

# **Bulkley Silviculture Strategy**

## **2<sup>nd</sup> Edition**

Prepared by the Bulkley Silviculture Committee  
2001

Approved by: \_\_\_\_\_ Date: \_\_\_\_\_

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## Strategy at a Glance

### Purpose:

- Identify and provide strategies for product targets.
- Create a long-term timber supply that supports a steady wood flow in the Bulkley TSA.
- Guide preparation of silviculture and stand management prescriptions.
- Rank stands for silviculture investments.
- Decrease long-term timber supply fall down.
- Protect values identified in higher level plans.
- Achieve early green up of harvested areas and,
- Increase regenerated stand volumes.

### Forest Product Targets:

- **Sawlogs:** Manage 50% of the annual harvested area to maximize mean annual increment while maintaining sawlog target piece size and minimizing rotation.
- **Premium Sawlogs:** Manage 10% of the annual harvested area for premium Pine sawlogs.
- **Increased Yield:** Manage 25% of the annual harvested area for increased yield opportunities that may produce a variety of products through rotation.
- **No Target:** 15% of the annual harvested area will not be managed for product targets.

### Silviculture Investment Priorities:

- Establish silviculture investment priorities based on the Bulkley LRMP direction.

	<b>Silviculture Priorities</b>		
<b>LRMP Zone</b>	Backlog	Fall Down	Incremental
ETD	VH	H	VH
IRM	H	H	H
LC	M	L	L
SMZ 2	M	L	L
RMZ	M	L	L
Other Zones	L	L	L

# Bulkley Silviculture Ranking Key April, 2001

<b>CP:</b> _____	<b>BLK:</b> _____	<b>Opening #:</b> _____
<b>Location:</b> _____		<b>Stratum</b> _____

**1. Landscape Points**

Enhanced Timber (1 Point)	IRM (2 Points)	Landscape Corridor (3 Points)	SMZ (4 Points)
RMZ (5 Points)	Ag/Wildlife (6 Points)		Other Zone (10 Points)

**Landscape Points:**  
\_\_\_\_\_  
**Go to Step 2**

**2. Is the treatment considered? "B: Backlog Silviculture"**

**Yes (2 points) plus**

SR/NSR	Risk	Points
SR	High Risk	1
NSR	N/A	2
SR	Mod Risk	3
SR	Low Risk	10

**Backlog Silviculture Points:**  
\_\_\_\_\_  
**Go to step 5**

**3. Is the treatment for limiting? "C: Fall Down"**

no

**Yes (3 points) plus**

Age / Site Index		
Age	SI <sub>50</sub>	Points
<b>Immature:</b>		
21-80	20+	1
41-80	16-19	2
61-80	<16	3
other		10

**Fall Down points:**  
\_\_\_\_\_  
**Go to Step 5**

**4. Is the treatment considered? "D: Incremental Silviculture"**

no

**Yes (4points) plus**

Density	
<b>"Effective" Stand Density</b>	<b>Points</b>
>4000 stems/ha	1
600 to 900 Prunable Pine stems/ha	2
2250-4000 stems/ha	3
Other	6
<b>Effective Density _____stm/ha</b>	

..... Site Index:	
SI <sub>50</sub>	Points
19+	1
16-18	3
<16	5

**Incremental Points**  
\_\_\_\_\_  
**Go to step 5**

**5. Add Forest Health**

Risk Level	Points
No Risk	0
Low Risk	1
High Risk	20

**Forest Health Points:**  
\_\_\_\_\_

**Completed By:** \_\_\_\_\_  
**Date:** \_\_\_\_\_

**Treatment Recommended:** Yes / No    If yes    **YEAR** \_\_\_\_\_

**Target   Sawlogs   Increased Yield   Premium Sawlog   Other   (circle)**

Comments: \_\_\_\_\_

Note: Remember to consider Forest Health issues before recommending treatment  
Note: The lowest point total receives the highest treatment priority.  
Note: Stands already spaced have a higher priority for treatment.

