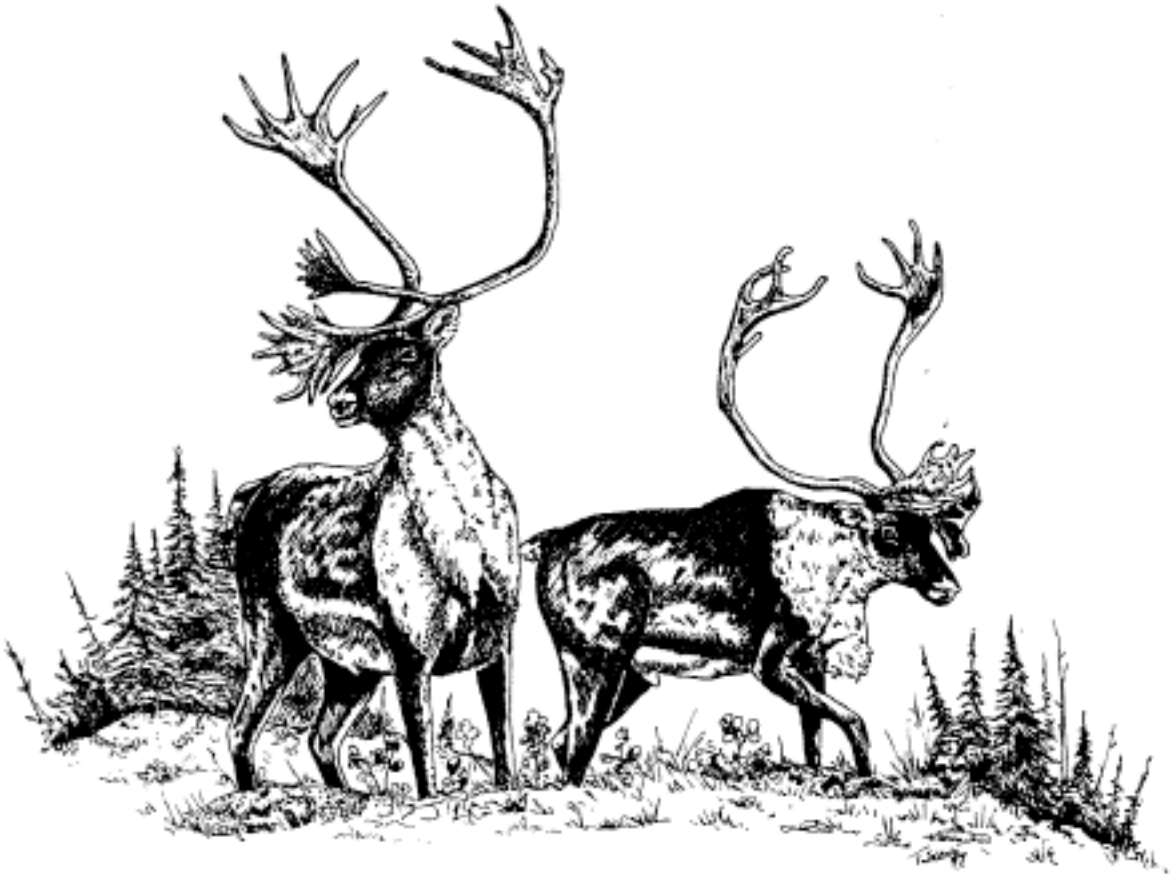
As with provincially featured species, the management of habitat for locally featured species is dependent upon the identification and delineation of specific habitat attributes critical to the survival of the species in question. Some of these habitat attributes are easy to describe (e.g., a nest) but others, such as the habitat of the spotted turtle, is more difficult.

The methodologies to locate the nests of osprey and great blue herons are not presented in this section even though they may be locally featured species. These are combined with the methodologies to locate bald eagle nests and moose aquatic feeding areas (provincially featured species) and appear in the previous section.

As with Threatened and Endangered species, the methodologies described in this section are for Vulnerable biota that are known to occur in the area subject to Crown land forest management, and for which there is sufficient information to describe an inventory methodology. Several of the methodologies are presented here for the first time and may have had little field testing. Methodologies and techniques to identify, delineate and manage the habitat for these species will continue to be updated in this manual as our knowledge and experience increases.

2.2.a IDENTIFICATION AND DELINEATION OF WOODLAND

CARIBOU WINTER HABITAT



Tim Timmermann
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Northwest Region
Thunder Bay

1. Introduction

i. Background

The purpose of these instructions is to describe a basic technique for delineation of woodland caribou winter habitat based on observed caribou-use patterns. Relatively little is known about exacting caribou habitat requirements, however, caribou are known to use the same geographical habitats year after year and even where woodland caribou are common, the density of animals is relatively low (especially in comparison to moose or white-tailed deer). For these and other reasons, management of known caribou habitat is an important consideration when planning for forest operations or other resource developments.

Other methods of range assessment, coupled with information from this survey methodology, will be needed for long-range caribou habitat management planning. For example, radio-collaring of caribou has been used in the Northwest Region to identify some of the year-round ranges of caribou (including winter range) which were being impacted by forest operations.

This survey depends on locating, identifying and mapping sightings of caribou and caribou tracks. Sightings and tracks of moose, white-tailed deer and wolves are also recorded since these animals have a strong bearing on the distribution and abundance of caribou. Observers must be able to distinguish to species animals and their tracks from low level and slow flying aircraft. Because population estimates are not a function of these surveys (although caribou numbers should be estimated whenever individuals or their tracks are encountered), most four-seater, single engine, fixed wing aircraft capable of low speed flight are acceptable. Rotary-winged aircraft are preferred.

ii. Caribou Track Identification Criteria

1. Caribou dig numerous craters in the snow for food. Moose sometimes dig through slush on lakes and sometimes make beds in snow (which can be mistaken for craters), but the number of moose diggings or beds are always relatively few and the beds are not circular. Deer may also crater, although deer seldom crater when snow depths exceed 50 cm (20 in.). Caribou will continue to crater when snow depths are a meter or more.

2. Caribou on lakes tend to walk in straight lines, often leaving parallel tracks. Moose walk in very erratic patterns. Deer frequent lakes

primarily along shorelines. They will cross ice but will usually traverse from land at right angles. Wolves will travel on ice long distances. Their tracks are often identifiable because of their habit of following in single file.

3. Caribou in deep snow sometimes jump, leaving well defined landing patterns similar to those made by white-tailed deer. This behaviour is atypical of moose in northern Ontario.

4. Caribou walking in shallow snow tend to lift their feet clear or swing them in wide sweeps. Moose frequently drag their feet from step to step. Deer have much smaller hooves than caribou or moose and their tracks appear very narrow.

Distinguishing moose and caribou tracks under dense cover with no cratering and only one or two animals present is very difficult. Caribou tracks may be misidentified as moose or vice versa in these cases. Usually, deer will not be encountered on northern areas where caribou are - however, identification of animals associated with tracks is always preferred, especially during periods when deer numbers are expanding and moving northwards.

2. Initial Preparation

- Identify cells to be surveyed as per **'1.0, GENERALIZED METHODS AND TECHNIQUES'**. See Figure 1.1.

- The map scale most appropriate for recording observations, in most instances, will be 1:50,000. Photocopy enlargements or larger scale maps (e.g., 1:20,000) may be easier to work with.

- Transects should be flown following mercator grid lines and grid lines should be 2 km apart.

- For more intensive surveys, change flight direction (e.g., from north/south to east/west) and fly mercator grid lines, still at 2 km spacing, over the same survey area.

- Because areas searched for caribou tend to be large, it is recommended maps be cut into manageable sections. Attaching maps to Bristol board will aid in labeling and ease storage problems in the aircraft.

- Obtain at least two map copies of each cell to be surveyed. One copy may suffice depending on how neat the recorder(s) is (are) and the needs of the pilot (some pilots like to have a map exclusively for navigation).

- Consider using the Visual Navigation Program (VNP) as a flight aid for data recording.

3. Survey Considerations

i. Survey Crew and Training

- If possible, survey crew members should be familiar with aerial surveys for large mammals.

- The survey crew need only to consist of a pilot and a combined navigator/recorder/observer. However, adding a right and a left observer can be done to increase efficiency.

- When crew members unfamiliar with such surveys are added, make training flights to illustrate, at the least, moose tracks. Crew members should review Section E - Tracks; in "A Manual For Aerial Observers of Moose" (Oswald 1982).

- Since caribou are usually found in remote locations and their presence is undependable, it is usually not feasible to become acquainted with caribou tracks beforehand. However, familiarity with moose tracks is easy and this should help observers identify caribou, deer or wolf tracks - i.e., any tracks which look fundamentally different from those of moose will stand out and the rest of the crew can arrive at a consensus as to which animal was responsible for making them.

ii. Time of Year

- As a general rule, the survey period should fall between February 1 and March 15.

- Snow depth should be a minimum of 30 cm (12 in) and there should be little to no crust.

iii. Time of Day

- As a general rule, flights should occur between 1000 and 1500 hours.
- Flights earlier or later than above increase the risk of missing tracks because of shadows due to the low position of the sun.

iv. Type of Day

- Surveys should be done under clear, bright conditions. High, very light overcast or scattered, thin clouds are also acceptable but increased observer fatigue may result.
- Tracks are difficult to see when skies are highly overcast.
- Sun glare can be reduced considerably, and fewer tracks will be missed, if observers wear polarized sunglasses. Yellow 'shooting' glasses are often helpful to increase contrast on high haze days.
- High winds [20-25 km/h (12-16 mi/h) or more] compromise safety and comfort and can drift in tracks, resulting in a poor survey. Winds less than 16 km/h (10 mi/h) are preferred.
- Flights should not be conducted sooner than 48 hours after a major snowfall. Heavy snow tends to obliterate tracks.

v. Flight Altitude and Speed

- Flights should be conducted between 100 and 200 m (300 and 600 ft).
- Ground speeds up to 90 km/h (55 mi/h) are recommended when using the helicopter. Slow speeds are necessary to ensure tracks are not missed, to help in distinguishing caribou tracks from those of moose and wolves, and to assist in getting an estimate of caribou numbers. If fixed-wing aircraft is used, ground speeds between 130-190 km/h (80-120 mph) are recommended.

4. Survey Procedure

- Write down the date of each flight directly on the map along with snow depth, crust conditions (i.e., Passmore 1953), cloud conditions and temperature. Also record the names of the pilot, navigator and all observers.

- Write down the time the survey began and the time it ended.

- The navigator/recorder/observer and pilot are responsible for covering transects and accurately recording the position of tracks and animals.

- All of the crew, including the pilot, will look for tracks and animals. All observations of tracks should be immediately reported to the recorder.

- All tracks for the following species should be recorded directly on the map; caribou (C), moose (M), white-tailed deer (D) and timber wolf (W) along with the appropriate letter designation.

- Old tracks should be differentiated, when possible, from fresh tracks (OT, T).

- If any of the four species (above) are seen, record the number in every group encountered.

- When caribou tracks are seen, especially on frozen waterbodies, attempt to estimate the number of animals in the group.

- When cratering is seen, try to delineate the extent of the area cratered.

5. Interpretation

Northern districts often have considerable data on caribou locations collected over the years using various methodologies. This survey methodology, by standardizing data collection techniques, should result in more consistent data and ultimately better management decisions. Survey results are most valuable when coupled with other information such as ecosection distribution, stand age, knowledge of caribou calving sites, etc.

6. Data Compilation and Storage

- As soon as possible after the flight, a final map delineating the area surveyed and the area(s) frequented by caribou, if any, should be prepared.

- Fig. 2.2.1 is an example of a GIS map showing the area surveyed and those areas where caribou sign had been identified.

- Transfer information to the "Woodland Caribou Winter Habitat" Inventory Form as soon as possible. **Do not attempt to complete the Inventory Forms in the field**. **All information needed to fill in the forms can be deduced from the completed maps.** Information should also be recorded on the District Values map.

- Inventory Forms are designed to store data in a standardized fashion for future analysis. Data should be readily retrievable.

- For best results, winter caribou habitat delineation will take several surveys over a number of years under differing winter conditions. A single survey is only a start.

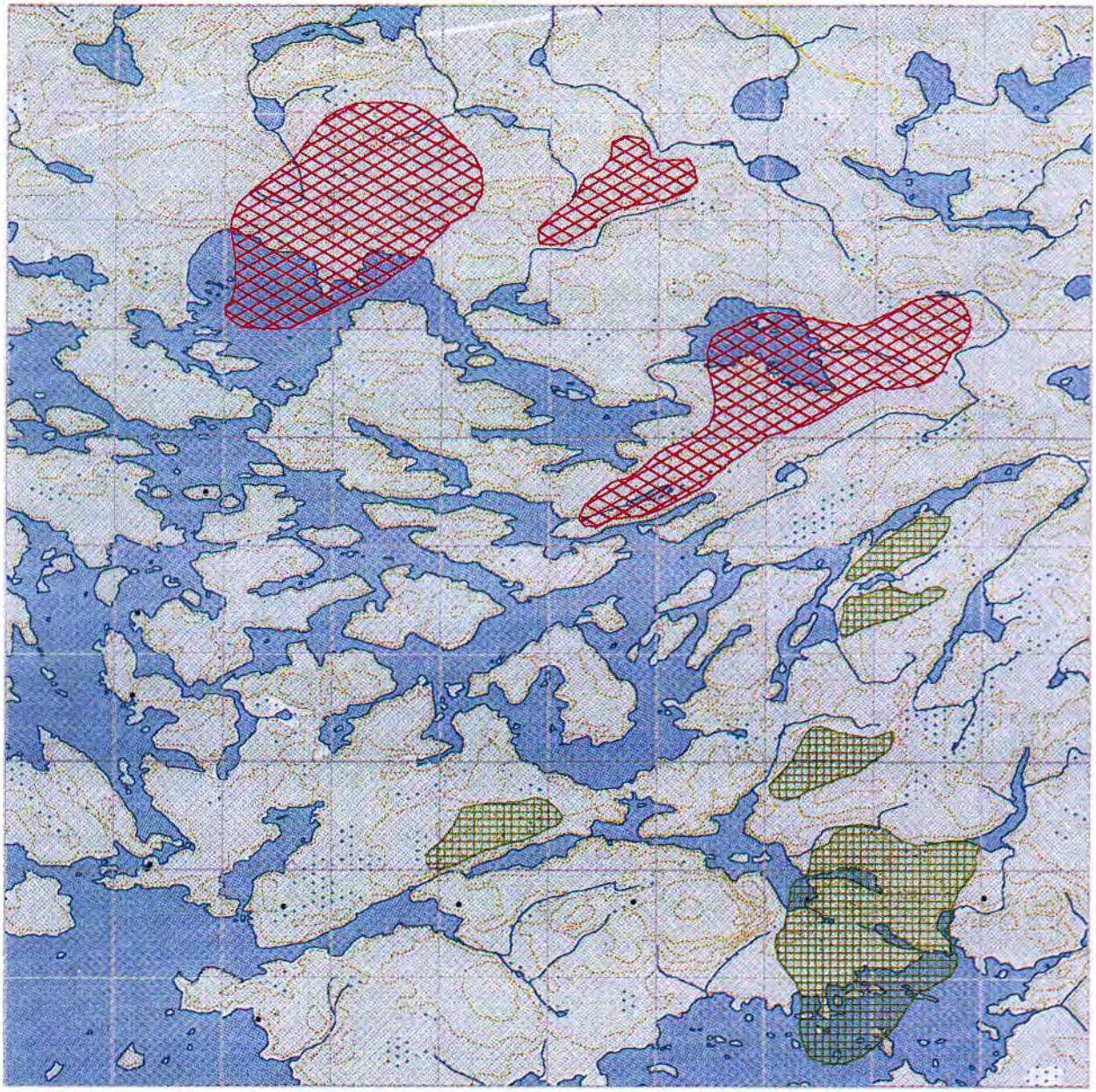


FIGURE 2.2.1 Mapping Woodland Caribou Winter Habitat
(entire area surveyed)

caribou tracks, cratered area; old

caribou tracks, cratered area: new

7. Suggested References

Bergerud, A.T. 1989. Aerial census of caribou and wolves in Wabakimi Provincial Park, March 1989. 23 pp.

Cumming, H.G. and D.B. Beange. 1987. Dispersion and movements of woodland caribou near Lake Nipigon, Ontario. J. Wildl. Manage. 51(1):69-79.

Oswald, K. 1982. A manual for aerial observations of moose. OMNR. Wawa District,Ms Rep. 103 pp.

Godwin, L. 1990. Woodland caribou in North Western Ontario, why they are different. Tech. note-07. Northwest. Ont. For. Tech. Develop. Unit. 7 pp.

Hartley, R.T. 1991. Caribou winter habitat survey - summary. Unpub. OMNR Rep. Nipigon Dist. 5 pp.

Passmore, R.C. 1953. Snow conditions in relation to big game in Ontario during the winter of 1952-53. Ont. Dept. Lands and For., Wildl. Res. Rep. No. 2. 12 pp.

