Management strategies and species lists updated from the CDC as of April 2012.

6.0 ANIMAL MANAGEMENT STRATEGIES

It is necessary to develop and implement management strategies that will provide species with food, cover, and protection from human activities. In order to meet such an objective, two approaches should be implemented simultaneously. At stand level, specific strategies may be implemented, such as those provided with each individual account. At landscape level, because many species have similar habitat requirements and management strategies, a multi-species management approach should be considered (Cooper and Beauchesne 2003).

Classes of Management Strategies

From a practical point of view, strategies proposed for individual species can be grouped into 5 different classes (Table 1):

Table 1. Classes of Management Strategies for Animal Species (I: invertebrates; F: fish; B: birds; M: mammals)

Class of Management Strategy	*Actions*	*Species*	*Comments*
1	No actions.	Albert's Fritillary (I) Mormon's Fritillary (I)	These species do not inhabit sites that may be impacted by logging.
2	1) Do not destroy/alter the riparian ecosystems (i.e., discharge of fill material, draining, ditching, tiling, stream canalization or diversion, or diversion or alteration or contamination of surface or ground water flow into stream due to roads); for species inhabiting openings and alpine sites, do not destroy areas surrounding meadows, ridges and rocky slopes. 2) Implement Riparian Management Guidelines and protect riparian reserves and riparian management zones along S1-S3 streams. 3) Maintain wildlife tree patches and shrub communities (with a minimum 5m-machine-free zone) along smaller streams. 4) Maintain natural connectivity routes between streams. 5) Minimize the number of stream crossings.	Rocky Mountain Capshell (I) Pygmy Fossaria (I) Beaverpond Baskettail (I) Quebec Emerald (I) Forcipate Emerald (I) Mead's Sulphur (I) Magdalena Alpine (I) White-veined Arctic (I) Bull Trout (F) Cutthroat trout (F) White Sturgeon (F) American Bittern (B) Great Blue Heron (B) Sandhill Crane (B) Western Toad (I) Salish Sucker (F) Pelidne Sulphur (I) Hagen's Bluet (I) Rusty Blackbird (B) Jutta Arctic (I) American White Pelican	The sustainability of aquatic ecosystems requires maintaining naturally viable flows, adequate sediment and organic matter inputs, natural fluctuations in light and heat, clean water, and a naturally diverse plant and animal community (Baron et al. 2003). Because the health of watersheds depends largely on the integrity and quality of small streams, the riparian habitats of all streams that are connected to the reservoir or to grayling-inhabited rivers should be protected. The maintenance of proper riparian habitats will help considerably to the maintenance of clear and cool waters (Beaudry and Proulx 2006).

Class of Management Strategy	*Actions*	*Species*	*Comments*
	Maintain roads and right-of-ways in good condition. 6) Do not herbicide near aquatic ecosystems. 7) Prevent or minimize access to locations inhabited by species, particularly during the reproduction season. 8) Spawning and nesting areas should receive increased protection from habitat degradation and public access.	(B)	
3	1) Control forest encroachment, and favor a diversity of forage species. 2) Do not construct roads and limit use of existing roads over breeding areas. 3) Maintain cover near grasslands used by sheep, and throughout movement corridors. 4) In areas that have been logged, reforest at reduced stocking rates that promote understorey development (herbs, grasses and shrubs). 5) Do not apply herbicide in or near occupied habitats. 5) Exclude livestock from areas inhabited by these species. 6) When a special habitat feature (nest, lambing area, salt lick, etc.) is found, special measures should be taken to protect it and its surroundings, and avoid disturbance. Establish Wildlife Habitat Areas (WHAs) or wildlife tree patches/reserves over such areas. 7) Prevent the introduction of invasive species and control spread on ranges.	Long-billed Curlew (B) Short-eared Owl (B) Bobolink (B) Bighorn Sheep (M) Barn Swallow (B) Sharp-Tailed Grouse (B)	The habitat requirements of this group of species are largely associated with early-successional stages. Forestry practices, if properly conducted, can be used to enhance habitat quality.
4	1) Maintain mosaics of deciduous and mixedwood forests of early-. mid-, and late-successional stages. At least 50% of the managed landscape should provide animals with structured forests, interconnected with connectivity corridors. 2) Retain old-growth deciduous stands with decrepit large trees and snags. 3) Late-successional stands should have ≥ 30% canopy closure, and ≥20 m^2/ha basal area in mature trees. 4) Protect den areas. 5) Large coarse woody debris should be kept along streams, forest edges, and within wildlife tree patches (≥ 2 ha). 6) No activity during the breeding	Broad-winged Hawk (B) Northern long-eared myotis (M) Fisher (M) Wolverine (M) Grizzly bear (M) Olive-Sided Flycatcher (B) Magnum Mantleslug (I)	The protection of mosaics of successional stages, and the retention of mature and old-growth forests can be achieved through the implementation of a multi-species management program (see below).