**Total Points**  
\_\_\_\_\_

# Silviculture Strategy in the Bulkley TSA.

## Introduction:

Since the early 1970's, harvesting forests and milling logs into lumber and chips has been a major industry in the Bulkley Timber Supply Area (TSA). It was not until 1982 that replanting these forests began in earnest and in 1987 planting trees after cutting became the duty of the logging companies. Since the highest risk in growing forests is at establishment, the government passed legislation requiring the companies to manage these stands, past the establishment stage into a period called Free Growing.

Today, many of these forests are at this free growing stage. **It is critical** to set these forests on a managed path to ensure that future managed forests will produce a range of forest products at rotation. This strategy recognizes that forest stands growing larger, knot free logs, produce less volume, but very high valued products, such as veneer, window frames, and door jams, while forest stands growing smaller logs, produce a higher volume of fiber or small dimension lumber at a lower value. Biologically all these products are acceptable on most sites in the Bulkley TSA, but choices are difficult. It takes many years to grow these forests to a harvestable age. No one can guess which product will be the most desirable at harvest time, but Foresters must make choices. Once an initial path is chosen and implemented, changes can be difficult, if not impossible to achieve. This strategy is intended to help Foresters make the right choices. Choices that are consistent with the Bulkley TSA's current thinking on desired forest products. Choices that minimize risk and maintain options for the future of the forests.

Some forests in the Bulkley TSA, as determined by the Bulkley LRMP, have a higher value as unmanaged forests. These natural values include wildlife, fisheries, soil, biodiversity, water quality and visual quality. Some of these forests can produce log products as well, but not at the cost of these other values.

The Chief Forester in TSR 1 also predicted a fall down in the yearly allowable cut over the next 20-80 years. Failing to address fall down could adversely affect the future economy of the TSA. Silviculture methods, such as commercial thinning, fertilization, and juvenile spacing can reduce some of this fall down.

## Purpose:

- Identify and provide silviculture strategies that will produce timber product targets.
- To provide a plan for regenerating and tending forests that will create a long-term timber supply that supports a steady wood flow in the Bulkley TSA.
- To provide guidance in the completion, assessment, and approval of silviculture and stand management prescriptions.

- To provide an independent ranking key to rank areas for silviculture investments for annual district silviculture investment planning and funding.
- To decrease long term timber supply fall down anticipated by TSR 1
- To protect other natural values by implementing a landscape and stand planning hierarchy that focuses silviculture treatment on higher timber value areas while limiting treatments on areas with higher natural values.
- To achieve early green up of harvested areas, and
- To increase regenerated stand volumes on enhanced timber areas.

## **Key Elements of this Silviculture Strategy:**

- **Area Defined:**

This strategy applies to the Bulkley Timber Supply Area (TSA).

- **Landscape Planning Hierarchy**

This strategy is consistent with the following landscape planning hierarchy of B.C.:

- A. Forest Practices CODE of B.C. Act
- B. Bulkley Higher Level Plan
- C. Landscape Unit Planning Objectives.
- D. District Manager Policy.

- **Stand Planning Hierarchy**

The stand planning hierarchy in the Bulkley TSA is:

- A. Basic Silviculture
- B. Backlog Silviculture
- C. Silviculture Strategy to Reduce Fall Down
- D. Incremental Silviculture
- E. Silviculture Strategy for Non Merchantable Timber Types

- **Landscape and Stand Forest Health Strategy**

A Bulkley Forest Health Strategy that complements the silviculture strategy and gives direction to landscape and stand level silviculture.

- **Quality**

Quality of planning, prescription development, and delivery of all silviculture treatments within the context of good forest stewardship is required.

- **A Range of Tree Species:**

A range of tree species, both coniferous and broad-leaved, based on the Biogeoclimatic Ecological Classification of BC and biodiversity criteria defined in the Landscape Unit Plan objectives.