INVENTORY FORM

WOODLAND CARIBOU WINTER HABITAT

Date: ☐☐ (YY) ☐☐ (MM) ☐☐ (DD) Aircraft: ☐

Experience Code:

Pilot: ☐ L. Obs: ☐

Nav: ☐ R. Obs: ☐

Climate:

Cloud Conditions: ☐

Temperature: ☐ (+ / -) ☐☐ °C

Snow Depth: ☐☐☐ cm

Snow Crust: ☐

Hours last Snowfall: ☐

Aircraft Crew Identification:

Pilot: _____ Navigator: _____

Left Observer: _____ Right Observer: _____

Wildlife Management Unit # ☐☐☐ (N N A)

UTM Block # ☐☐☐☐ (A A N N)

Cell Searched (circle)

1-1 1-2 1-3 1-4 2-1 2-2 2-3 2-4 3-1 3-2 3-3 3-4 4-1 4-2 4-3 4-4

Tracks Present (Yes ▮ No ☐)

cmwd	cmwd	cmwd	cmwd	cmwd	cmwd	cmwd	cmwd	cmwd	cmwd	cmwd	cmwd	cmwd	cmwd	cmwd	cmwd
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

No. Caribou seen:

B															
C															
Cf															
Unk															

No. Other Animals seen:

M															
D															
W															

Tracks Present: C - Caribou, M - Moose, W - Wolves, D - White-tailed Deer

Caribou Seen: B - Bull, C - Cow, Cf - Calf, Unk - Unknown

Additional Comments:

AIRCRAFT CODES

(1) 2 seater fixed wing aircraft (e.g. Piper, Citabrea, etc.)
(2) 4 seater fixed wing aircraft (e.g. Cessna 172, Cessna 180, Cessna 185)
(3) Turbo Beaver
(4) Piston Beaver
(5) Otter
(6) Twin Otter
(7) 4 or 6 seater helicopter (e.g. Bell 206 Long Ranger)
(8) 2 seater helicopter (e.g. Robinson)
(9) Other (specify)

EXPERIENCE CODES for WINTER MOOSE HABITAT INVENTORY (Hours, in last 5 years)

(1) 0-10 (2) 11-50 (3) 51+ (9) no observer

CLOUD CONDITION CODES

(1) Bright
(2) Hazy Bright (distinct shadows)
(3) Cloudy Bright
(4) Moderate Overcast (dull)
(5) Heavy Overcast (dark)

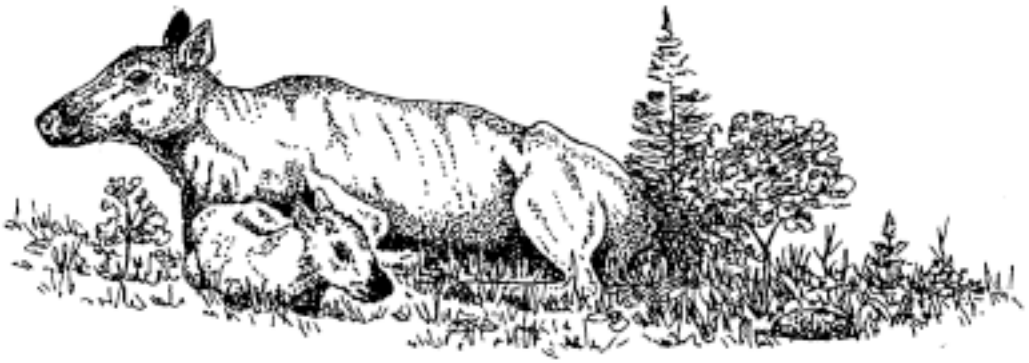
HOURS SINCE LAST SNOWFALL CODE (Hours)

(1) 1-6 (2) 7-12 (3) 13-24 (4) 25-48 (5) 49-72 (6) 73+

SNOW CRUST CONDITIONS

A no crust
B light crust in upper portion of snow column
C heavy crust - will support an adult on snowshoes

2.2.b IDENTIFICATION OF WOODLAND CARIBOU CALVING AND NURSERY SITES



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Northwest Region
Thunder Bay

1. Introduction

i. Background

The purpose of these instructions is to describe a basic technique by which to identify woodland caribou calving and nursery sites on islands and peninsulas. Caribou appear to use the same basic 'traditional' sites in which to calve and raise young year after year, and often calving/nursery sites are considerably removed from habitats used at other times of the year. By identifying calving and/or nursery areas, important decisions regarding management of caribou habitat can be made when forest operations or other land developments are proposed.

Woodland caribou often use habitats other than islands and peninsulas for calving. In some areas, bog/fen complexes are preferred. However, nearby islands and peninsulas are likely to be the nursery habitats chosen.

For a summary of the habitat needs of woodland caribou, see "Timber Management Guidelines for the Provision of Woodland Caribou Habitat" (OMNR 1993).

This survey details how to locate, identify, and map islands and peninsulas used by woodland caribou as calving and nursery sites. **The presence of caribou tracks or other sign or the presence of caribou, are needed for confirmation of any particular site.**

ii. Caribou Sign Identification Criteria

Caribou tracks are differentiated from moose and deer by their crescent shape and usually clear imprint of dew claws behind the hooves (Figure 2.2.2). Trails are also often made and used extensively by caribou. Other animals also make trails (e.g., moose, deer, bear) so be sure to follow trails and search for tracks or pellet groups.

Pellet groups are variable in shape and can be differentiated only with practice and with a good field guide. However, if not yet on a lush, spring diet, caribou pellets are usually much smaller then either moose or deer (they have been described as "pea-sized") and are almost black in colouration. When feeding on succulent green vegetation, pellets appear globular and are generally not distinct.

Sign of browsing on green forbs can often signal the presence of caribou. Caribou like to browse on plants such as bluebead (Clintonia borealis), northern bush honeysuckle (Diervilla lonicera) and others. The leaves of

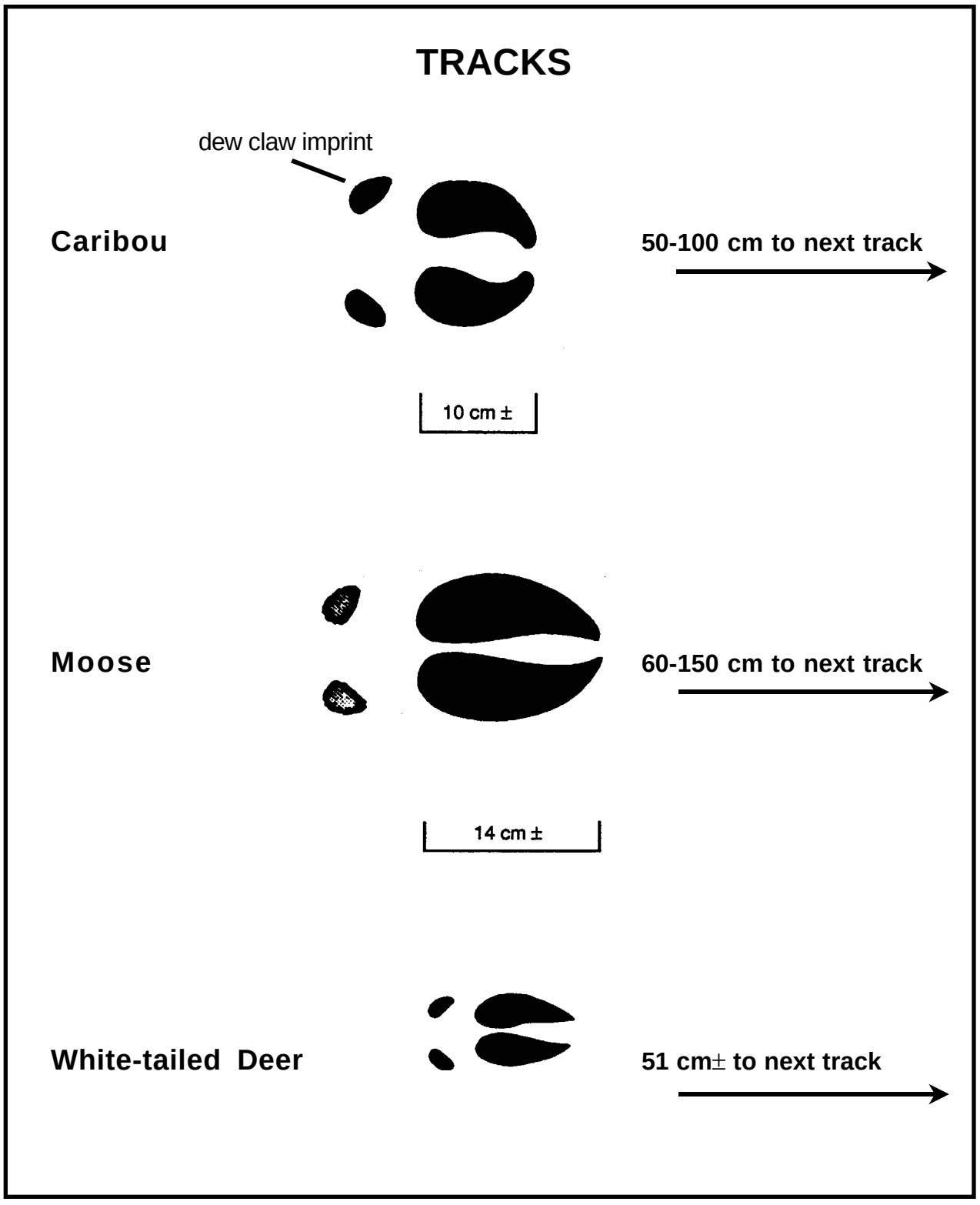

TRACKS
dew claw imprint
Caribou
50-100 cm to next track
10 cm ±
Moose
60-150 cm to next track
14 cm ±
White-tailed Deer
51 cm± to next track

Figure 2.2.2

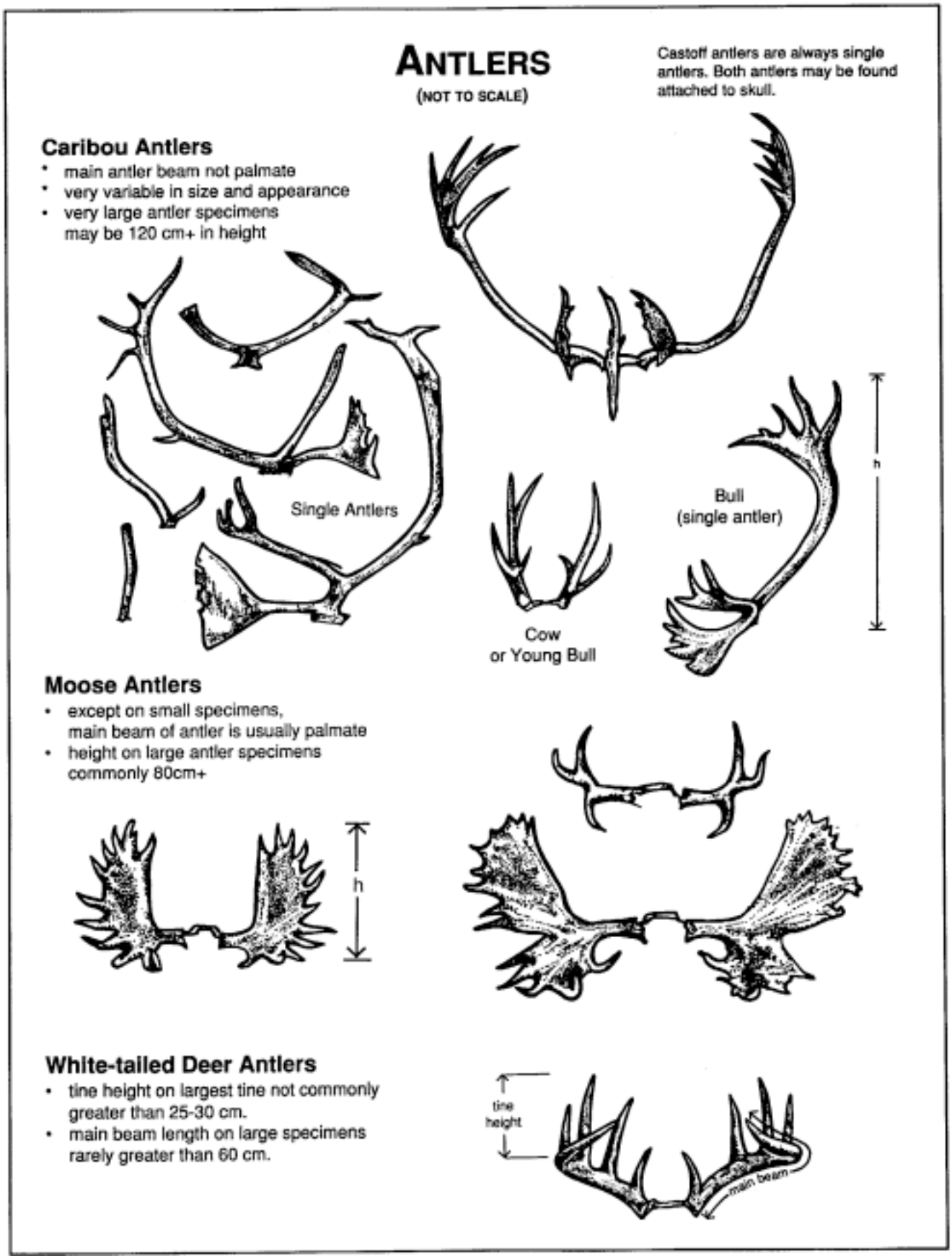

ANTLERS
(NOT TO SCALE)
Castoff antlers are always single antlers. Both antlers may be found attached to skull.
Caribou Antlers
• main antler beam not palmate
• very variable in size and appearance
• very large antler specimens may be 120 cm+ in height
Single Antlers
Cow or Young Bull
Bull (single antler)
h
Moose Antlers
• except on small specimens, main beam of antler is usually palmate
• height on large antler specimens commonly 80cm+
h
White-tailed Deer Antlers
• tine height on largest tine not commonly greater than 25-30 cm.
• main beam length on large specimens rarely greater than 60 cm.
tine height
main beam

Figure 2.2.3

mountain maple (Acer spicatum) and white birch (Betula papyrifera) are also favoured.

Caribou antlers can be distinguished easily from those of moose or deer when large antlers are available. Large caribou antlers have erect, spreading main beams with several tines (points), including palmate brow tines that point over the face. Small ungulate antlers can be confusing and identification to species can be difficult (Figure 2.2.3).

Other signs indicating caribou use at a particular site include thrashed trees and, of course, the presence of animals.

2. Initial Preparation

- Identify cells to be surveyed as per **'1.0, GENERALIZED METHODS AND TECHNIQUES'**. See Figure 1.1.

- For evidence of past calving and/or caribou sightings, consultation with local residents (trappers, tourist outfitters, First Nations) is necessary. Many Districts have used a 'Sighting or Reporting Form', left at lodges and outpost cabins, to record caribou sightings by owners and their guests.

- Search MNR District (Area) files - information on caribou is often recorded as an ongoing function.

- Information from past moose or caribou population surveys, or winter caribou habitat surveys, is also valuable information to consult.

- Be sure to talk to MNR co-workers. Their knowledge may not be recorded.

- All information concerning caribou locations, from all sources, should be plotted directly on a map.

- To identify the general survey area, select waterbodies (lakes) with numerous islands or peninsulas, in proximity (up to 80 km) of identified, recently used winter habitat.

- If several lakes are identified as potential caribou calving areas, priorize these lakes in consideration of the following:

    1. potential for calving (e.g., number of islands, proximity to known winter range);

2. reliability of information;

3. access; and

4. areas which may require protection from future developmental activities (eg. tourism, timber management, etc.).

- Select islands and peninsulas to inventory. Islands closer to mainland should be checked first.

- From aerial photos, identify and mark on a map potential sand beaches on all selected islands and peninsulas.

- Recommended maps for recording field survey data are 1:50,000 (alternates are 1" to 2 mi, 1:100,000, etc.).

3. Survey Considerations

i. Survey Crew and Training

- Survey crew members should number at least two.

- Crew members must be skilled in the use of outboard motors and/or canoes, since these are the usual transportation modes when surveying likely locations. The remoteness of calving sites generally necessitates proper survival training for all crew members.

- Much of the information gathered is dependent upon surveyors being able to distinguish caribou tracks, pellet groups and cast antlers from those of other ungulates (primarily moose). If surveyors do not possess experience with caribou, appropriate reference material is needed to be able to take in to the field. Suggested Field Guides are Burt and Grossenheider 1964 and Murie 1975.

ii. Time of Year

- Surveys need to be done after calves are dropped but before calving habitats are vacated.

- The recommended time period for the survey is from June 15 to August 15, but a good survey can usually still be done as late as early September.

iii. Time of Day

- Anytime during daylight hours is acceptable.

iv. Type of Day

- Surveys should be done when weather conditions are at least fair. Since most surveys will be in remote areas, good weather increases the safety margin.

- Very high winds (40 km/h or more) compromise safety, especially if small boats are being used to reach islands.

- Searches should not be conducted sooner than 24 hours after a major rainfall. Otherwise, tracks on beaches may be obliterated.

4. Survey Procedure

- Write down the date each island or peninsula was searched directly on the field map. Also record the names of all people involved in the search.

- To survey an island or peninsula, use a boat/canoe to circle the landform and verify/locate sand beaches or soft, flat, low-lying terrain.

- Land and walk these areas searching for signs of caribou, moose or deer - tracks (T), pellet groups (P), thrashed trees (TH) or discarded antlers (DA). Record the presence or absence of each and, if possible, identify the ungulate responsible for the sign.

