

TERMS OF REFERENCE FOR AN URBAN BIO-INVENTORY

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## A. INTRODUCTION

The Ministry of Environment, Lands and Parks recommends a bio-inventory assessment of a site when there is insufficient information available on an area or habitat to make appropriate recommendations:

- for layout design and prescriptions to best protect fish and wildlife habitat and sensitive ecosystems; and/or
- for compensation for permanent habitat loss or degradation associated with, or adjacent to, a proposed development.

The bio-inventory should document plant communities, aquatic and wildlife habitat values, aquatic and wildlife species presence, sensitive ecosystems and rare species, adjacent land use and threats, site stability and flood issues or other factors affecting lot layout and, where appropriate, potential habitat enhancement/protection opportunities.

To minimize controversy related to the biases and/or accuracy of the report produced, we recommend that the local government hire the consultant(s) and oversee the inventory work, but that the proponent pay the cost of this service.

## B. INVENTORY LEVELS

### Development Process Stage

The issue of what level of bio-inventory is needed at what stage in an urban development process requires some analysis, and is to some extent site specific. A detailed survey provides the greatest level of comfort when assessing whether a proposed rezoning – or development - is appropriate for a property, but this must be weighed against the cost of the investment when the rezoning or development may not be approved. At a minimum, enough data needs to be collected to be certain that the density and type of development being considered is appropriate for the site, whether the proposed layout conflicts with known environmental features, and if enough flexibility (of layout and density) exists to revamp a proposal if subsequent detailed inventory identifies additional sensitive features that need to be protected.

For example, a rezoning may be approved which shows greenspace for play fields on top of an existing wetland, and multi-family housing on a HT (rocky outcropping) sensitive ecosystem. If subsequent detailed inventory identifies high environmental values associated with those features, but the topography negates the revision of the layout to relocate the land use elsewhere, then conflict arises as to whether density (or “development potential”) is lost in order to protect the values or whether the environmental features must be compromised or lost.

As a minimum, we recommend that the site survey be done using the “Conservation Evaluation and Visual Inspection Forms”. This form is attached and is available from the Conservation Data Centre (CDC) (250) 356-0928.

### Parcel Size Criteria

- **sites under 2 hectares**, with limited known sensitive or complex issues: use existing inventory information from the local watershed atlas, bald eagle and heron inventories, FISS (see G. Aquatic Habitats and Species) and other available inventory sources;
- **sites over 2 hectares but under 5 hectares, OR** where the potential intensity of the development could destroy a sensitive ecosystem: carry out a **site quality survey** to help determine whether a more detailed inventory is needed;
- **sites over 5 hectares, OR** sites with known highly sensitive or complex issues or features: a detailed bio-inventory should be carried out.

### Site Quality Overview

#### Step One - What is the quality of the upland habitat?

- A site that has been *extensively modified* (e.g., recently logged or cleared) may need only limited assessments for terrestrial habitats and species, rare and endangered species and sensitive ecosystems. However, any remnant patches (e.g., older forests or trees, wetlands, rocky outcroppings) that show potential biological value should be inventoried or where local knowledge suggests those existing values may be at risk.
- A site that was originally farmed but has been idle for many years may have patches or extensive areas of rehabilitated terrestrial habitats (such as oldfield sites with numerous hawthorn and similar bushes); the potential for some rare and endangered species; and remnant sensitive ecosystems. Wetlands and channelized watercourses may have re-established good environmental values and should be inventoried.
- If the site is a re-development, the environmental values may range from extremely compromised, for paved and/or manicured properties, to extremely high, for old estates with basically undisturbed sensitive ecosystems or wildlife habitat patches. Design the inventory process accordingly.
- If the identified environmental features are going to be protected by return to Crown or equivalent protection, and human disturbance prevented during and after site development, a detailed bio-inventory of that feature is not necessary. However, if the final lot layout is unknown or sensitive habitats may be destroyed during development, a detailed inventory should be undertaken.

**Step Two** - Look for the presence of watercourses. Even ephemeral channels, which only carry water during storm events, should be noted and considered in aquatic habitat and stormwater assessments.

- **Check existing inventory information regarding fish presence:** If fish are known to be present in nearby reaches of the watercourse, no new fish inventory is necessary. Other aquatic and stream reach inventory information may still need to be collected if changes are anticipated to the watercourse or its hydrology.
- **If fish presence in the watercourse is not confirmed** and the developer wishes to have the site designated non-fish-bearing, extensive inventory will be needed to

- conclusively identify a watercourse as non-fishbearing. Refer to “G. Aquatic Habitats and Species” for further information.
- **Wetlands** need to be inventoried for all values (amphibians, plant communities, invertebrates, etc.), not just fish. Any proposals to alter wetlands to enhance fish habitat or for stormwater management need to consider all other values and the implications on those resources (such as sensitive ecosystems, plant communities, amphibian breeding sites, etc.).

