

# **Terrestrial Ecosystem Mapping of CDC-listed Ecosystems in the North Coast LRMP Area**

## **Final Report**

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for  
The North Coast LRMP Table

## **Project Team**

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## 1.0 Introduction

Old growth forests that make up the temperate rainforests of coastal British Columbia are characterized by a longevity that is unusual in North American and Asian forests at similar latitudes. Disturbance in these forests is infrequent and seldom stand-replacing, so that living elements of previous stands remain following fire, windstorms, flooding, and landsliding. As a result, present old growth stands contain very old (> 800 years) and, often very large (> 2m DBH) structural elements both living and dead. Biodiversity conservation in these forests is closely linked to stand structural elements, including large lateral branches for nesting, large trunks for denning, complex foodwebs associated with large downed wood, and stream ecosystems dependent on large wood for stream morphology and bank stability.

Forest harvesting clearly has an immediate and direct impact on old growth stand structural functions, structure-function relationships that have taken 500-1,000 years to develop. It should also be clear that re-establishment of these structure-functions is not achievable within any meaningful management timeframe, so conservation of existing structure and biodiversity is central to maintaining biodiversity values in these forests.

Old growth forests have a composition and structure that can be differentiated by the site series classification of the biogeoclimatic ecosystem classification (Banner *et al.* 1993). Each site series is typified by old growth stands that can be described as a single site association (a group of similar 'plant communities'). To ensure biodiversity conservation it is fundamental that old growth stands on all site series be maintained in numbers sufficient to maintain their coarse- and fine-filter biodiversity functions.

The Conservation Data Centre (CDC) of British Columbia uses site series to identify old growth ecosystems considered to be threatened (Red-listed) or vulnerable (Blue-listed) in the province. CDC rankings are based primarily on the expert opinion and field experience of staff of the Prince Rupert Forest Region, and not on detailed inventories of the listed ecosystems. The objective of this project was to identify and map Red- and Blue-listed ecosystems ("plant communities") across the North Coast LRMP area (MSRM, CDC, 2001). This project provides an inventory for the North Coast LRMP area of the most prevalent group of listed ecosystems – old growth floodplain forests, as well as associated fan ecosystems.

The results of the project are intended to provide an inventory of existing Red-listed ecosystems to assist the North Coast LRMP Table in determining regional conservation priorities, and in the development of LUPs.

## **1.1 Approach and Objectives**

Given the level of funding for the project, it was decided to concentrate on Red-listed ecosystems, and to opportunistically map any adjacent Blue-listed ecosystems observed on the photos selected for the Red-listed ecosystems. This approach was feasible in the North Coast LRMP area because Red-listed ecosystems occur on floodplains, and the Blue-listed occur as valley floor ecosystems on fans adjacent to the Red-listed floodplains. The main objective then was to do a thorough job of mapping Red-listed ecosystems, and to map as many Blue-listed as possible, as we mapped the Red-listed. We also opportunistically mapped early structural stage ecosystems on site series that support Red- and Blue-listed ecosystems in the Old Forest structural stage.

## **1.2 Red and Blue-listed Ecosystems**

The Conservation Data Centre (CDC) provides provincial coordination for international endangered species and plant community conservation efforts implemented by the Nature Conservancy. The CDC lists over 200 rare plant communities, many of which are mostly the Old Forest structural stages (see RIC 1998) of harvested forests, or grassland ecosystems located in the path of agricultural and urban development in British Columbia.

A Red-listed ecosystem is considered by the CDC as "imperiled provincially because of extreme rarity or because some factor(s) making it especially vulnerable to extinction" (1992). A Red-listed ecosystem is estimated to have less than 20 occurrences within the province. A Blue-listed ecosystem may have from 21 to 100 occurrences and is considered vulnerable to either large-scale disturbance, or continued human-caused disturbance. Both Red and Blue-listed ecosystems may be either naturally rare in occurrence or have become rare due to human activities. The thirteen Red and Blue-listed ecosystems of the North Coast planning area are listed in Table 1 below. A summary of the status and ecology of each CDC-listed ecosystem is contained in Appendix A, and is extracted from the Manual for Identification and Assessment of Red and Blue-listed Plant Communities (1999).