- **A Range of Densities**

A range of managed and unmanaged stand densities that will produce a diversified portfolio including:

1. A range of quality and quantity of timber products and
  2. Diversity in future forest structure and habitat conditions.
- **A Range of Landscape Seral Stage Distributions.**  
Considering natural disturbance types (NDT) is a key element of a silviculture strategy. Silviculture planners must consider these types in determining the long-term management objectives of silviculture prescriptions. Biodiversity Objectives of the Landscape Unit Plans describe this key element more fully.
  - **Silviculture Opportunities Plan.**  
Prepare Silviculture Opportunity Plans in the Bulkley TSA by landscape unit planning areas. Identify silviculture opportunities, in more detail, by landscape unit, to achieve the desired forest product target distribution identified in this strategy.
  - **Product Targets.**  
These targets should be TSA wide and may vary geographically depending on Landscape Unit Plan objectives. These targets will: A. Achieve a balance of volume and product goals across the TSA B. Be cost effective and C. Achieve a bell curve distribution of tree density ranges in the TSA.
1. **Sawlogs:** Manage approximately **50%** of the annual harvested area or approx. 1,500 ha in the Bulkley TSA to achieve the minimum sawlog targets in Table 1. These targets will maximize Mean Annual Increment (MAI) while maintaining piece size and minimizing harvest age by using Topsy for TASS to model stands. Using current silviculture treatment regimes, expect these stands to grow to maturity without further density control. Maximum **recommended** effective density at free growing on these stands is 2,250 stems/ha. “Effective Density” is defined as, the number of trees/ha that are taller than 50% of the median height of preferred and acceptable species.

Table 1

Leading Species	Site Index	Mean Diameter Dq	Volume/ha
Pine	<19	21 cm	275 m3
Pine	19+	22 cm	325 m3
Other Conifers	<20	25 cm	400 m3
Other Conifers	20+	25 cm	450 m3

2. **Premium Sawlogs:** Manage approximately **10%** of the annual harvested area (300 ha) for high quality, high value, 35 cm diameter, clear saw log production. Stands with a Pine species component of greater than 80% and a site index > SI 19 will be the preferred location for incremental treatments. To achieve premium sawlog objectives, stands with trees that have small tight ringed core and effective densities that exceed 2250 stem/ha are preferred initially. Spacing and pruning are then prescribed to bring the density down to less than 900 stems/ha.

3. **Increased Yield:** Manage approximately **25%** of the annual harvested area (750 ha) for increased yield. Increased yield defines a group of stands, which due to high initial densities will not produce the minimum **Sawlog** target diameters prior to culmination age. Rather than reduce these densities to achieve sawlog target diameters, at an early age, future interventions (commercial thinning during the forecast fall down in the TSA) are prescribed to remove anticipated mortality (increased yield) from over crowding and set the stand up to achieve sawlog targets. Baseline modeling of average stand types within the Bulkley TSA suggests that effective densities greater than 2250 stems/ha, at free growing, provide suitable opportunities to implement intermediate harvests before stand rotation
4. **No Target:** No specified managed product targets for 15% of the harvested area. No managed targets are set for landscape zones such as Landscape Corridors and Special Management Zones where other values take precedent over targets. It is expected that timber produced from these areas will be utilized to the best product available at the time of manufacture.

Monitor the target percentages as part of the TSR process every fifth year.

## **Key Elements of Silviculture Prescriptions:**

The legal content requirements or key elements of silviculture prescriptions (including Silviculture, Stand Management, and Backlog Prescriptions) are outlined in the Forest Practices CODE of B.C. Act and Regulations. However, Foresters agree that the following additional key elements **should** also be included to achieve strategic landscape and stand objectives. It is understood that stand objectives are based on the best current information and growth models and that long-term objectives are only projections. It is also understood that if future legislation removes any elements, that they be added to the following list.

- Prescriptions are long term planning tools and therefore, **should** contain specific long-term management objectives for all values identified at the landscape and stand level.
- Prescriptions **should** identify one of the four product options.
- *Stand Management Prescriptions (SMPs) or Silviculture Treatment Regimes (STRs)* **should** prescribe intermediate harvest volume and piece size targets as part of the long term management objectives for each standard unit or forest stand. These targets include objectives for species, rotation age, quadratic mean stand diameter or Dq, mean annual increment or MAI, volume per ha, and stems per.
- *Stand Management Prescriptions (SMPs) or Silviculture Treatment Regimes (STRs)* **should** prescribe treatments that maintain the long-term health (greater than 250 years or 3 rotations) of each forest ecosystem. They should also maintain the long-term productivity of the forest site or Site Value.



