Decision Support: Scenario Exploration
December 9 - 13, 2003, January 29 - 31, 2004 and February 20, 21, 23, 2004 Working Group and Table Meetings

Scenario Exploration Using the North Coast Landscape Model

DRAFT

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Executive Summary

North Coast Decision Support is a decision system implemented to capture environmental and resource management domain knowledge about the North Coast LRMP area and indicator responses to different land use management scenarios. The document "The North Coast Landscape Model" (Morgan, et al, 2002) describes the North Coast Landscape Model in detail and presents the results from the benchmark scenario. In Morgan et al. (2003) we describe results from some temporal resource analysis experiments for general scenarios. This document describes some land use scenario exploration that has been conducted in support of the tables' decision making. Scenario exploration results have been presented to the table at the December 9th to 12th, 2003, January 29th to 31st, 2004 and the February 20th to 23rd, 2004 working group and planning table meetings in Prince Rupert, BC.

The General Management Direction (GMD) sets out targets for meeting resource objectives. Scenario exploration was undertaken to understand the interactions between the different targets in the GMD. The main trade-off is between areas for meeting conservation and visual objectives and area available for timber harvesting. Four main elements were looked at:

1. Potential protection areas,
2. Fine filter areas, including:
    - Grizzly Bear habitat,
    - Mountain Goat winter range,
    - Red and blue listed ecosystems,
    - Hydro riparian ecosystems:
3. Old growth representation targets from the Coarse Filter Biodiversity GMD, and
4. Visuals values.

The amount of timber harvesting land base (THLB) and the reduction in the amount of timber that could be harvested on the remaining THLB were calculated. Protection areas and fine filter areas remove areas from the timber harvesting land base. Visuals and old growth targets do not reduce THLB; instead they limit the rate of harvesting in the THLB and result in a reduction in the overall amount of timber supply from the THLB.

Table 1. Experiments presented to the table in December 2003.

Experiment	**%THLB Protection**	**Timber supply impact (% reduction in AAC)**
Protection Areas (PA): all proposals	49%	48%
Protection areas: First Nations proposals	26%	26%
Protection areas: conservation sector proposals	42%	40%
Fine Filter (see table 4)	14%	16%
Plan wide Old Growth Representation (CFB) 70%	n/a	33%
Plan wide Old Growth Representation (CFB) 50%	n/a	16%
Plan wide Old Growth Representation (CFB) 30%	n/a	5%

Visuals with constraint applied to productive forest	n/a	0%
Visuals with constraint applied to THLB only	n/a	13%
PA + FF	54%	-
PA + CFB	55%	-
FF + CFB	28%	-
PA + FF + CFB	59%	-
Dec11g + FF + CFB 30%	30%	37%
Dec11g + FF + mixed CFB (apply 70% RONV targets on smallest 60% of AU/BEC and 30% RONV target elsewhere)	30%	49%

Table 2. Experiments presented to the table in January 2004.

Experiment	**%THLB Protection**	**Timber supply impact (% reduction in AAC)**
Low Protection Areas – GTT Jan 9 map	4%	3%
Medium Protection Areas – GTT Jan 9 map	19%	16%
High Protection Areas – GTT Jan 9 map	46%	46%
Fine Filter (see table 4)	7%	8%
Low Protection Areas + Fine Filter	11%	12%
Medium Protection Areas + Fine Filter	24%	24%
High Protection Areas + Fine Filter	48%	49%
Low Protection Areas + Fine Filter + RONV70	11%	38%
Medium Protection Areas + Fine Filter + RONV70	24%	45%
High Protection Areas + Fine Filter + RONV70	48%	62%
RONV 30 common/70 uncommon	n/a	10%
Medium Protection + RONV30/70	19%	27%
Medium Protection + FF + RONV30/70	24%	31%

Table 3. Draft area analysis of working group's February 20th scenario presented to the table in February 2004.

Strata	**% plan area**	**%THLB Available**	**%THLB Removed**
Existing Protection Areas	3%	100%	n/a
Potential Protection Areas	29%	82%	18%
Total Potential Protection Area	32%	82%	18%
Total potential protection with mining	12%	82%	7%
Total potential protection without mining	20%	82%	11%

Table 4. Draft experiment results presented to the table in February 2004.