- In addition to searching for tracks and pellet groups on beaches and low lying areas, inland searches should also be conducted.

- Try to search habitats which are mature. Areas which have been recently burnt, or have a high amount of blowdown ('over-mature' forests) will seldom be suitable to caribou. However, some of these habitats should be searched to assess the relative abundance of moose, deer and possibly bear.

- Time, the nature of the habitat and other factors will all influence how much shoreline/inland searching can be accomplished. As a rule of thumb, try to search at least once for every one to two kilometres of shoreline.

- Another method to consider, especially if quantitative data is desired, is the use of transect surveys (especially on large islands or large peninsulas).

- Transects should run perpendicular to the shoreline at 100m intervals. On relatively large islands, transects should go inland 100m. On small islands, the entire island should be traversed. Mark transects searched directly on the map.

- Along the transect look for tracks and pellet groups. If tracks can be seen in moss or lichen and can be followed, follow tracks to search for pellet groups. Try to identify and distinguish adult tracks from those of calves/fawns.

- On exposed rock knobs and hills, be sure to examine the condition of ground lichens, especially Cladina spp. (commonly called reindeer lichens). Winter use of Cladina spp. can easily be determined, as many lichen clumps will be overturned and closely cropped. Winter pellets (which will be dry, hard and very distinct) should also be easily visible. Presence or absence of this sign will help determine the seasonal nature of habitat use by caribou. In lush habitats, caribou use of lichens during summer months will be evident. Don't confuse summer use with winter use.

- Record all sightings of ungulates and, if possible, identify them to age (adult or calf/fawn) and sex.

5. Interpretation

Caribou calving and nursery sites are an important component of woodland caribou habitat. Linkage between caribou calving and nursery grounds and winter habitats, which are often disjunct, will aid in land use planning and will help ensure the long-term survival of caribou. Unlike wintering areas, calving and nursery sites likely have long-term fidelity.

6. Data Compilation and Storage

- Keep field maps on file.

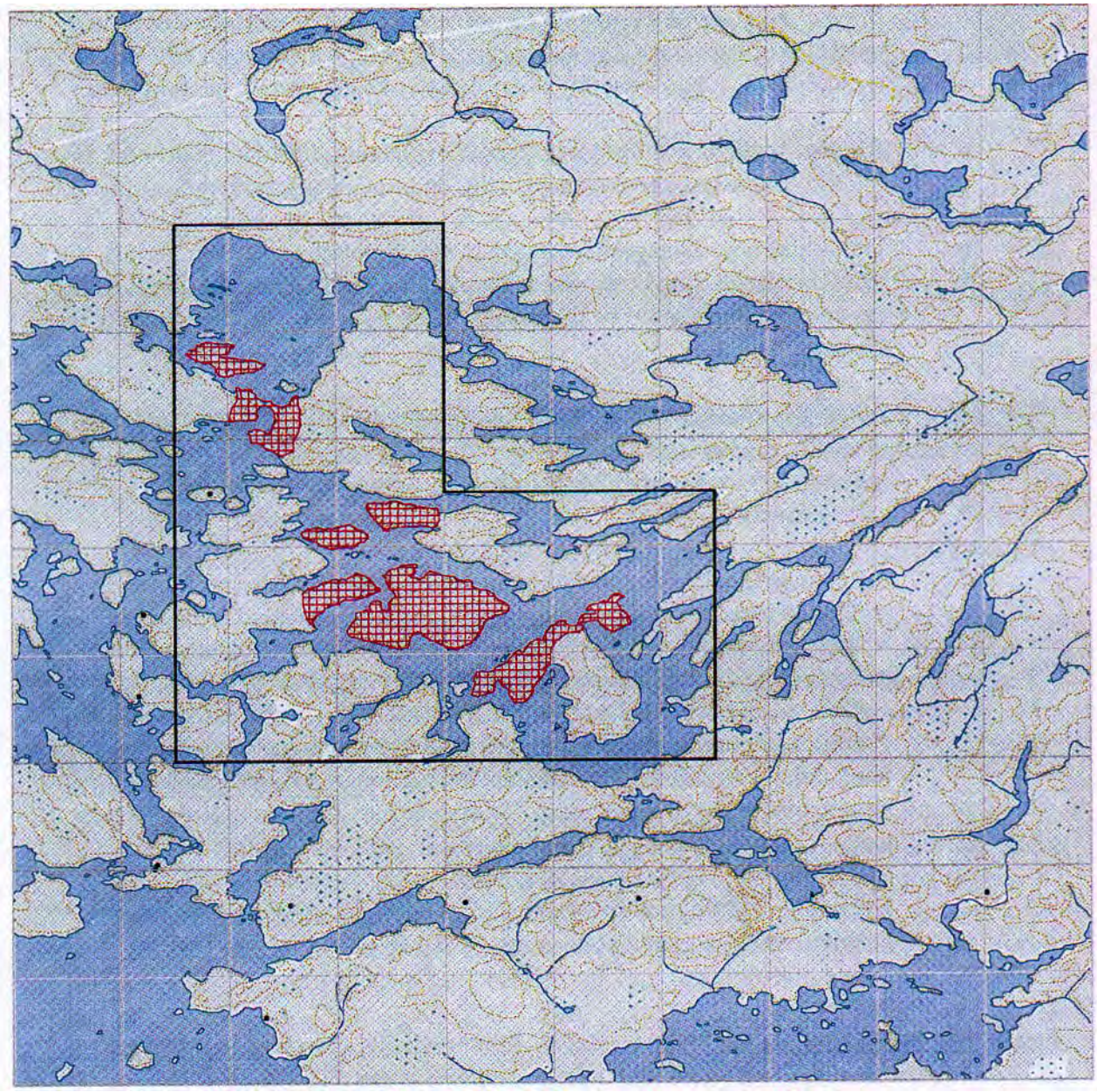


FIGURE 2.2.4 Mapping Woodland Caribou
Calving / Nursery Habitat

area surveyed (3 cells)

area with caribou activity (pellets, trails, tracks, feeding; calf activity identified mainly be presence of very small pellets)

- Transfer information confirming the presence of calving/nursery areas (including, if encountered, those of moose) onto District Values maps.

- Fig. 2.2.4 is an example of a GIS map showing the area searched and caribou calving/nursery areas identified.

- As soon as possible after the field survey, transfer information to the "Woodland Caribou Calving Sites" Inventory Form. **Do not attempt to complete the Inventory Forms in the field. All information needed to fill in the forms can be deduced from the completed maps.**

- Inventory Forms are designed to store data in a standardized fashion for future analysis. Data should be readily retrievable.

7. Suggested References

Burt, W.H. and R.P. Grossenheider. 1964. A field guide to the mammals. Houghton Mifflin Co. Boston. Second ed. 284 pp.

Cumming, H.G. and D.B. Beange. 1987. Dispersion and movements of woodland caribou near Lake Nipigon, Ontario. J. Wildl. Manage. 51(1):69-79.

Godwin, L. 1990. Woodland caribou in North Western Ontario, why they are different.Tech. note-07. Northwest. Ont. For. Tech. Develop. Unit. 7 pp.

Murie, O.J. 1975. A field guide to animal tracks. Houghton Mifflin Co. Boston.Second ed. 376 pp.

Ontario Ministry of Natural Resources. 1993. Timber management guidelines for the provision of woodland caribou habitat. Draft report.

INVENTORY FORM

WOODLAND CARIBOU CALVING SITES

Date: ☐☐ ☐☐ ☐☐
YY MM DD

Survey Crew: _____

_____

_____

_____

Waterbody Name: _____

UTM Coordinate (waterbody centroid):

☐☐ ☐☐☐☐XX ☐☐☐☐☐XX

UTM Block #

☐☐☐☐
A A N N

Cell	EVIDENCE			
	Caribou	Moose	Deer	Unk. Ungulate
1-1	1234567	1234567	1234567	1234567
1-2	1234567	1234567	1234567	1234567
1-3	1234567	1234567	1234567	1234567
1-4	1234567	1234567	1234567	1234567
2-1	1234567	1234567	1234567	1234567
2-2	1234567	1234567	1234567	1234567
2-3	1234567	1234567	1234567	1234567
2-4	1234567	1234567	1234567	1234567
3-1	1234567	1234567	1234567	1234567
3-2	1234567	1234567	1234567	1234567
3-3	1234567	1234567	1234567	1234567
3-4	1234567	1234567	1234567	1234567
4-1	1234567	1234567	1234567	1234567
4-2	1234567	1234567	1234567	1234567
4-3	1234567	1234567	1234567	1234567
4-4	1234567	1234567	1234567	1234567

1 - tracks, adult
2 - tracks, calf/fawn
3 - pellet groups
4 - thrashed trees
5 - discarded antlers
6 - adult seen
7 - calf/fawn seen

INSTRUCTIONS

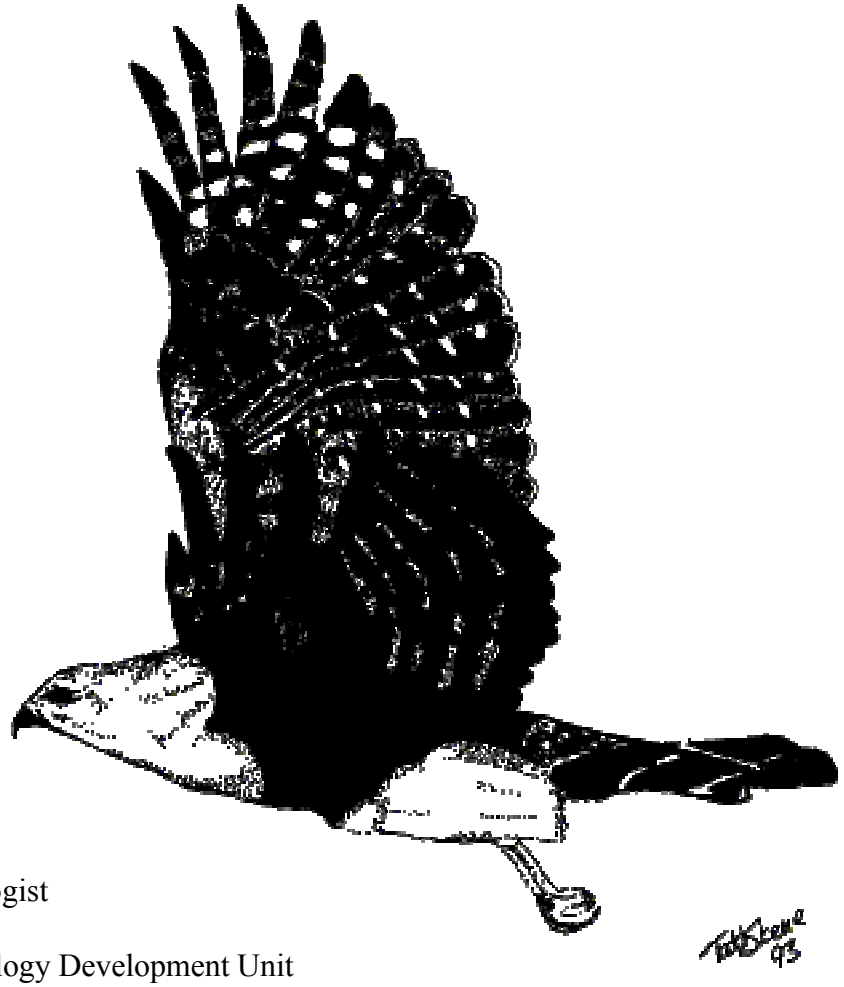
Separate forms are required for each lake where islands or peninsulas were searched.

For each cell checked, shade in the appropriate slot for each code type that was present. A form should be completed for each block checked even if no observations were recorded (presence vs. absence)

Data is compiled per cell checked rather than for each island or peninsula.

Individual islands will be known because these will be recorded on the filed maps.

2.2.c LOCATING RED-SHOULDERED HAWK NESTS



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Central Region
Science and Technology Development Unit
North Bay

Kandyd Szuba
Forestry and Wildlife Consultant
North Bay

1. Introduction

i. Background

The red-shouldered hawk (Buteo lineatus) is officially designated as Vulnerable in Canada and Ontario (Risley 1982, Cadman et al. 1987). Timber harvest that reduces canopy closure below 70% may result in at least temporary nest site abandonment (e.g., Bryant 1986), and thus timber harvest is a concern when managing habitat for red-shouldered hawks. In Ontario, this raptor is a locally featured species in some regions.

The red-shouldered hawk was once the most common diurnal raptor nesting in southern Ontario until it experienced a series of declines, the most recent of which occurred across its range in the late 1950s (Caster and Perks 1961, Weir 1987). Population trends based on migration counts suggest that numbers of the species are now relatively stable but are not increasing (Hussell 1984, Titus and Fuller 1990). Although it is considered common in 8 of 12 southeastern states (Mitchell and Millsap 1990) and 5 of 9 northeastern states (Titus et al. 1989), 7 of the 21 eastern states list it as a species of special concern.

This document provides guidelines for the survey of red-shouldered hawk stick nests. The method described here has been used successfully to conduct stick nest inventories in (the old) Algonquin Region and parts of (the old) Eastern, Central and Northeastern Regions. However, there is still much to be learned about the life history and habitat use of red-shouldered hawks in Ontario. Some of our guidelines (e.g., minimum patch size of suitable habitat) represent best guesses of the authors based on their own experience and the experiences of other Ministry wildlife and forestry staff members, many who have spent countless hours looking for stick nests.

Where the red-shouldered hawk is locally featured, habitat guidelines (Szuba and Bell 1991) are applied to mitigate potential impacts of forest operations. However, application of the guidelines requires that allocated stands be searched and active nests located.

Decisions concerning the management of habitat for red-shouldered hawks should ideally be based on a thorough inventory of all nests on crown and private land in each Forest Management Unit (FMU). Unfortunately, it is not feasible to conduct a complete enumeration of most FMUs because of the prohibitive cost. Consequently, survey effort must be prioritized. As a minimum standard, districts should strive to survey all stands that have a history of use by red-shouldered hawks, or stands that are potentially

suitable as nesting habitat and **are eligible** for harvest in a forest management plan (FMP).

A thorough stick nest survey for a FMP requires 2-3 years to complete for a typical FMU in central and southern Ontario. Thus, stick nest surveys should **ideally** begin 3-4 years before a FMP is due. This would ensure a relatively complete database upon which to assess development options. It would also reduce the need for subsequent amendments. However, eligibility maps are generally not available until 12-18 months prior to a plan's due date. Thus, most surveys will begin the summer before plan submission and continue for an additional 1 or 2 summers. Figure 2.2.5 will help prioritize which stands should be searched for the presence of hawks.

When it is not feasible to complete a thorough stick nest survey of eligible stands because of money and staff constraints, personnel who are collecting cruise data or marking trees for harvest must be relied on to locate stick nests. The completion of accurate stick nest reporting forms and a commitment to re-visit nests during the nesting season with tape player in hand to verify status and identity following the protocol suggested in this chapter is essential.

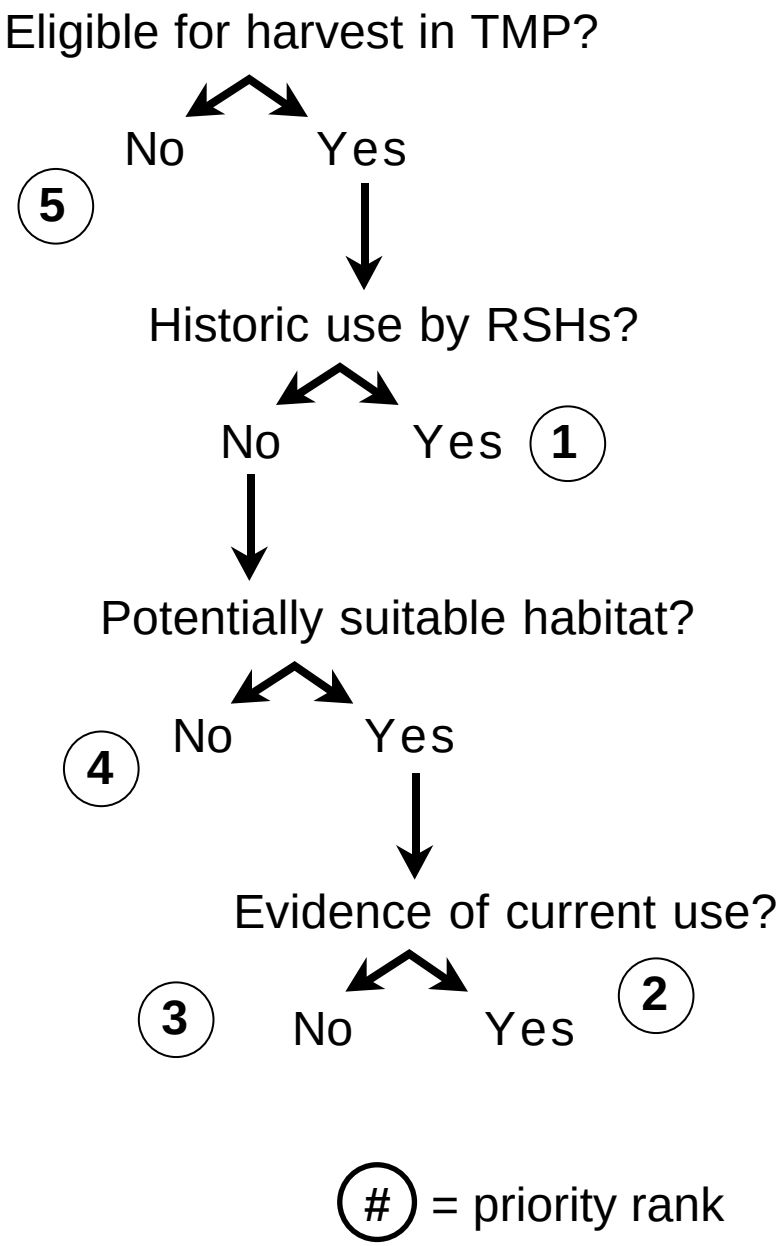
There are a number of limitations to relying solely on cruisers or markers for locating nests of red-shouldered hawks. First, cruisers or markers are frequently operating outside the optimal window for locating nests and identifying status. For example, nests may be missed while marking under summer leaf-out conditions. Second, many nests may be located during winter and scheduled for harvest before status is verified. In this situation, options incude: a reserve, despite verification; defer harvest until verification can be done; or, substitute another stand for harvest. Finally, cruisers and markers are likely to miss nests located outside a stand boundary but within the Area of Concern (AOC).

ii. Characteristics of Nest Sites

Red-shouldered hawks typically nest in dense mature tolerant hardwood forest (Armstrong and Euler 1982, Morris and Lemon 1983, Szuba et al. 1991). They show strong site fidelity; the same nesting area may be used for up to 40 years (Johnsgard 1990), and even the same nest may be used for up to 11 years (Szuba and Norman 1990). Traditional nesting territories typically contain a cluster of nests that include the nest that is currently active plus one to four alternate nests that may have been used in previous years, and may again be used in future years.