**Table 1: CDC Red- and Blue-listed Ecosystems in the North Coast LRMP Area**

Scientific name	Biogeoclimatic Ecosystem Classification Unit(s)	Provincial Rank	Provincial List	Typical Situation	Structural Stage
<b>Group 1: Floodplain Forest and Alluvial Forest</b>					
<i>Picea sitchensis</i> / <i>Rubus spectabilis</i> Very Wet Maritime	CWHvm1/09	S2	Red	high bench floodplain	7
<i>Picea sitchensis</i> / <i>Trisetum cernuum</i>	CWHvh2/09	S2	Red	middle bench floodplain	7
<i>Picea sitchensis</i> / <i>Maianthemum dilatatum</i> Wet Hypermaritime 1	CWHvh2/08	S2	Red	high bench floodplain	7
<i>Abies amabilis</i> - <i>Picea sitchensis</i> / <i>Oplopanax horridus</i>	CWHvm1/08 CWHvm2/08	S3	Blue	alluvial/colluvial forest	7
<i>Populus balsamifera</i> ssp. <i>trichocarpa</i> / <i>Cornus stolonifera</i>	CWHvm1/10 CWHwm/06* CWHws1/08* CWHws2/08*	S3	Blue	middle bench floodplain	6
<i>Thuja plicata</i> - <i>Picea sitchensis</i> / <i>Oplopanax horridus</i> Very Wet Hypermaritime 2	CWHvh2/07	S3	Blue	alluvial / colluvial forest	7
<b>Group 2: Spray Zone Forest</b>					
<i>Picea sitchensis</i> / <i>Calamagrostis nutkaensis</i>	CWHvh2/16	S3	Blue	spray zone	7
<i>Picea sitchensis</i> / <i>Carex obnupta</i>	CWHvh2/18	S3	Blue	spray zone	7
<i>Picea sitchensis</i> / <i>Kindbergia oregana</i>	CWHvh2/15	S3	Blue	spray zone	7
<i>Picea sitchensis</i> / <i>Malus fusca</i>	CWHvh2/19	S3	Blue	spray zone	7
<i>Picea sitchensis</i> / <i>Polystichum munitum</i>	CWHvh2/17	S3	Blue	spray zone	7
<b>Group 3: Difficult to Airphoto-Interpret</b>					
<i>Thuja plicata</i> - <i>Picea sitchensis</i> / <i>Polystichum munitum</i>	CWHvh2/05	S2S3	Blue	limestone and meta-morphics	7
<i>Thuja plicata</i> - <i>Tsuga heterophylla</i> / <i>Polystichum munitum</i>	CWHvm1/04	S3	Blue	steep well-drained	7

The three Red-listed plant communities for the North Coast mapping area all occur on active floodplains (CWHvm1/09; CWHvh2/08; CWHvh2/09). In many cases they adjoin blue-listed ecosystems, either on the floodplain (CWHvm1/10) or adjacent alluvial/colluvial fans and toe slopes (CWHvm1,2/08; CWHvh2/07; CWHwm/06; CWHws1,2/08). This first group of ecosystems is the focus of the mapping project, as this group encompasses all of the Red-listed ecosystems. The floodplain and alluvial/colluvial ecosystems also happen to be the most reliable to identify by air-photo. All rivers with a significant component of Red-listed floodplain forest will be mapped for both Red and Blue-listed ecosystems in this first group.

A second major group of blue-listed ecosystems occur in salt-spray zones along windward shores in the CWHvh2 (CWHvh2.15,16,17,18,19). Thematic mapping would not help to narrow the field of search on these, as occurrences are often

much smaller than a forest cover polygon. All air-photos covering the outer coast were reviewed for productive forest exposed to a southwest ketch from the Pacific. Air-photos were selected and organized by map sheet, but no typing or attributing was undertaken – as time and resources did not permit.

