



Handbook Team Response to Final Review Comments.

Prepared by Dan Cardinal, February 22, 2004

Alton Harestad – Peer Reviewer

Major Comments

Comment: The reviewer suggests that the Handbook does not maintain a clear commitment to the priority of maintaining ecological sustainability. Two key comments on this issue include:

- There are ecological limits (i.e. to species productivity and forest productivity) which define the domain within which management activities can operate. Activities to support human well being must be such that they keep the system within these boundaries. If these limits are treated as boundaries that can be transgressed depending on the magnitude of human need then the central principle of sustainability may be compromised.
- In Table 7.3, the priority between the two goals of EBM (p. 5, Table 2.1) is finally revealed. However, the principle of sustainability is not clearly expressed in this table. If there are going to be trade-offs that result in unsustainable activities then can you call it “Ecosystem-Based Management”?

Response: The commitment to ecological sustainability in the EBM Handbook is captured by the statement on page 5: “The goal to maintain ecological integrity defines an overarching context for achieving high levels of human well-being, primarily because it implies a commitment to sustainable, cautious resource use.”

However, this commitment is not repeated *ad nauseum* because we did not feel it necessary to beat people over the head with this dictum. Rather, we chose to weave the idea explicitly into a risk-based approach to maintaining ecological integrity, which focuses on achieving precautionary management at broader scales, while allowing for greater operational flexibility via a wider range of management targets at lower scales. This approach embraces the often significant uncertainties inherent in trying to identify ecological limits, and also recognizes that it is impossible to operate within those limits everywhere, at all scales, all the time.

Additionally, in developing the Handbook’s institutional elements (i.e. the troubleshooting section) we have, as described by Jack Ruitenbeek, “. . . drawn on evidence elsewhere that at times this position is untenable because of the dynamics of human-ecosystem interactions. If people are ignored while ecosystems are protected, political and institutional mechanisms will prevail in a way that people will eventually get taken care of: this is not a prescriptive statement, it is a descriptive statement. The interim steps are sometimes painful, manifest through political unrest, roadblocks, and deliberate ecosystem destruction or vandalism to draw attention to human problems . . . Nobody can rightfully say that these are 'sustainable' circumstances. In this case, you need to take care of human needs if you have any hope of looking after the ecosystem requirements as well. This is still, patently, ‘Ecosystem Based Management’”



In short, we have explicitly embraced the priority of ecological sustainability, while recognizing the technical uncertainties, practical difficulties and institutional realities involved in trying to achieve this goal.

Comment: The term “precautionary principle” is used incorrectly and should be clarified. The precautionary principle and precautionary approach are different concepts which have quite different implications to managers.

Response: We are aware of the distinction between the precautionary principle and the precautionary approach as they are characterized in the scientific literature. The only reference to the precautionary principle in the Handbook is in section 2.2, which paraphrases the guiding principles agreed to by all parties involved in the Central Coast Agreement and in the development of the EBM Framework. The Handbook builds on agreement to this principle by developing an approach which seeks to implement workable provisions of the precautionary principle (i.e. proponents wishing to manage to higher risk targets must undertake additional assessments, due diligence and commitments to adaptive management) as well as engage workable elements of a precautionary approach (i.e. identifying RONV benchmarks, establishing low risk “precautionary” management targets, etc.). Those interested in the more technical aspects of this approach can refer to the Compendium, which references the use of statistical power analysis, bayesian inference and other techniques for dealing with uncertainty.

Minor Comments

Comment: The definition of EBM on pages iii and 4 is not quite the same as that on p. 66 in the glossary. A definition should be the same in both places and across the various reports for that matter.

Response: Agreed. We have revised the definition for consistency.

Comment: Section 2.5.1 (p. 5) should be expanded to include management and contribution of the matrix along with the protected areas and reserves. The way it reads now is that protected areas and reserves are the primary (almost only) tool to meet conservation goals.

Response: We note that bullet 4 in the first paragraph explicitly refers to maintaining biological legacies in the matrix. This is further developed in the last bullet of this section which discusses how this can be accomplished through planning for stand-level retention. Regardless, we have extended the word “maintaining” to include “managing and where necessary restoring” and made other revisions to make this commitment clearer.

Comment: The reviewer does not understand why ecological risk (as portrayed in Figure 2.3) must always increase with increasing size of scale and why management flexibility increases with decreasing size of scale. Management flexibility is a product of ecological context and current state. It is not clear how this diagram was derived.

Response: We note that the diagram explicitly states that it is not “ecological risk” that increases with increasing size of scale, but “ecological risk constraint”, which is (an apparently unclear) attempt to describe that management becomes less flexible and more cautious overall at broader scales. To make this clearer we have changed “Increasing ecological risk constraint” to “Increasing management constraint”, and revised the explanatory text.



Comment: Why is “Environmental risk” listed in Table 3.3 but not ecological integrity or ecological values? Surely ecological values should be listed as is cultural heritage. Environmental risk should be listed because it is not one of the planning values but it is one of the decision considerations.

Response: Agreed. We have changed “Environmental risk” to “Ecological values and risks”.

Comment: 7.3 on page 59 deals with trade-offs. This vulnerability framework does not explicitly deal with issues of scale. It seems to me that a particular hectare may have high ecological value but also may high value to human well being. This hectare may be ecologically important as some small scale but how important is it at a larger scale? Somehow scale should be incorporated into this framework.

Response: Yes, we agree that lack of reference to scale in section 7.3 is a problem. We have revised the text to indicate that trade-offs should only be made at smaller scales over shorter periods of time.

Comment: To understand Table 3.1, readers would benefit from an example of the different scales. Give a real life example of a “region” and a “territory/subregion” etc.

Response: Agreed. We have revised the text slightly.

Comment: Is the caption for Figure 3.4 correct? Should this read “Adaptive co-management cycle”?