Scenario	**%THLB Available**	**%THLB Removed**	**Timber supply impact (% reduction in AAC)**

Feb 20th map – Existing protection areas	100%	0%	0%
Feb 20th map – Potential protection areas	82%	18%	18%
Total potential protection	82%	18%	18%
Fine Filter (see table 4)	94%	6%	3%
Feb 20th map + Fine Filter	77%	23%	19%
Feb 20th map + Fine Filter + RONV70	77%	23%	41%
Feb 20th map + Fine Filter + RONV3070	77%	23%	27%

Scenario exploration is an ongoing process. As new protection area options are presented and different conservation and timber targets are considered; scenario exploration can shed light on the interactions, overlaps and trade offs of different land and resource management strategies.

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Acknowledgements

The process used in conducting the experiments for the LRMP is known as collaborative modelling. This process requires input from a large number of people. Most of those listed below are domain experts that assisted with the development of conceptual models and model interpretation. The NC analysis team (NC A-Team) facilitates the participation of domain experts in an extended multi-disciplined team. This team has expertise in data management, spatial analysis, Environmental Risk assessment, decision support systems, timber supply, inventory, operational forestry, operational biology and expertise in linking domain knowledge to LRMP decision making. This team is co-ordinated and integrated with the NC LRMP government technical team and the NC LRMP process. It evolved over several years with a great amount effort by all involved. It has a common vision of its purpose that promotes a positive professional environment that allows the collaborative modelling framework to succeed.

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Audience

This report is intended for the North Coast LRMP table, Government Technical Team and Domain Experts.

Introduction

As part of the North Coast LRMP, the planning table is developing general management direction (GMD). To understand the implications of the GMD on landscape and resource objectives, scenario exploration analyses were conducted and presented at the December 2003 and January and February 2004 working group and table meetings in Prince Rupert, BC. This document provides some background and context, describes the analysis, and presents results from those presentations. The two primary tools used for the analysis were the North Coast Landscape Model and static protection area analysis spread sheet. For a more detailed discussion of the North Coast Landscape model please see "The North Coast Landscape Model" (Morgan, et al, 2002). For more background on conducting temporal and static landscape experiments please see the documents Decision Support System: Static Experiments" (Reid et al., 2003) and Decision Support System: Temporal Resource Analysis Experiments" (Morgan et al., 2003).

The language used to describe temporal resource analysis is founded in the domain of timber supply. As a result, it is inherently biased towards describing things as they impact timber harvesting. An alternative description would describe how different resource management options benefit or impact other values such as wildlife, biodiversity, tourism, or communities. As well, the language is culturally biased and does not reflect some First Nations values or interests. Reframing the analysis description to be more culturally appropriate and to describe analysis in terms of other interests is beyond the current scope of this document. However, the intent is to inform all sectors and efforts have been made to describe analysis using more sector neutral language.

Definition of land use scenario in context of landscape modelling: A land use scenario consists of a map of different zones (possibly overlapping) and a set of rules attached to each zone. The rules for protection areas and integrated resource management are simple, but other management objectives (e.g. targets for range of natural variability (RONV) by analysis unit (AU), biogeoclimatic zone (BEC) and landscape unit) require clear definitions of rules and constraints.

Goals of handling land use scenarios using landscape modelling:

(i) to enable the table to explore a range of possible scenarios
(ii) to assess timber supply impacts in a fairly detailed manner, and in a way that can be partially automated and efficiently processed
(iii) to provide information on economic and ecological impacts and benefits of the scenario via indicators

For the exploration experiments, we applied a relatively straightforward approach to estimating timber supply impacts. In essence, we used a reasonably efficient method to search for the maximum *percentage of the base case harvest level* that could be sustained in the scenario. This provides information on the percent that the harvest level would have to be reduced to (a) be able to sustain a level growing stock over the long term and (b) meet the harvest target in every time period. It is important to note that this *timber* *supply impact* (TSI) is in effect the amount the harvest level needs to be reduced in the most constraining period and so represents a worst-case impact. That is, the identified impact will be required in at least one time period, but the impact in other periods could be less.

There are two key advantages to the above approach for experimental scenarios. First, it can be implemented efficiently, so that a range of scenarios can be processed rapidly and information flow can have a fast turnaround time. Secondly, it provides a measure for each scenario that is fairly easy to interpret: the timber supply impact of a scenario is the amount that the base harvest level would need to decline to meet sustainable timber supply objectives.

Scenario Components: Protection Areas, Fine Filter, Coarse Filter and Visuals

Four components of resource management were considered in this exploratory analysis; first, protection area, second, maps of specific species habitat needs which are grouped together as fine filter analysis, third, old growth representation, as a part of coarse filter biodiversity and fourth, areas where allowable land alteration targets are set to manage for visual values.