Two other Blue-listed ecosystems were considered in a separate category from the rest, because photo interpretation is more difficult, and because there is no easy way to pick them out of the map inventories available, as was the case for listed floodplain and fan ecosystems. These are the CWHvm1/04 which occurs on steep slopes with good drainage; and the CWHvh2/05 which occurs on fresh soils which have developed over base-rich bedrock (metamorphics and limestone). It was not possible to address these ecosystems within the scope of this project.

## **2.0 Methods**

### **2.1 Locating and Mapping Rare Ecosystems**

Standards and approaches for rare (Red and Blue-listed) ecosystem mapping (REM) are outlined by the CDC (RIC 2000), and are followed in this project as much as possible. In the absence of a specific database standard for REM, the Terrestrial Ecosystem Mapping (RIC 1998) standard has been adapted for this project. A TEM (1998) working legend for the mapping products is found in Appendix B.

CDC-listed ecosystems were located by a combination of expert information and thematic mapping. Broad ecosystem unit (BEU) mapping is available at 1:250,000 scale for the planning area. The BEU, Sitka Spruce – Black Cottonwood Riparian (SR), provided a first cut of watersheds to check for CDC-listed floodplain units. Two other thematic maps based on forest cover data also provided information on the planning area:

- ✓ leading in black cottonwood or Sitka spruce and age class 8 or 9; and,
- ✓ height class 6 or greater.

By reviewing our thematic maps with local experts we are quite confident that all watersheds with a significant component of the Red-listed floodplain ecosystems were identified. Our local experts were: Jim Pojar and Allen Banner, of Ministry of Forests, Regional Office, Research Section; and, Mike Grainger and Sarma Liepins, of Prince Rupert Forest District.

For each of the identified watersheds, Red and Blue-listed ecosystems were delineated on 1:15,000 forest cover air photos using a Sokia stereoscope with 3x magnification. This step took considerable time because air-photos had to be

removed from the Ministry of Forests Regional warehouse, checked by stereoscope for CDC-listed ecosystems, and laser-copied prior to typing and attributing.

One important issue with the mapping stems from the old air photos used for much of the typing. Almost all photos were flown in the 1970s, and that is what appears on the maps. This could mean that our mapping overestimates the area of Red and Blue-listed ecosystems, if many of them have been logged since the 1970s. However, during the course of fieldwork we flew over almost all areas in a helicopter and observed that very few of the areas mapped have been logged since that time. To fine-tune the mapping it would be worth looking at updated forest cover to note any logged Red or Blue-listed ecosystems. We don't feel this will significantly alter the results presented in this report.

## 2.2 Field Checking

The CDC-listed ecosystems mapped are associated with unique biogeoclimatic site series, and occur in predictable landscape positions, i.e., fans and floodplains. These ecosystems tend to have readily identifiable air photo signatures. Initially no field verification was budgeted for this mapping project. However, in view of the proposed changes to CDC listings (recommended in Section 4.0), it was considered prudent to carry out field checking.

The field checking target for CDC-listed ecosystems is 100% of polygons (RIC, 1999). The standard for a similar scale Level IV TEM map is 20% of polygons checked; roughly one third of these should be ground-checked (RIC, 1998). The costs in meeting the RIC standard for ground-visited polygons, is simply prohibitive in this type of terrain, where access is largely by helicopter or boat.

Ecosystem attributing was checked in the field using a helicopter for a two day period in May 2002. In order to cover as much of the mapping area as possible in this limited timeframe aircalls predominated - no full ecosystem plots, and only 6 full ground inspection plots and 7 visual ground inspection plots were carried out (RIC 1998). The ground work was used to calibrate the 109 polygons confirmed from the helicopter (air calls). Total polygons confirmed was thus 122 of 346 CDC-listed polygons or 35%.