Response: Agreed. We have revised the caption.

Comment: Why should passive adaptive management be implemented when ecological risk is high? (see second bullet under Passive Adaptive Management on page 23). Surely when the ecological risk is “unacceptably high” then you should either use “precautionary management” or “active adaptive management”? It seems that using best current knowledge may not be good enough. Hence, you should either use either precautionary management or invest the time and money to do active adaptive management.

Response: Agreed. We have shifted this bullet up to the precautionary management section.

Comment: The word “Adaptive” is missing from the phrase “Engage in Active and/or Active Co-management” in table 3.4. This would make the terminology consistent with p. 23.

Response: Agreed. We have made necessary changes.

Comment: Table 3.4 seems to be inconsistent if not opposite to the guidance offered with the 3 options on page 23. On page 23, the authors state Precautionary Management is best when the “ecological, cultural or social risks are considered unacceptable” but then on page 24 Table 3.4 Precautionary Management is recommended to be used when there is a low risk management target. Passive Adaptive Co-management should be used for Low Risk situations. Active Adaptive Co-management or Precautionary Management should be used for Moderate Risk Situations and if Active co-management is used then it can be at a larger scale. Active Adaptive Co-management or Precautionary Management should be used for High Risk Situations but if Active co-management is used then it must be at a small scale until new knowledge generated by truly adaptive management is available to inform management decision processes.



Response: The peer reviewer is misinterpreting the table. The column that refers to management targets refers not to the risk of the situation, but to the management targets that have been allocated to particular watersheds and landscapes. The table attempts to convey the relationship between the risk associated with the proposed management plans and the corresponding requirements for assessment, planning and adaptive co-management. Apparently the table does not do this clearly. We have revised the table and associated text in an effort to make this concept clearer.

Comment: In the second bullet under Key Characteristics on page 25 there is, again, a focus on Protected Areas and Reserves as the means to protect endangered and rare species and ecosystems and sustain populations of all native species. Protected Areas are important, but the management activities in the areas among these reserves are critical to the efficacy of the reserves and, for many species, sustain their populations even without reserves. This over reliance on Protected Areas and Reserves misses the substantive benefits of better management practices over the bulk of the land base. Perhaps this importance of the matrix is understood by the authors, but it is never stated absolutely and clearly. It should be dealt with as one of the underlying principles of resource/land management.

Response: We note that the third bullet refers to the need to develop cautious management targets for the unprotected landscapes, watersheds and sites; in other words, management of the matrix. We also note that sections 5 and 6 deal more exhaustively with the idea of matrix management through landscape, watershed and site planning. Regardless, we have revised bullets 2 and 3 to better reflect a balance between protected area planning and matrix management.

Comment: Why should “cautious targets” be developed as stated on page 25, third bullet? Yes, knowledge of natural ecological patterns and processes should be used to develop targets for management but the cautious part of it must be dealt with a risk management mechanism. Perhaps there should be a sixth bullet where a formal risk management mechanism is used to set cautious targets when sufficient information is not available.

Response: Cautious targets are developed because we ARE explicitly adopting a cumulative approach to risk management as described in section 2.5.5. Section 4 deals with the broadest level of planning – territories and subregions – which is also the scale at which management targets should be more cautious to ensure maintenance of ecological integrity overall in the planning area.

Comment: The last paragraph under section 5.1 on page 34 states that in “general landscape and watershed plans should not be implemented before high level planning is complete” and then refers to Section 7.2. The issues and flexibility addressed in Section 7.2 are critical to local communities. These issues are important enough to state again here, at least give a summary statement.

Response: We believe reference to section 7.2 is sufficient.

Comment: Where do the numbers in table 5.2 on page 38 come from? Are they scientifically or ecologically based? Are they the result of negotiations among managers and stakeholders to integrate/balance ecological and social values? A short paragraph stating the origin of the numbers is needed and would add greatly to the credibility of the document.



Response: Agreed. We have included a footnote at the beginning of tables 4.1, 5.1 and 6.1 which explains the source of the numbers.

Comment: The last bullet under Integrated Design on page 48 states, “Identify uncertainties and develop site-specific monitoring/research projects”. This statement taken literally implies that each stand will have some monitoring or research project because there will be uncertainties associated with each stand. Surely most of these projects would be conducted in a sample of site/stands and the results extrapolated to all similar sites.

Response: We assume people will be using a measure of common sense when reading and working with the Handbook. Regardless, we have changed the text slightly to address this comment.

Comment: The words “cash in on” on page 53 are the wrong words. Such wording plays into the hands of distrust which is a key issue in obtaining support for management initiatives. Use “enable” or “access”.

Response: Agreed. The sentence has been revised.

Comment: One very important issue not addressed in section 7.2 is “reasonable time line”. If the constraint is that “landscape and watershed plans should not be implemented before high level planning is complete”, then higher level planning must be done in a timely fashion. It cannot be left open ended. Otherwise this puts local communities at high risk and thus violating one of the core objectives of EBM as stated on p. 5. Resources to do the work and commitment to firm deadlines is paramount and need to be articulated in this planning framework. This is a key issue for both governments and stakeholders to understand.

Response: Our assumption is that interested readers will have some familiarity with the various planning processes referred to in the Handbook (e.g. LRMPs, SRMP, FSPs etc.), and with their proposed timeframes. Certainly, governments and stakeholders in the CIT region are painfully aware of the need to try and deliver planning more efficiently. But a general desire to accomplish this, or prescriptive statements to that effect in the Handbook, will not make it so. Experience clearly indicates planning is most inefficient when governance and institutional arrangements do not allow for necessary participation or examination and resolution of issues, whatever the planning scale.