### C. DATA COLLECTION AND REPORT COMPOSITION

**Bio-inventories are to be carried out by registered professional biologists or equally qualified personnel.**

A review of all existing records on the area, including historical and current aerial photographs and rare elements/plant communities/ecosystems likely to be present, should be conducted prior to the commencement of any field studies.

The contents of the bio-inventory report should include:

- names, qualifications and area of expertise for all personnel involved in fieldwork, analysis and reporting;
- background information on the surveyed area, including sources and people contacted, their affiliation and phone number;
- a description of the methodology, results and a discussion of potential impact and mitigation/compensation measures;
- collected field data including photo-documentation;
- study area maps indicating inventory collection sites, environmental elements and other features, such as watershed boundaries.

The bio-inventory report should provide, but not be limited to, summarized data including the following information:

1. vegetation – an overview of the various plant species and plant communities present, with particular emphasis on sensitive ecosystems and their characteristics (e.g., size, degree of degradation, location in relation to proposed development components, etc.);
2. wildlife - a list of species found, methods of assessment and expected/potential wildlife use;
3. threatened, rare and endangered species – any records of the area, potential species based on habitat and locale and survey results;
4. watercourse presence, fish distribution, other aquatics present/potential, as per wildlife section above;
5. adjacent land-use and potential impact on the development site - including review of environmentally sensitive area (ESA) status, agricultural and/or forest land reserve (ALR, FLR) status and local government zoning if appropriate;
6. a development impact assessment (see Section H) of the impact of the projected changes to the site’s hydrology and land use on the biological components present.

All field data forms should go back to the originating agency, for inclusion in future data base updates.

## Locators

Locators are required to ensure that all data collected is compatible with Environment, Lands and Parks' Geographical Information System (GIS). Locators must be in Universal Transverse Mercator (UTM) units (NAD 83), as well as latitude and longitude. There are Resource Inventory Committee (RIC) GPS standards to follow. Locators are required for the following data recorded during a bio-inventory and should be shown on the site plans and maps:

- threatened, rare and endangered species' capture or identification sites (including plants and plant communities). If the site is a polygon, this must be delineated and mapped;
- specific biological components identified (vegetation communities, wildlife sightings, etc.); raptors; threatened, rare or endangered birds; Section 34 birds' nest sites.

## Photos

Photos are to be provided for all nest/breeding sites, significant habitat features and all other plant communities. These should be referenced and indexed as necessary.

## Mapping

Mapping is to be completed for each bio-inventory. The following survey parameters are to be indicated on map sheets:

**Location Map** (e.g., 1:10,000 scale) – shows the property in relationship to easily identifiable landmarks and roads.

**Specific Maps** (1:5,000 scale or larger) - indicates the property overlaid on the most current cadastral map. To keep the map from being too 'busy', additional mapsheets or mylars should be provided. See Glossary of the BMP document for definitions.

The following information should be included:

1. contours at 1 metre intervals or as appropriate for the size of the development;
  2. survey data collection points and transects;
  3. appropriate roads and landmarks;
  4. major and rare plant communities and sensitive ecosystem polygons;
  5. raptor/heron nest/roost sites and other important wildlife features;
  6. wildlife species capture or identification sites (including major use areas for nesting, bedding, migration routes, etc.);
  7. threatened, rare or endangered species capture or observation sites;
  8. wetlands and watercourses including ditches and ephemeral streams;
  9. aquatic habitat features including fish distribution and obstructions;
  10. 'top of bank', and/or distance from the 'natural boundary', for the portions of the development that would be affected by setbacks and buffers; and
  11. potential or known threat sources (e.g., adjacent logging or property slated for intensive housing project).
- **Map Legend** – clear description of all symbols used on the map (e.g., reach break symbol), as per RIC standards.

## D. TERRESTRIAL HABITATS AND SPECIES

All upland field collection of data should follow criteria as outlined in “The Field Manual for Describing Terrestrial Ecosystems” - Land Management Handbook #25 (especially ‘Ground Inspection Form’) and the relevant standards from the series “Standard Components of British Columbia’s Biodiversity” (especially the “Species Inventory Fundamentals”) prepared by the RIC (see RIC website <http://srmwww.gov.bc.ca/risc/>). Certain components of bio-inventories do not yet have appropriate RIC or other MELP standards. Contact Jan Kirkby [(250) 387-0732] at the Conservation Data Centre <http://srmwww.gov.bc.ca/cdc/> for suggestions regarding other inventory systems.

### **Plant Communities**

One of the first steps in the bio-inventory is to map the various plant communities on site. This will allow the consulting team to focus their attention on those areas most likely to provide results. For forested communities, apply the Ministry of Forests’ Biogeoclimatic Ecosystem Classification, identifying each site series occurring in the area. The site series can then be correlated to the CDC rare plant community occurrences. For wetland and other **non-forested ecosystems**, provide a detailed description to allow plant community correlation at a later date. The CDC staff is available to help identify non-forested communities.