Class of Management Strategy	*Actions*	*Species*	*Comments*
	season. 7) Do not apply herbicides in or near areas inhabited by these species. 8) Consider establishing Wildlife Habitat Areas to secure critical habitat features. 9) Minimize the density of active roads.		
5	1) Divide the landscape into high-, medium- and low- priority zones; 2) Harvest should be stopped in high-priority zones, and modified in medium- priority zones. 3) Maintain late-successional stands with arboreal and terrestrial lichens. 4) Establish Wildlife Habitat Areas over critical habitats such as calving grounds. 5) Minimize the density of active roads within the range of caribou populations.	Woodland Caribou (M)	Old forests are particularly important for caribou as they offer good visibility relative to younger forests, provide large supplies of arboreal and terrestrial lichen, provide good snow interception, a cooler microclimate during summer, and a diversity of plants greater than in other habitat types (Cichowski et al. 2003). The management of old forests for caribou can be conducted within a multi-species management program (see below).

The Multi-Species Management Approach

Monitoring and managing all aspects of biodiversity is difficult, time-consuming and costly. Also, developing specific management programs for each of the 27 species at risk found within the BCTS' operating areas would be expensive and likely redundant. Indeed, some of these species are difficult to inventory and monitor over time (e.g., American bittern), and many of them share similar habitats for which common management strategies can be applied (Table 1). It is therefore appropriate to consider a multi-species management approach for SAR with similar habitat requirements. Such an approach can integrate coarse-filter and fine-filter management approaches to develop comprehensive landscapes to maintain viable animal populations.

For example, in an effort to identify which late-successional stands to protect in Tree Farm Licence 30 in the Prince George Forest District, Proulx (2005) identified indicator species (species whose welfare and habitat requirements are representative of those of sympatric species) and SAR associated with mature and old-growth forests. Using American marten as a coarse-filter species, and fisher, wolverine and mountain caribou as SAR, he developed predictive distribution maps for each of these species on the basis of their specific habitat requirements. After validating predictive distribution maps in the field (e.g., Proulx 2006, Proulx et al. 2006), Proulx (2005) concluded that the distribution of high-quality habitats for each of these species overlapped witch each other throughout the landscape. While inventorying and monitoring wolverine is time-consuming and very expensive, the use of American marten distribution is sufficient to identify high-quality habitats that are used by this species at risk (Proulx 2005).

The multi-species management approach resulted in multi-species management areas for coarse- and fine –filter species. Because the identification of multi-species management areas is the result of bringing together the distribution of several species, there are fewer uncertainties about the value of such areas, and the model is more robust and realistic than theoretical models (e.g., Bunnell et al. 2003, Huggard 2004),

or models based on only one species. Once multi-species management areas have been identified, various habitat conservation measures (e.g., old-growth management areas, reserves, wildlife habitat areas, corridors, etc.), and a more effective road network may be implemented. Also, different harvest schemes may be proposed where multi-species management areas receive more protection at the expense of adjacent areas with less biodiversity potential where timber harvest mat be increased in a compensatory manner (Proulx 2005). It is noteworthy to mention that the distributions of animal SAR may be overlapped with those of plant communities at risk to better delineate the boundaries of multi-species management areas (Proulx and Bernier, unpubl. data). When plant communities cannot be protected within multi-species management areas, their conservation may be assured through a fine-filter approach where reserves are strategically identified across the landscape.