Regardless, we have tried to sketch out some of the general parameters of how to achieve efficiency in planning by reinstating the key concept section called collaboration which appeared in earlier drafts of the Handbook.



Scott Slocombe

Major Comments

Comment: The reviewer made many comments which collectively focus on the lack of institutional and process material in the Handbook. He writes, for example:

- “What is missing from the Handbook (or background documents) is any review of the lessons, experience, general mechanisms even, of broad, regional, multi-party, multi-scale planning processes.”
- “On the other hand, the Handbook could usefully include explicit discussion of uncertainties in planning and decision-making processes, and perhaps in socioeconomic issues and questions which will surely intrude into decision and planning processes, e.g. in costs-benefit analysis, in determining stakeholders, in negotiation processes, in terms of income and gender and other equity contexts.”
- “The big question is how the scales and technical parts fit together into an EBM or planning process. The who and when and where. While the lists in Section 3.3 and examples in Sections 4-6 provide many lists of data used and analyses conducted, they don’t talk about timeframes, sequences, who was involved, how Tables were chosen, etc. Without this, the technical content is apt to confuse the reader, and cause them concern over non-technical dimensions of planning – especially if they haven’t considerable knowledge and experience of these kinds of processes.”
- “Beyond the applied literature there are approaches more explicitly emphasizing complex systems approaches, the interaction of socio-ecological and biophysical (sub) systems, approaches to fostering resilience and capacity in communities, and institutional dimensions of science and management, e.g. Berkes & Folke (1998); Berkes, et al. (2003); Gunderson & Holling (2002); Gunderson & Pritchard (2002); and Westley & Miller (2003). These approaches build consideration of whole system dynamics into the planning process, attend explicitly to institutional and process details, and try to draw on social and natural science more equally. They are strong on lessons from case-studies of what does and doesn’t work; and on understanding the interaction of connected biophysical and socio-economic which is weak (or at least not discussed explicitly and in detail) in the documents I have reviewed.”
- While the term “system” is in the Handbook glossary it is little used in the texts; hierarchy is referenced almost exclusively in a spatial scale context, and dynamics are largely limited to natural disturbance. It is true that systems approaches are not as “hard” natural science as the strictly ecological, hydrological and forestry science literature most often referenced. But it is also true that dimensions beyond the biophysical, and dynamics beyond the linear, are often mentioned in both documents. It is especially unfortunate given the concluding Section of the Handbook which certainly implies and draws on a more interdisciplinary, systems perspective. The following would be an excellent start with many useful ideas and lessons for EBM in the CIT: Berkes & Folke (1998); Berkes, et al. (2003); Gunderson & Holling (2002); Gunderson & Pritchard (2002); and Westley & Miller (2003).
- “Clearly the final form of the planning and management processes to implement EBM will be a government decision, but there is a good and large literature on what makes environmental governance, collaborative management, EBM processes, etc. work – and the CIT documents



do draw on specific BC coastal examples. What this means for the Handbook is that inclusion of process examples and best practices would be desirable and useful.”

He summarizes his comments on this topic by suggesting that the “Handbook isn’t very practical; too much is missing, and what’s there isn’t always interrelated and integrated well.”

Response: Our response to this is fourfold.

First, we agree that the collection of work produced by the CIT has a major gap with respect to the institutional elements of EBM. To fill that gap we recommended to various members of the Management Committee that the CIT should develop a socioeconomic/institutional counterpart to the Scientific Compendium that would reference much of the material referred to by Scott Slocombe. Work toward that end was undertaken under the auspices of the Gitga’at-Kitasoo Pilot, and the CIT did eventually hire consultants to provide socioeconomic input to the EBM working groups, but this work did not result in a stand alone document. We hope the institutional analysis currently being drafted will take up this task to some extent.

Second, in working to incorporate socioeconomic content into the Handbook, we reviewed and considered much of the reference material recommended by Slocombe, and, ironically, considered it beyond the scope of the Handbook and too conceptual and impractical for the Handbook’s intended audience and purpose. Jack Ruitenbeek and Shelagh Huston, in their initial contributions, provided a good deal of material drawn from many of the same references cited by Slocombe, and we did discuss developing a stand alone chapter within the Handbook that would deal with institutional issues. However, we rejected this idea on the basis that it would leave the document unbalanced and much too long. In the end we simply summarized the material and worked to distribute it as appropriate in the document.

Third, we have reviewed the Handbook in light of Slocombe’s remarks on this issue, and worked to reinstate some of the institutional and process material where appropriate and as time allowed.

Finally, we note that development of a coherent, integrated Handbook has been frustrated by many factors, not the least of which include: 1) various sections of the first draft were produced by 5 different authors, 2) socioeconomic and institutional expertise was contracted halfway through Handbook development and 3) background material relating to hydrosiparian planning was developed independently by a different working group. We take solace in the fact that our efforts to work around these problems have proven successful to the point that participants in the Central and North Coast LRMPs have adopted the Handbook as useful guidance in working to implement EBM.

Minor Comments

Comment: On page 6 there is reference to “reserves... but the land is not formally protected”. There may be a need to clarify whether that means unregulated or simply not protected in a park sense.

Response: Agreed. We have revised the text.

Comment: Table 2.3 providing examples of different levels of management direction would be clearer if all the examples related to, followed through, the same system characteristic.

Response: Agreed. We have revised the text.



Comment: In 2.5.6 vulnerability indicators should probably be disaggregated by gender, if possible, to allow identification and response to any differences.

Response: Agreed.

Comment: In Section 3.3.1, under the discussion of context assessments, I would favour explicit inclusion of at least the institutional, economic, and ecological context of the planning unit – even at the Territorial/Subregional level. On the next page, in the Institutional Analysis bullet point, capacity gaps could be added to those being identified.

Response: Agreed. We have revised the text.