1. *Proposed protection areas:*

Table 5. Proposed protection areas used for exploration

December 9-13th Table Meeting	**January 29-31st Table Meeting**	**February 20-23rd Table Meeting**
All First Nation land use plans protection area designations (includes Cultural and Natural Areas as defined by the Allied Tsimshian Tribes).	GTT Low Protection Scenario, based on December Table agreement.	February 20th working group's potential protection scenario.
Environment sector December, 2003 potential protection areas.	GTT Medium Protection Scenario.	
All proposed protection areas combined.	GTT High Protection Scenario.	

2. *Fine Filter:*

Table 6. Fine filter elements used for exploration

December 8-13th Table Meeting	**January 29-31st Table Meeting**	**February 19-23rd Table Meeting**
100% Grizzly Bear class 1	100% Grizzly Bear class 1	100% Grizzly Bear class 1

and 50% of class 2	and 50% of class 2	and 50% of class 2
100% Mountain Goat winter range	100% Mountain Goat winter range	90% Mountain Goat winter range
100% Red and 50% blue listed ecosystems (except CWHvm1(08))	100% Red and 50% blue listed ecosystems ecosystems (except CWHvm1(08))	100% Red and 50% blue listed ecosystems ecosystems (except CWHvm1(08))
An approximation of hydro riparian ecosystems: • 70% of 50m buffers around estuaries, wetlands and lakes • 70% of Flood plains and 50m buffers. • 50m buffers on tailed frog habitat, used as a surrogate for small streams	An approximation of hydro riparian ecosystems: • 70% of 50m buffers around estuaries, wetlands and lakes • 70% of Flood plains and 50m buffers. • 70% of 50m buffer on small streams, based on >1km stream catchment model	An approximation of hydro riparian ecosystems, not including small streams: • 70% of 50m buffers around estuaries, wetlands and lakes • 90% of flood plains and 50m buffers.

The NCLM accounts for fine filter objectives at a comparatively detailed spatial scale. In addition to timber supply review analysis, the benchmark, January and February scenarios used reductions to forest growth yield curves to account for some of the effect of fine filter objectives on timber supply. Given the spatial detail that is now being modelled, these growth curve adjustments are no longer applied.

3. *Old growth representation:* targets are from the Coarse Filter Biodiversity GMD. For the purposes of the North Coast LRMP ecosystems surrogate units are being used that capture tree species and site richness. A detailed explanation is provided in Holt and Sutherland, 2003. Old growth representation targets are set at three different scales; plan wide, at the landscape unit scale, and at the watershed scale. Old growth targets are combined with expected amounts of old growth for each site type to calculate a final target. The model then meets these targets at each scale. For example, there could be a 70% representation of Old Growth by site at the plan scale, 50% representation at the landscape unit scale and 30% at the watershed scale. Having the least constraining target at a watershed scale allows for flexibility for timber harvesting and meeting conservation goals at an operational level. However, at the landscape scale some of the drainages within the landscape unit would need to be managed more intensively for old growth to ensure that the landscape scale target is met. Some units currently have very little old growth and the model then "recruits" old growth to meet the desired target over time, these units have been labelled "high risk" ecosystems. An additional, old growth representation strategy was explored for the January table meeting. This strategy involved ranking by area all of the BEC/AU surrogate units and assigning the first 60% of the rank as uncommon and the remaining 40% as common. Common units were assigned a 30% plan level old growth representation target and the uncommon units were assigned a 70% target.

The rationale behind this strategy is that the more common units are at less risk than the uncommon ones and can therefore have a less precautionary target assigned.

4. *Visual Quality:*

A new zoning system is being proposed to replace the current system of scenic areas and visual quality objectives. Its goal is to maintain the overall desired visual quality experience in a relative sense for the zone as a whole. Four visual management zone descriptions and prescriptions were identified and drawn along the shorelines on the LRMP map on December 1, 2003 by the tourism, small business and major licensees sectors: Wild Zone (Class 1), Natural Variability Zone (Class 2), Landscape Forestry Zone (Class 3), and Special Viewscape zone (Class 4). Class 4 was assumed to be the same as Class 1. The Government Technical Team (GTT) then drew polygons from the line work along the shoreline to extend inland to cover the viewscape from the ocean or from Highway 16 along the Skeena River.