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7.0 VASCULAR PLANT MANAGEMENT STRATEGIES

Vascular plant species at risk are often overlooked by resource management field crews; however, an intensive field inventory of vascular plants by botanists over the entire PGBA is prohibitively costly. We currently have to rely on field crews to identify potential rare vascular plants. When potential populations are identified in the field by well trained forestry crews, a process to verify and manage the vascular plant population will be initiated. The following steps should be taken to manage vascular plants over large areas, and are described in further detail below:

- Staff Training – Identification and Management of Species at Risk
- Process to follow when potential rare vascular plants are identified in field
    - Record location, photograph population
    - Take sample of specimen (where appropriate)
    - Qualified RPBio review sample, confirm identification
    - When necessary, RPBio field visits location, determines extent of population
    - Population management strategies described and implemented in appropriate planning documents
- Monitor effectiveness of crews identifying potential plants at risk

7.1 Staff Training – Identification and Management of Vascular Plants at Risk

Having field crews with the ability to identify potential populations of rare and endangered plants is likely the most important component of vascular plant at risk management. There are no detailed vascular plant inventories or maps that can be referenced to help avoid vascular plants at risk. Field crews that are out walking the future roads and future harvest areas are responsible for identifying unusual habitats and the rare plants that may be found in these sites.

Once a year, all field staff and field based consultants should attend an identification workshop for species at risk that includes identifying and managing vascular plants at risk. At the end of the workshop, all staff and consultants should be aware of the proper protocol to follow if a potential vascular plant at risk is identified in the field. Field identification keys or guides to species at risk should be available in some format to all field crews. Consider an open book quiz at the end of the workshop to ensure staff proper comprehension of the concepts and main points of the workshop.

7.2 Confirming Identification of Potential Vascular Plants at Risk

7.2.1 Record Potential Location

When a potential vascular plant at risk is located in the field, crews should treat the population as though it were at risk until confirmation of species identification is completed. Flag the extent of the entire population, or the core area if the population is very large. Record the exact location, GPS the site, take photographs, obtain a specimen collection if necessary (see 7.2.2) and report the occurrence to the designated species at risk coordinator.

7.2.2 Collect Specimens Where Appropriate

To avoid further field visits for incorrectly identified vascular plants, field crews should collect a sample specimen for office identification by a qualified RPBio. If the specimen is clearly identifiable and is not a vascular plant at risk, no field validation will be necessary. Plant collection guidelines should be adhered

to when crews are deciding when and how to collect a sample for identification. The following guidelines are based on Douglas et al (2002), Proulx et al (2003), and Proulx and Bernier (2006).

Common sense should prevail when a rare plant species population is encountered. Where limited individual plants are encountered, it is recommended that the precise site location be recorded, photographs taken, and submitted to the species at risk coordinator for your company. Subsequent field visitation by a qualified RPBio can confirm the species presence.

If there are at least 20 individual plants and the population appears stable, a full plant specimen should be collected. Collections should be made of the entire plant, including the root system and reproductive structures. Avoid bending or folding the specimen while placing it in a plastic bag. Remove as much air as possible from the bag, being careful not to damage or compress any plant structures. Refrigerate the specimen for a period not exceeding 5 days if the specimen cannot be pressed the day it is collected.

A typical plant press consists of 2 pieces of plywood, cardboard, newspaper sheets and rope. Place the specimen on one side of the newspaper sheet with the other side folded over it. Rest the newspaper between two cardboard sheets and then pile specimens on a sheet of plywood. When all specimens have been prepared this way, put the other plywood sheet on top of the cardboard stack and squeeze the whole press together using rope. Plants dry out in this type of press in 5-10 days. Label each specimen with the plant name, location, date, collectors name and description of the plant habitat.