Comment: It seems to me that in 3.4 on AM the identified conditions, especially the first two, are very narrow and restrictive. At the least, one of the goals of active AM is to develop new information and learning (to be sure, when the risks of exploring alternatives are not too high). Consequently I am not entirely convinced that AM is necessarily or always high risk (as indicated by Table 3.4).

Response: Interesting that this peer reviewer also misinterpreted table 3.4. Again, we have revised Table 3.4 and the accompanying text.

Comment: Sections 4 to 6 provide lists of example planning activities, guidelines, and products at Territory/Subregion, Landscape/Watershed, and Site/Stand levels. In general, the planning components, and guidelines, seem more developed for the upper level, and less so for the lower; and the socio-economic guidelines especially seem little developed (they are very general and nearly identical at all levels) – they would benefit from stronger development. Planning in these sections comes across as a very linear, technical exercise – it even says so at the start of the lower level planning sections (Watershed, Site/Stand), seemingly implying less participation and consultation there. While there are extensive lists of data and analysis steps there is very little clear and substantive about the process: leadership, participation, and timeframes: the how as opposed to the what. That may be a matter for later decisions, but some examples, if only from LRMPs and other northern processes, would make this stronger and clearer.

Response: Similar comments have been made by many others, and those comments have fallen equally for more prescription or less prescription. Reviewers with background in institutional analysis and dispute resolution suggest less technical emphasis and more process design; those from the biological realm suggest a more rational planning approach. Resource professionals tasked with delivering landscape, watershed and site plans suggest more technical procedure recommendations that limit consultation requirements at lower scales. First Nations want consultation, cooperative management and accommodation everywhere, all the time. We opted, in the end, to provide a core set of technically-oriented planning steps, coupled with a general recommendation that designs and final plans at all scales be negotiated among relevant parties. This approach is consistent with the idea that plan “integration” is a collaborative process of negotiation. We were reluctant to prescribe leadership, participation and timeframes with respect to collaboration and integration because these arrangements are actively being negotiated by First Nations, the provincial government and stakeholders.

However, having said the above, we have reinstated the key concept section on collaboration, and developed additional text as appropriate in other sections to better cover this issue.



Comment: The other major substantive concern raised by these sections, in relation to the Compendium, is the absence of any development of targets, thresholds, and scientific background beyond forestry, fish and wildlife in the region: they are notably absent for mining, and tourism and recreation, both of which are identified as elements in the Planning Guidelines. Hopefully the Socio-Economic CIT documents will allow parallel, related analyses for Well-being etc.

Response: The first bullet on page 2 explicitly states that “The issues, objectives, targets and indicators in sections 4 – 6 are not comprehensive . . . People working to implement EBM in different areas will need to work with domain experts to develop objectives, targets and indicators relevant to the issues at hand, particularly with respect to focal species, cultural values and socioeconomic issues.”

Regardless, to make this clearer we have included a similar caveat in sections 4, 5 and 6.

Comment: Section 7 seems a quite thoughtful discussion of several key issues and opportunities for transition to EBM. This is an important topic, and Reed (2003) would also provide much specific and general food for thought.

Comment: The handbook has no clear statement of the process key elements equivalent to Framework Section 5.1 of the Framework. Many of the components are mentioned in the Handbook 2.5.1 and elsewhere in 2, but they are scattered and it is harder to determine what’s most important. Both Framework and Handbook start off discussing EBM, but then begin referring to ecosystem-based planning, or EBM planning. It might be useful to add an explicit explanation and rationale for the difference. The Framework also includes a good institutional arrangements diagram (Figure 1) that might usefully be included in the Handbook.

Response: Agreed. We have reinstated the key concept section on collaboration, further developed the institution design section to include the diagram from the EBM Framework, and worked to reinstate other institutional and process-related material.

Gordon Butt

Specific Comments

Comment: The Handbook recommendation to “secure representation of all ecosystem types in protected areas” is central in EBM. It can be accomplished by appropriate design of protected areas, rather than by prescriptive and arbitrary rules set on a Subregional scale.

Response: It is unclear what the reviewer intended by this comment. The reviewer doesn’t specify which rules are prescriptive, or why they are arbitrary. We could assume he is referring to the old forest representation targets. If that is the case we note the Handbook provides plenty of flexibility in how such targets can be achieved through efficient design of protected areas, landscape reserves or stand level retention.

Comment: The Handbook recommendation to “Protect or reserve naturally occurring, regionally rare ecological features” is also an important objective in EBM. However, it is subject to interpretation regarding the definition of rare at a regional level. The determination of “regionally rare” should be based on a consensus of qualified specialists, and not subject to individual bias. At some point



in the process, the EBM committee should identify a process for evaluating regional rarity, if it differs from criteria used by CDC.

Response: Agreed. The need to develop threshold criteria for determining ecosystem rarity was discussed but never completed. A note has been inserted before the tables in sections 4, 5 and 6 that addresses the need to further refine recommended targets and develop additional targets relating to wildlife, focal species and socioeconomic and cultural objectives.

Comment: In the Handbook recommendation to “Maintain >97% of the natural riparian forest next to estuaries and in karst landscapes” the meaning of the word “next” is sufficiently vague, and at this point such vagueness is probably appropriate. As written, this will likely forego any logging on karst areas, based on the assumption that karst forest is regionally rare (and in which case such ecosystem units are covered under the above recommendation). This is another case of a blanket recommendation that fails to allow sufficient flexibility in managing at the local level. Is it really necessary to protect all karst forest? These vary in their extent and significance. In some cases, there may be an isolated outcrop of limestone with minor karstic effects. There are already BC management guidelines that allow an assessment of the significance of each karst occurrence, and contains recommendations for protection of values. A better approach would be to refer to existing guidelines, and recommend a review of any karst landscape exceeding a certain threshold area or significance.

