DATA COLLECTION STANDARDS FOR THE INVENTORY of NATURAL HERITAGE COMPONENTS for an EIS

GUIDING PRINCIPLE

Knowledge about the features and function of natural areas is considered central to the assessment of the potential impacts of development.

BACKGROUND

A natural area is characterized by natural features and by ecological functions, and these are inter-connected. They form the basis for assessing the effects of a proposed development on an area and its adjacent lands. Establishment of "significance" (as in "significant woodland" in the Provincial Policy Statement) may be less clear until comparative evaluations are undertaken. Data from Ontario indicates that in landscapes with less than 30% natural cover all natural heritage features are important to regional biodiversity and watershed function. Comparative evaluations require extensive knowledge of regional ecosystems. Similar comparisons will be more difficult in isolated studies such as a site-specific EIS unless regional information is available.

Watershed and sub-basin studies establish a good baseline of information from which comparative evaluations can be made. The intention of data collection standards is to ensure that all new information collected for various studies, including EISs, uses a similar approach and format so that it may be entered into regional databases and compared with existing information. The size of the study area should not affect the ability to make comparative evaluations.

The initial consultation between the proponent and the Technical Review Team will establish whether a principle for development is acceptable, or unacceptable because of the high probability of negative impacts on natural heritage features. The Technical Review Team will make recommendations on the level of effort required to address the potential for impacts, and the specific elements of study that will be required for the EIS. The specific elements required for the EIS will be selected from a detailed list. Not all elements will need to be studied for all EIS's.

NATURAL HERITAGE ELEMENTS OF AN EIS:

Specific requirements for the natural heritage inventory and analysis of an EIS will vary depending on the size, type, location of the development and the natural feature that may experience negative impacts. The following guidelines indicate the features and level of information that may be required.

Assessment of Function:

An EIS may be required to take into account the following functions.

Ecological functions

(the natural processes, products or services that species and non-living environments provide or perform within or between ecosystems and landscapes). They include, but are not limited to the following:

habitat (provision of food, shelter and movement for species)
size
fragmentation
vegetation structure, density and diversity
connections and linkages
proximity to other areas
proximity to water

hydrological functions (hydrogeology, fluvial geomorphology and hydrology)
nutrient and energy cycling
succession and disturbance
reproduction and dispersal
landscape linkages
relationships between species and communities

Wetland Functions

(the biological, physical and socioeconomic interactions that occur in an environment because of the properties of the wetlands that are present). These may include, but not be limited to, the following:

ground water recharge and discharge
water storage and release
flood damage reduction
shoreline stabilization
sediment trapping
nutrient retention and removal
food chain support
habitat for fish and wildlife
attendant social and economic benefits

Natural heritage features and landscapes

Ecological functions and benefits include:

moderating climate
maintaining water cycles
providing habitat for all species
supplying oxygen and absorbing carbon dioxide

Benefits of importance to humans

contributing to healthy and productive landscapes
cleaning, conveying and storing water
improving air quality
preventing erosion
converting and storing atmospheric carbon
providing natural resources and green space for human activities
aesthetic and quality-of-life benefit

Natural Heritage Planning Componen:

Including the area under study, the EIS should take into account the following (if applicable):

natural heritage features (woodlands, wetlands, watercourses, etc)
adjacent sections of rivers and valleys;
linkages and corridors to natural areas;
information obtained from previous studies such as life science inventories;
environmental targets and recommendations in local policy; and
environmental management strategies and policies that may have been developed.

Vegetation communities survey

A survey of vegetation community types should be undertaken during the main growing season, preferably over three seasons, but otherwise during the period late May to July. Community description outlines may be qualitative, but should follow the Ecological Land Classification for

southern Ontario (Lee et al., 1998) to Vegetation Community Type, or contain an equivalent or greater level of structural and floristic detail. The report should present both a description of the communities and vegetation maps superimposed on an air photo or a base map of scale 1:5 000 that shows contours and water courses.

For each community type the following technical information should be included:

(i) A full list of vascular plant species present and an indication of their abundance.

(ii) An assessment of soil type(s), drainage regime and moisture regime.

(iii) An identification, where possible, of the Ecological Land Classification unit (Lee et al., 1998).

(iv) The element ranking for each ELC community types identified (Bakowsky, 1997).

(v) Calculation of the following floristic quality indicators (Oldham et al. 1996) by community: number of native species, number of non-native species, number of conservative species (conservatism coefficient >=7), mean conservatism coefficient and sum of weediness scores.