- *Stand Management Prescriptions (SMPs) or Silviculture Treatment Regimes (STRs) should estimate all treatments and year of treatments to achieve the target product option.*
- *Site Index is a key element to predict height growth at age 50 years.*

In conclusion, this strategy acknowledges that silviculture and treatment regimes may vary site by site and forester by forester because they are as much an art as they are a science. This **variance** is also a key element of a silviculture prescription.

## **Landscape Zones:**

The current **Bulkley Higher Level** defines Landscape and Resource Management Zones and Stand Level Zones as a requirement under the Forest Practices CODE Act of B.C. The forest management direction from the Bulkley Higher Level Plan and the CODE for these zones cover a range of land uses from primary timber to one restricted to virtually no harvesting. It is crucial to outline the silviculture strategy for each zone to avoid conflict with this higher level direction.

### **1. Enhanced Timber Development Zone. (ETD)**

Backlog, Basic, Incremental Silviculture, Fall Down, and Non Merchantable are high priority in this zone. Minimize regeneration delay to 2 years or less. Emphasize silviculture systems that optimize timber production. Use genetically improved seed or superior planting stock. Optimize the site value or soil expectation at physical rotation. Optimize the numbers of well-spaced conifer stems/ha. Limit the mapable NSR within this landscape zone to less than 3%. Target early free growing windows. Identify and treat backlog areas promptly. Shorten time between treatment identification and treatment by allowing exemptions for Backlog Silviculture Prescriptions for mechanical brush treatments on Aspen, Birch, and Cottonwood in the ICH and SBS subzones. Give priority to spacing, pruning, fertilizing and intensive brushing and weeding treatments in this zone. Give high priority to regenerating temporary roads and landings. Maintaining permanent access roads for long-term management is important in this zone. Silviculture opportunity plans are a high priority in this zone.

### **2. Integrated Resource Management Zone (IRM).**

Silviculture treatments must be compatible with resource values where identified in higher level plans or stand level prescriptions. Use the whole range of ecologically suitable silviculture systems to meet the various IRM objectives. Identify, harvest and/or treat Backlog, Non Merchantable and Fall Down areas where possible. Limit the mapable NSR within this landscape zone to less than 3%. Exempt Backlog Silviculture Prescriptions for mechanical brush treatments on Cottonwood, Aspen, and Birch in the ICH subzone. Incremental silviculture has a moderate priority in this zone. Use the

Coffin Lake Ungulate/Silviculture Vegetation Management Plan (1994) for silviculture practices direction in the Valley Landscape Unit until the landscape unit plan is approved. Limit the need for intensive brushing, by planting larger stock, choosing or preparing good micro sites for planting and using fertilizers. For Retention and Partial Retention VQO areas consider faster growing species, at higher than normal densities, and/or fertilize at time of planting to speed visual and hydrological green-up.

### 3. Landscape Corridors (LC)

Basic, backlog, and incremental silviculture treatments must protect and enhance biodiversity and wildlife habitat, protect forest health and maintain 70% of the forest's structure and function. Select silviculture systems for landscape corridors that will maintain forest health and harvest levels over the rotation. Long rotation forests should be an objective included in prescriptions. The use of shelterwood silviculture systems and commercial thinning are possible options for maintaining structure and function while still maintaining wood flow (See Landscape Unit Plans). Non Merchantable and Fall Down treatments have a low priority in this zone.

### 4. Special Management Zone 2: (SMZ 2)

Backlog, basic and incremental silviculture treatments must be consistent with the SMZ 2 objectives for these sensitive resource areas. Priority varies between zones. Treatments should enhance other values if possible. Do not treat Non Merchantable and Fall Down areas in this zone.

### 5. Riparian Management Zone. (RMZ)

This is a stand level zone. Harvesting strategy will determine basic silviculture in this zone. Low priority on all other strategies. Protect all trees including hardwoods designated for retention during harvesting. Ensure that site preparation methods protect stream bank integrity and minimize soil disturbance. Limit the use of herbicides to protect the water quality and fishery's values.

### 6. Agriculture/ Wildlife Zone.

Generally, harvesting occurs in response to forest health agents. Require Basic Silviculture. Prefer natural regeneration of conifers and/or broad-leafed trees to achieve the original timber type species mix. Extend regeneration delay and reduce stocking standards if necessary. Enhance other values if possible. Only existing plantations at high risk require backlog silviculture. Do not conduct incremental silviculture in this zone. Consider Agro/Wildlife options for all silviculture treatments.

