Adaptive Management Framework for the Central and North Coast of British Columbia

Research Priorities for Ecological Integrity

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Final Report
Prepared for the Ecosystem Based Management 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.

Introduction

This document lists questions that have a medium or high priority for research or monitoring in the Central and North Coast (i.e., low priority topics are not included). The questions were derived by applying the Prioritization Procedure[1] to the Knowledge Summary[2].

The questions presented below are organised in sections based on the objectives listed in the knowledge summary[3]. Each section identifies the objective, lists the indicators (derived from strategies) that influence achievement of the objectives, lists the priorities for different types of monitoring (implementation, effectiveness and validation) and finally lists the research and monitoring questions and provides a brief rationale for each. A complete list of the priorities for each indicator and objective—the direct output of the Prioritization Procedure—can be found in the companion spreadsheet (Coast Monitoring Priorities Dec 19.xls).

List of questions

Objective: maintain the natural diversity of species, ecosystems and seral stages

Indicator: % old forest per ecosystem type

High priority for effectiveness monitoring and validation monitoring (i.e. probability of success is low with low uncertainty for some ecosystems and high with high uncertainty for others). The remaining indicators have low priority for study.

This is the only indicator with some implementation data already compiled (Rachel's base case) and with clear targets.

1. What ecosystems—based on site series—are at risk?

This question requires an inventory comparing TEM and AU to determine whether harvesting has (if already harvested) or will (via plans) draw down particular site series within analysis units. It also requires an analysis of which of these ecosystems are and are not included within hydroriparian buffers.

2. How do ancient forests differ from "old" forests?

This question is basic research addressing a big uncertainty about the structure, composition and organisms in forests that are 180 years, 250 years and older than 1,000. We don't know how to determine stand age however (at least beyond the 300-year-old tree growing on a 300-year-old log)—developing methodology would also be important (e.g. sites less susceptible to wind or burning?).

[1] See the companion document: Guide to the Knowledge Summary and Prioritization Procedure.
[2] See the companion document: Knowledge Summary
[3] Objectives were originally derived from land use plans; the knowledge summary is only partially complete so priorities do not address all objectives.

3. How do sensitive species respond to low levels of retention?

This is a true effectiveness monitoring question that addresses the uncertainties in our curve. It would be very tricky to answer as we don't know which organisms are most sensitive—but could try marten and epiphytic lichens for a start.

4. How does natural disturbance change over time?

This is a long-term monitoring question that is needed to deal with uncertainty due to climate change as well as to improve our estimates of disturbance for different ecosystems. It requires a large area.

5. How will climate change affect soil and nutrient regimes?

This is a long-term monitoring question, but may be approached with preliminary data and models. Climate change may affect site series, with consequences for the effectiveness of ecosystem representation.

Objective: protect known red- and blue-listed and regionally rare ecosystems

Indicators: % known red- and blue-listed plant communities protected; % of known non-listed, naturally rare ecosystems protected

High priority for validation monitoring (i.e. uncertainty is high).

Inventory is not compiled—high priority for implementation monitoring. Targets exist for listed communities, but not for rare ecosystems.

1. How much of each rare ecosystem—by site series—is there?

This question requires an inventory of rare ecosystems. In particular, it can reduce uncertainty by documenting site series with the potential to become rare ecosystems over time (i.e. younger seral stages of listed plant communities). Answering this question will help determine which ecosystems are naturally rare and which are rare due to past harvest—and will help determine recruitment needs.

Objective: habitat for focal species

We couldn't determine priorities for this objective as work on the models is ongoing through Hannah's project.

Objective: retain forest structure and diversity at the stand level

Indicators: % of cutblock retained; % of retention within block

High priority for effectiveness monitoring (i.e. probability of success is low with low – moderate uncertainty).

Inventory is not compiled—high priority for implementation monitoring. Targets exist.

1. How much retention is left?

This question is essentially implementation monitoring to address uncertainty that although the targets are low, current practices may actually have a higher probability of success.

2. How much "excellent retention" is left?

This question determines the ecological value of the retention left as recorded—see Kremsater et al. background report for a description of "excellent retention". Note that validation monitoring for stand-level retention is not a high priority (i.e. studies of how organisms respond to different levels of retention). Although uncertainty remains about the effectiveness of different levels of retention, this area is better studied than most (although not for older stands), and hence a lower priority.

Objective: maintain a natural tree species mix

Indicators: % natural occurrence of each species in managed early seral forest

Unable to determine priority for study as no targets or current information exist. However, western redcedar and cottonwood may be species to consider. The indicator does not seem appropriate to address these questions—the redcedar and cottonwood concerns are likely best addressed under the % old forest representation objective.