7.2.3 Confirm Identification

Identification of unusual vascular plants should be completed by a trained botanist, who will use macroscopic and microscopic identification keys to confirm the taxonomy of the collected specimen. All confirmed vascular plants at risk will be field reviewed by an RPBio trained as a botanist. The field validation will confirm the extent of the population, and the CDC Field Survey Form for plants (AppendixXXX) will be completed. Information will be sent to the CDC for consideration of an official element occurrence.

7.2.4 Implement Appropriate Stand Level Management

All plant populations at risk and the habitat they are found in should be protected; therefore, site-specific /stand-level strategies for all rare plants are generally the same. The following lists the overall management recommendations for IWMS plants (Paige and Hartwell, 2002; Penny, 2002; British Columbia, 2004):

- establish core area around element occurrence, providing a 30-50m-wide buffer around population perimeter;
- maintain microclimate conditions in core area;
- establish a management zone around core area, between 150-200m-wide around the buffer;
- do not harvest within the core area, unless harvesting is aimed specifically at improving the habitat for the particular rare plant species;
- partial harvest in management zone, retaining 60% basal area, wind-firmness of stand and any critical habitat species (i.e. deciduous component);
- do not allow road or trail construction within or upslope of element occurrence, unless absolutely necessary;
- deactivate temporary roads;

- where roads already exist or are necessary, ensure road is not altering hydrology of element occurrence habitat, do not allow road maintenance activities to destroy or alter element occurrence (i.e., do not mow or use herbicides/pesticides); and
- if seeding occurs, use native species (prevent spread of exotic plant species).

7.3 Stand level Monitoring

A percentage of proposed roads and cutblocks should be assessed by a botanist, looking for vascular plants at risk. The effective management of vascular plants at risk is highly dependent on field crews identifying unusual vascular plants when they are encountered. An effectiveness monitoring program should be implemented that includes an RPBio's assessment of a portion of blocks and roads where no vascular plants at risk were identified to ensure field crews are, at a minimum, capturing the obvious populations of vascular plants at risk (Proulx and Bernier, 2006).

7.4 Landscape Level Rare Plant Assessment

There are no known rare plant inventories or assessments in the PGBA. It is suggested that a rare plant assessment be completed in the future, to help identify where the most likely locations are for vascular plants at risk. This assessment would include:

- theming base inventories (PEM, VRI, TRIM, etc) for potential habitat for each vascular plant at risk
- field confirming the existence of all known populations, mapping their entire extent,
- field checking a portion of the areas mapped as potential habitat for vascular plants at risk
- final mapping

Completing a full rare plant inventory in the PGBA would be cost prohibitive; however, a more general rare plant mapping and assessment exercise can be a useful planning tool. These potential rare vascular plant maps allow planners to avoid sensitive areas or potential vascular plant at risk habitat when developing cutblocks. These maps can also be reviewed by field crews prior to their field visitation, to highlight which species that may be encountered in their area.

7.5 References and Additional Reading

Paige and Hartwell 2002 (IWMS 2002)
Penny 2002 (tall bugbane)
IWMS/Province of BC 2004
Douglas et al 2002 (rare plants of BC)
Proulx and Bernier 2006 (Canfor FIA report)
Proulx et al 2003 (Coastal guide)

8.0 PLANT COMMUNITY MANAGEMENT STRATEGIES

Managing plant communities at risk is ideally performed at the landscape level. An effective landscape level management strategy requires a detailed sensitive ecosystem inventory (SEI), a focused representation analysis, defined area targets for conservation, and commitment from multiple stakeholders.

Large portions of the PGBA have adequate ecosystem mapping available and sensitive ecosystem inventories have begun in the Prince George Forest District (Timberline, 2006). However, a full landscape level management plan for plant communities at risk will take 2-5 years to complete properly. Preferably, this would be completed within a multiple species and community management program (see section 6).

Until the landscape level information is available, plant communities have to be managed at the stand level. The stand level management program relies on:

- adequate training of staff to identify and manage plant communities
- clearly defined internal process for BCTS staff to follow after an occurrence of a community has been identified in the field
    - Recording plant community data in the field
    - Reviewing minimum sizes for occurrences of interest
    - Completing an office assessment
    - Completing a field assessment when necessary
    - Following stand level management recommendations in site plans
- Using an effectiveness monitoring program to ensure program is working properly

The following sections describe the specific components of a stand level management program in detail.

