

APPENDIX 4 -INTEGRATED REFORESTATION STRATEGY

Purpose

One of the strategies contained within the DFMP is to strive to reforest to silviculturally and commercially acceptable tree species, all dispositions as they are added back into the productive landbase. This document is intended to describe how this is to be accomplished.

Procedure

Site Identification

The first step towards achieving this strategy is identification of sites within the FMA that have received reclamation certificates. The local Sustainable Resource Development office has agreed to notify Vanderwell of all instances where a reclamation certificated is applied for within FMA 9700036.

Site Classification

Each site, once reclaimed into the FMA landbase, must be classified to determine if it is suitable for reforestation activities. To be deemed suitable the site must be located on a site that would otherwise have been classified as productive or potentially productive during the net landbase determination process.

Integration

Once sites are identified, the next step is to identify where the financial and administrative support for the reforestation project is going to come from. This is a critical step, as without adequate financial support, the reforestation of the site can not be complete.

Vanderwell proposes the financial support be achieved as following:

1. Vanderwell will re-invest the reforestation portion of monies collected for Timber Damage Assessments for the site.
2. Additional financial support, where required, is invested from the disposition holder that received the reclamation certificate.

In addition, Vanderwell is willing to incur all administrative costs associated with the reforestation project. This includes such things as hiring and supervising the site preparation contractor, ordering and organizing the transport of seedlings, and hiring and supervision of tree planting contractors.

Acceptable Variance

Vanderwell commits to strive to implement the above strategy. Due to the uncertainty of coming to agreeable terms with regards to financing the reforestation it is unknown how often results will actually be implemented on the ground.

Implementation Strategy

Due to the uncertainty associated with the above strategy, implementation must be site specific and will commence on all sites that receive reclamation certificates from July 1, 2004 onwards.

Monitoring Procedure

The annual Silviculture Schedule will detail any plans to implement this strategy. The annual submission of the General Development Plan and Stewardship Report will summarize the amount of area that has been treated under this strategy.

Operating Plan Linkages

The annual Silviculture Schedule will detail any plans to implement this strategy. The annual submission of the General Development Plan will summarize the amount of area that has been treated under this strategy.

APPENDIX 5 - BOREAL CARIBOU COMMITTEE BEST MANAGEMENT PRACTICES FOR FOREST INDUSTRY

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FOREST INDUSTRY - NON-LINEAR DISTURBANCE

A Natural Disturbance Model (NDM) provides a guide to managing stands and landscapes in a manner that will more closely approximate the natural system in which woodland caribou have evolved. Since habitat quantity and quality have been identified as key concerns for caribou conservation, timber harvesting under a NDM is a good starting point for forest companies to minimize their effect on caribou. Special planning (or "fine filter" approaches) will also be required.

Forest companies can play a role in minimizing disturbance and displacement of caribou through the timing and nature of their activities. Integrated planning and coordinated operations on a single land base are essential to the success of caribou conservation strategies.

The following table lists Best Practices for the forest industry in relation to non-linear developments. Due to the variability on the landscape as well as caribou status considerations for particular ranges, application of these best practices may vary on a site-specific basis.

Concerns	Best Practice to minimize impact
Amount and Pattern of Clearing	<ul style="list-style-type: none"> Caribou habitat supply requirements (e.g., stand type, size and age class amount and distribution, including spatial pattern) will be developed jointly by industry and government and incorporated into the timber supply analyses for each caribou range. <i>While recognizing existing DFMPs, forestry companies need to immediately begin to consider caribou habitat supply issues with regard to timber supply implications. Approved DFMPs must be examined for consistency with caribou management objectives. New plans must incorporate these objectives.</i> Where caribou ranges have overlapping forest tenures, Detailed Forest Management Plans (DFMPs) will integrate planning and operations for deciduous and coniferous interests. Where caribou ranges are split by adjacent forest tenures, the tenure holders will work together to produce a coordinated caribou habitat supply/timber supply analysis. Pursue collaborative planning with other industrial operators to reduce cumulative impact. Where possible, maximize spatial and temporal overlap of infrastructure. Long-term Harvest Projections - Map and sequence the forest stands included in the Timber Supply Analysis within caribou range. This will provide a long range forecast of the location, amount, and timing of operations within a given caribou range. Along with that forecast comes a prediction of future forest state. These forecasts are essential for caribou range plan development. A critical evaluation of productive forest stands within caribou range should be done to see if there are some remote stands that may be