FIGURE 2.2.5

PRIORITIZING STANDS FOR SEARCH



American beech (Fagus grandifolia), sugar maple (Acer saccharum), yellow birch (Betula alleghaniensis) and white birch (Betula papyrifera) represent 80% of the nest trees used by red-shouldered hawks in Ontario. Beech is clearly preferred when available (40% of all nest trees), but yellow birch is the most frequently used nest tree in northern parts of the hawks' range and where beech is an uncommon component of the forest. Sugar maple is commonly used as a nest tree throughout the province (20% of nest trees) White birch is used primarily in southern and eastern Ontario (13% of nest trees in the old Central and Eastern Regions). Nests have also occasionally been found in red oak (Quercus rubra), white oak (Quercus alba), white ash (Fraxinus americana), black cherry (Prunus serotina), trembling aspen (Populus tremuloides) and white pine (Pinus strobus). Nest trees have a mean dbh of about 50 cm (19.5 in) and a mean height of about 25 m (80 ft).

Use of this search method will also reveal stick nests of other raptors that share similar nesting habitat. These may include the broad-winged hawk (Buteo platypterus), red-tailed hawk (Buteo jamaicensis), sharp-shinned hawk (Accipiter striatus), Cooper's hawk (Accipiter cooperii) or northern goshawk (Accipiter gentilis). [For a description of the nests of these species and information on how to distinguish them from nests of red-shouldered hawks, see Szuba and Bell (1991).] For species that may be locally featured such as the Cooper's hawk, this may lead to the identification of additional areas of concern. However, following the methodology described below will not ensure a thorough survey of nests of all these species since they nest in a broader range of habitat types, may have slightly different nesting chronologies and respond more consistently to their own species' calls.

iii. Forest Stand Composition of Typical Nest Sites

Forest stand composition is an important aspect of where red-shouldered hawk nests are located. Figure 2.2.6 summarizes which aspects are most important. The information below provides the detail needed for a more complete assessment. Note the process of identifying stands with a high probability of containing a nest can be facilitated using the habitat suitability model for central Ontario (Naylor et al 1994).

a) Species composition

Stands in the Hard Maple, Yellow Birch or Other Hardwoods [primarily those stands dominated by American beech, soft maple (Acer rubrum), or red oak] working groups have the greatest probability of containing a nest. Stands that are

FIGURE 2.2.6.

CHARACTERISTICS OF POTENTIALLY SUITABLE NESTING HABITAT

Species composition

- Mh, By, or H (Or, Be, Ms) working groups

Stand age

- at least 60 years old

Stocking

- at least 0.6 (old FRI)
- at least 0.7 (new FRI)

Proximity to water

- stand boundary < 250 m from river, creek marsh, swamp, pond or warm water lake

Stand area

- aggregate area > 10 ha in a complex of mature forest > 100 ha

essentially pure tolerant hardwood are better than stands with a conifer or intolerant hardwood component. Stocking of beech seems to be especially important in determining habitat suitability. Stands in the Hemlock or White Pine working groups may occasionally contain a nest, but only if they have a component of tolerant hardwood tree species.

b) Stand age

Older stands have a greater probability of containing a nest than younger stands. Stand age should be at least 60 years. Remember to adjust dates shown on FRI maps (FRI maps may be > 10 years old).

c) Canopy closure

Red-shouldered hawks typically nest in stands with a canopy closure > 70%. FRI stocking is approximately equivalent to canopy closure. Thus, when working with recent FRI maps (< 10 years old) select stands with a stocking >= 0.7. When working with older FRI maps, select stands with stocking >= 0.6 (stocking tends to increase as stands age).

Note: FRI data can occasionally be inaccurate. Information on some eligible stands may be available from operational cruising (OPC) databases. OPC data can be used to verify the species composition, age and stocking. OPC data can also provide information on stand structure. Although red-shouldered hawk nests have been found in stands with a total basal area as low as 14 m^2/ha, good nesting habitat appears to have a total basal area of at least 20 m^2/ha with at least 5 m^2/ha in medium and large sawlog-sized trees (i.e., trees >= 40 cm dbh).

d) Proximity to water

Red-shouldered hawks spend a considerable amount of time hunting for reptiles and amphibians along the edge of wetlands and waterbodies. Active nests are usually within 250 m of a waterbody capable of producing herptiles. Thus, stands with the greatest potential as nesting habitat are usually within 250 m of a river or creek, marsh, swamp, pond (especially a beaver pond) or warm water lake. Large, cold water lakes have low suitability unless they contain warm shallow bays which support submerged and emergent aquatic vegetation. Fens and acidic (sphagnum) bogs are probably unsuitable.

e) Patch size

Red-shouldered hawks are thought to be area-sensitive. In Ontario, they do not nest in small isolated woodlots. In large forest tracts, active nests have been located in stands ranging from 6 to > 400 ha in size. However, the size of individual stands (as delineated on FRI maps) is probably not as important in determining suitability as is the combined area of contiguous stands with suitable species composition, age and stocking. For example, a mature 6 ha hard maple stand surrounded by a large white pine stand might not be suitable nesting habitat. However, the same 6 ha stand might be suitable if adjacent to another mature maple stand. The aggregate area of stands with suitable species composition, age, and stocking should be at least 10 ha and should be contained within a complex of mainly mature forest stands that is at least 100 ha (although these stands need not all be in the tolerant hardwood working group).

2. Initial Preparation

- Identify cells to be surveyed as per **'1.0 GENERALIZED METHODS AND TECHNIQUES'**. See Figure 1.1.

- Obtain all historic information on known nesting sites of red-shouldered hawks in the cells to be surveyed. Eligible stands with historic use should be the first priority for search. This information should be available from your regional Vulnerable, Threatened, & Endangered Species Database. However, some Regions may not have such a database. If this database does not exist at your region, contact the Natural Heritage Information Centre, 300 Water St., Peterborough, Ont., K9J 8M5, or Ross James regarding information in the Ontario Nest Record Scheme (Royal Ontario Museum, 100 Queen's Park, Toronto, Ontario, M5S 2C6, 416-586-5519).

- Request data from cruisers, tree markers, and other field staff on sightings of hawks or stick nests. Stands in which hawks or large stick nests (especially clusters of stick nests) were observed should receive a high priority for search, if the observations were made in potentially suitable habitat.

- Identify potentially suitable nesting habitat on the eligibility maps. Only potentially suitable habitat needs to be searched. Potential suitability of individual stands can be assessed based on information shown on the FRI maps relating to species composition, stand age, canopy closure, proximity to water, and patch size.

o Obtain:

good quality binoculars (e.g., 7X35);
a spotting scope (optional);
compass;
flagging tape;
1:10,000, 1:20,000 or 1:50,000 topographic maps;
FRI maps;
air photos;
raptor nest survey forms (Appendix 1);
portable tape recorder with amplifier and speakers (recommend - Realistic Minimus 2 watt speakers); and
a taped call of the red-shouldered hawk [available from Brian Naylor, Southcentral Science and Technology, 3301 Trout Lake Rd., North Bay, Ont. P1A 4L7. (705) 475-5564.

3. Survey Considerations

i. Survey Crew and Training

One or two person crews can be used depending on the availability of funds, the size of the area(s) to be searched and district policy. As a rough rule of thumb, one person can thoroughly search about 50-75 ha per day. Two people can search about 100-150 ha per day.

Searching for stick nests is as much an art as it is a science. Developing a strong search image and an efficient search technique usually takes about one field season. Thus, use of experienced staff is strongly recommended. If inexperienced staff are to be used, a thorough training session in hawk identification is critical to the success of the survey.

Note: Cruisers and tree markers can be of immeasurable help in locating nests of red-shouldered hawks. In Ontario, it will soon be a requirement that all marking on crown land must be done by certified tree markers, and part of the certification process involves training in the identification of stick nests and the habits of forest nesting raptors.

Tree markers should be used to record and map the presence of stick nests while visiting the stand in the normal course of their work. Follow-up assessments can be done during the nesting season to verify nest activity using the techniques which follow.

A useful resource is the Hawk Guide for Ministry of Natural Resources Field Personnel (Szuba and Bell 1991; copies available from MNR's Southcentral Science and Technology unit in North Bay).

ii. Sensitivity to Human Disturbance

**** Red-shouldered hawks are sensitive to human disturbance ****

1) Try not to flush the incubating bird from the nest unless absolutely necessary for the verification of its identity. In the latter case, try to use the tape-recorded call (see below). Never flush the bird by rapping on the nest tree! If you do flush the bird from its nest, leave the area as quickly as possible. If the bird is away from the nest for too long the eggs or chicks may become chilled or consumed by predators!

2) Spend as little time as possible at an active nest site. Our recent experience suggests that observers should stay a maximum of 10 minutes per visit in April, May, or the first two weeks of June. Stay a maximum of 20 minutes in late June or July. Cut these times in half if the weather is wet or cold.

3) Do not go right up to the base of the nest tree - this may leave a scent trail for a raccoon to follow.

4) Do not place flagging tape on the nest tree. Flagging tape may attract predators or unwanted humans. Instead, place minimal flagging tape on a tree > 100 m from the nest; note the bearing and distance to the nest tree. A trail can be sparingly flagged when > 200 m from the nest. To facilitate monitoring in subsequent years, nest trees may be inconspicuously marked with blue paint after the nesting season (i.e., after July 31).

iii. Time of Year

o Red-shouldered hawks return to their breeding range in Ontario about mid-March, although this can vary depending on latitude and age of the birds. Courtship, nest building (or rebuilding) and egg-laying typically occur from their return through to late April. Incubation begins in late April and lasts for about one month. Chicks are in the nest for about six weeks, usually fledging in late June or early July.

- For optimal efficiency, conduct surveys or activity checks between April 1 and May 15, preferably as early as possible in this time window. Prior to incubation, red-shouldered hawks are highly vocal and are most responsive to broadcasted calls of their species'. Thus, this is the best time to locate active nesting areas and do activity checks. Nests are also highly visible. However, it can sometimes be difficult to positively identify which specific nest in a cluster is being used because more than one nest may be decorated. In this situation, revisit the site during incubation when the presence of an incubating bird will verify which nest is being used.

- Red-shouldered hawks become less vocal and responsive to broadcasted calls once incubation begins. Moreover, birds and nests are less visible during the latter part of incubation (after about May 15) when flowers and leaves of trees flush and expand.

- Surveys or activity checks conducted when chicks are in the nest (late May to early July) are the least productive. The response by hawks to broadcasted calls is sporadic and full leaf cover makes it extremely difficult to see nests. In addition, while active successful nests can be confirmed by the presence of chicks, active nests that failed during incubation will be missed.

- Stick nests surveys can also be done anytime during the winter when nests are highly visible and snowmobiles facilitate the efficient coverage of large areas. Unfortunately, winter surveys cannot differentiate between active and inactive nests or unequivocally determine 'ownership'. However, stands with a cluster of stick nests can be given high priority for checking the following spring.

iv. Time of Day

- The red-shouldered hawk is a diurnal raptor, so surveys or activity checks can be conducted throughout the daylight hours.

- Displaying hawks are often most highly visible following the development of thermals in late morning and early afternoon.

v. Type of Day

- o Weather can have a dramatic effect on the response by birds to the broadcast call. The call does not broadcast well on windy days. The hawks do not seem to respond as aggressively on cold, rainy days. Ideal weather is warm and clear with little wind.

- o Do not search for nesting hawks on very cold days ($< 5^0$ C) or during heavy rain, especially from late April on, when adults are sitting on eggs or brooding young chicks. Eggs and chicks are susceptible to chilling if the adult is flushed from the nest.

4. Survey Procedure

- o Write down the date each area was searched directly on the field map and the Raptor Nest Survey form. Also record the names of the survey crew.

- o For efficiency, a survey crew can consist of a single person, although for safety, a two-person crew is recommended. Two person crews also facilitate the training of inexperienced observers.

- o In the field, locate stands to be surveyed. FRI maps, topographic maps and air photos are all useful to find stands and to establish an access route. Air photos are particularly useful for orientation.

- o When possible, locate wetlands or a waterbody close to high potential nesting areas. These wet, open areas likely provide hunting opportunities for red-shouldered hawks and are preferred places to start an intensive search.

- o If an area has a known history of use by red-shouldered hawks, begin at one of the known nest sites.

Use of the Call

- o Observers should position themselves so they will have a good view across the wetland or waterbody but so that they will not be in plain view of the hawks. Broadcast the red-shouldered hawk call from a portable tape-recorder for about 20 seconds at the greatest volume possible without distortion.

- Listen quietly for a response for about 40 seconds. Repeat three to five times. Hawks may respond to the call by flying-in silently or by flying-in and calling. Either of these responses suggests that there may be an active nest within 300 m (900 ft).

- The observers should make note of the direction from which the responding bird(s) came and departed. This may suggest where the nest is located. Birds may also call from a distance but not approach the observers' position. This response would suggest that the observer is likely more that 300 m (900 ft) from the nest.

- If there is no response to the initial broadcasting of the call, the area may be unoccupied or the birds may simply not be able to hear the tape. Search the stand systematically, with the aid of transect lines, looking for stick nests, concentrating initial effort within 250 m (750 ft) of wetlands or open water. Broadcast the taped call at roughly 20 minute intervals or when stick nests are encountered. Judicious use of broadcast calls is not a known cause of nest territory abandonment.

- The call may also be used when checking the status of previously located nests. If there is evidence the nest is being used (see "What to look for when a nest is located"), it may not be necessary to play the tape. However, the call may be useful when a nest appears to be inactive. Playing the tape may elicit a response from birds which may be using the known nest or another, nearby, nest.

<u>If the hawks respond</u>

- If red-shouldered hawks respond to the call, the observers should begin to thoroughly search for an active nest in that portion of the stand from which the hawks responded.

- Observers should walk through the stand in a systematic manner (use of transect lines is again recommended), traveling at a speed that permits each observer to scan for large stick nests in the crowns of trees within 25-40 m (75-120 ft) on either side.

- Observers should also scan the ground for feathers and whitewash. Experienced observers that have developed a search image will be able to travel faster than novices. With two-person crews, observers can walk parallel routes on either side of a transect or can split up to cover different parts of the stand.

What to look for when a stick nest is located

- If a stick nest is located, first decide if it could be a red-shouldered hawk nest. Red-shouldered hawks build a medium-sized [45-90 cm (18-35 in) in diameter, 45-50 cm (18-20 in) deep] nest from straw-sized and pencil-sized twigs that looks very solid and earthy. Nests are usually located in the main fork [12-15 m (36-45 feet) above ground] of a large diameter [> 40 cm (18 in) dbh] hardwood tree.

- Stick nests of other raptors differ in width and depth, size of twigs, type of construction and location in the nesting tree (see Szuba and Bell 1991 for a thorough discussion). However, stick nests can look rather similar and considerable experience may be required to properly identify them.

- If a stick nest appears to have been built by red-shouldered hawks, look carefully for a variety of clues that can indicate if the nest is active (Figure 2.2.7). [An active nest is one in which hawks have laid or intend to lay eggs. A typical red-shouldered hawk territory will contain one active nest and a number of inactive alternate nests, usually within 150 m (450 feet)].

- A red-shouldered hawk sitting on the nest is the strongest evidence that the nest is active. However, a bird sitting on a nest in an area where red-shouldered hawks have been calling is not necessarily a red-shouldered hawk. Goshawks, Cooper's hawks, and broad-winged hawks will nest in close proximity to red-shouldered hawks. Rather than make assumptions, identify the hawk to species.