As a result of the field checking we deleted numerous polygons north of the Skeena that were originally typed as *Abies amabilis* - *Picea sitchensis* / *Oplopanax horridus*, as they were drier than expected; and, corrected some of the floodplain typing where ecosystems typed as middle bench should have been high bench on the steeper gradient rivers. Field checking also allowed us a closer look at the subtle gradient between middle and high bench ecosystem progression on the Ecstall and Quall Rivers, and refine the typing there. We are confident that the focus on aircalls for field checking was appropriate for covering



the LRMP planning area and that the field checking has significantly improved map reliability.

### **2.3 Map Production**

Polygons delineated on the 1:15,000 photography were digitized and orthorectified using a monorestitution process by Triathlon Mapping Inc., Saanichton, B.C., using RIC (1999) GIS standards. Ecological attributes for each polygon were recorded into an Excel database using a TEM standard. The database is included with final products for the project. The line work was linked to the database in an Arcview™ environment. The maps feature a map legend drawn to TEM (1998) standard.

## **3.0 Results**

### **3.1 Mapping Overview**

Table 2 lists the 26 watersheds we examined in detail to locate Red-listed ecosystems. The table lists the map sheet numbers, BEC unit, notes on Red and Blue-listed ecosystems found, and general notes on the watershed. Of the 26 watersheds checked, 12 had enough area in Red-listed ecosystems to justify mapping. The 'Comments' section in Table 2 notes small areas of Red-listed ecosystems that were too small or dispersed to map for the project. Watersheds which originally supported Red-listed ecosystems, but which have been logged, such as the Kitsault, are also noted.

Based on the expert information obtained, and, using thematic mapping as a reference, we feel reasonably comfortable that all watersheds with a significant component of Red-listed floodplain ecosystems have been mapped. This mapping also includes any Blue-listed floodplain or alluvial forest ecosystems in proximity to the Red-listed units. That is, for any of the rivers having a significant Red-listed floodplain forest component, all of the Blue-listed floodplain and alluvial units have been mapped as well.

All BEU map polygons themed as Sitka Spruce – Black Cottonwood Riparian (SR) were air-photo interpreted to determine presence/absence of Red or Blue-listed ecosystems. This BEU was helpful in identifying some of the more extensive floodplain forest units, whether in an old growth state or logged. It missed entirely several floodplain forest units leading in western hemlock, such as the Khutzehmateen and Sparkling River (Ecstall River drainage). Many of the less extensive occurrences, such as Captain's Cove, and the unnamed creeks west of Stair Creek were also missed. The Johnson and Burton watersheds were incorrectly mapped as having relatively extensive floodplain forest.

Forest cover thematic mapping of black cottonwood and Sitka spruce age class 8 and 9 helped further refine the field of search for CDC-listed floodplain ecosystems. In particular, this mapping helped determine where along the major river tributaries, identified by expert information, to extend the search. This helped minimize the quantity of air-photos that needed to be pulled and checked by stereoscope.

**Table 2: North Coast Red and Blue-listed Ecosystem Mapping Summary**

Area	Map Sheets	BEC	Red	Blue	Comments
Altanhash River	103H.048, 038	CWHvm1		08, 10 middle bench	some limited middle bench floodplain forest, but most is south of planning area boundary
Baker Inlet	103H.071	CWHwm		06 middle bench	too steep for floodplain forest
Belle Bay	103P.021	CWHws		08 middle bench	some large spruce, but no floodplain to speak of
Captain's Cove	103G.080	CWHvh2	08, 09	07	limited floodplain
Chambers Creek	103J.080, 090, 103I, 081	CWHvm1		middle, and alluvial/colluvial fans	good representation of fluvial/colluvial fan forest; two large wetlands near drainage divide with Johnson Creek
Ecstall / Sparkling River	103H.082, 083, 084, 072, 073	CWHvm1,2	high-bench	middle, and alluvial/colluvial fans	good representation of middle bench; very little high bench; lots of fluvial/colluvial fan forest; extensive wetlands (unlisted); other tribs: Hayward, Muddy Lakes, Big Falls have productive fan forest; nice high-bench floodplain at mouth of Big Falls Creek
Freda Lake	103H.062	CWHvh2	09 middle bench	07, 09 middle bench	limited 09 middle bench floodplain forest less than 1/2 ha in size at north end of lake; some productive 07 forest on colluvial slopes east of lake
Illiance	103P.043	CWHws		08 middle bench	high-bench floodplain (unlisted) at river mouth is second growth; channel gradient increases up river - no middle-bench floodplain forest
Johnson	103I.091	CWHvm	09 high bench	08, 10 middle bench, 04	no floodplain to speak of

