Field Methods for the Identification and Characterization of Wildland Conservation Corridors

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1997

Research Report No. 16
Ancient Forest Exploration & Research
Powassan and Toronto, Ontario

INTRODUCTION

To properly identify and characterize wildland corridors in northern temperate landscapes, research should be carried out to address a variety of questions that relate to corridor design, watersheds, old-growth forests, riparian forests, wetlands, natural disturbance, recreational features, cultural features, and forest sustainability. Due to the multidisciplinary nature of corridor studies, a variety of field methods must be employed to obtain required site information. This paper presents a number of broad or multi-year questions and their corresponding methodologies that need to be addressed in order to identify and characterize an eastern section of the Superior-Temagami Corridor (STC) in Temagami, Ontario. The STC crosses the Lake Temagami Site Region (LTSR) from Lake Superior to the Ottawa River.

BROAD OR MULTI-YEAR QUESTIONS

General Corridor Design

1. How wide should the STC be to provide representation for and to maintain the integrity of ecological, recreational and cultural features?
2. How many examples of each ecosystem type are required to maintain ecological representation in the face of unpredictable landscape changes (e.g. wildfire)?
3. What land-use management tools and designations are most appropriate for creating a protected conservation corridor?
4. How much information is required to make a convincing case for protection?

Watersheds

1. Where are the pristine watersheds located in the STC and what are the characteristics of human disturbance in those that are not pristine?
2. How do watershed boundaries relate to the ecological, recreational and cultural heritage features?

3. What is the baseline ecology of the pristine watersheds? (e.g. what are the relationships between tree species composition and nutrient loss in streams?)

Old-Growth Forests

1. Where is the remaining old-growth forest located?
2. What other types of old-growth forest are located in the STC area in addition to old-growth white and red pine (e.g. yellow birch, white cedar, jack pine)?
3. What is their baseline ecology? (e.g. what community types are there?; what are their habitat conditions?)
4. Are these other types of old growth rare?
5. Could these additional old-growth forests in the STC area provide representative value for the LTSR?

Riparian Forests

1. Where are the riparian forests located?
2. How does the riparian forest differ from the upland forest, if at all?
3. What types of riparian forest occur in the STC area?
4. Can these STC riparian forests provide representative value for the LTSR?

Wetlands

1. Where are the wetlands located?
2. What types are there?
3. Are they rare?
4. Can those in the STC area provide representative value for the LTSR?

Natural Disturbance

1. What types of natural disturbance occur in the STC area?
2. Where are these areas located?
3. What are the characteristics of these areas?
4. Are they representative of those within the larger LTSR?

Recreational Features

1. In addition to the long distance canoe tripping route that defines the central axis of the STC, what other recreational features are located in the STC area?
2. Which of these recreational features can provide a significant contribution of recreational needs in the region?

Cultural Features

1. What kinds of cultural activities have taken place in the STC area and where are they located?

2. Which of these locations contributes significantly to cultural heritage protection in the STC area?

Forest Sustainability

1. What influence does logging have on forest regeneration in the logged areas?
2. What influence does logging have on forest regeneration in adjacent, fragmented old-growth forests? Of particular concern are the shoreline reserves which are very long and narrow due to logging which has occurred very close to the shores of the lakes.
3. What influence does logging in combination with the mixture of ecosystems in a watershed have on the loss of terrestrial nutrients and an the increase of metal concentrations in streams?

METHODS

Qualitative Surveys

<u>Wetlands</u>

1. Wetland surveys should take place in wetlands identified on 1:20,000 topogaphic maps and Forest Resource Inventory Maps.
2. Either an enlarged photocopy or a sketch should identify the wetland area on the data sheet.
3. The size of the wetland should be estimated.
4. The portion of the wetland that is open water should be estimated.
5. The position of the water table should be recorded where possible. In some cases, this may involve digging down to find the water table.
6. A team should walk through the wetland identifying the different vegetation zones and marking their boundaries on the map.
7. Each vegetation zone should be described by dominant vegetation in both the overstory and the understory.
8. A plant species list for terrestrial and emergent plants should be produced for the entire wetland.
9. The wetland type should be determined according to the key and set of definitions supplied in the Northern Ontario Wetland Evaluation System (OMNR 1993).
10. Unique features and signs of wildlife should be recorded and their location noted on the map.

<u>Riparian Zones</u>

1. Riparian surveys should take place along the banks of streams and rivers identified on the 1:20,000 topographic maps.
2. Either an enlarged photocopy or a sketch should identify the riparian area on the data sheet.
3. One or two people should walk along the bank of the stream at a distance of 2 meters from the stream edge.
4. All vegetation zones along the stream should be identified, characterized and mapped.
5. The three most abundant plant species in both the overstory and the understory should be recorded for each vegetation zone.
6. A list of all plant species observed along the stream should also be compiled.

7. Unique features and signs of wildlife should also be noted and mapped.

<u>Old-Growth White and Red Pine Forest</u>

1. Potential unidentified old-growth white and red pine stands should be surveyed for old trees, snags and logs within 10 x 200 m plots.
2. The plot size was determined by estimating the length of timber cruises completed by the Ministry of Natural Resources for forest resource inventory information.
3. The beginning of the plot should be located at a random point along the longest axis of the stand. This point should be found by using both the Forest Resource Inventory Maps and the 1:20,000 topographic maps in the field.
4. Once the axis end has been located, the beginning of the plot should start at a random point between 10 m and 100 m from that axis end.
5. From the beginning of the plot, a 100 m line should be run through the stand on a compass bearing determined by the longest axis of the stand.
6. Each side of the plot centre out to a distance of 5 m should be inventoried by a team member for old trees, snags and logs.
7. Plots should be inventoried at 100 m intervals until the end of the stand is reached.