- Occasionally, incubating birds can be difficult to see, especially if in high nests. Sometimes, the tip of the tail protruding over the rim of the nest may be the only part of the incubating bird visible. In this situation, move away from the nest (far enough away so as not to be plainly visible but close enough to see the nest) and use the broadcast call. This may cause the bird to stand up or fly off, affording an opportunity for identification.

- The presence of decoration on the rim of a stick nest is a good sign the nest **may** be active (the absence of decoration **does not** mean the nest is inactive). Fresh sprigs of conifer have been documented on more than 85% of the visits to active nests in Ontario. Some active nests may be literally covered with decoration, while other may have only one or two sprigs. Eastern hemlock (Tsuga canadensis) is the conifer most frequently used by red-shouldered hawks as decoration, but cedar, balsam, spruce, white pine and even juniper may be used.

FIGURE 2.2.7

SUMMARY OF EVIDENCE SUGGESTING THAT A NEST IS ACTIVE IN THE SPRING

Hawk on nest, perched in nest tree or adjacent tree

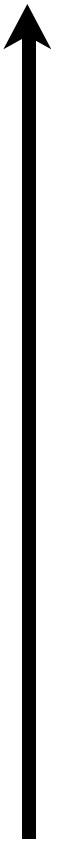
Hawk heard or seen in stand but not observed on nest

- Nest with decoration and down
- Nest with decoration or down
- Nest without decoration or down

No hawks heard or seen in stand

- Nest with decoration and down
- Nest with decoration or down
- Nest without decoration or down

Nest is a state of disrepair



Probability of nest being active

- Unfortunately, red-shouldered hawks may decorate alternate nests (i.e., inactive nests) and other hawk species such as the broad-winged, red-tailed hawk and goshawk may also decorate their nests with conifer sprigs.

- Down feathers have been observed on the rim of about half of all active red-shouldered hawk nests in Ontario visited in April and early May. However, lack of down does not necessarily indicate an inactive nest.

- Note the state of repair of the nest. Nests that appear to be falling out of the tree are unlikely to be occupied. Nests that contain fresh sticks may be active.

- If a stick nest is located and there is no bird sitting on the nest, broadcast the call as above. If the nest is active, a red-shouldered hawk may fly in and land either on the nest, in the nest tree or in an adjacent tree. Any of these responses is a strong sign that the nest is active.

- Other clues that might indicate an active nest (and possibly the user) are moulted feathers, whitewash, egg shells, prey remains and dead adults or chicks. If the nest is being used by an accipiter (e.g., Cooper's hawk or goshawk), butcher blocks will likely be observed within 75 m of the nest (a butcher block is a stump, log or leaning tree used by an Accipiter for plucking prey. Butcher blocks are characterized by large accumulations of feathers, bones, etc.).

- If there is no response to repeated broadcasting of the call but some evidence of activity is found (e.g., stick nest with down or decoration), plan to revisit the stand later. If no evidence of activity is noted, revisit the stand at a later date (if before April 10) or assume the stand is unoccupied (if after April 10).

<u>What to do if the active nest cannot be found</u>

- If red-shouldered hawks respond to the call, perhaps even being observed in the vicinity of a nest, but you are not able to identify the actual nest being used, revisit the stand one or two weeks later. If an additional visit does not identify the active nest, follow these rules:

    1) If no nests with decoration or down were located in the stand, assume that the hawks are nesting in another stand. Warn tree markers to be on the lookout for the active nest just in case you missed it;

2) If a decorated or down-covered nest was located but a hawk was never observed in the nest, assume that this is the active nest; and

3) If a number of decorated nests were located, but a hawk was never observed in any of the nests, select as the active nest the one that seemed to be in the best repair and that had down feathers on it or had the greatest amount of decoration.

Checking for fledging success

- Identifying active red-shouldered hawk nests for input to FMPs does not require the monitoring of fledging success. However, some situations (e.g., participation in an effectiveness monitoring program) may warrant checking nests for fledging success.

- To document fledging success, all nests that were considered to be active in the spring should be checked during the last two weeks of June. Observation of chicks in the nest or within 300 m of the nest, or hawks carrying food to the nest should be considered the strongest evidence of a successful nest. In some nests, chicks may not be immediately visible. If observers wait quietly (maximum of 20 minutes) near the nest they may see the chicks moving about or the parents bringing food to the nest.

- Some nests may have fledged young before the last two weeks of June. In these cases, whitewash on the branches supporting the nest or on the trunk of the tree or around the base of the tree is good evidence of fledging success. Presence of fresh conifer decoration is also a good indication that the nest was successful. If chicks are not observed in the nest, check within 300 m of the nest for fledglings (they are generally quite vocal at this time).

5. Interpretation

Red-shouldered hawk populations have apparently begun to stabilize after a long period of decline. Protection of nesting sites would appear to be a prudent approach to ensuring populations remain viable and, hopefully, begin to increase. In the future, other habitat management techniques may be necessary to ensure there is a bright future for this hawk.

6. Data Compilation and Storage

- Tie in all active nests to a recognizable landmark (compass bearing with appropriate declination and distance). Also, after chicks have left the nest, tie in the location of alternate nests to the active nest. Draw a detailed map on the Raptor Nest - Field Data Sheet (Appendix 1 of this Chapter) showing how to find the nest. Don't count on your memory; many other people may have to find the nest for purposes of monitoring or laying out reserves.

- On the Raptor Nest - Field Data Sheet also be sure to record all the evidence used to decide that the nest was active. You may need to go back over your notes at a later date to justify your decision.

- **Even if no birds or nests are located, observers should record where they searched (i.e., which FRI stands), how long they searched and under what conditions the search was conducted (i.e., weather).**

- **Important:** When an active nest is located, observers should do what is necessary to verify the user of the nest, make the notes necessary to permit them to find the nest again and then leave as quickly and quietly as possible. When at a suitable distance from the nest (>300 m), observers should complete the Raptor Nest - Field Data Sheet.

- Record the location of nests on the (GIS) District Values map (similar to Values mapped on Figure 2.1.9, pg. 102). You may wish to keep details confidential.

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Appendix 1. Instructions for completing the OMNR raptor nest data sheet (Adapted from Szuba and Bell 1991).

Wherever possible, write things out in full. Do not use a short form for the date, such as 04/05/89 (is this June 4 or April 5?). Fill in as much information as possible while in the field. Some referencing information must be collected after returning to the office. The UTM (Universal Transverse Mercator) grid values can be determined from a National Topographic Series (NTS) map or an Ontario Base Map (OBM). This information will help document the location of the nest for future reference. Note how accurate you believe this mapping to be under the heading 'Precision of location'.

Give the nest a meaningful name such as Hawkley 321-1 (e.g., incorporate the township name, FRI stand number, and the number of the nest within stand). Record the nearest landmark that will not likely disappear (e.g., do not use trees) and that appears on a topographic or FRI map.

Record all evidence of activity at a nest site. If you make several trips to a nest site, complete a separate sheet for each visit.

Note the species of nest tree, its diameter at breast height (dbh: 1.4 m above ground), and the distance from the nest tree to the nearest source of water (lake, river, pond, marsh, swamp, creek, or seasonal pool). Make these measurements after the nesting season, once the chicks have left the nest.

Record details of nest structure and placement. This can help to determine which species built the nest.

Record the stand description given on the appropriate FRI map and note if it is inaccurate. Include the stand number, species composition, age, height, stocking, site class, and stand area.

Draw a map showing clearly how to find the nest again. Show north, the nearest landmark, and any other features that will help in relocating the nest. Make sure to note the declination setting on your compass. If there are alternate nests, take enough measurements (distance and angle) so that the distance between all pairs of nests can be determined.

Add any details you know about the history of the nesting area or individual nests (e.g., when they were built, in which years they were used, and the species that built and used them).

Raptor Nest -- OMNR Field Data Sheet Page 1

Date (IN FULL): MAY 10, 1990

Species: RED-SHOULDERED Active (circle one): (Yes) No Unsure

District: PARRY SOUND Township: HAWKLEY

NTS map # 41 P/2 NTS scale 1: 50,000 OBM # _____

UTM: Zone 17 Easting 550356 Northing 4755921 *Precision: P

*Precision of location: P = Precise (to 10m), R = Reliable (to 100m), A=Approximate (to 1km), M = Medium (to 5km), G = General (to 10km), V = Vague (unmappable)

Observer(s): SUE JONES ; JOE SMITH

Land Ownership (circle one): (Crown) Municipal Private Unknown

Nest ID #: HAWKLEY 321-1 Nearest Landmark: SW OF WREN LAKE

Evidence of Activity:

Adults: Near 2 Flushed from nest 1 Remained in nest ____

Birds were: Silent __ Called spontaneously __ Returned call to tape of (spp) RSH

Birds flew: Towards observers ✓ To nest ✓ Carrying food ✓ or Sticks __

Chicks were: Seen (give number) 2 Heard ✓ In nest ✓ or nearby __

Nest decorated: Sparsely ____ or Thickly ✓ with FRESH HEMLOCK

Found: Down in/on nest ✓ Molted feathers near nest tree ✓

Whitewash near nest tree __ Egg shells below __ or Near nest tree (m) ____

ID # of old nests nearby: HAWKLEY 321-2; 321-3

Nest Tree Characteristics: Tree species BEECH DBH (cm) 52

Total Height (m) 30 Distance to nearest water (note type): 30 m - POND

Nest Characteristics: Condition: Old ____ New ✓ Intact ✓ Broken ____

Height above ground (m) 15 Nest diametre (cm) ~ 25

Nest materials (include twig size) FINE - MED TWIGS; NEAT; DENSE

Location in tree MAIN FORK OF TRUNK; TREE LEANING

Nesting Habitat: FRI codes: MAB Be2 120-30-.6 X 35

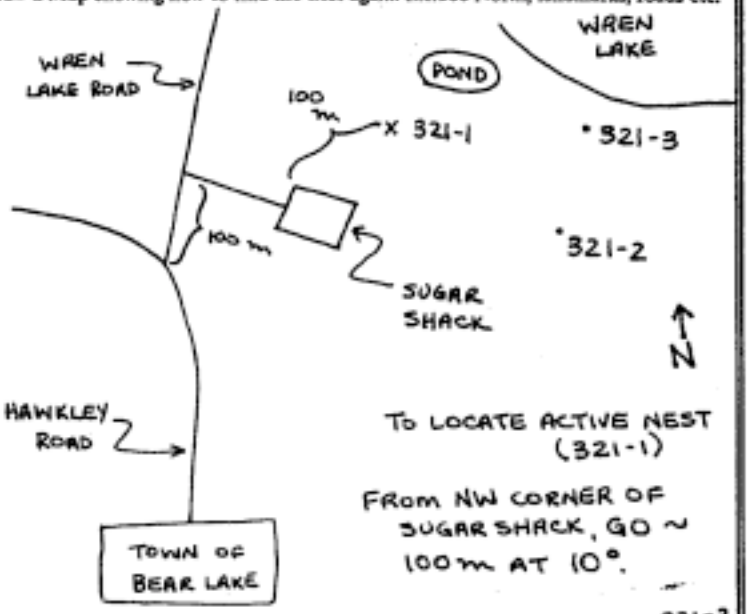
FRI stand #: 321 Average stand height (m) 30

General habitat description FRI IS WRONG! MATURE MAPLE WITH CLOSED CANOPY - STOCKING ~ 0.9

Raptor Nest -- OMNR Field Data Sheet Page 2

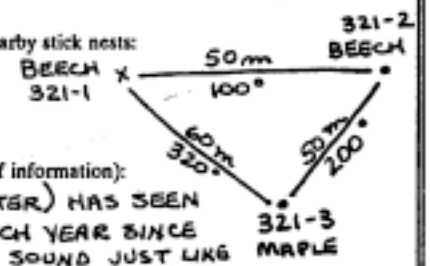
Nest Identification No.: HAWKLEY 321-1 Declination: 3° EAST

Draw a Map showing how to find the nest again. Include North, landmarks, roads etc.



Other Information: Indicate other nearby stick nests:

SEPARATE FORMS WERE FILLED OUT FOR EACH NEST



History of Nesting Area (and source of information):

JOHN SMITH (UNIT FORESTER) HAS SEEN HAWKS IN THIS AREA EACH YEAR SINCE 1985. HE SAYS THEIR CALLS SOUND JUST LIKE THE RSH CALLS ON OUR TAPE.

Evidence of Other Wildlife (eg. bear nests, deer/moose bedding area/yards, dens, other bird nests) (other reasons why site should be protected):

- 2 BEAR NESTS IN BEECH TREES
- PILEATED WOODPECKER HEARD DURING SURVEY

Sample of a Completed Sheet for an Active Nest

Raptor Nest -- OMNR Field Data Sheet Page 1

Date (in FULL):_____

Species:_____ Active (circle one): Yes No Unsure

District:_____ Township:_____

NTS map # _____ NTS scale 1: _____ OBM # _____

UTM: Zone _____ Easting _____ Northing _____ Precision: _____

Precision of location: **P** = Precise (to 10m), **R** = Reliable (to 100m),

A = Approximate (to 1km), **M** = Medium (to 5km), **G** = General (to 10km),

V = Vague (unmappable)

Observer(s): _____

Land Ownership (circle one): Crown Municipal Private Unknown

Nest ID #: _____ Nearest Landmark: _____

Evidence of Activity

Adults: Near_____ Flushed from nest _____ Remained in nest _____

Birds were: Silent ___ Called spontaneously ____ Returned call to tape of (spp) ____

Birds flew: Towards observers ____ To nest ____ Carrying food ____ or Sticks ___

Chicks were: Seen (give number) _____ Heard _____ In nest _____ or nearby ____

Nest decorated: Sparsely _____ or Thickly _____ with _____

Found: Down in/on nest _____ Molted feathers near nest tree _____

Whitewash near nest tree _____ Egg shells below _____ or Near nest tree (m) ____

ID # of old nests nearby: _____

Nest Tree Characteristics: Tree Species _____ DBH (cm) _____

Total Height (m) _____ Distance to nearest water (note type): _____

Nest Characteristics: Condition: Old ____ New ____ Intact ____ Broken ____

Height above ground (m) _____ Nest diametre (cm) _____

Nest materials (include twig size) _____

Location in tree _____

Nesting Habitat: FRI codes: _____

FRI stand # _____ Average stand height (m) _____

General habitat description _____

_____

Nest Identification No: _____ Declination: _____

Draw a Map showing how to find the nest again. Include North, landmarks, roads, etc.

Other Information: Indicate other nearby stick nests:

History of Nesting Area (and source of information):

Evidence of Other Wildlife (e.g. bear nests, deer / moose bedding area / yards, dens, other bird nests) (other reasons why site should be protected):

2.2.d LOCATING GREAT GRAY OWL NESTS

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1. Introduction

i. Background

The great gray owl (Strix nebulosa) is officially designated as Vulnerable in Ontario. It likely breeds sparsely throughout northern Ontario (Godfrey 1986)

Great gray owls occupy much of the Boreal Forest Zone and its associated muskeg. While the range of the species is extensive, breeding requirements appear to be restricted to mature or overmature tamarack (Larix laracina) and tamarack/black spruce (Picea mariana) bogs adjacent to mature or overmature aspen stands (Jim Duncan[1] pers. comm.). Duncan has also reported that great grays may not use the same nesting area in successive years. Over the course of their lives, they invariably use alternative breeding home ranges, usually hundreds of kilometres apart. Breeding densities in any given area and time will vary, as the owls are dependent upon the availability of their principle prey, microtine voles.

Since breeding territories keep great grays confined to the immediate area for lengthy periods, it is these habitats which are considered most critical. Great grays will seldom forage more than 1.5 km from a nest site that contains eggs or young (Duncan pers. comm.).

The search methodology is designed specifically to help locate great gray owl nests. Originally initiated by volunteers in Manitoba (Duncan and Duncan 1992) and subsequently the Long Point Bird Observatory, it tracks trend through time data on a variety of forest owl populations when conducted on established routes which are intended to be surveyed each year. We have adopted their survey methods as the basis for this methodology, although the primary purpose of this survey is to identify great gray owl nesting habitat for use in FMP preparation. The additional information collected, at no extra cost, may help to answer questions concerning biodiversity and long-term, ecosystem health.

The use of electronic aids as described in this methodology has been used successfully to locate great gray owl nests in Red Lake District. The techniques incorporated in the use of electronic aids was largely derived from Duncan and Duncan (1992).

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[1] Jim Duncan, Manitoba Conserv. Data Centre, Box 24, 200 Saulteaux Cresc., Winnipeg, Manitoba. R3J 3W3

ii. Characteristics of Nest Sites

Nests are frequently located in stands of tamarack/black spruce or aspen adjacent to bogs and/or fens. Tamarack stands or aspen stands adjacent to muskeg appear to be the preferred habitat. In Manitoba, tamarack and aspen were the preferred nest trees (Bouchart 1991). Since great gray owls do not build their own nests, habitat choices are influenced by nesting habitat selected by red-tailed hawks, broad-winged hawks, goshawks, crows, ravens, etc. Many hawks prefer mature or large deformed trees to support their nests. Great gray owls have also been documented using stumps (Gilmore and MacDonald 1996); stumps being defined as the depression left in the main stem of a tree after it has broken off. In young forests, hawks (and thus the great gray owl) often seek out any remnant mature trees for nesting purposes.