8.1 Staff Training

Training field crews to identify plant communities at risk is a critical component of stand level management. If crews are not able to recognize that a road or block is scheduled to remove a portion of or all of a plant community at risk, they have committed an error of omission, and the stand level management strategies will fail. Errors of omission are dangerous because BCTS may believe they are doing an effective job managing rare and endangered plant communities when in reality, these sensitive plant communities are still being harvested unnecessarily and unknowingly.

8.2 Stand level Management Strategies

In absence of the tools to effectively manage plant communities at a landscape level, stand level management is necessary. The following sections describe the basics of a program designed to trigger a series of additional steps when a plant community at risk has been identified in the field.

8.2.1 Initial Field Observation

It is important for all field crews to be aware of plant communities at risk in their area, whether they are laying out roads or working on a block, prior to going to the field. Appendix XXX summarizes all plant communities at risk by BGC variant, and should be referenced by crews prior to any trips to the field. IN addition, if ecosystem mapping or a sensitive ecosystem inventory has been completed, crews should refer to these products to determine if a plant community at risk has already been mapped in their area.

When a potential plant community at risk is identified, crews should complete the BCTS Species at Risk Field Observation Form. As much detail as possible should be recorded on the forms. Additional field assessments may be avoided if enough information is provided by the original field crew. Photographs of the community, extra soils information, and complete vegetation lists are very important for office confirmation.

8.2.2 Minimum Sizes by Community Type

Not all occurrences of plant communities at risk require special management strategies. The first method is to rule out small occurrences of plant communities. The minimum size used for plant communities is based on the type of community. There are matrix, large patch, small patch and linear community types. Definitions of each are reproduced below from the CDC website (http://www.env.gov.bc.ca/cdc/ecology/patterns.html):

A. *Matrix Community*: Communities that form extensive and often contiguous cover may be categorized as matrix (or matrix-forming) community types. Matrix communities occur on the most extensive landforms and typically have wide ecological tolerances. Individual Element occurrences of the matrix type typically range in size from 2,000 to 405,000 ha (approximately 5000 to 1,000,000 acres). In a typical ecoregion, the aggregate of all matrix communities covers, or historically covered, as much as 75-80% of the natural vegetation of the ecoregion. Any matrix occurrence is likely to have large patch and small patch occurrences embedded within it. Matrix community types are often influenced by large-scale processes (e.g., climate, fire), and are important habitat for wide-ranging or large area-dependent fauna, such as large herbivores (e.g., bison).

B. *Large Patch Communities*: Communities that form large areas of interrupted cover may be categorized as large patch community types. Individual EOs of this community type typically range in size from 20 to 2,000 ha (approximately 50 to 5000 acres). Large patch communities are associated with environmental conditions that are more specific than those of matrix communities, and that are less common or less extensive in the landscape. In a typical ecoregion, the aggregate of all large patch communities covers, or historically covered, as much as 20% of the natural vegetation of the ecoregion. Like matrix communities, large patch community types are also influenced by large-scale processes, but these tend to be modified by specific site features that influence the community.

C. *Small Patch Communities*: Communities that form small, discrete areas of cover may be categorized as small patch community types. Individual EOs of this community type are typically 20 ha (approximately 50 acres) or less. Small patch communities occur in very specific ecological settings, such as on specialized landform types or in unusual microhabitats. In a typical ecoregion, the aggregate of all small patch communities covers, or historically covered, only as much as 5% of the natural vegetation of the ecoregion. Small patch community types are characterized by localized, small-scale ecological processes that can be quite different from the large-scale processes operating in the overall landscape. The specialized conditions of small patch communities, however, are often dependent on the maintenance of ecological processes in the surrounding matrix and large patch communities. In many ecoregions, small patch

communities contain a disproportionately large percentage of the total flora, and also support a specific and restricted set of associated fauna (e.g., invertebrates, herpetofauna) dependent on specialized conditions.