<u>Ancient Forest Confirmation and Characterization</u>

1. The boudaries between pristine landscapes and cutovers should be identified from logging records.
2. These boundaries should be located in the field and transects should be run on the pristine side of the boundary to confirm the pristine (ancient forest) condition.
3. An area 5 m either side of the transect should be scouted for signs of logging including stumps, logging roads and skidder trails.
4. To characterize the ancient forest landscape, a visual plot (an area defined by the limit of vision in a 360 degree radius) should be assessed every 100 m for the relative abundance of dominant overstory and understory species.

<u>Rare Plants</u>

1. Using existing botanical inventories for the Temagami Region (White 1990a, 1990b) (but not specifically including the study area), the presence of rare plants should addressed. They should be classified as provincially, regionally or locally rare.
2. The location of all rare plants should be recorded on plant survey cards and maps.

<u>Recreational Features</u>

1. Recreational features should be identified, described and evaluated.
2. These features should include existing and potential canoe tripping routes, campsites, portages, hiking trails, interpretive trails, mountain biking trails, etc.
3. All observations should be recorded on data sheets and maps.

Cultural Heritage Features

1. Cultural heritage features should be identified from any existing sources including all maps and personal correspondence with persons knowledgeable in this area.
2. A team should visit the location of the potential site and determine the nature of the site.
3. All observations should be recorded on data sheets and maps.

Quantitative Study Methods

Baseline Ecology Field Studies - Ecological impacts due to logging will be best understood only when we have a basic understanding of the unaltered or pristine ecosystem condition. Thus, ideally, basic descriptive studies of each ecosystem type (e.g. forests, lakes, streams and wetlands) occurring within the corridor area should be conducted. Work could begin with the upland forests.

a. Field sampling of the upland forests should be designed with respect to known environmental gradients (Harmon et al. 1983, Gillison and Brewer 1985, Phillips 1985, Ludwig and Cornelius 1987, DeVelice et al. 1988, Keddy 1991, Gosz 1992). "Gradients organize nature in such a way that such empirical relations among environmental conditions, distributions, and abundances of species, and traits of these species can be easily explored" (Keddy 1991, pg. 182). Quinby (1991) and Quinby et al. (1995) have shown that the most obvious landscape habitat feature reflecting community and productivity gradients at the local level in central Ontario is topography. Topographic gradients in this region are actually indirect indicators of complex habitat change in soil moisture, light conditions at the forest floor, microclimate and fire frequency. For example, a hilltop location would generally be characterized by low soil moisture, high light intensity at the forest floor, a warm microclimate and a high fire frequency.
b. Using forest stand composition maps, the major upland forest community types in the study area should be identified and mapped.
c. The following sampling design should be applied for data collection in upland forests.
  * Each upland forest community type should be sampled for vascular vegetation along a topographic gradient as an indicator of the variety of habitat conditions. Together, the following slope positions represent the topographic gradient: (1) hilltops/ridgetops, (2) upper slopes (north- and south-facing), (3) lower slopes (north- and south-facing), (4) valleys and (5) flats.
  * Overstory trees (10+ cm dbh - diameter at breast height) should be identified and measured within a 20 x 20 m randomly located plot representing a particular slope position.
  * Percent cover of all mid-story vegetation (>.5 m height and <10 cm dbh) should be determined by species within five 2.5 x 2.5 m sub-plots that should be located within the larger 20 x 20 m plot such that four are positioned in the corners and one is positioned in the centre.
  * All understory trees and shrubs (<.5 m height) and all other vascular plants will be assessed for % cover by species in fifteen 1 x 1 m quadrats that should be located along each side of the 20 x 20 m plot and down the middle.

* Snags within the 20 x 20 m plots that are greater than 10 cm dbh and taller than 2 m should be identified to species when possible, measured for dbh, assessed for decay class and assessed for woodpecker activity.
* Logs within the 20 x 20 m plots that have a minimum diameter of 15 cm at the large end and a minimum length of 1 m should be identified, measured for length, measured for diameter at each end and assessed for decay rank.
* Habitat conditions and other relevant information should be described and recorded for each sample plot (eg. exposed bedrock, slope, aspect, evidence of fire, etc.).

<u>Impact Ecology Field Studies</u>

a. Descriptive field studies can be designed to make comparisons using existing conditions. For example, the effects of logging on vegetation composition and plant diversity can be conducted by comparing samples taken in pristine forest with samples from adjacent logged areas.

b. Experimental field studies can also be designed to make comparisons between the effects of treatments and reference (or untreated) sites. To do this, it will be necessary to have both government and forest industry cooperation with respect to planning and executing differences in location, area and intensity of logging. Forest productivity, vegetation composition and plant species diversity issues can be addressed.

Rapid Exploration

In some cases, it may be most practical to first carefully scout areas where the landscape inventories of ecological and recreational features will be focussed. These areas, which will be assessed in more detail at a later date using the quantitative and qualitative methodologies, should be identified through reconnaissance which maximizes the amount of landscape covered, but which also minimizes the amount of data gathered in any one place.

Integrate Research Findings

The key steps in the forest management planning and design process for the LTSR should be identified and a good working relationship with those who manage the process should be established. Good examples of how results may improve forest sustainability should be developed and communicated, and help should be offered to integrate the results for improving forest biodiversity conservation.

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