Allowable alterations to the landscape as a result of timber harvesting were identified for each class and converted to a plan view alteration for modelling purposes (see table below). A perspective to plan view (P2P) ratio of 2 was used in this calculation except for Class 1, which initially used a P2P ratio of 3 in the December scenario, and was later changed to a P2P ratio of 2 in subsequent scenarios. It is recognized that this number may be lower on steeper ground, and as high as 3-4% on flatter ground. The higher the ratio, the greater the amount of alteration (i.e. harvesting) allowed. In addition to the alteration allowed, a further rule of a 7 metre green-up height was modelled for each class to reflect the time needed for harvested stands to grow back and look like trees before adjacent stands could be harvested.

	Allowable Alteration (%)			
	Perspective View	Plan View (original)	Plan View (final)	Green-up Height (m)
Class 1	2	6	4	7
Class 2	5	10	10	7
Class 3	8	16	16	7
Class 4	2	6	4	7

These rules were applied only to the visual portion of the landscape where they fell within one of the classes delineated on the map. This visual portion is identified in the inventory as Visual Sensitivity Classes, or VSC, having attributes of very high, high, moderate or low. In a typical timber supply analysis, the rules governing disturbance levels allowed in each of these attributes are different. However, the working group has re-defined the sensitivity of the area and as such the class rules are being applied to the VSCs, regardless of the attribute. For example, for Class 1 polygons, there could exist VSCs of very high and low. The same rule for class 1 is applied to both the very high and low VSC. In effect, the VSC from the inventory is being replaced by the definition of classes 1-3.

The analysis experiments that were carried out for December 9 used landscape units (LU) and proposed scenic areas (as per draft visual quality general management direction) as a reference unit. What this means is that the rules had to be met within the intersection of the LU and scenic areas overall, and not within each individual visible area (VSC). If the rules were constraining timber harvesting within a unit, the model attempted to harvest in another unit until it met the maximum allowable alteration there before it had to move to yet another unit in trying to meet the target harvest level. The first experiment applied the rules to the visible green portion of the landscape (includes timber harvesting landbase and forested area outside the THLB), while the second experiment applied the rules only to the THLB.

Further modelling since December has used the VSC as the reference unit and applied a P2P ratio of 2 to all classes, using a revised map from December 13, 2003. The results showed a 0.6% impact to AAC, and were reported to the visuals working group, but not to the table at large, as several factors in reaching agreement were still pending. This proposed new system of managing for visuals has replaced the way that visuals were modelled in the benchmark scenario in all subsequent scenarios.

Note that timber supply impacts were assessed at the strategic scale. The implication of modelling at this scale is that harvesting is assumed to move to a different area once a visual area has reached its maximum allowable alteration. Operationally, individual units may be unavailable for harvesting for certain time periods, forcing operations to move elsewhere, thereby increasing costs and potentially making some areas uneconomic to harvest at all. This operational impact is not a timber supply impact, and as such, is not captured here, but it does need to be considered within the larger strategic context when making resource management decisions.

Scenario Exploration

By exploring the interaction of applying protection areas, fine filter, old growth representation and visuals, an understanding of the impacts and benefits of the GMD can be gained. The main indicator impacted is the amount of land available for timber harvesting and the length of time between harvesting. A reduction in timber harvesting landbase or THLB has an impact on the allowable annual cut (AAC). The removal of highly productive sites results in a greater impact on the AAC and the removal of low quality sites has a lower impact. Over large areas these tend to average out such that a 1% THLB removal is equivalent to a 1% AAC reduction, however, locally, the ratio can be quite different. To meet old growth targets, some of which are 250 years, harvesting is excluded for longer than what would be desirable to maximize timber return on the land base. To maximize timber production, trees need to be cut at approximately 100-150 years, depending on the species and the site.

It is understood that these analyses are exploratory and evaluate the question of what would be the impacts if everything were implemented today. There are a variety of implementation options that the table could consider to meet its GMD objectives. There is tremendous opportunity for flexibility. For example, in some of these examples 100% retention of forest within the fine filter areas was assumed. However the GMD offers a range of 70 to 100% retention. Another example is the application of 70% old growth retention of all ecosystems at the plan scale. Flexibility, or a phasing in approach, could be considered in applying this target. For example, presented at the January table meeting was an analysis of applying different old growth targets based on how common a site is in the plan area. More common sites were assigned lower targets and rare or high-risk sites were assigned the more precautionary 70% target.