### **For all wildlife:**

A survey should be carried out to identify vertebrate species (present/not found) on the site.

- a survey should be conducted to locate all raptor or heron nest sites on or adjacent to the property;
- if not already included in the MELP bald eagle or heron inventories, contact planning and assessment staff for data forms;
- location and date-stamped photo-documentation is required of each nest site;
- once identified, heron nesting sites should not be disturbed during the nesting season (herons are very susceptible to disturbance during that time and have been known to permanently abandon a colony that has been established for many years);
- include other wildlife species that could reasonably be expected to occur on the site.

## E. RARE AND ENDANGERED SPECIES AND PLANT COMMUNITIES

Many aquatic and terrestrial habitats in Region 1 support threatened, rare or endangered (i.e., red-listed), and vulnerable (i.e., blue-listed) species and ecosystems. **The Conservation Data Centre (CDC) should be contacted prior to the initiation of any field surveys** (CDC website at <http://srmwww.gov.bc.ca/cdc/> or phone (250) 356-0928) **for information on what species and plant communities are now being ranked as 'rare' or 'uncommon' and for guidance on the surveys themselves.**

Areas with the potential to support red- and/or blue-listed mammal, bird, or invertebrate species should be assessed for the presence of those species, in the appropriate seasons. Every effort should be made to identify the species in the field. If voucher specimens are needed for ID or confirmation of a species in an area, please follow the RIC standards for Voucher Specimen Collection in "Standards for Components for BC's Biodiversity No. 4a and 4b". If you have questions about when and what type of voucher should be collected, please contact the Royal BC Museum.

## F. SENSITIVE ECOSYSTEMS (SEI)

An inventory of the sensitive terrestrial ecosystems in the eastern coastal lowlands of Vancouver Island and the adjacent Gulf Islands was carried out between 1993 and 1997 (SEI), through air-photo interpretation and field checking. The publications and results (which indicated that less than 8% of the study area is left relatively unmodified) are available at <http://srmwww.gov.bc.ca/cdc/sei>. Maps may be viewed at the local government offices, through planning and assessment staff at the Nanaimo MELP office or through the CDC in the Victoria MELP office.

Using the ecosystem description and data collection forms outlined in "Sensitive Ecosystems Inventory: East Vancouver Island and Gulf Islands 1993-1997. Volume 1: Methodology, Ecological Description and Results" and "Volume 2: Conservation Manual", as well as the "Guidelines for Site Conservation Evaluation" available through the CDC, all sensitive ecosystems, *regardless of size*, should be mapped and recorded.

## G. AQUATIC HABITATS AND SPECIES

### Freshwater resources

Biological values exist for all aquatic systems; from lakes to ephemeral streams, storm ditches to dug ponds and winter wetlands. Hence an assessment needs to start out by mapping **all channels**, wet or dry, which are components of the local drainage system if not already correctly located on large scale maps. Even isolated winter wetlands are components in the hydrologic regime for a site, as well as potentially supporting unique species (see F. Sensitive Ecosystems section).

### Marine coastal sites

Any proposals involving potential changes below the high tide line need to be referred to Fisheries and Oceans Canada, as well as British Columbia Assets and Land Corporation. Proposed changes to the nearshore habitats, or within 100 m of an estuary, should be included in this bio-inventory, as part of the "Terrestrial Habitats and Species" component.

- **Known fish and fish habitat information:** Check the local watershed atlases, *A Guide to the Streams of the East Coast of Vancouver Island* (MELP regional office), as well as the Fisheries Information Summary System (FISS) through the BC Fisheries website at <http://www.bcfisheries.gov.bc.ca/fishinfobc.html>.
- **If fish presence is not confirmed and the developer wishes to have the site designated non-fish-bearing extensive inventory will be needed to conclusively identify a watercourse as non-fishbearing.** See the Forest Practices Code Fish-stream Identification Guidebook (Revision2) <http://www.for.gov.bc.ca/tasb/legsregs/fpc/FPCGUIDE/Guidetoc.htm> for fish

Other useful references include the "*The Streamkeepers Manual: A Practical Guide to Stream and Wetland Care*" 1995 or "*Stream Habitat Inventory Mapping*" 2000 for watercourse surveys, depending on the level of detail required. Use the RIC standard: *Reconnaissance (1:20,000) Fish and Fish Habitat Inventory: Standards and Procedures* and the MOF/MELP *Fish Stream Identification Guide (Revision2)*. For fish presence/non-fishbearing studies see website at <http://www.for.gov.bc.ca/tasb/legsregs/fpc/FPCGUIDE/Guidetoc.htm>