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	<p>considered for permanent deletion due to the high amount of disturbance required to retrieve a nominal volume.</p> <ul style="list-style-type: none"> • Natural fire patterns can provide basis for distribution and size of blocks as well as amount of residual material retained, as this is the process that caribou and their habitat have evolved with. • Supply LFS with digital version of yearly (or longer if available) road and block plans to facilitate mapping and review with other industrial activity.
Successional Change and Recovery	<ul style="list-style-type: none"> • Ensure that forest management strategies are coordinated and consistent with caribou habitat management objectives. • Silviculture prescriptions need to be developed and evaluated for their effectiveness at returning harvest areas to effective caribou habitat.
Human Use of the Site	<ul style="list-style-type: none"> • Limit the number of times caribou range is accessed through strategic planning of entry versus traditional cut/leave planning. • Limit the number of times caribou range is accessed through better, integrated planning within the forest industry and between forest company and other industries.
Induced Access and Other Use	<ul style="list-style-type: none"> • In-block roads will be reforested to a shrub/tree successional pathway to remove the footprint. The reforestation standard developed between government and industry for industrial sites other than cutblocks will apply (as discussed in Government Best Practices) as a minimum. Conifer operators planting the block may choose to reforest the road in the same manner and to the same standard as the rest of the block.
Timing	<ul style="list-style-type: none"> • For winter work, work will commence immediately after freeze-up, with the appropriate steps taken to complete most or all of the work within caribou range in the earlier part of the winter season. Each company is expected to clearly describe how this will be accomplished in their schedule of activities. All attempts should be made to access the most remote areas and complete all activities in these areas in order to close down access and limit disturbance across large areas of caribou range throughout the late winter period. Ensure that hauling, restoration and silviculture take place in a timely fashion following the harvesting of the block. • In most cases it is desirable to complete approved operations within the season, rather than reopening access the next year if no further work is planned for the following year. • Plan contingency blocks outside of caribou range to minimize number of entries into a range and access requirements.
Effects Upon Distribution of Predators and Prey	<ul style="list-style-type: none"> • In areas where there are overlapping wildlife management concerns between caribou and moose, caribou management objectives will be given first priority. Overlap with other wildlife management objectives may exist in certain areas and will have to be examined on an individual basis.

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- These concerns are addressed primarily by the points under “amount and pattern of clearing.”

FOREST INDUSTRY - LINEAR DISTURBANCE

There are two types of linear features created by the forest industry in Alberta. In-block roads provide temporary access and are reclaimed and reforested once work in the block has been completed. The second type are routes from existing roads to the cutblocks. Access roads constructed by the forest companies range from winter-access roads, to permanent all-weather roads.

Due to the potential for access to negatively affect woodland caribou, it is important for forest companies to take a modified approach to access development within caribou range.

The following table lists Best Practices for the forest industry relating to linear developments. Due to the variability on the landscape as well as caribou status considerations for particular ranges, application of these best practices may vary on a site-specific basis.

Concerns	Best Practice to minimize impact
Development	<ul style="list-style-type: none">• Forest companies will determine long term access requirements based on harvest projections. Road plans will be based upon a combination of access requirements and caribou habitat supply requirements (see non-linear best practice for forest industry). Forest companies will coordinate access with other industries to minimize the amount needed in an area and to maximize the spatial and temporal overlap of developments.• Within the forest industry, companies should strive to conduct operations using minimal access on frozen ground. Winter access often uses existing lines and minimizes the amount of disturbance to the soil and thus aids in the quick recovery of the line.• Where companies require summer volume, the first course of action should be to obtain the volume from outside of the caribou range.• If summer volume must be accessed within caribou range, all attempts should be made to access it from existing access routes with only minimal access development taking place. This may be facilitated by conducting the harvest activities during the summer, but delaying the haul until winter to eliminate the need for extensive improved access.• The least preferred option for accessing summer volume in caribou range would be to harvest and haul the volume during the summer using minimum all-weather access that stays primarily to higher ground. This would only be used where forest companies demonstrate that other options will not meet summer harvest volumes.• Access should be planned to avoid key caribou habitat types. Roads that intersect or encircle areas of caribou habitat can affect the distribution of caribou as well as the amount of useable habitat. Caribou habitat issues must become an integral part of access planning within caribou ranges. Access planning must be a cooperative effort with all industrial users in a