## 7. Settlement Zone.

Harvested areas require basic silviculture treatments. Generally harvesting will only occur for forest health reasons. Regeneration of conifers and/or hardwoods to achieve the original timber type species mix is desirable. Enhance other values if possible. Do not conduct incremental or backlog silviculture in this zone.

## 8. Core Ecosystems. (CORE)

Openings greater than 1 ha require restocking. Artificial regeneration is not recommended unless the stocking objective is Pine. Do not conduct backlog or incremental silviculture in this zone. (See landscape unit plans)

## 9. Riparian Reserve:

Riparian Reserves are stand level zones. Silviculture treatments maybe required to rehabilitate riparian values, but no harvest is allowed in this zone

## 10. Special Management Zone 1: (SMZ 1)

Restore original forest values, where possible, after mineral exploration.

## 11. Protected Areas: (PA)

No, silviculture treatments required in this zone. A future park plan or protected areas may include a harvest, protection, forest health, and silviculture strategy.

# Landscape Ranking Table

Enhanced Timber (1 Point)	IRM (2 Points)	Landscape Corridor (3 Points)	SMZ (4 Points)
RMZ (5 Points)	Ag/Wildlife (6 Points)		Other (10 Points)

## Stand Level Silviculture Treatment Regimes:

Stand level silviculture treatment regimes are silviculture treatment packages used to describe a series of silviculture treatments applied to achieve long term timber production objectives.

## A. Basic Silviculture:

**Basic Silviculture Objective:** To regenerate timber stands harvested after 1987, to achieve free growing status, to the objectives, standards and in the time frames prescribed in the Silviculture Prescription. To achieve product targets of this strategy.

Basic Silviculture is required as indicated in the planning hierarchy.

Example: On a small block in the Ag/Wildlife Zone natural regeneration of various species is the chosen option. On a large block in the Enhanced Timber Zone a prescription would include, more expensive mechanical mounding, planting of genetically improved conifer stock and intense brushing.

## B. Backlog Silviculture:

**Backlog Silviculture Objective:** To practice basic silviculture using site preparation, planting and/or brushing methods, to restock poorly stocked timber stands (NSR), harvested before 1987. To achieve product targets outlined in this strategy.

Example: In the Ag/Wildlife Zone planting of conifers and natural regeneration of broadleaf species has occurred at close to minimum stocking levels. A substantial amount of moose forage is present, causing moderate risk to the trees. Recommend no treatment on this area. Under the same circumstance in the Enhanced Timber Zone, a forester may prescribe more expensive mechanical planting spot establishment, planting of large conifer seedlings, and follow with chemical brushing to increase stocking levels.

Base backlog treatment decisions at the stand level on minimum stocking criteria. Free growing standards, the stocking before disturbance, health of the existing crop and other local values such as wildlife and riparian values also factor in this decision.

Determine the priority of stand level treatments by using the Backlog Treatment Matrix.

**Backlog Treatment Matrix** Table 2

	Stocked (SR) High risk stands	NSR (Not Sufficiently Stocked)	Stocked (SR) Moderate risk stands	Stocked (SR) Low risk stands
Rank	1	2	3	10

Note: It would be preferable to have Silviculture Prescriptions for treatments on all backlog areas. The District Manager will approve exemptions in some cases for the Enhanced Timber and IRM zones to ensure timeliness of treatments. Use the Silviculture

Ranking Key on all surveys. When completing Backlog SP's, identify product targets as required in this strategy.

## **C. Reducing Fall Down:**

### **Reducing Fall Down Objectives:**

1. The landscape level Timber Supply Fall Down Silviculture objective is to evaluate the timber supply benefit of the treatments, that is the cost of doing the treatment today versus the benefit of increasing the future timber supply. The prime objective is to address timber supply shortages. It is important to recognize that volume targets and costs may be secondary to the achievement of operability within 20-80 years.
2. The stand level Timber Supply Fall Down Silviculture objective is to place a priority on incremental silviculture treatments on age class 2, 3 and 4 stands that exceed 3,000 stems/ha. All prescriptions must address the fall down window. Good sites will grow into the window more quickly than poorer sites. Stand Management Prescriptions for stands to be treated must show how they will achieve diameters and volume targets in the key elements of this strategy, within 80 years. Commercial thinning, fertilization, and juvenile spacing are the currently available treatment options to achieve these goals.