**Table 2 (con't): North Coast Red and Blue-listed Ecosystem Mapping Summary**

Area	Map Sheets	BEC	Red	Blue	Comments
Khutzehmateen	103I.061	CWHvm1, 2	09 high bench	08, 10 middle bench, 04	good representation of middle and high bench floodplain forest; existing TEM mapping available (Clement, 1990).
Khyex River	103I.021, 022, 031, 032, 041, 042	CWHvm1, 2	09 high bench	08, 10 middle bench, 04	logging near mouth; good representation of middle and some high-bench floodplain forest farther up river
Kitkiata River	103H.064	CWHvm1, 2	09 high bench	08, 10, 04	no floodplain to speak of; alluvial (08) forest is all logged)
Kitsault	103P.043, 053	CWHws1,2		08 middle bench	large river subject to "flashy" flow regime - no middle-bench floodplain forest; quite extensive second-growth high-bench and fluvial fan forest
Kshwan River	103P.061, 062	CWHwm		06 middle bench	large river subject to "flashy" flow regime - no middle-bench floodplain forest
Kwinamass	103J.080	CWHvm	09 high bench	08, 10 middle bench, 04	most of floodplain at mouth of river is logged; some floodplain forest and extensive alluvial forest up river
McNeil River	103J.021	CWHvh2	08 high middle bench	07	bog forest at river mouth; some productive stands of (07) alluvial forest along colluvial slopes up river
Nass Islands	103P.003	CWHvm	09 high bench	08, 10 middle bench, 04	good representation of middle-bench floodplain forest, but, logged

**Table 2 (con't): North Coast Red and Blue-listed Ecosystem Mapping Summary**

Area	Map Sheets	BEC	Red	Blue	Comments
Pa-Aat River	103J.080	CWHvh2	08 high bench, 09 middle bench	05, 07	limited floodplain
Quall River	103H.064, 074	CWHvm1,2	09 high bench	08, 10 middle bench, 04	good middle-bench, some high-bench up river, near estuary is bog forest
Scotia River	103I.012, 023	CWHvm1	09 high bench	08, 10 middle bench, 04	bog forest at river mouth, limited alluvial 08 fan forest up river
Skeena Islands	103I.011, 012, 013, 021, 022, 023, 024, 034	CWHvm1	09 high bench	08, 10 middle bench, 04	extensive middle bench floodplain, but logged
Stagoo River	103P.022, 032	CWHwm		06 middle bench	some floodplain in first few km; extensive fens and bogs; fluvial/colluvial fan forest (unlisted in this subzone) up river
Stair Creek	103H.074, 075	CWHvm1	09 high bench	08, 10 middle bench, 04	some floodplain forest and fluvial/colluvial fan forest
Toon River	103I.051	CWHvm1, 2	09 high bench	08, 10 middle bench, 04	floodplain at mouth is logged; up river good representation of fluvial/colluvial fan forest; trib to north appears to have some 08, and limited 09
Triumph River	103H.037, 047	CWHvm1		08, 10 middle bench	Triumph Bay 07 sites on colluvial materials logged; no floodplain to speak of along Triumph R
Welda	103I.091	CWHvm1, 2	09 high bench	08, 10 middle bench, 04	no floodplain to speak of, too steep

### **3.2 Maps Produced**

Two final maps were produced for the project. Map 1 lists just Red and Blue-listed ecosystems, i.e. no younger structural stages that have been harvested or feature natural succession have been mapped. Map 2 shows all mapping, including the adjacent younger structural stages of the same site series. Map legends describe all units and other details of the mapping.