Nesting sites are further determined by feeding ecology, hunting habitat and prey vulnerability (Sonerud 1986). Although the great gray can hunt within forested habitat and catch concealed prey, its primary food (microtine voles) can decline to extremely low densities that may not recover for long periods of time (Mihok et al. 1985). When this occurs, nesting failure and subsequent nest-site abandonment, as mentioned above, are likely occurrences. As a result, suitability of an area as great gray owl nesting habitat may only be determined by observations spanning several years.

2. Initial Preparation

- Identify cells to be surveyed as per **'1.0 GENERALIZED METHODS AND TECHNIQUES'**. See Figure 1.1.

- Obtain all historic information, if any, of known nesting sites of great gray owls in the cells to be surveyed.

- Also obtain historic information of nesting sites of red-tailed hawks, broad-winged hawks, goshawks, crows, ravens, etc.

- Request data from cruisers, tree markers and other field staff on sightings of great gray owls or stick nests [for a guide to stick nests, see Szuba and Bell (1991)]. **As an on-going function, the recording of great gray owl sightings and all stick nests is recommended. All field staff should be encouraged to record such sightings, and each District/Area should keep an up-to-date file of owl sightings and stick nest locations.**

- Identify high potential nesting habitats on eligibility maps. Potential suitability should be based on information shown on FRI maps (e.g., mature or overmature

tamarack and black spruce/tamarack bogs adjacent to mature or overmature aspen stands).

- **Due to the temporal nature of great gray owl nests coupled with fiscal and manpower constraints, it is important to concentrate field searches in those areas with have the highest potential of having nests. Since the present strategy is to actively manage for great grays only on sites the owls are known to use, it is important to keep a record of great gray owl sightings and the area(s) they have been seen in.**

- **It may be necessary and it is desirable, to re-survey routes. Routes can be re-surveyed at different times during the same spring as well as in subsequent years. Both may result in locating nests which may not have been detected in one survey (e.g., the owls did not respond to calls on a particular night [which commonly occurs for reasons as yet unknown], or owls were simply not present in the year of the initial survey).**

- Obtain:

compass;
flagging tape;
topographic maps;
FRI maps;
air photos;
at least one flashlight;
good quality binoculars (e.g., 7X35);
a reasonably good quality, portable tape recorder; and
a taped call of a great gray owl (available from either of the authors. Commercially produced great gray owl calls are available and are also recommended).

3. Survey Considerations

i. Survey Crew and Training

- One or two-person crews can be used depending on the availability of funds, the size of the area(s) to be searched and district policy (e.g., two person crews may be necessary in remote areas for safety reasons). When searching for nests in forests, a rule of thumb is that one person can thoroughly search about 50-75 ha per day.

- Stick nests of any kind should be recorded as all are potential great gray owl nests. To identify the species using the nest (if any), it is

preferable to have surveyors who are adept at bird identification, including recognition of calls.

- Field staff should have bird identification field guides with them while in the field (e.g., Szuba and Bell 1991). Familiarity with the taped calls of the great gray is also a prerequisite.

ii. Time of Year

- The great gray is quite vocal and calling related to territory establishment may begin as early as January or February (Shepherd 1992). For the initial location of nests, though, we recommend using electronic callbacks from late March to late April.

- Ground searches for active great gray owl nests can be done immediately after locating calling owls but can be done as late as early June. If ground searching is done before early May, the great gray is likely to still be incubating eggs or the young are still very small and difficult to see. Afterwards, young are much more visible and vocal, both of which aid in locating nests (e.g., until early June).

- Eggs are laid from about mid-March through to early April. An average of three eggs are laid at intervals of three days or more. Incubation lasts about thirty days, and incubation for each egg commences when the egg is laid. This results in a wide size range of young owls in any given nest. After hatching, chicks stay in the nest for about three weeks, when they usually jump out and climb nearby, leaning trees.

- Ground searches for active great gray owl nests can be optimal if done during warm weather, after chicks have hatched, once food has become more readily available and before leaf flush has occurred (e.g., mid-to-late May). If you are lucky, young may be still in the nest, but will be large enough to have caused the female to leave. When this happens, you can often hear the young and the female vocalizing to one another.

- Nests searches can also be scheduled during fall or winter when leaves are off the trees. However, the occupant of the nest will be unknown and a re-visit will have to be scheduled the next spring.

iii. Time of Day

- Audio surveys should begin no earlier than one half hour after sunset and no later than one half hour before sunrise. Surveyor fatigue is a factor, therefore it is prudent to plan the survey early and finish before 2:00 a.m.

- For ground searches of the nest, any time during daylight hours is appropriate.

iv. Type of Day

- Weather has a great influence on vocalizations by great grays. For optimal response to played calls, select for nights that are clear, calm (winds less than 15 km/h) and not too cold (above -10^0 C). The call of the great gray owl does not carry well so wind is a key limiting factor. Rank the expected wind conditions high in your decision whether or not to schedule a survey.

- Do not search for nests on very cold days ($<5^0$ C) or during heavy rain, especially from mid-March to early May, when the female is sitting on eggs or brooding young chicks. Eggs and chicks are susceptible to chilling if the adult is flushed from the nest.

- Heat ($+20^0$ C?) can also be a concern when the adult is sitting on eggs or brooding young chicks, especially in intense sunlight.

- If an active great gray owl (or other raptor) nest is found, spend as little time at the nest as is possible. Many species are sensitive to human disturbance and may abandon the nest. If the weather is cold (or hot), a nesting failure may result if the nest is vacated for even very short periods.

4. Survey Procedure

- Areas previously identified as containing stick nests and areas with habitat attributes great gray owls seek should be identified prior to field surveys and marked on FRI maps and/or aerial photos.

- **Areas where sightings of great grays have been recorded should be a high search priority, especially if favourable habitat attributes are present. Multiple sightings over a period of several years will have a higher priority than only a single or a few sightings.**

- For efficiency, a survey crew can consist of a single person, although for safety, a two-person crew is recommended. Two-person crews also facilitate training of inexperienced observers and improve the chances of detecting owl responses.

Use of the Call

- To survey using the broadcast call, drive along a pre-determined route in the area where you have determined you wish to search. Plan on stopping every 0.8 km (0.5 mi) to broadcast the call of the great gray.

- Indicate on a map each stop. This can be done using a known starting point and subsequently the vehicles' odometer. Each stop should be numbered in a consecutive fashion. For safety reasons, it may not be prudent to stop exactly every 0.8 km. Record any variations.

- At each stop there is an initial listening period of at least one to two minutes. Write down whether any owls are seen or heard, the distinction being noted. Also record whether or not both listeners heard an owl and identify the owl to species (if possible).

- After the initial listening period, the call of a boreal owl is broadcast for 20s, followed by a 1 m listening period. Record any owls you hear.

- The third step is to broadcast the call of the male great gray owl for 20 s , again followed by a one minute listening period. Again, all owls detected are recorded.

- With respect to both calls, they are to be used regardless if any owls were heard in the initial one minute listening period.

- If an owl is heard during the initial listening period, record whether or not it stopped calling or continued after the playback(s). Record the compass direction from the stop to each owl and note the loudness (this is very subjective).

- The above sequence of calls can be referred to as the ‘Manitoba Method’.

- If a response from a great gray is heard, stay at the location for a further five or ten minutes listening for other calls. Specifically, listen for the female contact call (this is best described as a ‘whoop’) or the call of a female requesting food from her mate (a series of single calls, at a rate of about 50/minute [pers. comm. J. Duncan]). These calls are most likely to be heard if the nest is close by.

- Some owls may come to the call without calling themselves. Keep a watch for owls which may land in an adjacent tree or fly over you or the vehicle .

- Whether or not a great gray owl is heard, repeat the same procedure at the next stop. To help pinpoint nests, attempt to locate responding owls by getting compass bearings from various stops, concentrating effort from 100-300 metres from the initial contact location.

- Owls that are hunting may vary their position - the three bearings will thus not cross at the same point (however, bearings will seldom cross exactly at the same point).

- At each location where a great gray is heard, tie flagging tape to the nearest tree. This ensures you know exactly where your stop was (odometers can be unreliable).

- If you experience equipment failure, or do not have any playback recording equipment, the survey can still be done. It is actually unnecessary to use the boreal owl call for locating great grays (but as indicated earlier, we have recommended its use since it provides more information about owls at no extra cost) and with a little practice, it is fairly easy to vocalize a good imitation of the great gray owl call. It helps if you cup your hands around your mouth when calling. If you can't do this, simply run the survey as outlined but increase the initial listening period to three minutes.

- As an option, you may do the survey by using no broadcast calls at all. If you elect to not use a broadcast call, ensure your listening period at each stop is about three minutes. Again, all owls heard are recorded, to species.

- Be sure to record which broadcast calls, if any, you used when doing the survey.

<u>Searching for a Nest</u>

- Write down the date each area is searched for a nest directly on the field map and, if taken into the field, the nest survey form.

- Air photos, FRI or topographical maps can be used to help establish an access route to the stands to be searched.

- If you have bearings from call responses, you will have a good idea where to search. To keep the distance you have to walk as short as possible, approach the suspected nest location from the road at a 90^0 angle.

- If a call was not used but habitat characteristics and previous information warrant a search, use the already marked FRI or aerial photos to locate stands in the field. Give the highest priority for inventories in potential habitats within areas allocated for forest management activities.

- Great gray owl nests can also be detected from helicopter searches but ground searches are more successful. Use of the helicopter is only recommended in remote, very open habitats dominated by hardwoods (to allow good visibility). If helicopters are to be used, first identify high potential nesting sites from FRI maps and aerial photos and then lay out grid flight lines at approximately 200 m intervals. Interval width can be adjusted dependent on site characteristics.

- A systematic approach to the search should be used to ensure all potential nesting sites have been covered.

- When searching early in the year (usually done when a call was used and a response has suggested a nest is highly probable), a systematic search may not be warranted. Since visibility is high (no leaf flush), finding the nest can be surprisingly easy. If an active nest is found, spend as little time in the immediate area as possible. Back off to a distance and confirm the identification with binoculars. Great grays and other raptors tolerance to humans is variable, although great grays are usually tolerant.

- If you search later in the spring, moving through the forest quietly is critical as you may hear the young chicks crying for food or the adults producing soft calls. These soft calls can be a form of communication to their young or their mate.

- When only eggs or very young chicks are present, active great gray owl stick nests usually **cannot** be identified from the presence of whitewash below the nest. As chicks get older, some whitewash is usually present. Abundant whitewash is indicative of use by other raptors, but not a great gray.

- If the survey is late in the spring, nestlings may have fledged. Look for great gray owl young near the nest, especially in areas with leaning trees (young great grays will use leaning trees to climb).

- Obvious nest sites are stick nests constructed by other birds and depression type cavities that remain in a tree that has been snapped off. Some of these depressions can hide an incubating female quite easily so care must be taken to check these potential spots from all angles. On rare occasions, great grays have been known to nest on the ground.

- The presence of feathers on the ground or in trees may attest to the presence of great grays. Great gray owls frequently lose breast feathers, which are long (up to 24 cm) and quite distinctive. Feathers can be collected and verified as to origin later.

- Towards mid-day, the male may return to a perch in a tree close to the nest. Hooting (territorial call) for the male may gain a response and lead you closer to

the nest area. If a male is located, a continuation of an intensive search is warranted.

- If you have trouble finding the nest, search all high potential habitats systematically (as you would in the absence of call response data) before giving up.

5. Interpretation

Not much is known about the frequency or habits of great gray owls nesting in Ontario. In part, this lack of knowledge is owing to the lack of effort in searching for the great gray. This methodology to find and locate nesting sites should help improve our knowledge base. Hopefully, it will provide some insight on this owl, and help ensure our management practices result in the continued existence of the great gray owl across Ontario's forested landscapes.

6. Data Compilation and Storage

- Tie in all active nests to a recognizable landmark such as a lake or other permanent feature (compass bearing with appropriate direction and distance). Also draw a detailed map showing how to find the nest.

- If great gray owl nests are found, put the information on the District Values map (e.g., similar to Figure 2.1.9, pg. 102). As soon as possible after a survey, complete the Inventory Form.

- Keep a record of all stick nests, regardless of what species was using it. We recommend stick nest locations be recorded either on the great gray owl nest inventory form (IF) or the Raptor Nest Field Data Sheet form (RFNDS) in Szuba and Bell (1991).

- As a Vulnerable species with only a few nesting records in Ontario, the location of nests is of interest to both the Natural Heritage Information Centre (NHIC) and the Ontario Nest Records Scheme in the Dept. of Ornithology, Royal Ontario Museum (ROM). Both want the information, which should be provided (a completed IF or RFNDS can be sent to NHIC; ROM provides a nest recording form of their own. Contact ROM @ Ontario Nest Records Scheme, Dept. of Ornithology, ROM, 100 Queen's Park, Toronto, Ont., M5S 2C6, for copies of their form.

- A cell is considered to have been searched using the broadcast call when at least two stop stations are done within a cell.

- **Even if no birds or nests were located, observers should record where and when they searched (i.e., which FRI stands), how long they searched, members of the crew, etc.**

- Inventory forms are designed to store data in a standardized fashion for future analysis. Data should be readily retrievable.

- The data inventory form is primarily for locational data and value identification purposes. Other information desired (e.g., from repeat visits) such as date fledged, should be stored separately.

7. Literature Cited

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INVENTORY FORM

GREAT GRAY OWL NESTS

Date of Survey: ☐☐ ☐☐ ☐☐
YY MM DD

Complete survey info. for one type of survey only

Aerial Survey

Aircraft: ☐

Aircraft Crew Identification:

Pilot: _____

Navigator: _____

Left Observer: _____

Right Observer: _____

Ground Survey

Ground Survey Crew Identification:

_____

_____

_____

_____

Wildlife Management Unit # ☐☐☐ N N A

UTM Block # ☐☐☐☐☐ A A N N

Cell Searched (circle)

1-1 1-2 1-3 1-4 2-1 2-2 2-3 2-4 3-1 3-2 3-3 3-4 4-1 4-2 4-3 4-4

NESTS FOUND

Cell #	UTM Coordinates Easting	UTM Coordinates Northing	Nest Active Yes	Nest Active No	Nest Active Unkn	# Young	Tree Species	FRI #	V-Type
	XX	XX							
	XX	XX							
	XX	XX							
	XX	XX							
	XX	XX							
	XX	XX							
	XX	XX							
	XX	XX							
	XX	XX							
	XX	XX							

Additional Comments:

AIRCRAFT CODES

(1) 2 seater fixed wing aircraft (e.g. Piper, Citabrea, etc.)
(2) 4 seater fixed wing aircraft (e.g. Cessna 172, Cessna 180, Cessna 185)
(3) Turbo Beaver
(4) Piston Beaver
(5) Otter
(6) Twin Otter
(7) 4 or 6 seater helicopter (e.g. Bell 206 Long Ranger)
(8) 2 seater helicopter (e.g. Robinson)
(9) Other (specify)

2.2.e IDENTIFICATION OF SOUTHERN FLYING SQUIRREL HABITATS

Mark Stabb
Biologist
Pembroke District
Central Region

1. Introduction

i. Background

The southern flying squirrel (Glaucomys volans), designated as Vulnerable by COSEWIC (no COSSARO designation), is an occupant of deciduous and mixed forests throughout southern Ontario. Their northern range limit lies within the Great Lakes-St. Lawrence Forest. A cavity-nester, southern flying squirrels are most abundant in mature or older stands although some will live in younger stands. Optimal numbers are found in forests with a wide variety of mast producing tree species; mixed Carolinian forests of hickories (Carya spp.), oaks (Quercus spp.) and others, such as beech (Fagus grandifolia), provide excellent habitat. Large diameter cavity trees are important, particularly for winter aggregations at the northern edge of the species' range. Populations become concentrated in a small number of these crucial cavity trees in winter. For a summary of the habitat needs of southern flying squirrels see Stabb (1987).

2. Initial Preparation

- Identify cells to be surveyed as per **'1.0 GENERALIZED METHODS AND TECHNIQUES'.** See Figure 1.1.

- Obtain all historic information, if any, where the presence of southern flying squirrels has been documented. This can include museum collections, accounts of local naturalists, etc.

- Identify high potential habitats on eligibility maps. Potential suitability should be based on information shown on FRI maps, e.g., stand composition and age.

- The District or Area office will have to have Havahart-style or fabric box traps for proper inventories. At least two dozen traps should be available.

- An accurate spring scale to weigh captured squirrels is necessary. A "Pezola" style scale with a capacity of up to 200 g is suggested.

- A capture device as described by Sonenshine et al. (1973) should be purchased or made. This is basically a long telescopic pole with a clear plastic bag attached to a circular frame at the end (hereafter called the `capture pole').

- Onion skin or similar bags are needed to transfer trapped squirrels for weight and length measurements.

- o Both a 15 cm and 30 cm ruler are useful for length measurements. Calipers can also be of help.

- o A 35 mm camera can be used to record habitats where squirrels are found, tree conditions (e.g., cavities) and physical features of squirrels (especially if the surveyor(s) are unsure of identification - belly hairs in particular should be photographed).

3. Survey Considerations

i. Survey Crew and Training

- o One or two person crews can be used depending on the availability of funds, the size of the area(s) to be searched and district policy.