D. *Linear Communities*: Communities that form, as linear strips are often, but not always, ecotonal between terrestrial and aquatic systems. Examples include coastal beach strands, bedrock lakeshores, and narrow riparian communities. Similar to small patch communities, linear communities occur in very specific ecological settings, and the aggregate of all linear communities covers, or historically covered, only a small percentage of the natural vegetation of the ecoregion. They also tend to support a specific and restricted set of associated flora and fauna. Linear communities differ from small patch communities in that both local scale processes and large scale processes, such as lake/ocean currents or river flow regimes, strongly influence community structure and function. This characteristic often leaves these communities highly vulnerable to alterations in the surrounding land and waterscape.

The recommended minimum size for deciding whether an office assessment is required is as follows:

1. Matrix Community: 2.00 ha
2. Large Patch Community: 0.40 ha
3. Small Patch Community: 0.05 ha
4. Linear Community: 30 m in length

The table below classifies each of the plant communities at risk into the designated community type, sorted by English name.

ENGLISH NAME	COMMUNITY TYPE
Balsam poplar, black cottonwood – spruces / red-osier dogwood	Small Patch
Black cottonwood – subalpine fir / devils club	Small Patch
common juniper / bluebunch wheatgrass	Small Patch
Douglas-fir - hybrid white spruce / electrified cat's-tail moss	Large Patch
Douglas-fir - hybrid white spruce / falsebox	Large Patch
Douglas-fir - hybrid white spruce / knight's plume	Large Patch
Douglas-fir - hybrid white spruce / thimbleberry	Large Patch
Douglas-fir - lodgepole pine / clad lichens	Small Patch
Douglas-fir - subalpine fir / black huckleberry	Small Patch
Douglas fir – Western redcedar / wavy-leaved moss	Large Patch
Douglas-fir / Douglas maple / step moss	Large Patch
hybrid white spruce / black huckleberry - falsebox	Large Patch
hybrid white spruce - paper birch / devil's club	Large Patch
hybrid white spruce / falsebox / knight’s plume	Large Patch
hybrid white spruce / foam lichens	Small Patch
hybrid white spruce / hardhack	Large Patch
hybrid white spruce / hardhack - prickly rose	Large Patch
hybrid white spruce / hardhack / oak fern	Large Patch
hybrid white spruce / horsetails - western meadowrue	Large Patch
hybrid white spruce / soopolallie - falsebox	Large Patch

ENGLISH NAME	COMMUNITY TYPE
hybrid white spruce / ostrich fern	Linear
hybrid white spruce / pinegrass / step moss	Large Patch
lodgepole pine - black spruce / red-stemmed feathermoss	Large Patch
lodgepole pine / Labrador tea – velvet-leaved blueberry	Small Patch
lodgepole pine - clad lichens - juniper haircap moss	Small Patch
lodgepole pine / common juniper - falsebox	Large Patch
lodgepole pine / black huckleberry - velvet-leaved blueberry	Large Patch
lodgepole pine / black huckleberry / reindeer lichens	Small Patch
lodgepole pine / dwarf blueberry / peat-mosses	Small Patch
lodgepole pine / falsebox / pinegrass	Large Patch
lodgepole pine / Kruckeberg's holly fern - Indian's-dream	Small Patch
lodgepole pine / Labrador tea - velvet-leaved blueberry	Large Patch
lodgepole pine / velvet-leaved blueberry / clad lichens	Small Patch
subalpine fir / alders / horsetails	Small Patch
Subalpine fir / reindeer lichens – clad lichens	Small Patch
Subalpine fir / white flowered rhododendron / sitka valerian	Small Patch
western hemlock - western redcedar / clad lichens	Small Patch
Western hemlock / common juniper - falsebox	Small Patch
western hemlock / false azalea / clad lichens	Small Patch
western hemlock / velvet-leaved blueberry - falsebox	Large Patch
western hemlock / wood horsetail / peat-mosses	Small Patch
western redcedar – paper birch / oak fern	Small Patch
western redcedar / devil's club / ostrich fern	Linear
western redcedar / falsebox	Small Patch
western redcedar / falsebox / wild sarsaparilla	Small Patch
western redcedar / oak fern - bunchberry	Small Patch
western redcedar / oak fern / electrified cat’s-tail moss	Small Patch
western redcedar / prince's pine / electrified cat's-tail moss	Large Patch
western redcedar / red raspberry / oak fern	Small Patch
white spruce / oak fern – wild sarsaparilla	Large Patch
white spruce / red swamp currant / horsetails	Small Patch
white spruce / red swamp currant / tall bluebells	Large Patch
white spruce – subalpine fir / black huckleberry / red-stemmed feathermoss	Large Patch