Response: This comment should be directed to the authors of the Hydroriparian Planning Guide.

Comment: The recommendation to “Maintain > 90% of the natural riparian forest next to floodplains, fans, forested swamps and small steep streams/gullies with unique microclimate” is nearly unchanged from the previous version (“minimum of” is replaced by “>”), but the problem of inconsistency, conflict with other guidelines, and vagueness to the point of uselessness remains. If the intent is that 1.5 tree lengths on either side of these units, then this should be clarified. This is a broad, rigid recommendation. Will every forested swamp require a 1.5 TL buffer, even if it is small and insignificant? Is it necessary to require an additional 1.5 TL buffer around a large floodplain unit? More flexibility is needed to allow professional foresters to exercise discretion and judgment on the ground.

I believe that the reference to small steep streams/gullies with unique microclimate should be deleted. Since any small stream can have a “unique microclimate” (spray zones?) by some definition, does this mean that all small streams should have >90% forest retention? That would conflict with the next guideline exhorting us to maintain >70% of natural forest next to non-active fluvial units. The Scientific Basis for EBM suggests that spray zones may support “unique” [sic] plant communities, but if so these should be already protected under red, blue or non-listed plant community protection, or under hydroriparian rules.

Response: We have inserted footnotes to the tables in section 4 that include the HPG definition of riparian forests and also refer those interested in more detailed discussion of the hydroriparian management definitions and targets to the HPG. Careful reading of that document will reveal little overlap or conflict among HPG guidelines. Also note that this recommendation, like the majority of the management targets derived from the HPG, is an adaptive management trigger, not a management constraint. The reviewer should really direct this comment to the authors of the Hydroriparian Planning Guide.



Comment: The recommendation to “Maintain >70% of the natural riparian forest next to other aquatic ecosystems” extends the previous guideline that suggests minimum 90% retention on active fluvial units (floodplains and fans), which roughly correspond to **deposition** zone stream reaches.

By deduction, this guideline suggests that at least 70% of natural riparian forest next to **transport** and **source** zone stream reaches be reserved (since the Scientific Basis of EBM includes forest adjacent to source zone streams as riparian). Note however, that in Table 5.2 (landscape/watershed scale recommendations), there is a recommendation to maintain >30% of the same kind of forest. This means that for every landscape/watershed in which 40% of such riparian forest is reserved, an equal area must have 100% retention (to meet the 70% regional target). Most of what we are talking about consists of small source zone streams (far more prevalent than transport zone streams). These **do not warrant** such a high level of protection. A more appropriate regional target would be 30 to 50%. Since narrow riparian buffers are prone to blowdown, wide buffers are needed (as noted in the handbook). And since source zone streams have a high density, this will result in the reservation of large areas of common and ubiquitous hillslope forest. It will probably make logging unprofitable in many areas, since these source zone streams are so abundant. The recommendation as it stands is too restrictive, and is not warranted by the conservation importance of source zone riparian forest.

Additionally, the recommendation that all buffers be 1.5 tree lengths is too rigid. Where blowdown hazard is identified, I agree that wider buffers are likely to be more windfirm. But in protected locations, narrower buffers may be quite appropriate to protect hydroriparian processes in source zone streams.

Response: The subregional hydroriparian targets are consistent with the Handbook goal of implementing an overall precautionary approach at higher planning scales (i.e. 70% maintained at the subregional scale) while allowing greater flexibility at lower scales (i.e. 70% - 30% maintained in particular watersheds). Again, protected areas contribute to these calculations, as do riparian forests outside of the THLB.

The reviewer apparently disagrees with the assessment of the HPG working group that source zone streams, and by association source zone riparian forests, play a key role in the fluvial and ecological functioning of watersheds. The reviewer asserts source zone riparian forests do not warrant the recommended protection, but offers no information to support this claim. Nor does he provide any analysis to support the assertion that the recommendations will unduly limit access or increase logging costs.

Finally, we note that all hydroriparian management targets in the Handbook are derived from the HPG, and we defer detailed response on this comment to the authors of the Hydroriparian Planning Guide.

Comment: The recommendation to “Maintain > 70% of the natural old seral distribution in each ecosystem type” is unnecessarily restrictive and will create the unintended result of reserving common and ubiquitous ecosystem units (e.g.: circum-mesic forested units). In Clayoquot Sound, the scientific panel only 10 years ago suggested that a representation of 30% was appropriate. Even there, forest planners have learned that this requirement resulted in illogical decisions at the site level. A 70% representation is likely to lead to numerous instances where a forester is required to walk away from ideal logging opportunities amidst tracts of widespread circum-mesic redcedar- hemlock forest, which could be easily harvested with a low impact on non-timber resources. Such an arbitrary, armchair-driven guideline will frustrate the ability of foresters to



practice discretion and professional judgment on the ground. I strongly urge continued opposition to this guideline.

Response: First, we note that, unlike the CSSP recommendations for old seral maintenance which were a fixed percentage of the forested landbase in a watershed, the CIT target is 70% of the natural distribution, which according to initial natural disturbance regime analysis results in management targets ranging from 45 – 65%, depending on the ecosystem type in question.

Moreover, the Handbook approach also differs from the CSSP recommendations by including protected areas within the overall calculation of old growth representation. Thus, strategic designation of protected areas at the subregional planning scale will reduce representation requirements on the managed landbase.

We also note that the Handbook provides considerable spatial flexibility in how this overall subregional target can be met, allowing for management targets ranging from 30% to 70% of the natural distribution. According to initial disturbance regime analysis, this translates to a potential target range varying from 20% to 65% depending on the ecosystem type and planning area that is being managed.

Finally, we note that the target is not “armchair-driven” but based on review and synthesis of available, relevant scientific literature. Disagreement over the merits of 70% as a low risk threshold and precautionary management target should be directed toward review of the Scientific Compendium, not the Handbook.

