Landscape and Watershed Units and Criteria for Use in EBM Planning on the Central and North Coast:

Subcommittee Recommendations for the EBM Working Group

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Disclaimer

This report was commissioned by the Ecosystem-Based Management Working Group (EBM WG) to provide information to support full implementation of EBM. The conclusions and recommendations in this report are exclusively the authors', and may not reflect the values and opinions of EBM WG members.

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Assigned Tasks for the Subcommittee:

In the summer of 2007, Land Use Objectives were finalized by Provincial and First Nations Governments in a Ministerial Order for the South Central Coast. A similar Order is currently in draft for the North Central / North Coast. These Ministerial Orders reflect goals and objectives of both governments, using the EBM Handbook and Hydroriparian Planning Guides for guidance. The Land Use Objectives are currently being localized, as provided in the Orders, through a Detailed Strategic Planning Process, being led by First Nations within their respective territories.

At the same time, the Coast Forest Conservation Initiative (CFCI) group of companies, together with the Rainforest Solutions Project (RSP) group of ENGO's are exploring alternate approaches to watershed / landscape unit planning that address representation and allocation of risk consistent with approaches suggested in the EBM Handbook.

To support implementation of EBM going forward from the emerging Land Use Objectives and other work, the EBM working group tasked this subcommittee to develop recommendations on a consistent approach to defining watershed and landscape planning units to support the ability to integrate targets and objectives at a range of scales across the Coast.

Specifically the subcommittee undertook to develop recommendations for:

1. Designation of watershed planning to accommodate application of Land Use Objectives from the Ministerial Orders (final and draft) for: Fisheries Sensitive Watersheds, and Upland Streams.

2. Designations of landscape unit planning that will:
    1. Integrate with planning at watershed scales,
    2. Accommodate landscape level LU objectives from Ministerial Orders, First Nations planning objectives and requirements, and other existing administrative units, objectives and requirements.

Background:

The original exploration of EBM planning on the BC Coast through the EBM Handbook (EBMH) and Hydroriparian Planning Guide, suggested a hierarchy of planning units from Subregion, to Landscape, to Watershed, to Site level. As First Nations and Provincial governments further explored these planning levels, it became clear that between the Landscape and the Site levels there were several categories of objectives and targets flowing out of the EBMH – one set may be characterized as hydrologic-watershed based, while another set was mostly focused on conservation of biodiversity and habitat objectives. Several EBMH targets suggested both hydrology-based and conservation/habitat drivers between the Landscape and Site scales. This mix of intent created the idea that between the Landscape and Site levels there may exist (in some cases) two potential planning units – a hydrology-based watershed unit, and a biodiversity/habitat-based sub-landscape unit.

The direction in the EBMH evolved through the First Nations and Provincial government to government discussions to be expressed in a suite of Land Use Objectives found in several Ministerial Orders. These are considered to be a major step toward completing the picture of EBM on the Coast, but not necessarily the final vision. In this step, EBM targets and objectives from the EBMH were considered, but often expressed in different ways, with a focus for management at the Landscape, Hydrologic Watershed, and Site levels.

The role of the Sub-landscape based on the Ministerial Orders (Final for the south and Draft in the North) is not clear. However, future evolution of thinking around planning for a range of EBM objectives may suggest a role for sub-landscape units. An example of this is the independent CFCI and RSP exploration of representation and risk allocation for conservation of biodiversity. With this in mind, the subcommittee wished to focus on recommendations for Landscape Units and Hydrologic Watersheds, recognizing the potential for a Sublandscape unit in the future.

Landscape units typically partition the region based on ecological objectives and boundaries. Hydrologic-watersheds are defined using a hierarchy of hydrologic boundaries that do not neatly partition the region or landscape. While they may found within Landscape units, Hydrologic Watershed units are not determined by partitioning landscape units, and therefore may not integrate perfectly across those scales for some objectives or targets. If there is a need to partition Landscape units, either to plan for targets or to analyze outputs, then sub-landscape units may be required.

Hydrologic Watershed Units

Recommendations:

A) As an initial step for strategic level planning over the short term, refine Watershed Atlas (WSA) boundaries and coding, using the Corporate Watershed Base (CWB).

B) Using the CWB, divide primary hydrologic watersheds, through GIS application of CWB, into basins with a maximum size of 50,000 ha. Further divide these CWB watersheds into sub-drainages, with a size range of 1,000 ha to 5,000 ha, and an average of 3,000 ha.

C) Provide the results of (B) to each DSP process, to be refined based upon traditional/local knowledge and used for strategic analysis and planning. The results would also be provided, based on the actual physical characteristics of the watersheds, to operational implementation to allow also for refinement into smaller or larger units (i.e. <1000ha or >5000ha.) depending on basin characteristics, including, but not limited to:

- Stream channel type (e.g. alluvial, semi-alluvial, non-alluvial)
- Basin morphology
- Terrain stability (e.g. slope steepness and soil depth, occurrence of natural landslides etc.)
- Presence of lakes, wetlands and other large water storage areas.
- The amount and distribution of alpine or non-forest area.
- Elevation distribution (rain on snow events etc.)
- Distribution of aquatic/focal species habitat.

Discussion:

The Land Use Objectives from the Ministerial Orders for hydrologic-watersheds address:

- Sensitive (or Important Fisheries) watersheds, and
- Upland Streams

Note: while it not entirely clear to the subcommittee if the intent for upland streams, which links back to the Hydroriparian Planning Guide, is for both hydrologic and biodiversity objectives, the targets for upland streams seem to be most relevant to hydrologic-watershed units.