8.2.3 Office Assessment

An office assessment of a potential plant community at risk is normally completed by an RPBio, experienced in evaluating the conservation status of terrestrial ecosystems. Some plant communities will have to be assessed in the field; however, many of the identified stands can be evaluated in the office and a management strategy employed without the expense of another field visit.

Crews should submit the following materials for an office assessment:

- SAR field observation form (s);
- SP eco cards;
- General location map;
- Block location map;
- Layout field map (with site series labeled if completed);
- Stereo pairs of aerial photos for block and surrounding area; and
- Digital photos (if available).

For each plant community occurrence, the office assessment evaluates the:

- Size;
- Condition; and
- Landscape context.

Where possible, a ranking of the overall size, condition and landscape context of the community will be determined, and ranked as follows:

- A – Excellent;
- B – Good;
- C – Marginal (fair); and
- D – Poor.

Using these rankings, an overall occurrence ranking will be determined when possible. Excellent and good occurrences generally require conservation measures (see 8.2.5), while marginal and poor occurrences do not normally require conservation.

If there is not enough information available from the original field observation forms, an additional field visit may be necessary, to confirm the classification and evaluate the condition and size of the occurrence.

8.2.4 Field Assessment

An additional field visit will be required when the office evaluation can not determine a conservation status with a high degree of certainty. The need to evaluate the condition of a stand or lack of information on the original field cards is usually what triggers a field visit by a terrestrial ecologist. For example, if the size and landscape context rankings are marginal to good in the office, the condition of the stand will often determine whether the occurrence should be conserved or not. The condition of a stand is not easily evaluated in the office, as this ranking takes into account structural development, forest health, how representative the plant community expression is, and various other site and soil conditions of the stand.

Should a field visit be required, the ecologist will confirm the identification of the plant community, as well as evaluate the size, condition and landscape context of the identified stand. A FS882 ecosystem/soils field form or a Ground Inspection Form (GIF) will be completed in at least one location within the plant community of interest. BCTS personnel responsible for planning of the proposed road or block are encouraged to join the ecologist, to aid in the specific decisions that may have to be made to adjust block boundaries.

A completed conservation assessment report will be submitted by the ecologist who performed the conservation assessment. If the plant community is recommended for conservation and BCTS follows the

recommendations in the report, a package of information should be sent to the CDC in Victoria that includes:

- Conservation assessment report;
    - Photographs of the plant community
    - Copies of GIF or FS882
- Location maps;
- Copies of air photos depicting location.

8.2.5 General Management Guidelines

Forested floodplains, uplands and wetlands generally have similar management guidelines and are described below. All non-forested communities are grouped together because they are typically not a major concern for the forest industry. However, general recommendations for the management of these communities are provided in the following sections. These guidelines will be included in an office or field conservation assessment report, tailored to the specific stand of interest. Inclusion of communities (plus a buffer) in a WTP, and moving access roads to avoid specific plant communities are the most common management guidelines.

8.2.5.1 Forested Floodplain Communities

Forested floodplains are particularly sensitive to edge effect caused by adjacent harvesting, and they are highly susceptible to changes in local hydrology. Forested floodplains depend on seasonal fluctuations in water tables. When planning activities adjacent to these communities, staff should ensure roads, bridges and culverts are planned to minimize any change in the hydrology, particularly in the flooding regimes of these communities.
All good and excellent quality forested floodplain plant communities should be protected from harvesting. A 100 m-wide natural buffer with no harvesting permitted should be placed around all edges of the community. Avoid activities that could cause the spread of invasive species, reduce future access to the community where possible and ensure local hydrology is not affected upstream of the community.