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	<p>given area and should address placement of roads in relation to caribou habitat.</p> <ul style="list-style-type: none"> • LFS will be supplied with digital version of yearly (or longer if available, e.g., 5 year plan) road and block plans to facilitate mapping and review with other industrial activity. This information must be made available to other industrial users to provide the opportunity for integrated planning. • To reduce barrier effects of roads, road design (height) will consider the ability of caribou to have a clear line of sight to habitat on the other side of the road, at least along portions of the road at regular intervals.
Recovery	<ul style="list-style-type: none"> • In-block roads will be reforested to a shrub/tree successional pathway to remove the footprint. The reforestation standard developed between government and industry for industrial sites other than cutblocks will apply (as discussed in Government Best Practices) as a minimum. Conifer operators planting the block may choose to reforest the road in the same manner and to the same standard as the rest of the block. • When temporary roads are to be abandoned, the road will be reclaimed to a shrub/tree successional pathway to remove the footprint, according to industrial reforestation standards (see government best practice). Government will work with industry to develop a coordinated plan for determining which roads are to remain reclaimed and which ones may be re-opened. • In areas where silviculture operations are being conducted, forest companies should investigate opportunities for reforesting adjacent linear corridors identified for reclamation by the coordinated access plan. • Identifying and agreeing on some main access routes would help identify which other linear disturbances could be recovered (reclaimed, reforested) with reduced probability of re-use. • During periods of non-activity between phases of operations, or during holiday or weather shut downs, access should be temporarily blocked using bundles of logs, snow berms or other means as determined by the situation and management objectives. Periods of non-activity will be defined as any continuous period exceeding 72 hours when there is no active operations taking place. If any phase of the harvest-processing-haul-site preparation or reclamation operations are taking place, the operation will be considered active. • In situations where the forest company has created and has primary control of a section of road, the company shall manage or restrict access to areas of harvest. This will be accomplished using a technique that is effective for the situation and addresses management objectives.
Line of Sight	<ul style="list-style-type: none"> • Immediate line-of-sight of linear corridors off of main lines should be minimized by making a bend in the line near the main access, in a manner that does not compromise safety considerations.

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Timing

- Winter work will commence immediately after freeze-up, with appropriate steps taken to complete most or all work within caribou range in the earlier part of the winter season. The company is expected to clearly describe how this will be accomplished in their schedule of activities. All attempts should be made to access the most remote areas first and complete all activities in these areas in order to close down access and limit disturbance across large areas of caribou range throughout the late winter period. Ensure that hauling, restoration and silviculture take place in a timely fashion following the harvesting of the block.
 - In most cases it is desirable to complete approved operations within the season, rather than reopening access the next year if no further work is planned for the following year.
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APPENDIX 6 - STAND STRUCTURE MONITORING PROCEDURE

Introduction

In the Detailed Forest Management Plan (DFMP) for FMA 9700036 strategies have been developed that commit to maintain 3% of the area within the net landbase as structure within harvest areas. This strategy is used to meet Goals 3 and 6. This structure is being left in addition to the amount of landscape structure that is left across the FMA as defined in the Landscape Assessment document.

This document first presents a definition of stand structure, followed by the methodology to be used to measure the amount of stand structure.

Definition

For the purposes of this DFMP stand structure is defined as follows:

An area that is left intact post-harvest that was sequenced to be harvested at the same time as the adjacent cut block. It can be islands of stands that were left standing within a cutblock (minimum size of 0.1 ha) or areas that are on the edge of cutblocks. Buffer areas surrounding upmapped watercourses, areas deleted for operational reasons (steep slopes), and buffers retained surrounding areas of special biological significance also contribute to stand structure requirements (if structure left in these areas does not meet the 3%, additional areas will be retained that is representative of the pre-harvest stand type). The minimum size of an area that counts as stand structure is 0.1 hectares.

Identification

Most areas that are left as stand structure are identified during the layout phase of final harvest plan development. If identified at this time the boundary of the stand structure area is mapped and justification given for why it was chosen.

At the operational stage areas can also be left as stand structure. Areas left at the operations stage should be mapped and shown on the as-built plan submitted once operations are complete for the year. Justification why these areas were left must also be documented.