Comment: The recommendation to “Protect or reserve 100% of known occurring red listed and other non-listed rare ecosystems” is appropriate, with the proviso that identification of non-listed rare ecosystems be subject to an open and balanced review.

Response: Yes, we agree with this comment.

Comment: The selection of 70% as a target for protecting or reserving known occurring blue listed ecosystems is rather arbitrary, and could equally be 50%. More importantly, however, this recommendation illustrates a fundamental inconsistency. The authors of the EBM handbook recommend representation of >70% of old seral for each ecosystem type, then go on to recommend representation of >70% of blue-listed ecosystems. Thus they are treating all ecosystem types the same as blue-listed ones. I think protecting of 70% of blue-listed ecosystem units makes much more sense than protecting 70% of common ecosystem units. Again, this underlines that the EBM handbook recommendations goes too far in protecting common ecosystems.

Response: We disagree that blue-listed and common ecosystems are treated the same – the requirement for representation of blue-listed ecosystems extends across scales from subregional down to watershed, whereas there is flexibility ranging from 30% to 70% in the application of the general representation target.

We do agree that further work is needed to refine the 70% old forest representation target for each ecosystem type. We discussed the need to develop a system for refining the generic 70% representation target, based on criteria such as ecosystem commonality, distribution in the THLB and non-THLB and other factors, but did not have time to complete this work. We have conveyed the need to do this to planning tables and have incorporated such a recommendation into the Handbook.



Comment: The Handbook includes the recommendation to “Protect, and where needed restore, critical habitats for red/blue listed and focal wildlife species (including corridors)” and the term “critical habitat” is defined in the EBM handbook, but it is highly qualitative and judgmental. There should be some clarification that we are talking about essential ecosystems or elements and not non-limiting habitat. In BC ‘critical habitat’ is not universally defined or standardized, and this may generate confusion.

I think the recommendation for protection of “limiting habitat” (definition used in IWMS) of red-listed species is appropriate (and anyway may be required under SARA). But is it necessary to stipulate that **all** critical habitat for **all** blue-listed and **all** focal species be protected? Consider the following recommendation concerning population objectives. It seems to me that if we set population objectives for blue-listed and focal species, it is not necessary to require that all critical habitats for all designated species be protected, but to allow a certain amount of flexibility.

Response: Many of the qualitative objectives and requirements in the Handbook emerge from considerable discussion among pre-Handbook Team working groups. This particular statement reflects consensus reached among participants that included provincial wildlife biologists; hence we are reluctant to change it without further discussion. We tend to agree further definition is required to clarify the intent, but lack of definition is a common problem with strategic policy documents, legislation, judicial decisions, and regulations (FRPA for example). No doubt precision in definition and understanding will evolve as coastal planning shifts from negotiation over zoning, goals and objectives, to implementation.

Comment: The recommendation to “Establish precautionary population objectives for red/blue listed and focal wildlife species based on assessment of habitat capability, suitability and carrying capacity” in theory is reasonable. However, except for some areas and some species, I suspect there is inadequate knowledge to set realistic population objectives. Given that we are going to be preserving a substantial portion of the coastal forest, is it really necessary to set population objectives for all blue-listed and all focal species? I agree that conservation biology supports the setting of objectives and monitoring for some species, but I don’t agree that it is necessary for all species in all areas. There should be some flexibility built in here. Again, the rule is too rigid.

Response: Yes, given the paucity of population distribution, abundance or demographic data in BC relating to wildlife, endangered, focal or otherwise, we agree a more reasonable approach is to set precautionary habitat supply objectives for endangered and focal species. We have revised the text accordingly.

Comment: The recommendation to “Maintain > 30% (watershed scale) or > 50% (landscape scale) to >70% (low risk) of the natural old seral distribution in each ecosystem type; maintain >70% average distribution across all landscapes” allows more flexibility at local scales, but the need to average >70% means that logging in one watershed will foreclose opportunities elsewhere in the landscape or region, regardless of the local conservation imperatives. The average target of 70% across all landscapes is too high, and should be modified to 40 or 50%. We already have >70% for blue listed ecosystems and 100% for red-listed ones, not to mention all the hydrosiparian, karst, critical habitat, corridors and other kinds of retention; why do we need such a high level of retention for common ecosystem units? Answer: we don’t.

Response: See above responses on the topic of flexibility, representation calculation, natural disturbance regime and representation analysis, spatial distribution of management targets, and



the basis of the 70% old forest representation target. And again we suggest the reviewer's arguments would carry greater weight if they were supported by something more than his opinion.

Comment: In the recommendation to “Maintain <50% of each ecosystem type in mid seral (landscape scale)”, setting 50% as the limit is rather arbitrary, and could be 70% (as it is in Clayoquot Sound). Arguably, we do want to limit the extent of mid-seral forest due to its low habitat and biodiversity values. But setting rigid limits at the landscape/watershed scale may result in restrictions that do not have a conservation benefit. Is it necessary to maintain this rule in a watershed of low inherent biodiversity values? It would be appropriate to allow more flexibility here.

Response: The 50% mid seral cap is derived from literature in the Scientific Compendium and in literature provided by provincial wildlife biologists (which we can supply to the reviewer if necessary). Review of that literature suggested 50% was in fact a relatively risky management target for many focal wildlife species (particularly bears). We did not have the resources or time to develop more refined targets for specific focal wildlife, and so settled on a general management target that met a reasonable standard of effectiveness. We agree development of species-specific mid seral management targets is needed, particularly for focal wildlife such as grizzly bears, and make recommendations to that effect in the final draft of the handbook. We note the North Coast LRMP has developed a precautionary mid seral management target of 17%, and a risk-managed mid seral cap of 50%

Comment: The reviewer suggests the recommendation to “In developed landscapes with >50% mid seral in the timber harvesting landbase, harvest or reserve managed stands to prevent excessive mid seral” is a more sensible style of recommendation. The intent is clear: to avoid the development of large areas of mid-seral forest, which we know has lower biodiversity and habitat values. The guideline addresses a scientifically based objective, but allows sufficient flexibility to allow professional foresters (and other specialists) to practice some discretion locally.