The most extensive areas of Red and Blue-listed floodplain and alluvial forest occur along the Ecstall River and its tributaries, particularly the Sparkling River. Another exceptional area is the Khutzehmateen, where ecosystems have already been well mapped (Clement, 1993) and thus are not included in the mapping for this project. On the Skeena River Islands, and the Nass River Islands to a much lesser extent, large areas of middle-bench floodplain occurs, most of which has been logged. The Khyex River also has some excellent examples of Red-listed floodplain forest. Other rivers of note include the Quall, Kwinamass, Chambers, Toon, and two unnamed creeks west of Stair Creek.

### **3.3 Representation of Red- and Blue-listed Ecosystems**

Table 3 summarizes the numbers of polygons of Red or Blue-listed ecosystems targeted for mapping in this project. It is evident in Table 3 that almost all ecosystems mapped were either the Blue-listed fan ecosystem, BaSs-Devil's' club, or the Red-listed Ss-Salmonberry, found on the high bench of floodplains. Together, these two ecosystems accounted for 91% of all ecosystems mapped.

The Ss-Salmonberry is Red-listed by the CDC, and this implies that the ecosystem has less than 20 occurrences in the province. Clearly, this is not the case as evidenced by this mapping, and further emphasized by the point that there are additional known occurrences of this ecosystem in the Kalum and Central Coast FDs. This result calls into question the Red-listing for the Ss-Salmonberry ecosystem.

The 186 mapped stands of the BaSs-Devil's club ecosystem also call into question the Blue listing for this ecosystem. A CDC Blue-listed ecosystem is to be represented by between 21 and 100 occurrences. Considering that we did not attempt to map all occurrences of the BaSs-Devil's club in the North Coast FD, and that the ecosystem also occurs in adjacent forest districts, it is clear there are many more than 100 occurrences of this ecosystem in the province.

**Table 3: Summary of number of polygons mapped by site series and structural stage. This table shows only leading site series in the polygons (see text).**

Site Series	CDC Status	Map Code	RIC (1998) Structural Stage*				
			SH	PS	YF	MF	OF
CWHvm1/08 – BaSs-Devil's club	Blue	AD	24	9	2	5	186
CWHvm1/09 – Ss-Salmonberry	Red	SS	17	3	5	1	126
CWHvm1/10 – Act-Red osier dogwood	Blue	CD	10	41	45	17**	22
CWHws1,2/10– Act-Red osier dogwood	Blue	CD					
CWHwm/10– Act-Red osier dogwood	Blue	CD					
CWHvh2/08 – Ss-Lily of the valley	Red	SL	0	0	0	0	2
CWHvh2/07 – CwSs-Devil's club	Blue	SD	0	0	0	0	6
CWHvh2/09 – Ss-Trisetum	Red	ST	0	0	0	0	0

\* SH = Shrub-herb; PS = Pole-sapling; YF = Young Forest; MF = Mature Forest; OF = Old Forest; see RIC (1998)

\*\* Note that while these stands met the RIC definition of mature forest, where trees established since last disturbance have matured and the second cycle of shade tolerant trees have become established, these stands are still quite young – between 30 and 40 years of age, and thus do not meet the CDC definition for Blue-listing.

We mapped 22 occurrences of the Act - Red osier dogwood (Table 3), an ecosystem that occurs on middle bench floodplain benches where rooting zone flooding is prolonged during the growing season. Another 96 stands on middle bench sites were mapped that were in a younger structural stage. Although we can't confirm what exact proportion of these ecosystems have been harvested, we do know that most of the YF and MF stands are recovering following harvesting on islands in the Skeena River and Nass River. The low number of Old Forest occurrences of this ecosystem suggest the rank should be changed from Blue to Red to ensure no further harvesting occurs.