(vi) A summary of tree species, with age and/or size class distribution, including basal area by size class.

(vii) An annotated assessment of community condition based on the following broad criteria (adapted from Brownell and Larson, 1995) or equivalent:

A Excellent/Condition: nearly undisturbed, or nearly recovered from previous disturbance.

B Good Condition: recovering from earlier disturbance or from light levels of recent disturbance, but which, if properly managed, will recover to undisturbed condition.

C Fair Condition: in the early stages of recovery from disturbance, or altered in structure and composition such that the original vegetation of the site will never rejuvenate, but with proper management partial restoration is possible.

D Poor Condition: severely disturbed, structure and composition so altered that recovery to original condition will is unlikely even with proper management.

(viii) A summary of disturbance factors, including their intensity and extent.

(ix) Other indications of community condition including amount of decayed coarse woody debris.

(x) Where appropriate, community profile diagrams showing the relationship between the vegetation communities and topographic features.

Species with high conservation priority

Annotations on the population size, condition, and the significance of the site for all significant species should be included in the EIS.

Vascular Plants

Locations of globally, nationally, provincially and regionally rare vascular plant species should be mapped, and the extent of habitat for each species outlined. Recommendations should be made for additional protection of rare species.

Nationally rare species are listed in Pryer and Keddy (1990), and species with a global rank (G-rank) for G1 to G3 (Oldham, 1996, NHIC website).

Provincially rare species are those listed with a sub-national rank (S-rank) of S1 to S3 in Oldham (1996, Natural Heritage Information Centre (NHIC) website) and MNR species at risk in Ontario (Bowman, 1996).

Regional status for SW Ontario should be assessed from Oldham (1993) or from the best available information.

Fauna

Habitat, den sites, nesting areas and other locations should be mapped for significant fauna, where appropriate.

National, provincial and regionally rarity should be assessed from the best available information, including the following:

COSEWIC status reports;

MNR species at risk in Ontario (Bowman, 1996);

NHIC website for G-ranks and S-ranks for various faunal groups as follows:

Regional status should be assesses based on the best available information including provincial atlases and county lists eg:

Mammals (Dobbyn, 1994)

Breeding birds (Cadman et al., 1987) and current atlas updates

Butterflies (Holmes et al., 1991)

Herpetofauna (Weller, 1994)

Interior forest and area-sensitive species should be based on the best available information.

Priority birds species for each municipality should be determined from (Couturier, 1999, Bird Studies Canada website).

Aquatic communities and habitats survey

A survey of aquatic communities and habitats should be completed at the most appropriate times for sampling various species over the course of a year. The following technical information may include, but is not limited to the following:

1) Fisheries Inventory

seine, minnow traps and electrofishing sampling techniques

Index of Biotic Integrity (IBI) which is based on the ecological attributes of fish communities under three categories:

i) species richness and species composition (# native fish species; # darter species; # sunfish and bass species; # sucker and catfish species; # intolerant species; proportion of tolerant fish)

ii) trophic composition (proportion of omnivorous cyprinids; proportion of insectivorous cyprinids; proportion of piscivores)

iii) fish composition and abundance (proportion of diseased fish; catch per minute of sampling)

Habitat Assessment and Stream Inventory (include parameters found on all standard OMNR fish collection forms)(see also 3 below)

Target Habitat Suitability Index (THSI) are habitat models developed for specific target species. Habitat variables include: stream morphology; riparian habitat; in-stream cover; water temperature; in-stream flow.

2) Benthic Survey

qualitative and quantitative sampling of macro invertebrates

numeric taxonomic analysis (species richness and composition)

density

presence/absence of indicator taxa known to be sensitive or tolerant to stress and disturbance

EPT Index is the relative measure of diversity of pollution sensitive macro invertebrates

Water Quality Index (WQI) is the function of macro invertebrate densities and their tolerance to stress and disturbance

percent abundance of shredders which are sensitive to riparian zone degradation

Hydropsychidae/Trichoptera Index which measures the relative abundance of the generally mild pollution tolerant family Hydropsychidae to the total Trichoptera, most of which are less tolerant

percent contribution of the dominant taxa which include worms, mayflies, stoneflies, caddisflies, beetles, midges, snails and clams

3) Habitat Assessment and Stream Analysis

base flow (water velocity, stream order, water depth, stream width and bankfull width)

water chemistry (dissolved oxygen, temperature, pH, conductivity, water colour and transparency

substrates (texture, presence of aquatic vegetation, odours/discolouration of the sediments)

in-stream riparian cover (presence and extent) and shading

surrounding land uses

Breeding bird survey

A survey of breeding birds should be carried out during June to mid July. The following technical information should be included in the report:

(i) A full list of bird species present.