Trade-offs and Interactions

Generally, to achieve conservation objectives such as protection areas, old growth representation and minimizing modification of habitat, a trade-off must be made with the amount of land available for timber harvesting and how often trees can be cut on that land. The amount of habitat or of old growth forest outside of the THLB is already taken into consideration when determining how far the current resource management regime is from GMD objectives. The only way to gain habitat or old growth is to make land that is currently available for timber harvesting no longer available. Consequently, designating land with little or no THLB into a protection area will have no impact on meeting some plan wide conservation objectives. To meet old growth objectives trees must not be harvested for longer periods of time. This means that there is less wood available for harvesting in any given year.

Protection areas are an excellent strategy for conserving values that are located in a specific location. However, some values are spread across the entire landscape, such as hydro riparian ecosystems. Other values, such as grizzly bear habitat or old growth, cover much of the landscape but do concentrate more heavily in certain areas. Trade-offs can be evaluated between different strategies for protection area placement, and how much fine filter or old growth objectives is being met by those protection areas and what remains to be considered outside of protection areas at a more site-specific scale. The exploratory analysis is used to better understand the trade-offs. Ideally, multiple objectives can be met in the same area, for example by placing areas of high value grizzly bear habitat within protection areas will result in a proportional reduction in the amount of area removed from the THLB outside of the protection area. As well, it is important to understand that there is a large amount of overlap between different values such as grizzly bear habitat and hydro riparian areas. This is additionally coupled with uncertainty underlying mapping of detailed elements.

Resource Analysis as a Dark Room

To better understand the complexity of the interaction of the various elements of the system, an analogy was presented to the table. Understanding the implications of the various chapters of the LRMP is like trying to understand the layout of the furniture in a dark room. We do analysis to get a sense of where the different pieces are, and when we introduce new objectives, like old growth retention, we move furniture around. However, the furniture is tied together with rope, and if you move one piece, the others move at the same time. This necessitates further analysis to try and understand the arrangement of the furniture, and evaluate whether the arrangement is what is desirable.

December Table Meeting Scenario Exploration Results

Some scenario analyses were presented at the December Table meeting. Three different plan wide old growth representation targets were analysed; 30%, 50%, and 70% retention.

Table 7. Experiments presented to the table in December 2003.

Experiment	%THLB Protection	Timber supply impact (% reduction in AAC)
Protection Areas (PA): all proposals	49%	48%
Protection areas: First Nations proposals	26%	26%
Protection areas: conservation sector proposals	42%	40%
Fine Filter (see table 4)	14%	16%
Plan wide Old Growth Representation (CFB) 70%	N/a	33%
Plan wide Old Growth Representation (CFB) 50%	N/a	16%
Plan wide Old Growth Representation (CFB) 30%	N/a	5%
Visuals with constraint applied to productive forest	N/a	0%
Visuals with constraint applied to THLB only	N/a	13%
PA + FF	54%	-
PA + CFB	55%	-
FF + CFB	28%	-
PA + FF + CFB	59%	-
Dec11g + FF + CFB 30%	30%	37%
Dec11g + FF + mixed CFB (apply 70% RONV targets on smallest 60% of AU/BEC and 30% RONV target elsewhere)	30%	49%

The different types of conservation tools, protection areas, fine filter and old growth representation are not additive. For example, if protection areas and fine filter impact THLB were to be added it would be a 49.2 + 15.8 = 65% reduction in THLB, however, there is area overlap between fine filter and protection areas and the incremental reduction in THLB of fine filter on top of protection areas is only 4.9% instead of 15.8%.

January Table Meeting Scenario Exploration Results

The Fine Filter elements used were modified from those presented at the December table meeting and are outlined in Table 4. As well, a strategy was used to identify fine filter elements outside of the THLB as much as possible. However, this led to managing all fine filter elements at the landscape scale, which is inconsistent with the GMD for certain objectives. GMD identifies a scale for meeting an objective, either at the stand, polygon, watershed or landscape scale. The results from these further fine filter modifications will be presented at the February table meeting.

The RONV70 target maintains 70% of old growth for a site at the plan wide scale, 50% at the landscape, and 30% at the watershed scale. The RONV 30/70 target applies 30% plan wide target for the 40%, by rank, most common sites, and 70% plan wide target for the less common sites.

Table 8. Experiments presented to the table in January 2004.