8.2.5.2 Forested Upland Communities

Forest management activities have their greatest impact on forested upland plant communities. These communities are on the red or blue list for a variety of reasons, including

- Specific sites for this community are rare on the landscape;
- Climax communities are endangered due to over-harvesting, or land conversion for agriculture, urban areas, etc;
- They are endemic to British Columbia.

Regardless of the reason they are at risk, the management guidelines will generally be the same for forested plant communities. Specific management strategies are employed after a conservation assessment has determined that the specific occurrence of the plant community has a good or excellent conservation value. All good and excellent quality forested upland plant communities should be protected from harvesting, usually as in inclusion to a WTP. In addition, a no-harvest buffer of at least 1 tree length (minimum 25m) should be placed around the entire occurrence. Connectivity with other mature forest should be retained through forested corridors. Silviculture practices should encourage as much natural regeneration as possible (trees, shrubs, herbs and mosses), and reduce the chance of spreading invasive plant species into the nearby plant communities.

8.2.5.3 Forested Wetland Communities

Forested wetlands are usually not a concern for forest managers except when local hydrology may be altered by harvesting practices. Wetlands have been destroyed in the past when water input or output has been affected. Special care should always be taken around wetlands, at risk or not at risk, to maintain hydrological flow regimes.

All forested wetland communities at risk should be conserved with at least a 50 metre buffer with no harvesting. Connectivity to other mature forest should be retained to promote continued usage of the wetland after harvesting by wildlife, thereby maintaining a functional community. Special attention should be given to the local hydrology, especially if harvesting takes place around and upslope of the wetland.

If the community is within a Non-Classified Wetland (NCW) or W3, features which do not require a reserve zone, an appropriate 50m reserve zone should be established.

8.2.5.4 All Non-Forested Communities

Non-forested communities include shrubby floodplains, non-forested wetlands, grasslands, and alpine tundra areas. While most of these areas are not a direct forest management concern, special care needs to be taken when working adjacent to these areas.

Non-forested floodplains are especially sensitive to changes in local flooding regimes; therefore, activities that take place upstream and adjacent to these communities can not affect the hydrological flow patterns in the area. These communities are normally protected in riparian reserves and riparian management areas, and site plans should ensure that the recommended widths of these reserves is sufficient to maintain the sensitive communities along floodplains.

Non-forested wetlands and wetland transition areas are normally protected in standard riparian reserves. All non-forested wetland communities at risk should be conserved with at least a 50 metre buffer with no harvesting. Connectivity to other mature forest should be retained to promote continued usage of the wetland after harvesting by wildlife, thereby maintaining a functional community. Special attention should be given to the local hydrology, especially if harvesting takes place around and upslope of the wetland.

Grassland communities found on steep, south aspect slopes are not normally forest management concerns; however, they are susceptible to over-grazing by cattle. If forestry activities take place adjacent to grassy slopes, ensure these areas are marked machine free zones, and do not cut roads or skid trails through these areas. A buffer is not required on these communities as long as a no-access rule is enforced.

Alpine and subalpine plant communities are very sensitive to nearby forestry practices, and these areas should be avoided where possible. If harvesting is to take place in higher elevations that have subalpine meadows, avalanche tracks, etc nearby, the site plan should address how these areas will be avoided. Buffers of at least two tree lengths (50 metres) should be placed around any non-forested high elevation plant communities.

8.3 Effectiveness Monitoring

A percentage of proposed roads and cutblocks should be assessed by an ecologist, looking for plant communitites at risk. The effective management of plant communities is highly dependent on field crews identifying them accurately when they are encountered. An effectiveness monitoring program should be implemented that includes an RPBio's assessment of a portion of blocks and roads where no plant communities at risk were identified to ensure field crews have not missed rare or endangered areas (Proulx and Bernier, 2006).

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