### **Immature Stands:**

Immature stands suitable for reducing fall down are not abundant in the Bulkley TSA. In the few cases that exist, reducing the over stocking on stands disturbed within last 80 years will shorten rotation age and make timber available sooner. Treatments will allow diameter growth to increase, reduce time to operability and provide volume to reduce the fall down. The Timber Supply Analysis of 1994 outlined the fall down effect.

The following is a summary of the considerations given to the overstocked immature stands in the TSA.

1. Ages 21-80 years are the areas that when treated silviculturally can help to reduce fall down.
2. Fires are the main source of these age classes. There are 3-4000 ha of old fires in the TSA. This includes John, Van, Otto, Blunt Ck, Howson, Coal Ck, and Ganokwa Fires.
3. Incremental silviculture techniques can shorten rotation.
4. Loss of volume from treatments at the stand level can increase volume needed at the landscape level during fall down.
5. The older the stand and poorer the site, the lower the spacing required to achieve stand diameter targets within required time frames.
6. Maintaining a portion of these naturally dense stands at the landscape level will help maintain biodiversity.

Prioritize treatments based on the Fall Down Treatment Matrix (Table 3) Rank overstocked stands that do not fit these criteria using the Incremental Density Treatment Matrix. (Table 4)

### Fall Down Treatment Matrix

Table 3

Stand Development	Rank	Site Index	Age (yr.)
Immature	1	20+	21-80
	2	16-19	41-80
	3	<16	61-80

## D. Incremental Silviculture:

**Incremental Silviculture Objective:** To juvenile space, prune, and /or fertilize densely stocked juvenile timber stands so they will achieve the sawlog or premium sawlog product targets outlined earlier in this strategy.

**History:** Incremental Silviculture in the Bulkley TSA first occurred in 1981, but it was not until 1991, that it began in earnest. Over the past 8 years, an average of 400 ha/year of juvenile spacing and 100 ha/year of pruning has been done in the TSA, mostly on young Pine stands.

### Juvenile Spacing Objectives:

- To control density to meet growth objectives
- To increase stand value at harvest
- To manage species composition and/or stand structure
- To maintain or enhance forest health
- To meet biodiversity and wildlife habitat objectives.
- To “set up” the stand for future pruning and fertilization.

### Pruning Objectives (on previously spaced stands):

- To reduce the size of the knotty core and increase clear wood production
- To increase the proportion of valuable clear wood in the stem.
- To increase mechanical stress rating (MSR) of lumber.
- To speed the change from lower value juvenile wood to higher value mature wood
- To reduce stem taper.

### **Fertilization Objectives:**

- To increase stand yield.
- To reduce rotation length
- To speed stand to operable volume and diameter targets.

Evaluate incremental treatments at the landscape level to determine the economic benefit and the intensity of the treatment.

Example: Two areas are being considered for spacing, pruning and fertilization. Funds are only available for one area. The first area is in an Enhanced Timber Zone and the second is in a Landscape Corridor. Chose the one located in the Enhanced Timber Zone because it has a higher landscape level priority in this strategy.

Base incremental treatment decisions at the stand level on site index, moisture, nutrients, stocking, health of existing crop and other local values such as wildlife and riparian values. Silviculture Management Prescriptions should identify product targets outlined in the key elements of this strategy. Stand Management Prescriptions are required for all incremental treatments on free growing areas.

Pruning already spaced stands have priority to ensure pruning windows are not missed.

Target juvenile spacing in combination with pruning and some fertilization on 10% of the annual area harvested or approximately 300 ha in the Bulkley TSA. Use the Incremental Treatment Matrices below to rank stand level treatments.

Recommend that juvenile spacing, pruning and fertilization methods follow the regimes in their respective Forest Practices CODE guide books.