- **Wetlands:** Detailed information on the various components of a wetland are needed, especially if the proposal involves draining, filling, changing the natural water levels through use for stormwater retention or as an aesthetic feature, or affecting the flow regime due to stormwater changes. The first stage is a detailed mapping and analysis of the watershed affecting the wetland, plus its winter boundary and area extent at peak storms (the topographical mapping is useful here). The bio-inventory should look at the following resources: water quality at various seasons, flow regimes, aquatic organisms (from fish to amphibians to Daphnia) plants and plant communities (all submergent, emergent, ephemeral and riparian communities) and soils. For recommendations about inventory methodology and forms, contact the CDC at <http://srmwww.gov.bc.ca/cdc/>.





Note: any proposed changes to any watercourse, including road or pipeline crossings, water storage structures, dredging, or instream works, are covered by the *Water Act*. Acceptance of this bio-inventory or other aspects of the development proposal does not preclude the need to apply for the appropriate *Water Act* approval. This process takes time, so allow adequate lead-time. (Nor does an approval under the *Water Act* constitute an acceptance of other aspects of a development, such as lot layout.) If the watercourse is fish bearing or fish resources are present downstream, contact Fisheries and Oceans Canada to determine if alteration of fish habitat may occur.

## H. DEVELOPMENT IMPACT ASSESSMENT

The development impact assessment should detail how the environmental features will be protected, and any risks from the proposed layout or from the cumulative effects of this development combined with other developments in the watershed, including hydrologic changes. An analysis of the impact of the proposed development upon the habitat present on the site should include (but not necessarily be limited to) the following points:

### **Area**

- Is this site in a natural state (naturally vegetated vs. cleared)? Are there significant trees or treed areas?
- Are there signs of instability (steep slopes, slumping, windthrow) that could be aggravated by the development?
- Is there sufficient area of land outside of the identified biological features for a reasonable building envelope on each proposed lot? (“Reasonable” as determined by site constraints, average size/footprint of buildings and setbacks, with room for normal “yard” activities)?
- Do the species at risk require a buffer to maintain their use of a site; and if so, how large? Is the site large enough to accommodate our recommended buffers with the development as proposed?

### **Site Constraints**

- Are there significant constraints posed by topography, other environmental features or rights-of-way on the developable portion of the site?
- Have options been explored that would locate proposed structure(s) away from the sensitive area or provide for alternative layout options and /or design structures that adapt to the need for habitat protection?
- If development is proposed to the edge of the recommended buffer, have fencing or other exclusion techniques been explored?

For further information please contact:

Ministry of Environment, Lands and Parks  
Planning and Assessment  
Vancouver Island Region  
2080-A Labieux Rd  
Nanaimo BC V9T 6J9  
Telephone: (250) 751-3100



<b>% Fragmentation</b>				
<input type="checkbox"/> UNFRAGMENTED (< 5% of polygon) <input type="checkbox"/> PARTLY FRAGMENTED (5 - 25 % of polygon) <input type="checkbox"/> HIGHLY FRAGMENTED (> 25% of polygon)				
<b>DISTURBANCE HISTORY (ANTHROPOGENIC)</b>				
<input type="checkbox"/> LOGGING	<input type="checkbox"/> GRAZING	<input type="checkbox"/> AGRICULTURE		
<input type="checkbox"/> CONSTRUCTION	<input type="checkbox"/> RECREATION	<input type="checkbox"/> OTHER		
<b>DISTURBANCE HISTORY (NATURAL)</b>				
<input type="checkbox"/> FIRE	<input type="checkbox"/> WINDTHROW	<input type="checkbox"/> DISEASE		
<input type="checkbox"/> WILDLIFE USE	<input type="checkbox"/> EROSION	<input type="checkbox"/> OTHER		
<b>ADJACENT LAND USE:</b>				
<b>KNOWN THREATS:</b>				
<b>OTHER FACTORS:</b>				
<b>EVALUATION SUMMARY:</b>				
QUALITY	<input type="checkbox"/> EXCELLENT	<input type="checkbox"/> GOOD	<input type="checkbox"/> MARGINAL	<input type="checkbox"/> POOR
CONDITION	<input type="checkbox"/> EXCELLENT	<input type="checkbox"/> GOOD	<input type="checkbox"/> MARGINAL	<input type="checkbox"/> POOR
VIABILITY	<input type="checkbox"/> EXCELLENT	<input type="checkbox"/> GOOD	<input type="checkbox"/> MARGINAL	<input type="checkbox"/> POOR
DEFENSIBILITY	<input type="checkbox"/> EXCELLENT	<input type="checkbox"/> GOOD	<input type="checkbox"/> MARGINAL	<input type="checkbox"/> POOR
<b>NOTES (site diagram, exposure, gleying, etc.)</b>				