Response: It is interesting to note that in this comment the reviewer agrees that it is wise to avoid creation of mid seral, and does not object to a specification of 50% as being excessive, going so far as to comment that it is a “scientifically based objective”

Comment: The regional target for retention around transport and source zone streams is 70%. The watershed scale guideline of 30% is something that can be accommodated, but the regional target is unnecessarily restrictive. It also conflicts with other guidelines aimed at aquatic ecosystems.

Response: See above comments regarding lack of support for the reviewers' assertions. And again, we have attempted to adapt the HPG guidelines to conform more closely to the Handbook cumulative risk management approach. Note again that protected areas contribute to subregional targets. Note also that the final draft of the Handbook, at the watershed scale, now includes low risk hydriparian management targets, which are triggers for adaptive management, and high risk management caps.

Comment: The Handbook recommends creating small stream protection areas to include riparian corridors, but the scientific basis of EBM admitted that the utility of corridors as migration routes has not been well established. However, Richardson's research on small stream riparian ecology has supported the need to retain some forest cover on certain streams (e.g.: to maintain amphibian



populations). On balance, connecting two reserve areas with a riparian corridor may do some good, and probably should be part of the watershed level planning exercise. With all the other guidelines proposing drastic restrictions on riparian logging, I don't think this recommendation will make much difference.

Comment: The reviewer suggests that, without testing, it is difficult to know if the recommendation to “Design reserves to maintain representation of ecosystems that are rare in the landscape” will seriously impact harvesting opportunity, or if it will advance conservation goals. If an ecosystem is rare, then its protection in a reserve system should not create significant difficulties.

Response: We observe that this comment is based, like many other of the reviewer's arguments focusing on management targets, not on reference to a sound ecological rationale for changing recommended targets, but instead on personal opinion or cursory assessment of the potential negative economic and operational impacts of management target implementation. The author makes little or no reference to any research data or relevant scientific literature that supports use of different targets. With respect to adjustments to management targets for social or economic reasons, whether interim or long term, we note that such adjustments should be dealt with through a “troubleshooting” decision process, criteria for which are suggested in Section 7.5.

Comment: The recommendation to “Reserve all wetlands, active floodplains, active fluvial units and high value fish habitat including buffer” is a sweeping recommendation. All active fluvial units includes infrequently active fans that may not require full protection. Are all wetlands included, even if they are small and insignificant and not connected to fish habitat? Does this include road construction? Restricting roads across fans could isolate certain valleys. There are numerous methods of mitigating the impacts of roads on fans, and these can be employed if necessary. This recommendation should be clarified and moderated.

Response: We have inserted a footnote referring readers to the HPG for more detailed discussion of hydroriparian concepts. We defer response to this comment to the authors of the Hydroriparian Planning Guide. We also note, again, that this target is derived from the HPG and is an adaptive management trigger, not an absolute management constraint.

Comment: The recommendation to “Reserve riparian forest around streams in the transportation and deposition zones” conflicts with other objectives. This suggests full retention along transport zone streams, but other guidelines suggest that at a watershed level >30% retention would suffice. Again, these guidelines were developed independently from those developed for ecological representation. To be taken seriously, they must be integrated.

Response: This comment is difficult to respond to because the reviewer does not describe how the recommendation conflicts with other objectives. Note also that a footnote clearly states that all watershed scale aquatic ecosystem targets are precautionary guidelines that act as adaptive management triggers, not management targets. See also our comments above regarding perceived conflict among recommend HPG targets.

Comment: The recommendation to “Maintain >70% of the natural riparian forest in the source zone” is in direct conflict with the guideline under “Ecological Representation” exhorting us to maintain >30% (watershed) of natural riparian forest around remaining hydroriparian (presumably



meaning streams in transport and source zones). If this recommendation is intended at the landscape/watershed level, then it is excessively conservative. Such a draconian regulation would severely limit harvesting opportunity, but will retain a large area on hillslope forest of low conservation value. This is a significant problem in the EBM handbook as it stands. Although most of the text focuses on protection of rare, endangered, critical and riparian ecosystems, the rules have the effect of protecting the ubiquitous and common. A shift of emphasis is required for this to be a balanced document.

Response: Again, note that a footnote clearly states that all watershed scale aquatic ecosystem targets are precautionary guidelines that act as adaptive management triggers, not management caps. We have increased the profile of this footnote so readers will have a difficult time missing it.

Comment: With respect to the recommendation to “Maintain <20% (roaded) to 30% (unroaded) ECA”, any restriction on ECA should be based on the sensitivity of the watershed to harvesting-induced increases in peak flows, and ideally on a CWAP or similar watershed assessment. This is the problem inherent in all these broad recommendations; if they set explicit targets, then there is inadequate room for local flexibility, taking into consideration local conditions. Better to say that ECA limits should be based on an appropriate level of watershed assessment, rather than make such broad recommendations. ECA should of course be calculated on entire watershed area, as is the standard methodology for CWAPs in BC.

Response: The reviewer should become familiar with basic open channel hydraulics and stream morphology before commenting on the relevance of indicators for assessing watershed sensitivity. It is chronic increase in *bankfull* flow and sediment delivery, not increased *peak* flow, which has the most significant impact on channel stability and instream habitat. Arguably there are many factors influencing bankfull flow and sediment delivery, but ECA and level of source zone riparian forest cover provide useful surrogate indicators of watershed condition relative to those outputs. Monitoring of those indicators, coupled with stream flow monitoring, will yield useful data for understanding watershed sensitivity within particular hydrological subregions. With that in mind we, once again, note that the final draft of the Handbook has been revised to more clearly articulate that the HPG ECA numbers are triggers for adaptive management, not absolute management constraints.