#### **Conduct:**

- A literature review of costs and effectiveness of Chemical versus Natural Fertilizers.
- A literature review of successful and unsuccessful results from fertilization in the worlds Boreal and Suboreal managed forests. What volume, wood quality and piece size gains can be expected? What are the impacts on water quality, forest health, and overall ecosystem health?
- A study that determines the need for fertilization of the various site series in the TSA and obtain a recommendation on fertilization regimes by site series and site index.
- A literature review of the results of fertilization of 20-60 year old Spruce and Balsam

Prefer site indexes greater than 19 for incremental treatment because these stands will achieve the premium product targets outlined in this strategy at a lower net present value or higher economic return.

Require completion of the Bulkley Silviculture Ranking Key on all free growing surveys whether treatment is suggested or not.

Effective density is defined as, the number of trees/ha that are taller than 50% of the median height of preferred and acceptable species

**Incremental Density Treatment Matrix** Table 4

Effective Stand Density	>4000 conifers/ha	500-900 Prunable Pine stems/ha	2250-4000 conifers/ha	Other
Rank	1	2	3	6

**Incremental Site Index Treatment Matrix** table 5

Site Index	Rank
19+	1
16-18	3
<16	5

Determine incremental stand treatment priority by adding the two matrix results together.

## Increasing the Timber Harvesting Land Base

The Timber Supply Review I has identified the following reductions to the Timber Harvesting Land Base.

- Non Commercial Brush
- Low Productivity Sites
- Problem Forest Types
- Existing and Future Roads, Trails and Landings

Whereas Timber Harvesting Land Base reductions have a large impact on the timber supply, this Strategy suggests that these reductions be reviewed to determine if economic silviculture treatments can be applied to these areas, to return them to the Timber Harvesting Land Base.



## Silviculture Investment Priorities:

Priorities for silviculture investments are summarized in the following Investment Priority matrix that outlines **Landscape Objectives by zone** and **Stand Silviculture Strategies by type**.

Investment Priority Matrix  
Table 6

LRMP Zone	Silviculture Strategy Type		
	B	C	D
	Backlog	Fall Down	Incremental
1. ETD	VH	H	VH
2. IRM	H	H	H
3. LC	M	L	L
4. SMZ 2	M	L	L
5. RMZ	M	L	L
All Other Zones	L	L	L

## Bulkley Silviculture Ranking Strategy:

Use the landscape and stand planning hierarchy and treatment matrices in this strategy to prioritize projects for available funding. Complete the Bulkley Silviculture ranking key (see below) and attach it to **ALL** silviculture survey recommendations and prescriptions. Use the Bulkley Silviculture Ranking Key to determine the project's priority for the annual Bulkley Forest District silviculture planning and funding allocation.

## Ranking Key

The ranking key was designed to rank

1. Backlog NSR and SR blocks for silviculture treatments to achieve free growing.
2. Over dense immature and mature stands for enhanced silviculture to achieve target sawlogs within 80 years and reduce fall down.
3. Free growing blocks for current or future incremental treatments to achieve premium sawlogs.

The ranking key was **not** designed to rank treatments on Licencee responsibility (appraisal) blocks that are **not yet** free growing.

The ranking key is important because it combines stands characteristics and landscape location to ensure that all treatments are consistently ranked, against each other, so that

the treatments chosen will ideally give the best return on investment or economic gain for the TSA

The person who completes the key is not expected to rank the treatment. The Ministry of Forests will put all the rankings together for a given year to determine what treatments will be undertaken with the available funding. The point total should be unbiased towards a preferred treatment.

The Landscape and Forest Health portions of the key are mandatory. Only one of Backlog, Falldown or Incremental tables should be completed. It would be extremely unusual to fill out more than one of these 3 tables. If exceptions occur please discuss with a representative of the Bulkley Forest District. It would be extremely unusual to complete the Falldown table when completing a normal free growing silviculture survey. Falldown qualifying stands are quite dense (over 4,000 stems/ha) and more than 20 years old.

Treatments can be recommended now or at some future date. The time frame for brushing is based on the risk. Spacing is best carried out when the average height of the stand reaches or is forecast to reach 4 metres. Pruning normally follows spacing if premium sawlog is the prescription and is usually carried out when the average stand height reaches 6 metres. Size of limbs can be limiting factor on pruning, but not always.