CWHvh2 floodplain ecosystems are very rare in the North Coast LRMP area (Table 3). Only 8 occurrences were mapped - 6 CwSs-Devil's club, 2 Ss-Lily of the valley and no Ss-Trisetum. The rarity of these ecosystems reflects the rarity of active floodplains in the low relief landscapes of the CWHvh2 in the North Coast LRMP area. These ecosystem are more common the CWHvh2 on Haida Gwaii. These results point out that floodplain ecosystems in the CWHvh2 should be a very high conservation priority in all forest districts where they occur.

#### **4.0 Discussion and Recommendations**

The results of the sampling suggest the CDC-listing of some old growth ecosystems needs to be reconsidered. Table 4 presents recommendations for Red and Blue-listing based on the mapping conducted in this project.

1. Given the high number of occurrences mapped it is difficult to justify a listed status for the BaSs-Devil's club ecosystems. We recommend recognition of these fan and toe old growth ecosystems as special management areas. The large trees stabilize fan landforms and protect stream stability and habitats often important for anadromous fish. Old growth toe and fan ecosystems are also very important wildlife nesting, denning and foraging areas and any cutting should maintain these functions as well. To maintain these functions variable retention approaches are recommended on all sites. Also, a number of these ecosystems should be left unharvested in each watershed developed for harvesting. Wilford (2001) has developed specific recommendations for forest practices on fan ecosystems.
2. Given the mapping we have completed and the 'less than 20 occurrences' CDC rule for Red-listing, we recommend that Ss-Salmonberry ecosystems be changed from Red to Blue. The mapping revealed greater than 100 occurrences of these ecosystems, recognizing that not all are necessarily high quality, type A occurrences (as defined by CDC), especially the smaller patches. We also recommend that no harvesting occur in these important ecosystems for the following reasons:



- Most Ss-Salmonberry ecosystems occur along S1 or S2 streams with 50m and 30m riparian reserve zones, respectively. Given the prevalence of S3 and S4 streams in back channel areas, as well as the common occurrence of fisheries sensitive zones, it is very difficult to find harvestable areas in high bench floodplains.
- The brush hazard on floodplain ecosystems is extremely high, and regeneration of even small groups of conifers is extremely difficult, and historically has been completely unsuccessful.
- Wildlife habitat values are very high for a wide range of species, and particularly important for grizzly bears.
- Riparian functions of the old growth forests are also very important. Principle functions are the provision of large woody debris and maintenance of floodplain bank stability.

**Table 4: Suggested changes to the status of Red and Blue-listed ecosystems in the North Coast LRMP area.**

Site Series	No. of Occurrences	Present CDC Status	Suggested CDC Status
CWHvm1/08 – BaSs-Devil's club	186	Blue	de-list
CWHvm1/09 – Ss-Salmonberry	126	Red	Blue
CWHvm1/10 – Act-Red osier dogwood	22	Blue	Red
CWHws1,2/10– Act-Red osier dogwood		Blue	
CWHwm/10– Act-Red osier dogwood		Blue	
CWHvh2/08 – Ss-Lily of the valley	2	Red	Red
CWHvh2/07 – CwSs-Devil's club	6	Blue	Red
CWHvh2/09 – Ss-Trisetum	0	Red	Red

3. Also using the 'less than 20 occurrences' criterion we recommend that the status of Act-Red osier dogwood be upgraded from Blue to Red. These ecosystems should not be harvested for the same reasons listed above for the Ss-Salmonberry.
4. All floodplain ecosystems are extremely rare in the CWHvh2 within the North Coast LRMP and should be Red-listed. This means an upgrading of the CwSs-Devil's club from Blue to Red-listed. As for other floodplain ecosystems discussed above, no harvesting should be permitted on floodplains in the CWHvh2. These same Red-listed ecosystems occur in the CWHvh2 and CWHwh1 in the Queen Charlotte Islands FD where harvesting is ongoing. Given their extreme level of rarity in the North Coast LRMP area, this prohibition on harvesting these ecosystems should be extended to the

same rare ecosystem units in the Queen Charlotte Islands FD, and to the Central Coast FD.