Experiment	**%THLB Protection**	**Timber supply impact (% reduction in AAC)**
Low Protection Areas – GTT Jan 9 map	4%	3%
Medium Protection Areas – GTT Jan 9 map	19%	16%
High Protection Areas – GTT Jan 9 map	46%	46%
Fine Filter (see table 4)	7%	8%
Low Protection Areas + Fine Filter	11%	12%
Medium Protection Areas + Fine Filter	24%	24%
High Protection Areas + Fine Filter	48%	49%
Low Protection Areas + Fine Filter + RONV70	11%	38%
Medium Protection Areas + Fine Filter + RONV70	24%	45%
High Protection Areas + Fine Filter + RONV70	48%	62%
RONV 30 common/70 uncommon	N/a	10%
Medium Protection + RONV30/70	19%	27%
Medium Protection + FF + RONV30/70	24%	31%

February Table Meeting Scenario Exploration Results

The Fine Filter elements used were modified from those presented at the December and January table meetings and are outlined in Table 6. A strategy was used to identify fine filter elements outside of the THLB as much as possible. The GMD for the fine filter elements indicates the scale at which the elements should be managed, see table 9.

Table 9. GMD scale of Fine Filter element target.

Fine Filter Element	**Scale**
Estuary	watershed
Floodplain	Stand - floodplain by floodplain. Find in non-contributing first within an individual floodplain and its buffer.
Wetlands	Stand – wetland by wetland. Find in non-contributing first within an individual wetland buffer.
Lakes	Stand – lake by lake. Find in non-contributing first within an individual lake buffer.
Grizzly Bear – class 1	Stand – all polygons removed
Grizzly Bear – class 2	Watershed – search all non-contributing first within a watershed.
Mountain Goat	Stand – find the 90% in the non-contributing first within a winter range polygon.

Red and Blue Ecosystems	Stand – listed polygon by listed polygon

The scenario impact/benefit analysis was based on a coarse estimate from previous scenarios. A refined impact/benefit assessment will be provided at the March 12-13th working group and table meetings.

The RONV70 target maintains 70% of old growth for a site at the plan wide scale, 50% at the landscape, and 30% at the watershed scale. The RONV 30/70 target applies 30% plan wide target for the 40%, by rank, most common sites, and 70% plan wide target for the less common sites.

Table 10. Draft area analysis of February 20th scenario.

Strata	**% plan area**	**%THLB Available**	**%THLB Removed**
Existing Protection Areas	3%	100%	n/a
Potential Protection Areas	29%	82%	18%
Total Potential Protection Area	32%	82%	18%
Total potential protection with mining	12%	82%	7%
Total potential protection without mining	20%	82%	11%

Table 11. Draft experiment results presented to the table at February 2004 table meeting.

Scenario	**%THLB Available**	**%THLB Removed**	**Timber supply impact (% reduction in AAC)**
Feb 20th map – Existing protection areas	100%	0%	0%
Feb 20th map – Potential protection areas	82%	18%	18%
Total potential protection	82%	18%	18%
Fine Filter (see table 4)	94%	6%	3%
Feb 20th map + Fine Filter	77%	23%	19%
Feb 20th map + Fine Filter + RONV70	77%	23%	41%
Feb 20th map + Fine Filter + RONV3070	77%	23%	27%

Protection Areas Values Spreadsheet

The purpose of developing the protection areas static analysis spreadsheet was to have a visual and live tool to compare values within protection area proposals and groups of proposals in a scenario format. The tool used area-based statistics on protection area proposals that could be quickly summarized during table discussions. Proposed areas could be turned on or off so that the table could compare options for a protection areas scenario.

Method:

1. The spreadsheet was created by combining protection proposals (received prior to the December table meeting) from all sectors and governments into one layer. The name of each area is geographically-based and reflected who the proponent/s was/were.
2. Each unique polygon area was then overlaid with a number of coverages (map layers) in a GIS to define what the values were for each area. (e.g. amount of THLB, number of recreation facilities, amount of critical habitat, etc.)
3. The outputs for these overlays were then consolidated into one spreadsheet. Totals were summarized and a function was included to summarize sets of selected protection proposals (summarized if they are turned on).
4. During the December table meeting protection proposals were consolidated and the resultant protection map layer was re-analysed as per steps 2 and 3.

The resulting spreadsheet tool complemented the landscape model scenarios for conservation, biodiversity and visual scenarios during protection areas negotiations. The static spreadsheet was able to highlight a diverse range of conservation, social and resource values, including qualitative information on each protection proposal.

The protection area values spreadsheet was distributed to the table at the December working group and table meeting.

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