(ii) An annotated assessment of confirmed, probable or possible breeding birds and the number of territories.

(iii) Where appropriate, maps showing the location of nesting species and their habitat..

Other wildlife habitat

Other wildlife functions should be identified and assessed, and, where possible, mapped. Wildlife functions include, but are not limited to, waterfowl staging areas, fish spawning or nursery habitat, hepetofaunal breeding or hibernacula areas, areas that provide temporary shelter for migratory wildlife, areas that provide critical life cycle habitat, and wildlife corridors.

Corridors and linkages

Linkage with other sites. The EIS should assess the following linkage functions of the site:

Hydrological function (riparian areas, flood plains, valley lands, surface and ground water connections, recharge and discharge areas);

Degree of connection with natural areas (proximity, distance, intervening land use, corridors);

Linkage along the river corridor and the effect of stormwater management proposals on these;

Movement patterns of wildlife groups.

Assessment of linkage should take into account both linkage within the site and connections with other sites and include an evaluation of:

The natural areas and habitats linked (number of sites linked and site sizes and conditions);

Linkage habitat type (anthropogenic [e.g. utility corridor, hedgerow, plantation]; to natural community, river floodplain, etc)

Main cover type quality (e.g. from low [<40% forest cover or <50% thicket cover and native species <40% of total cover] to high [>60% forest or >75% thicket and >90% native cover]);

Width;

Length; and

Continuity (e.g. long gaps >100 m, or gaps containing roads or other barriers to gaps <30 m wide containing no barriers).

References

Argus, G.W. and K.M. Pryer, 1990. Rare vascular plants in Canada. Our natural heritage. Canadian Museum of Nature, Ottawa. 191 pp.

Bakowsky, W.D., 1997. Natural heritage resources inventory of Ontario: S-Ranks for communities in Site Regions 6 and 7. Ontario Natural Heritage Information Centre, Ministry of Natural Resources, Peterborough, Ontario. 11 pp.

Bowman, I. 1996. Species at risk in Ontario. Report of the rare, threatened and endangered task force. OMNR, Toronto, Ontario.

Cadman, M.D., P.F.J. Eagles and F.M. Helleiner (eds.) 1987. Atlas of the breeding birds of Ontario. University of Waterloo Press. 617 pp.

Committee on the Status of Endangered Wildlife in Canada (COSEWIC), 1996. Canadian species at risk. COSEWIC, Ottawa.

Committee on the Status of Species at Risk in Ontario (COSSARO), 1996. Ontario species at risk. COSSARO.

Dobyn, S. 1994. Ontario mammal atlas. Federation of Ontario Naturalists. 120 pp.

Lee, H., W.D. Bakowsky, J.L. Riley, J.M. Bowles, M. Puddister, P. Uhlig and S. McMurray, 1998. Ecological Land Classification for Southern Ontario: First Approximation and its App;ication. Ontario Ministry of Natural Resources Science, Southcentral Science Section, Science Development and Transfer Branch. SCSS Field Guide FG-02.

Oldham, M.J., 1993. Distribution and status of the vascular plants of Southwestern Ontario. Draft. Ontario Ministry of Natural Resources, Aylmer District. 150 pp.

Oldham, M.J., 1996. Natural heritage resources of Ontario: rare vascular plants. Natural Heritage Information Centre. Ministry of Natural Resources, Ontario. 53 pp.

Sutherland, D.A., 1994a. Natural heritage resources of Ontario: mammals. Natural Heritage Information Centre, Peterborough, Ontario. 8 pp.

Sutherland, D.A., 1994b. Natural Heritage Resources of Ontario: birds. Natural Heritage Information Centre, Peterborough, Ontario. 8 pp.

Sutherland, D.A., 1994c. Natural heritage resources of Ontario: butterflies. Natural Heritage Information Centre, Peterborough, Ontario. 14 pp.

Sutherland, D.A., 1994d. Natural heritage resources of Ontario: freshwater fishes. Natural Heritage Information Centre, Peterborough, Ontario. 14 pp.

White, D.J., E. Haber and C. Keddy, 1993. Invasive plants of natural habitats in Canada. Canadian Wildlife Service, Canadian Museum of Nature. 121 pp.