Comment: I assume the recommendation “Detrimental site disturbance does not exceed 5% of the cutblock” does not include permanent access, and if so it should be stated. This is another blanket recommendation that will be reasonable in some areas, and not in others. Rather than propose such a rigid guideline, why not state that detrimental site disturbance should be minimized?

Response: Agreed. The final draft of the Handbook has been revised to clearly state that this target does not include permanent access. The 5% target is drawn from FPC guidebooks.

Comment: The reviewer disagrees with the use of rigid, blanket guidelines such as the recommendation to ensure “Permanent access structures do not exceed 7% of the cutblock area” Imagine a small block that straddles a mainline road. This could have a permanent access area exceeding 10 or 15%, but so what? Much more logical to suggest: “permanent access should be planned to minimize the area removed from productive forest land”.

Response: Agreed. The final draft of the Handbook has been revised to state “do not exceed 7% of cutblock area, on average.”



Comment: Regarding the recommendation “Harvest block shape and retention is informed by natural disturbance guidelines” provided the term “informed” remains qualitative and vague, this may not be a problem. However, if the interpretation is that the size and shape of blocks must conform to natural disturbance patterns, this is unacceptable. As has been emphasized in the Scientific Basis of EBM, much of the coastal forest experiences a fine-scale disturbance, with modal natural opening size probably well under .2 ha. It is not feasible to closely emulate the natural disturbance pattern in harvesting. Conservation objectives will be met through the dual approach of (1) setting aside a reserve network and (2) establishing in-block retention amounting to 15 to 70% of the original stand. Attempting to closely emulate natural disturbance would be excessive, undermining economic opportunity dramatically at little gain in conservation.

Response: The reviewer has interpreted use of the word “informed” correctly. But this comment does raise the issue that the recommendation refers to natural disturbance “guidelines” which have yet to be developed. We have revised this recommendation so that it refers to knowledge of local disturbance characteristics.

Concluding Comments

Comment: Unfortunately the most contentious points remain in the latest version of the EBM Handbook.

Paramount of these points is the requirement to achieve an average of 70% representation of ecosystem types at a sub-regional level. Since watershed levels of representation can vary from 30 to 70%, a logical average should be 50%. As it is now, if any watersheds are managed for only 30% retention, (as is allowed) other areas will require well over 70% representation to meet the landscape level and sub-regional averages. This will mean setting aside large areas of potentially low conservation (but high timber?) values. This numeric rigidity is simply not logical. Conservation goals will be better and more logically achieved by using accepted principles of conservation design, rather than by the establishment of arbitrary rules concocted in a boardroom.

Based on Interfor’s experience in Clayoquot Sound (where the Science Panel suggested a 30% representation), a 70% rule on a sub-regional scale may result in substantial and unnecessary reductions in harvesting opportunities. It will result in the imposition on illogical site-level decisions, and the fettering of professional practice at local scales.

Guidelines around hydroriparian buffers continue to be conflicting and confusing.

The guidelines suggest (point 4.1.3, Table A) maintaining >90% of natural riparian forest next to floodplains, fans, forested swamps and small steep streams/gullies with unique microclimate, averaged across a subregion. The restriction is relaxed at the landscape/watershed level to >50%. Aside from minor wording changes, the restriction remains the same. Despite criticism of the confusing and vague wording, it remains unclear and will depend on the definition of words such as ‘next’, ‘small’ and ‘steep’, as well as ‘unique’. The lack of clarity is worrisome.

This is in conflict with guidelines under the third element (aquatic ecosystems) at the landscape/watershed scale. Point 5.2.1 (Table A) states: “Reserve riparian forest around streams in the transportation and deposition zones.” The implication is 100% reserve along all non-source zones, apparently in conflict with the landscape/watershed guideline to maintain >30% of natural riparian forest around remaining hydroriparian ecosystems (i.e.: transport and source zones).



I believe the guidelines have not been carefully thought out, and should be reviewed in a more balanced and rational manner.

Furthermore, I think that the guideline to reserve >70% of source zone streams at the landscape/watershed level is too high, for reasons I have suggested earlier.

Response: These concluding comments highlight that this review is generally misdirected. Most of the comments relate to the validity of the risk thresholds and recommended numerical management targets in sections 4, 5 and 6. But those thresholds and management targets are not “arbitrary” or “concocted in a boardroom”, but instead are derived from the Scientific Compendium, the Hydroriparian Planning Guide, supporting literature and numerous discussions among people involved in various CIT EBM working groups, all of which involved industry representatives with operational planning experience. It wasn’t within the purview of the Handbook Team to revise those thresholds and targets, other than to provide a (hopefully) coherent and integrated framework for their application, a task that was made difficult by the fact that the HPG and EBM Handbook planning approaches were developed independently by different people in different working groups. Again, reviewer comments focusing on specific management targets should have been, for the most part, directed to the Compendium and HPG working groups.

In addition, many of the comments are poorly supported or misplaced. Most of the reviewer’s arguments focusing on the relevance of specific management targets draw on assertions based in personal opinion combined with subjective and cursory assessment of the potential negative economic and operational impacts of target implementation. The author makes little or no reference to any research data, scientific literature, or expert risk assessments that suggest the targets are inappropriate. Nor does he support his assertions regarding economic or operational impacts with any analysis or empirical evidence. Even if he had, we note that the correct place to direct economic and social arguments for adjustments to management targets, whether interim or long term, is through some sort of a “troubleshooting” decision process described in Section 7.5.