Operational planning will require a detailed set of criteria to delineate watershed units over time for these objectives. However, the Detailed Strategic Planning processes also require a consistent approach to designation of watershed units for strategic analysis and planning right now. Therefore, initial guidance for delineation of units within DSP planning processes will be based on what is available now, while guidance for operational planning will improve resolution of that product over time.

The Sensitive Watersheds defined in the Ministerial Orders find their origins in the Provincial Watershed Atlas. The 1:50,000 British Columbia Watershed Atlas (BC Watershed Atlas 50K) is a topologically structured digital representation of all aquatic-related features (streams, lakes, wetlands, obstructions, dams, etc. and associated annotation) existing on the 1187 federal 1:50,000 scale National Topographic System Map Series (NTS) that cover British Columbia. In addition to these features, the data set includes boundaries for all third-order and greater watersheds, stream network connectivity, a route system for streams, and a hierarchical watershed code associated with all waterbodies.

More recently, TRIM1 mapping facilitated the development of a Corporate Watershed Base (CWB). CWB is a watershed atlas that defines watersheds and provides an associated stream and lake network for water management and fisheries information. The CWB adds functionality to TRIM 1:20 000 digital topographic base map data for the entire Province of British Columbia in order to provide: An intelligent, connected feature-coded stream network essential for GIS analysis and presentation of hydrographic information for use in allocation decisions, planning processes and environmental monitoring; and associated watershed boundaries.

The identification of 3rd Order Watersheds is directly linked to the scale of the map that is being used. The BC Watershed Atlas (1:50,000) uses fewer streams, so often leaves large areas along the coast without watershed units (for example: face units along inlets and channels). The CWB creates more 3rd order watersheds, allowing for more flexibility in creating planning units and more accuracy in defining hydrologic watersheds. In this way the watersheds from the BC Watershed Atlas can be updated, although the watershed coding must be refined as well, using information from the CWB. Dave Leversee has started such a process and developed guidance on how it may be undertaken. The subcommittee endorsed this approach.

The minimum and maximum sizes for hydrologic-watershed recommended by the subcommittee are derived from a number of sources. First, Sensitive Watersheds in the Ministerial Orders range from 200 to 80,000 ha with a median of 4,000 ha. The HPG recommended planning based on sub-basins of 1000 to 3000 ha. Typically with a Coastal Watershed Assessment Procedure (CWAP) to guide operations, large watersheds over 50,000 are viewed as regional watersheds. These are generally subdivided down to sub-basins that normally range from 1000 to 5000 ha (with smaller and larger units occasionally delineated) using the hydrologic and geomorphic character of the watershed, and the associated sensitivities to disturbance.

Landscape Units and Sub-landscape units.

Recommendations:

Landscape Units:

A) Rationalize existing Provincial LU boundaries with the CWB (1:20,000).

B) Provide the results of (A) to each DSP process, for their consideration. They may be refined based upon traditional/local knowledge.

Cautions:

a. Splitting of existing LU's along administrative boundaries will increase the constraint of objectives and targets in the resulting smaller units if the targets and objectives are applied equally in both.

b. If numerous LU changes are made, it may become difficult to interpret analysis results to determine impacts on TFL's or TSA's.

c. The original ecological intent of LU designations should not be lost. If boundaries are adjusted through the DSP process, they should be cross-checked to ensure they still adequately facilitate the original ecological intent, as defined in the original Mid-Coast and North-Coast criteria for LU designation (copies of these documents should be provided to DSP teams).

Sub-landscape Units:

C) If sub-landscape units are employed in EBM-implementation planning, use CWB watersheds to delineate 'sub-landscape units' within each LU, in a size range of 1,000-20,000 ha, with an average of 5,000-10,000 ha. These sub-landscape units should be as consistent as possible with ecological boundaries.

D) Non-typical sub-landscape areas on the coast (islands, face-drainages etc) can either be appended to neighbouring hydrological watersheds, or (less frequently) lumped together, depending on the situation. These sub-landscape units should be as consistent as possible with ecological boundaries. For example, avoid grouping two watersheds with different valley-bottom variants in a single sub-landscape unit.

E) Small Islands without watersheds will be assigned to the nearest sub-landscape unit.

F) In general, larger sub-landscape units would be appropriate in areas with Glaciers or other Non-Forest areas, and smaller sub-landscape units would be appropriate for areas with small islands or other geographic considerations.

Discussion:

Landscape units (LU's) were defined by the Province to address objectives and targets for coarse filter conservation of biodiversity, such as: old growth management,

representation, patch size distribution and wildlife habitat. LU's were typically 15,000 ha to 30,000 ha units based on heights of land and other ecological criteria. Government administrative units, such as Timber Supply Area (TSA) boundaries, occasionally created awkward boundary adjustments. Yet, from an ecological perspective these existing units continued to make good sense to the Provincial and First Nations governments and therefore were used in designing a number of objectives in the Ministerial Orders, including:

- Old forest and mid-seral representation objectives using site series surrogates.
- Focal species.
- Blue-listed ecosystems

The subcommittee agreed that these existing Provincial Landscape Units made the most sense as the basis for EBM landscape planning, however, they should be adjusted to improve the accuracy of the ecologically derived boundaries using the CWB. There already are examples of LU's being adjusted in DSP processes to better facilitate First Nations planning for traditional uses. However, the subcommittee recognized that numerous changes to LU's present planning challenges (therefore the cautions included in the recommendations). Clearly, the original ecological intent for LU's should not be lost.