As discussed above, the mapping in this project concentrates on a subset of the Red and Blue-listed ecosystems in the North Coast LRMP area. In particular the Spray Zone Forest group of ecosystems has not been mapped, nor has 2 Blue-listed upland ecosystems - the CwSs-Swordfern and the CwHw-Sword fern. There are other important ecosystems that require special consideration in the LRMP process and these are described in a separate report by Pojar (2002).

The project achieved its objective of providing a reliable inventory of floodplain Red-listed ecosystems in the North Coast LRMP area. The information will assist in decision-making for the LRMP area - especially in helping to identify those watersheds reserved for protection. The mapping also shows that, in drainages developed for forest harvesting, there has historically been a pattern of targeting fan and floodplain ecosystems because of the large timber and accessible valley-bottom position. This pattern repeats what has happened in south-coastal British Columbia, where fan and floodplain ecosystems have been eliminated from the forest landscape. The CDC Red and Blue-lists of threatened and vulnerable ecosystems are not intended as targets for land management. For example, it would not be sound land management to harvest BaSs-Devil's club ecosystems until there are 100 occurrences left, blue-list them, and then stop harvesting them. These ecosystems serve important ecological functions in each of the valleys in which they occur, and the recommendations in this report are put forward to reflect these functions.

## 5.0 References

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## **Appendix A**

***A summary of the status and ecology of the CDC-listed ecosystems, extracted from the Manual for Identification and Assessment of Red and Blue-listed Plant Communities (1999)***



# Appendix B: Red and Blue-listed Ecosystem Mapping Working Legend

BGC Zone	BGC Subzone	BGC Variant	Site Series Number	Site Series Code	Provincial Rank	Number of Occurrences	Site Series Name	Assumed Situation	Structural Stage	Typical Soil Moisture Regime
CWH	vh 2		07	SD	Blue <sup>1</sup>	6	CwSs - Devil's club	gentle slopes of lower, receiving sites; deep medium - textured soils; seepage	7	mesic - hygric
CWH	vh 2		08	SL	Red	2	Ss - Lily-of-the-valley	high bench - floodplain, deep medium - textured soils	7	subhygric - hygric
CWH	vh 2		09	ST	Red	0	Ss - Trisetum	middle bench - floodplain, deep medium - textured soils	7	subhygric - hygric
CWH	vm 1		08	AD	Blue <sup>2</sup>	185	BaSs - Devil's club	gentle receiving slopes; deep, medium - textured soil; seepage	7	subhygric - hygric
CWH	vm 1		09	SS	Red <sup>3</sup>	125	Ss - Salmonberry	active floodplain, high bench, deep medium - textured soil	7	subhygric - hygric
CWH	vm 1 wm ws 1, 2		10	CD	Blue <sup>1</sup>	22	Act - Red-osier dogwood	active floodplain, middle bench, deep medium - textured soil	7	subhygric - hygric

<sup>1</sup> Recommend change to Red-listing

<sup>2</sup> Recommend de-listing

<sup>3</sup> Recommend change to Blue-listing

<sup>4</sup> For other Site Series please refer to A Field Guide to Site Identification and Interpretation in the Prince Rupert Region.

# ***Appendix C: List of Rare or Significant Ecosystems Not CDC-Listed***

In identifying areas to look for Red and Blue-listed ecosystems we spoke to Jim Pojar and Allan Banner of ministry of Forests, Research Branch; Sarma Liepins, Forest Ecosystem Specialist, and Mike Grainger, Sylviculturalist, of the Prince Rupert Forest District. The following list of rare or significant ecosystems was collected.

Portland Inlet – Crow Lagoon second caldera

Golden Cedar on Porcher Island

Estuaries and tidal marshes – see Don Remington's report

Light stations

Seabird islands

Karst caves – Kumealon Inlet

Large fens and marshes – e.g. drainage divide between Chambers and Johnson Creeks

Kitson Island sandy beaches

Hotsprings

Any stands of productive yellow cedar (height class >6)

Caves