- o Surveyors must be capable of identifying flying squirrels to species [i.e., the ability to distinguish southern flying squirrels from the northern flying squirrel (Glaucomys sabrinus)]. Geography can be a determining factor, as only northern flying squirrels have been reported north of the French River. Only southern flying squirrels have been found in the counties bordering Lake Erie and southern Lake Huron.

- o Table 2.2.2 gives a summary of species identification criteria.

- o When checking trees with cavities for squirrels, surveyors must work in pairs and wear hard hats. Be aware of limbs and tree tops that may break and fall to the ground, which are a serious safety hazard.

ii. Time of Year

- o Numbers are highest in the fall, therefore surveys to monitor presence/absence (e.g. to determine species of flying squirrels present) or relative abundance might best be conducted at that time. As a rule of thumb, plan surveys anytime between the middle of September to early November.

iii. Time of Day

- o Southern tree squirrels are mostly nocturnal. Traps must be set at dusk, allowed to sit overnight and should be checked the following morning. Traps open during the day will inevitably be filled with diurnal species.

Table 2.2.2. **COMPARATIVE DESCRIPTIONS OF SOUTHERN AND NORTHERN FLYING SQUIRRELS**

	Southern Flying Squirrel		Northern Flying Squirrel
Size (mm)		(Canada)	
total length	198-255	(218-260)	245-368
tail vertebrae	80-120	(80-120)	110-150
right hind foot	21-33	(29-34)	34-40
ear (from notch)	13-23	(15-23)	16-25
Weight (g)	46.5-85	(46.5-70)	70-130
Pelage			
upperparts	pale, drab brown; darker fur on gliding membrane		cinnamon on back and sides
underparts	creamy white; belly hairs white from base to tip		whitish, washed with pale buff; belly hairs slate-coloured at the base

no recognizable size or colour differences between sexes

Sources: Dolan and Carter (1977), Baker (1983), Wells-Gosling and Heaney (1984). Canadian Museums (ROM. NMNS, Acadia. NSM, Vanier College).

- Tree cavities should be searched for and checked for squirrels during mid-day. Any time during normal working hours should be adequate.

iv. Type of Day

- It is preferable not to trap during cold, wet weather. Dry weather is also better when searching for and recording trees with cavities.

4. Survey Procedure

- Areas where southern flying squirrels have previously been seen should be identified prior to field surveys and marked on FRI maps and/or aerial photos.

- Generally, only presence/absence data is required, but depending upon objectives, this survey method can be used as a monitoring tool. Monitoring requires a much greater commitment of time and resources.

- The same air photos and FRI maps, or topographical maps, can be used to establish an access route to the areas to be searched.

- A survey crew can consist of a single person although two people are better for both safety purposes and ease of trap transportation. Two person crews also facilitate the training of an inexperienced surveyor.

- Give the highest priority for survey in those stands most likely to be allocated for timber harvest.

- Establish a transect through the stand(s) to be sampled. Traps should be placed at approximately 50 m intervals through the length of the stand (s) to be sampled.

- Traps work best if placed above the forest floor in the crooks of branches, as leaning pole sets, etc. Carey et al. (1991) and Sonenshine et al. (1973) should be consulted for details on trap setting. Traps should be baited with either peanut butter and rolled oats or sugary materials (Stabb 1988). On traps with mesh, keep mesh size smaller than 2.5 cm (1 in).

- Identify squirrels to species using the criteria given on Table 2.2.2. Weight and length measurements are best taken by transferring the squirrel to an onion skin bag or equivalent. With some trap-types, the squirrel can be weighed in the trap and the weight of the trap can then be subtracted. **Make sure pelage is looked at closely. Weight measurements may be misleading, especially if the squirrel is pregnant.**

- It may be beneficial to photo-enlarge the "Southern Flying Squirrel Inventory Form" and take it to the field. This will ensure no information is `forgotten'. Depending upon the objectives of the survey, the Inventory Form can be used to collect information on any or all of the small mammals that may be trapped.

- Only information pertaining to southern flying squirrels is mandatory.

- When traps are being set out, and cavity nest trees are encountered, these trees should be checked for the presence of flying squirrels. Check trees with cavities by rapping or shaking the tree.

- If squirrels are present, rapping or tree shaking is often sufficient to dislodge the squirrel(s) from their den.

- Once squirrels have been detected, move off a distance and wait for them to return to their holes. Even if the squirrels have glided to an adjacent tree, they will likely return to their hole within several minutes.

- If squirrels were present, assess whether or not the cavity is near enough to the ground to successfully use the capture pole. If possible, place the frame over the hole and shake or rap the tree with sufficient force to again cause the squirrels to leave the hole and enter the plastic bag.

- If squirrels are captured, transfer the animals to an onion skin or other bag for visual identification and to take a weight measurement.

- If desired, an assessment of the quality of cavities can be made (and recorded on the Inventory Form under ‘Additional Comments’) based on criteria presented on the "Cavity Survey Card", designed by and available from Southcentral Science and Technology unit.

5. Interpretation

Southern flying squirrels are part of a substantial group of wildlife species dependent upon cavities for their existence. The maintenance and management of tree cavities should be considered a high-priority in all long-term forest/wildlife management strategies.

6. Data Compilation and Storage

- Prepare and keep on file a detailed map showing all stands sampled. When stands are remote, the map should also indicate how to find the stands in the field.

- Areas where southern flying squirrels are documented should be recorded on the District Values map (e.g., similar to Figure 2.1.9, pg. 102).

- On the Inventory Form only spaces detailing the capture of flying squirrels are mandatory to complete. Data points concerning the capture of other small mammals, whether or not the trap was sprung, etc., are optional.

- Details on sampled stands need to included whether squirrels were or were not found.

- Inventory Forms are designed to store data in a standardized fashion for future analysis. Data should be readily retrievable.

7. Literature Cited

Baker, R.H. 1983. Michigan mammals. Mich. St. Univ. Press. East Lansing. 438 pp.

Carey, A.B., Brian L. Biswell and Joseph W. Witt. 1991. Methods of measuring populations of arboreal rodents. USDA For. Ser. Gen. Tech. Rep. PNW-GTR-273. 22 pp.

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INVENTORY FORM

SOUTHERN FLYING SQUIRREL

Date: ☐☐ ☐☐ ☐☐ (YY MM DD)

Page ☐ of ☐ pages.

Survey Crew Identification: _____ _____

_____ _____

Wildlife Management Unit # ☐☐☐ (N N A)

UTM Block # ☐☐☐☐ (A A N N)

Cell Searched (circle one)

1-1 1-2 1-3 1-4 2-1 2-2 2-3 2-4 3-1 3-2 3-3 3-4 4-1 4-2 4-3 4-4

FRI Stands Sampled: ☐☐☐ ☐☐☐ ☐☐☐ ☐☐☐

FRI Stand ☐☐☐ # Traps Set ☐☐☐

Suitable Cavity Trees Seen *(circle one)* Yes No

TRAP STATUS
N - no activity, undisturbed
T - tripped (door closed but empty)
S - successful

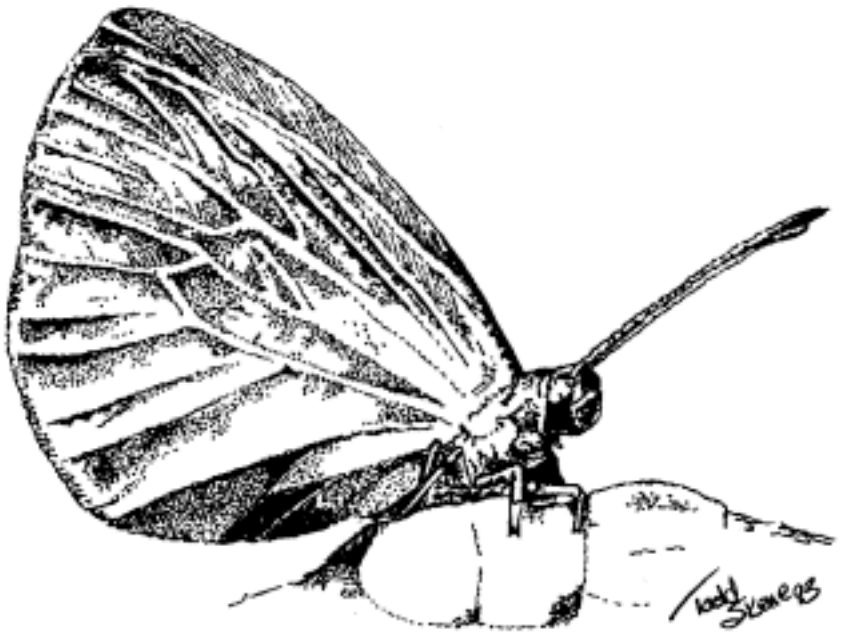
SOUTHERN SUBSPECIES
Y - yes, positive identification
N - no, positive identification
U - unknown, unable to determine

Trap#	Trap Status N T S	Species Caught	# Caught	Weight (gm)	Flying Squirrel Southern ssp? Y N U

Trap#	Trap Status N T S	Species Caught	# Caught	Weight (gm)	Flying Squirrel Southern ssp? Y N U

Additional Comments:

2.2.f LOCATING WEST VIRGINIA WHITE BUTTERFLY HABITATS



Daryl Coulson
Biologist
Cambridge District
Southern Region

1. Introduction

i. Background

The West Virginia white butterfly (Artogeia [Pieris] virginiensis) has been officially designated as Vulnerable in Ontario.

The West Virginia white butterfly inhabits rich, well drained deciduous woods and mixed woodlands. In areas where the butterfly has been documented, the dominant tree species is usually sugar maple. Dominant associates at Halton area sites, where the butterfly is known to occur, include beech, white ash and eastern hemlock. The forest successional stage the West Virginia white appears to use varies from intermediate to subclimax or climax. Small openings in the forest canopy, creating sunny patches, become increasingly important to the butterfly with the onset of tree leaf emergence.

The occurrence of the butterfly is closely linked to the distribution of the larval food plant, toothwort (Dentaria diphylla and D. maxima), spring flowering, ephemeral, herbaceous plants. Toothwort is very sensitive to disturbance and appears intolerant of grazing, human trampling or understorey clearing.

Butterflies may travel several miles from toothwort stands throughout wooded areas but the adults almost always remain within tree stands. This wandering behaviour may prescribe relatively large areas of continuous habitat.

2. Initial Preparation

- Identify cells to be surveyed as per **'1.0 GENERALIZED METHODS AND TECHNIQUES.'** See Figure 1.1.

- Obtain all historic information, if any, of known sightings in the cells to be surveyed.

- Identify high potential habitats on eligibility maps. Potential suitability should be based on information shown on FRI maps, i.e., stands for age and composition as described above. In addition, suitable habitat is usually stands comprising 25 km^2 or more of continuous forest, with forest cover **always** being >10% [for a detailed habitat profile, see Mainguy (1991)].

- Surveyors need to have suitable nets for capture and identification of butterflies.

- A 35 mm camera with a macro lens is recommended to record and confirm the identity of butterflies seen and captured.

3. Survey Considerations

i. Survey Crew and Training

- One or two person crews can be used depending on field staff availability, experience of staff with the West Virginia white, the size of the area(s) searched and district policy.
- Field staff **must** be adept at being able to identify toothwort as well as the West Virginia white.
- Identification of the West Virginia white butterfly is difficult even by experienced lepidopterists, as the West Virginia white is easily confused with the closely related mustard white butterfly (Artogeia napi oleracea). Inexperienced observers may also have difficulty distinguishing between the West Virginia white and the cabbage white butterfly (Artogeia rapae).

ii. Time of Year

- The West Virginia white is heterodynamic (or univoltine) meaning that the adults appear for a very limited time during a particular season. The pupae pass the winter in a dormant state. It is most conspicuous as an adult but this period in the spring is very brief - five weeks at the most, with the peak of observations during the early days and dropping off dramatically towards the end.
- In southern Ontario, this is typically late April to mid-late May. In more northern or eastern areas this may be delayed by a couple of weeks.
- In Ontario, West Virginia white butterflies have not been reported to emerge prior to April 19.

iii. Time of Day

- When searching only for toothwort, any time during daylight hours is acceptable.
- Best results for butterflies are obtained if surveys are done between 1000 and 1500 hours.

iv. Type of Day

- The West Virginia white butterfly is a fair weather flyer, with optimum conditions occurring on warm sunny spring days with light to no winds and little to no cloud cover.

- If heavy dew is present in the morning, searches should be delayed until the woods have dried.

4. Survey Procedure

- Areas with records of past sightings of West Virginia whites should be identified prior to field surveys and marked on FRI maps and/or aerial photos.

- Simple presence/absence data is all that is required to identify the area as West Virginia white butterfly habitat. In general, results from this survey method will not give an exact count of the population. However, if populations are monitored over time, counts can be used to give a comparative indices, such as from day to day or year to year, depending on the time frames used.

- Potential areas should be surveyed for the larval food plant, toothwort, prior to surveys which try to document the presence of the West Virginia white butterfly.

- Write down the date each area was searched directly on the field map and, if taken into the field, the survey form. Be sure to indicate whether the survey was for toothwort or for the West Virginia white.

- For efficiency, a survey crew can consist of a single person, although for safety, a two person crew is recommended. Two person crews also facilitate training of inexperienced observers.

- Air photos, FRI or topographical maps can be used to establish an access route to the stands to be searched.

- Use the already marked FRI or aerial photos to locate stands in the field. Give the highest priority to inventories in potential habitats within areas allocated for timber harvest.

- To record information, it is suggested that the Inventory Form be taken to the field. A photo-copy enlargement may make it easier to record data points.

- The inventory method suggested for toothwort is to go to the FRI stands you have chosen to sample and search thoroughly. Transects which simply record

presence/absence are an option, but more thorough searches may provide more satisfactory results.

- To search thoroughly, it is recommended surveyors spend time familiarizing themselves with toothwort and the microhabitats these species inhabit. Sites where toothwort are likely to exist are then more likely to be encountered.

- Since West Virginia white abundance is dependent upon the abundance of toothwort (Mainguy 1991), a relative measure of the abundance of toothwort can be estimated in FRI stands being sampled.

- Record the relative abundance of toothwort as follows:

    1. Mainly single plants or small patches.

    2. Frequently encountered. Up to 10% of the forest floor covered with toothwort.

    3. Abundant. More than 10% of the forest floor covered with toothwort.

- Once suitable stands with toothwort have been identified, establish transects on the FRI map, or air photos. In general, route the transect through the length of the stands to be sampled. A suggested transect length is 200 m, but lengths can be adjusted to accommodate time and terrain features as required.

- Transects are walked and observed butterflies counted. Each transect done needs to be fully documented, **including the length of time taken to search the transect.**

- Butterfly abundance has a direct bearing on the number of butterflies seen by the observers. To lessen the possibility of missing sites when the number of West Virginia whites is low (for whatever reason), it is suggested sites be inventoried on at least two days. Best results are obtained when counts are frequently taken several times on each day.

- To ensure butterflies are properly identified, capture with a net is recommended. To identify the butterfly without injury, carefully hold the body of the butterfly in the net, folding back the net until the wings are exposed. Confirm identification with a photograph and then release the butterfly.

- Unless mustard white butterflies seem common, the capture of three butterflies will usually identify whether or not the West Virginia white is present.

- As a rule of thumb, once the presence of the West Virginia white has been confirmed in an area, transects through suitable, adjacent habitats need not be closer than five km apart.

5. Interpretation

Locating occupied habitats of the West Virginia white butterfly is an excellent method by which to identify large areas with relatively little disturbance. Knowledge gained from use of this survey may be particularly important when grappling with complex issues like biodiversity and sustainability.

6. Data Compilation and Storage

- Detailed maps should be prepared showing the location of all stands sampled, how to access these stands and any transects lines established. Use of FRI maps is suggested.

- On the Inventory Form, be sure to fill in all the spaces.

- **Even if no butterflies were observed, an Inventory Form should be completed.** Those stands where West Virginia whites were recorded should be recorded on the District Values map (e.g., similar to Figure 2.1.9, pg. 102).

- Inventory Forms are designed to store data in a standardized fashion for future analysis. Data should be readily retrievable.

7. Suggested References

Brownell, V.R. 1980. The West Virginia White Butterfly (Artogeia virginiensis Edwards) in Canada: A Status Report. OMNR Unpubl. Toronto. 64 pp.

Fraser, J.F.D. 1973. Estimating butterfly numbers. Biol. Conserv. 5(4): 271-276.