No treatment will indicate that the stand will achieve the proposed target on it's own.

# Bulkley Silviculture Ranking Key April, 2001

**CP:** \_\_\_\_\_ **BLK:** \_\_\_\_\_ **Opening #:** \_\_\_\_\_  
**Location:** \_\_\_\_\_ **Stratum** \_\_\_\_\_

**1. Landscape Points**

Enhanced Timber (1 Point)	IRM (2 Points)	Landscape Corridor (3 Points)	SMZ (4 Points)
RMZ (5 Points)	Ag/Wildlife (6 Points)		Other Zone (10 Points)

**Landscape Points:**  
\_\_\_\_\_

**Go to Step 2**

**2. Is the treatment considered? "B: Backlog Silviculture"**

**Yes (2 points) plus**

SR/NSR	Risk	Points
SR	High Risk	1
NSR	N/A	2
SR	Mod Risk	3
SR	Low Risk	10

**Backlog Silviculture Points:**  
\_\_\_\_\_

**Go to step 5**

**3. Is the treatment for limiting? "C: Fall Down"**

**Yes (3 points) plus**

Age / Site Index		
Age	SI <sub>50</sub>	Points
<b>Immature:</b>		
21-80	20+	1
41-80	16-19	2
61-80	<16	3
other		10

**Fall Down points:**  
\_\_\_\_\_

**Go to Step 5**

**4. Is the treatment considered? "D: Incremental Silviculture"**

**Yes (4points) plus**

Density	
"Effective" Stand Density	Points
>4000 stems/ha	1
600 to 900 Prunable Pine stems/ha	2
2250-4000 stems/ha	3
Other	6

**Effective Density** \_\_\_\_\_ **stm/ha**

..... Site Index:	
SI <sub>50</sub>	Points
19+	1
16-18	3
<16	5

**Incremental Points**  
\_\_\_\_\_

**Go to step 5**

**5. Add Forest Health**

Risk Level	Points
No Risk	0
Low Risk	1
High Risk	20

**Forest Health Points:**  
\_\_\_\_\_

**Completed By:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Treatment Recommended:** Yes / No    If yes    **YEAR** \_\_\_\_\_

**Target Sawlogs   Increased Yield   Premium Sawlog   Other (circle)**

Comments: \_\_\_\_\_

Note: Remember to consider Forest Health issues before recommending treatment  
 Note: The lowest point total receives the highest treatment priority.  
 Note: Stands already spaced have a higher priority for treatment.

**Total Points**  
\_\_\_\_\_

## **Implementation, Monitoring and Review:**

The Bulkley District Silviculture Strategy 2<sup>nd</sup> Edition is considered District Manager Policy and will be implemented effective June 1, 2001

### **Survey Monitoring:**

The ranking key will be required on all future Free Growing and other Stand Management survey types. A copy of the completed ranking key must be submitted to the Forest Service to justify silviculture and prioritize funding on all Backlog, Incremental and Falldown areas.

### **Prescription Monitoring:**

Monitoring for compliance with the Landscape and Resource Management Zones and Stand Level Zones of Silviculture Strategy will be done by the Forest Service as part of the normal review and approval process of Silviculture, Backlog Silviculture, Stand Management Prescriptions, audits of Treatments Regimes and Free Growing Surveys. Monitoring for compliance with the product targets will be done at the Stand Management review and approval process.

### **Data Management:**

Individual block rankings will be compiled on an annual basis to determine how treatments are ranked and to assign funding. Treatments deferred due to lower ranking will be kept on file for the following years. This database will be used as a basis to develop the District Resource Management Plan (RMP).

### **Landscape Monitoring:**

Monitoring for compliance with landscape product targets will be done every five years in conjunction with TSR

### **Review:**

The first review of the Bulkley District Silviculture Strategy 2<sup>nd</sup> Edition will be completed prior to March 31, 2003 by the Bulkley Silviculture Committee. The review will include a determination of the current stocking levels of free growing stands and treated stands in the TSA to give an indication of the historical pattern of stand density and products. It will also include a review of effective density.

The Bulkley Silviculture Committee will complete future reviews at least every two years. The intent is to have and use a living up to date document.

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