Inventory is not compiled—high priority for implementation monitoring. No targets—high priority for planning.

Objective: maintain water quantity

Indicators: equivalent clearcut area per watershed

Low priority for important fisheries watersheds; moderate priority for other watersheds, primarily because no target, nor requirement for assessment, exists for these watersheds.

Inventory is not compiled—high priority for implementation monitoring. Targets only exist for important fisheries watersheds—moderate priority for planning.

1. How can ECA be refined for coastal BC

This is a large experimental question that would replicate studies completed in the US and determine specific sensitivities in coastal watersheds. This is a difficult undertaking and likely of lower priority than indicators relating to water quality.

Objective: maintain water quality

Indicators: % of active fluvial units reserved including buffer; % of potentially unstable terrain harvested; % of natural riparian forest around small steep streams with high potential for debris transport

High priority for effectiveness monitoring of active fluvial units in the South Central Coast because no buffer is protected, and activities are allowed on active fluvial units.

Inventory is not compiled—high priority for implementation monitoring of all indicators. Targets do not exist activities on unstable terrain or around small steep streams. There is no indicator relating to chronic sediment input from roads. High priority for planning.

1. What is the impact of activities on unbuffered active fluvial units

This is a long-term monitoring project looking at streambank stability, channel movement and sediment input, focussed on the South Central Coast, where fluvial units are unbuffered.

2. How much activity occurs on Class IV terrain and around small steep streams with high potential for debris transport?

This is an implementation monitoring project determining the extent of the issue.

3. What are the impacts of these activities?

These are long-term monitoring projects looking at slope failures and downstream impacts—study in especially wet seasons will help reduce uncertainty in relation to climate change.

4. How much blowdown occurs in buffers?

This could be an experimental project, or monitoring project, to determine the extent of the issue. Detailed investigation could reduce uncertainty about which buffers are likely to be windfirm.

5. How does stream morphology change over time?

This is a big project—potentially comparing watersheds with different morphology and different levels of harvesting activity. It would essentially be a replicated version of Carnation Creek.

Objective: maintain hydroriparian biodiversity and productivity

Indicators: % reduction in natural riparian forest in buffer around each ecosystem

Priorities vary among ecosystem type depending on their sensitivity and whether a target exists. High priorities for karst ecosystems, small steep streams, estuaries in the South Central Coast; moderate priorities for other streams, ocean spray forest, bogs and fens.

Inventory is not compiled—high priority for implementation monitoring. Targets exist for estuaries, floodplains, fans, large fish-bearing streams and forested swamps, but not for other hydroriparian ecosystems.

1. How much activity occurs on karst ecosystems, next to small steep streams and in other ecosystems without a target?

This is an implementation monitoring project determining the extent of the issue.

2. How much blowdown occurs in buffers?

See above section.

3. What is the extent of the hydroriparian ecosystem?

This is an inventory project that determines how far the influence of water on land and land on water extends around different hydroriparian ecosystems. It would reduce uncertainty associated with using a fixed-width buffer by delineating the range of variability.

4. How do activities in, and adjacent to, buffers affect the organisms that use these buffers?

This is a huge experimental undertaking. John Richardson's group (amongst others) has been studying this question (there is a vast literature)—but many questions remain. The effects of partial harvesting in productive floodplains, in particular, are difficult to study, but important to management. The importance of buffers around small streams is also understudied.

Objective: maintain high-value fish habitat

Indicators: % natural riparian forest around high-value fish habitat; % of watershed harvested in small watersheds

Both indicators have moderate priorities for study to reduce uncertainty.

Inventory is not compiled—high priority for implementation monitoring. Targets exist for specific high-value fish habitat, but not for activities in small watersheds.

1. Are there habitats that have high value for fish that are not included in the definition?

This is an implementation monitoring project reducing uncertainty about the definition.

2. What is the level of cut in small watersheds.

This is an implementation monitoring project determining the extent of the issue. It could be followed up by a study that investigates the effects of high levels of harvest if necessary.

Objective: maintain hydroriparian connectivity

Indicators: % of streams with natural cover along their entire length

This indicator has moderate priority for study to reduce uncertainty.

Inventory is not compiled—high priority for implementation monitoring. There is no target.

1. How many connected streams are there in watersheds with different levels of activity?

This is an implementation monitoring project determining the extent of the issue. Actually investigating the importance of connectivity would be very difficult if not impossible at this scale.