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INVENTORY FORM

<u>WEST VIRGINIA WHITE BUTTERFLY HABITATS</u>

Date: ☐☐ ☐☐ ☐☐
YY MM DD

Survey start time: ☐☐☐☐ hrs

Survey finish time: ☐☐☐☐ hrs

Experience

Survey Crew Identification: ____________________ ☐

____________________ ☐

Wildlife Management Unit # ☐☐☐ (N N A)

UTM Block # ☐☐☐☐ (A A N N)

Cell No. ☐–☐

Transect No. ☐☐

Transect Length ☐☐☐☐ m

	complete Y/N
Records indicate West Virginia White Butterflies seen	☐
Surveying for presence of Toothwort only	☐
Toothwort survey was previously conducted	☐
Surveying for presence of West Virginia White Butterflies	☐

FRI Stands Checked	Toothwort Present Y/N	Relative Abundance of Toothwort	No. of West Virginia Whites Counted	No. of Mustad Whites Counted

Map filed Y/N ☐ Map No. __________

	Y/N
Were weather conditions good?	☐
Were identification problems encountered?	☐
Were photos of WVWB taken?	☐

Additional Comments:

EXPERIENCE CODES for Identification to species of
WEST VIRGINIA WHITE BUTTERFLY AND HABITAT INVENTORY
(Hours, in last 5 years)

(**1**) 0 - 10 (**2**) 11 - 50 (**3**) 51+ (**9**) no observer

RELATIVE ABUNDANCE OF TOOTHWORT

(1) Mainly single plants or small patches
(2) Frequently encountered - up to 10% of the forest floor covered with toothwort
(3) Abundant - more than 10% of the forest floor covered with toothwort

2.2.g OTHER VULNERABLE SPECIES THAT CAN BE LOCALLY FEATURED

OTHER VULNERABLE SPECIES THAT CAN BE LOCALLY FEATURED

General

As with 'Other Provincially Featured Species', 'Other Vulnerable Species' are usually very localized in distribution and their presence is generally well known and documented by MNR District and Area staff. General and some specific habitat needs as outlined for each species should be recorded on the form located at the end of this chapter. Record habitats used as Values on the District Values Map (see Figure 2.1.9, pg. 102). Some of the species identified in this chapter have been reassessed as to their population status and are no longer considered to be at risk, or are listed by COSEWIC (the national Committee on the Status of Endangered Wildlife in Canada) as Vulnerable but not listed by COSSARO (Committee on the Status of Species at Risk in Ontario). However, they have been retained in the chapter (they were previously considered to be 'Rare' in earlier drafts of this manual) and may still be managed as 'Locally Featured', at the discretion of the District Manager. Information on Vulnerable species should be routinely forwarded to the appropriate Wildlife Assessment Unit (WAU), Regional Wildlife Planning Specialist and/or the Natural Heritage Information Centre (NHIC). NHIC may wish to have their own form completed (see Appendix II). Bird nest record information may be of interest to the Royal Ontario Museum (ROM), Ontario Nest Records Scheme, Dept. of Ornithology, 100 Queen's Park, Toronto, Ont. M5S 2C6.

With many species, there is conformity with COSEWIC and COSSARO designations, although some species which are at risk in Ontario may not be when viewed nationally. In addition, there are a number of species which COSSARO has not yet examined (it is a relatively new committee), and species which have not been assigned a status as yet by COSSARO may indeed be at risk, especially if they are identified as such by COSEWIC. When a species is identified in this chapter simply as 'Vulnerable', this implies COSSARO has examined and listed the species. Status designations of species do change, so keep abreast of these developments.

BIRDS

Eastern Bluebird

1. Background

The eastern bluebird was formerly classified as 'Rare' in Ontario but has been down listed to NAR (not at risk) by COSEWIC and NIAC by COSSARO (not in any COSSARO category). In general, habitats of the eastern bluebird are cultivated lands, grazed pastures, old fields, and other forest openings. Natural (or man made) cavities for nesting are needed as are room-sized patches of bare ground or short grass for feeding. Nearby perches are also required. Most eastern bluebirds are found in southern portions of the province, as good quality (for bluebirds) forest openings and agricultural areas are few and scattered.

2. Survey Considerations

Most bluebirds and the best bluebird habitats are associated with agricultural areas. In these areas, the only habitat component generally lacking is suitable nesting sites. Widespread use of bluebird boxes has proven to greatly assist bluebird populations. As such, surveys to identify and protect habitat are rather unnecessary. Rather, population assistance through an active bluebird box program is recommended.

3. Data Compilation and Storage

District or Area offices engaged in an active bluebird box program are encouraged to keep records of nest box use. Often this can be done in partnership with local birders, naturalist clubs, etc. Other database needs are not required.

Cooper's Hawk

Specific methods to locate and identify habitat's for this formerly Rare species (now listed as NAR by COSEWIC and NIAC by COSSARO) have not been developed. If the District Manager identifies the Cooper's hawks as a locally featured species, any known critical habitats (nests) should be protected. To locate and identify nests, field staff need to be familiar with the chapter "Locating red-shouldered hawk nests" as well as the "Hawk Guide for Ministry of Natural Resources Personnel" (Szuba and Bell, OMNR 1991). With this familiarity, field staff can identify nests that are encountered on an ad hoc basis or when searching for red-shouldered hawk nests. Nests that are found need to be recorded on the

'Other Vulnerable Species' form at the end of this chapter. Information may be forwarded to the appropriate WAU, the NHIC and ROM.

All Other Vulnerable Birds

No habitat surveys have been developed for any of the other Vulnerable bird species listed on Table 2.2.1. However, none of these bird species appear to be threatened by forest management activities. Information needs and appropriate management strategies need to be developed.

MAMMALS

Grey Fox and Wolverine

Neither of these two species, both potentially found in the Area of the Undertaking and listed by COSEWIC as Vulnerable (no COSSARO designation) have habitat inventory methods available at this time. Regional, District and Area offices are encouraged to maintain a file with any information on these species they feel is relevant . Information should be recorded on the 'Other Vulnerable Species' form and forwarded to the appropriate WAU and the NHIC.

AMPHIBIANS AND REPTILES

Small Mouth Salamander

No habitat inventory methods are available for the small mouth salamander at this time. This species, designated as Vulnerable by COSEWIC but not designated by COSSARO, is not believed to be at risk from habitat loss associated with forest management activities. Regional, District and Area offices are encouraged to maintain files on this species documenting any information deemed to be relevant. Information should be recorded on the 'Other Vulnerable Species' form and forwarded to the appropriate WAU and the NHIC.

Spotted Turtle

This Vulnerable species is found only in the eastern portion of Ontario and, in northern portions of this range, only along the southern edge of the Canadian Shield. The spotted turtle prefers very wet riparian areas and is often associated with peat bogs and fens. This turtle requires quiet waters and avoids swift flowing streams.

Specific methodologies to identify and delineate habitats required by the spotted turtle have not been developed. Nevertheless, because its known general habitat requirements are rich riparian areas, existing mitigative management strategies designed to restrict Forest management activities in these areas should provide protection for this species. The general area inhabited by the spotted turtle should be recorded and filed on the `Other Vulnerable Species' form located at the end of this chapter. Nesting sites should also be recorded and records forwarded to the appropriate WAU and the NHIC.

Wood Turtle

Few habitat studies have been conducted on this Vulnerable species. A few very recent studies suggest wood turtles generally stay close to water sources, but may travel great distances. They are known to use communal nesting sites in June during the breeding/nesting season. Sandy soils or gravely bedded rivers may be more important habitat features than types of forest cover. Habitat threats appear to be the presence of roads, as wood turtles seem to be run over at a high rate.

Specific habitat search methodologies have not been devised for the wood turtle. However, since only three populations of wood turtles are known to presently exist within the area of the undertaking [one (1) in Sault Ste. Marie District and two (2) in Algonquin Park District], and habitat concerns in these areas are being addressed (e.g., keeping roads away from areas where the wood turtles are), the lack of habitat survey methodologies is not of great concern at this time.

The general area inhabited by the wood turtle should be recorded on the ‘Other Vulnerable Species’ form located at the end of this chapter. Communal nesting sites should also be recorded on the form. As with other Vulnerable species, sightings should be forwarded to the appropriate WAU and the NHIC.

Suggested References

Harding, J.H. and T.J. Bloomer. 1980. The wood turtle, Clemmys insculpta . . . a natural history. Bulletin of NY Herp. Soc. 15(1): 9-26.

Quinn, N.W.S. and D.P. Tate. 1991. Seasonal movements and habitat of wood turtles (Clemmys insculpta) in Algonquin Park, Canada. J. Herp. 25(2): 217-220.

Quinn, N.W.S. 1991. Turtle trouble. Nature Canada. Fall issue. pp.21-25.

Ross, D.A., K.N. Brewster, R.K. Anderson, N. Ratner and C.M. Brewster. 1992. Aspects of the ecology of wood turtles, Clemmys insculpta, in Wisconsin. Can. Field-Nat. 105(3): 363-367.

Szuba, K. and P. Bell. 1991. Hawk Guide for Ministry of Natural Resources Personnel. MNR Unpubl. Mnscpt.

INVENTORY FORM

OTHER RARE SPECIES THAT CAN BE LOCALLY FEATURED

Date of Survey: ☐☐ ☐☐ ☐☐
YY MM DD

Survey Crew Identification:

_____

_____

_____

_____

Species Surveyed:

Eastern Bluebird	☐	Small Mouth Salamander	☐
Cooper's Hawk	☐	Spotted Turtle	☐
Grey Fox	☐	Wood Turtle	☐
Wolverine	☐		

Other *Common Name:* _____ *Scientific Name:* _____
genus *species*

Wildlife Management Unit #: ☐☐☐
N N A

Cell #s: ☐☐ ☐☐ ☐☐ ☐☐

UTM Coordinate: ☐☐ ☐☐☐☐XX ☐☐☐☐☐XX

Nature of Sighting: ☐☐☐☐☐☐☐☐☐
(check) 1 2 3 4 5 6 7 8 9

Number of Individuals Seen: ☐☐☐
Adults ☐☐☐ # each Sex M ☐ F ☐ Unk ☐
Young ☐☐☐

Nature of Sighting Codes:

1 - Adult seen
2 - Young seen
3 - Adult with Young
4 - Group of Individuals, ages unknown
5 - Evidence of Breeding (e.g. nest, lactation)
6 - Tracks
7 - Scat
8 - Specimen in hand
9 - With Flower and/or Seed (plants only)

Comments:

APPENDIX I

INVENTORY FORM

INCIDENTAL 'HABITAT VALUES' SIGHTINGS

Date Survey Flown: ☐☐ ☐☐ ☐☐ Recorder: _____
Y Y MM D D

Survey Type: ☐ Aerial Moose Pop'n; ☐ Aerial Moose Age/Sex; ☐ MAFA; ☐ Winter Moose Habitat; ☐ Aerial Moose Pop'n; ☐ Other _____

Wildlife Management Unit # ☐☐☐ (N N A) UTM BLOCK # ☐☐☐☐ (A A N N)

Cells Searched (circle): 1-1 1-2 1-3 1-4 2-1 2-2 2-3 2-4 3-1 3-2 3-3 3-4 4-1 4-2 4-3 4-4

Cell #	Habitat Value or Waterbody Name (stick nests)	UTM Coordinates Easting	UTM Coordinates Northing	Bird Info Sp. Code	Bird Info Adults Seen	Bird Info # Eggs	Bird Info # Young	Tree # Nests	Optional Sp.	Optional Condition	Optional Young Stage	Optional Nest Condition
		X X	X X									
		X X	X X									
		X X	X X									
		X X	X X									
		X X	X X									
		X X	X X									
		X X	X X									
		X X	X X									

Wildlife Management Unit # ☐☐☐ (N N A) UTM BLOCK # ☐☐☐☐ (A A N N)

Cells Searched (circle): 1-1 1-2 1-3 1-4 2-1 2-2 2-3 2-4 3-1 3-2 3-3 3-4 4-1 4-2 4-3 4-4

		X X	X X									
		X X	X X									
		X X	X X									
		X X	X X									
		X X	X X									
		X X	X X									
		X X	X X									
		X X	X X									

Wildlife Management Unit # ☐☐☐ (N N A) UTM BLOCK # ☐☐☐☐ (A A N N)

Cells Searched (circle): 1-1 1-2 1-3 1-4 2-1 2-2 2-3 2-4 3-1 3-2 3-3 3-4 4-1 4-2 4-3 4-4

		X X	X X									
		X X	X X									
		X X	X X									
		X X	X X									
		X X	X X									
		X X	X X									
		X X	X X									
		X X	X X									

AIRCRAFT CODES

(1) 2 seater fixed wing aircraft (e.g. Piper, Citabrea, etc.)
(2) 4 seater fixed wing aircraft (e.g. Cessna 172, Cessna 180, Cessna 185)
(3) Turbo Beaver
(4) Piston Beaver
(5) Otter
(6) Twin Otter
(7) 4 or 6 seater helicopter (e.g. Bell 206 Long Ranger)
(8) 2 seater helicopter (e.g. Robinson)
(9) Other (specify)

UTM COORDINATES

To identify the nest to the 100m point coordinate:

1. Identify the UTM block # (e.g., XE70)
2. Locate the 1 km^2 block. From the lower left-hand corner of the UTM (e.g., SW corner), there are ten blocjk numbers 0-9. From the same point are numbers 0-9 to the north. Thus a nest that was in the centre UTM 1km^2 block of XE70 would read XE7505.
3. Then use the same numbering methodology to estimate to the 100m point coordinate. If the nest is 30m west of the SW corner and 50m north, then the UTM coordinate would be XE753055.
4. The GIS applications used requre point locations to be accurate to the 1m. Spaces allocated on the data form allow for this.
   Note: use of easting and northing - fill in spaces from left to right and fill additional precision values with zeros.

HABITAT VALUE Bear den
Salt lick

SP. CODE
E - Eagle
O - Osprey
H - Heron
U - unknown

ADULTS SEEN: **Y** - Yes **N** - No

 # EGGS AND # YOUNG: For Heronries, estimate the total number for the entire colony

TREE CONDITION: **D** - Dead **T** - Dead at top **A** - Alive

YOUNG STAGE: (Bald Eagles only)
d - Downy (ligh grey in colour)
pf - Partly feathered (grey and black)
ff - Fully feathered (totally black)

NEST CONDITION:
nm - New material
nnm - Good with no new material
pf - Partly fallen
ag - Almost gone
g - Gone (for repeat surveys)

Eagles will often attend to nests but not lay in them. Nests frequented will often be free of debris and growing grass and will not usually be visible (as compared to nnm).

APPENDIX II

NATURAL HERITAGE
INFORMATION CENTRE
300 Water Street, 2nd Floor, North Tower
P.O. Box 7000, Peterborough, ON, K9J 8M5
(705) 755-2159 fax.(705) 755-2168

Rare Species Field Reporting Form

INSTRUCTIONS - PLEASE READ CAREFULLY:

1. **Important:** this form is to be COMPLETED BY THE PERSON WHO MADE THE OBSERVATION and is for reporting FIRST-HAND ON-SITE FIELD OBSERVATIONS; do NOT use this form to report second or third hand data from a letter, report, or conversation. Send us a copy of the letter, report, memo, etc. and we will process it in another manner.
2. Complete one form per species per site. Use a pen or dark pencil.
3. **Very Important:** attach a copy of the NTS or OBM topographic map indicating the location/boundary of the species. (see p.2).

SPECIES (scientific) NAME: _____

COMMON NAME: _____

OBSERVATION DATA: **LAST** observed: month:____ day:____yr.:____ **FIRST** observed: month:____day: ____yr.:____

Name of observer(s): _____ Telephone: ( ) _____ - _____

Address: _____ Fax: ( ) _____ - _____

_____Prov:_____ Postal Code: _____

Others knowledgeable about this occurrence (name, address, phone): _____

_____

LOCATION INFORMATION: **ELEVATION** (if known): _____ ft. / m (circle one)

SURVEY SITE NAME (local or place name for site) : _____

TOPOGRAPHIC MAP NAME: _____ TOPOGRAPHIC MAP NUMBER: _____

COUNTY(S) : _____

TOWNSHIP(S) : _____

DIRECTIONS TO THE OCCURRENCE : Describe in detail the **PRECISE LOCATION** of the species occurrence. Refer to nearby topographic landmarks and street names. Include distances and mileage whenever possible. Be clear and concise.

_____

_____

_____

_____

BIOLOGY : Total number of animals (adults, juveniles, nests, etc.) or plants (flowering, fruits, stems, etc.) observed:

_____

_____

_____

_____

_____

Photograph taken? **Y** **N** Specimen taken? **Y** **N** Collection #/ repository : _____

Identification problems? **Y** **N** Explain : _____

Quality of this occurrence : **Excellent** **Good** **Fair** **Poor** Explain : _____

_____

_____

SURVEY SITE INFORMATION:

Habitat/site description: (plant communities / dominants / associated species / other rare species / substrates / soils / aspect / slope) :

Overall quality of the site: **Excellent** **Good** **Fair** **Poor** Explain : _____

MANAGEMENT and PROTECTION:

Landowner(s) or manager(s) if known. Include name / address / phone : _____

Current Land Use : _____

Visible disturbance and possible threats : _____

Conservation / management needs : _____

Data security needed? **Y** **N** Explain : _____

***TOPOGRAPHIC MAP:** **(VERY IMPORTANT) - ATTACH** (staple) a **PHOTOCOPY** of the appropriate portion of the **TOPOGRAPHIC MAP** for area and indicate the precise location of each species occurrence. See the directions below :

1. If the size of the occurrence is very small, simply draw a **DOT** on the map indicating the location of the occurrence.
2. If the occurrence is large enough, draw a boundary (using a solid line) around the known extent of the occurrence.

HABITAT MAP: Draw a detailed **SKETCH** of the habitat showing fine details not shown on the topographic map. Indicate the **ROUTE** taken, **STREETS, LANDMARKS, DISTURBANCE, SCALE**, and **NORTH.** Use an additional sheet of paper if necessary.

IMPORTANT - PLEASE FILL OUT THE FOLLOWING:

FORM FILLED OUT BY : Date :_____ Name : _____

Affiliation : _____

Address : _____ Prov. _____ Postal Code _____

SUBMITTED BY: (if different from above) : _____