Measurement

The amount of area left as stand structure will be measured on an annual basis. The areas will be mapped using cutblock update photography or through the use of gps technology. Only areas that are a minimum of 0.1 hectare in size count towards meeting stand structure requirements.

Acceptable Variance

Acceptable range is from 2% to 5% within a five-year period over the FMA, or as required to meet other values (ie. dwarf mistletoe management).

Implementation Schedule

Ongoing.

Monitoring Procedure

The areas will be measured and reported in the submission of the Final Harvest Plan. As some areas may be added at the operational stage a summary will also be provided in the Stewardship Report.

Operating Plan Linkages

The areas will be measured on an annual basis and reported in the submission of the Final Harvest Plan. Where areas are added at the operational stage, the as-built map will show the locations.

APPENDIX 7 - AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE PROTECTION STRATEGY

Introduction

Goal # 8 of the Vanderwell DFMP states that areas of special biological significance are to be protected. This policy is intended to define what areas of special biological significance are, how they are identified and protected. Rules are also included that define acceptable variance for the implementation of this policy, the implementation strategy, monitoring procedure and operating plan linkages.

Definition

The following areas are deemed to be of special biological significance.

1. Mineral Licks
2. Grizzly Bear Dens
3. Wolverine Dens
4. Caribou Zones
5. Ungulate Zones
6. Migratory Bird Nesting Sites
7. Raptor Nest Tree
8. Natural Springs
9. Beaver Pond/Oxbows
10. Snake Hibernacula

Identification

The process of identifying areas of special biological significance varies depending on the areas defined above. The following table summarizes how and when each of the above defined areas are identified.

TABLE 7.1: AREA OF SPECIAL BIOLOGICAL SIGNIFICANCE IDENTIFICATION STRATEGY SUMMARY

Area	Identification
Mineral Licks	Layout, Pre-Harvest Assessments and during Operations.
Grizzly Bear Dens	Layout, Pre-Harvest Assessments and during Operations.
Wolverine Dens	Layout, Pre-Harvest Assessments and during Operations.
Caribou Zones	Identified in Landscape Assessment
Ungulate Zones	Identified in Landscape Assessment

Migratory Bird Nesting Sites	Identification not required, entire FMA assumed to be potential site.
Raptor Nest Tree	Layout, Pre-Harvest Assessments and during Operations.
Natural Springs	Layout, Pre-Harvest Assessments and during Operations.
Beaver Pond/Oxbows	Layout, Pre-Harvest Assessments and during Operations.
Snake Hibernacula	Layout, Pre-Harvest Assessments and during Operations.

Protection Strategy

For each area of special biological significance, strategies have been developed that ensure protection. The strategies may have both spatial and/or temporal attributes.

1. Mineral Licks will be protected with a minimum 30-meter buffer on all sides to a maximum determined by trained staff.
2. Protection of Grizzly Bear Dens, Wolverine Dens, Raptor Nest Trees, snake hibernacula and natural springs will be achieved through the maintenance of stand structure within cutblocks. A minimum 30-meter buffer is required on these sites to a maximum determined by trained staff.
3. Operations within Caribou Zones will be in accordance with an SRD approved Caribou Protection Plan or as per strategies defined in the approved Detailed Forest Management Plan.
4. Operations within ungulate zones will not occur between January 15 and April 30.
5. In order to ensure protection of migratory bird nesting sites, operations will not occur between April 1 and July 15.
6. Beaver ponds will have a buffer as appropriate for the class of stream (as defined in the Alberta Timber Harvest Planning and Operating Ground Rules) found existing the pond, with a minimum 20-meter buffer.

Acceptable Variance

As approved by SRD.

Implementation Strategy

The above strategies are implemented in all operations within the Vanderwell FMA.

The spatial protection measures will be implemented at the time the feature is identified. Vanderwell strives to identify all areas at the planning stage. Areas that are not observed at the planning stage will be protected at the operations stage.

Temporal protection measures are designed to ensure operations do not occur in areas where the feature is present at the times specified.

All areas that are protected spatially will have their boundaries mapped, and have the following information collected and tracked:

1. Date
2. Licence
3. Block number
4. Observer
5. Feature #
6. Feature Protected
7. Comments

Areas that are protected spatially contribute to the stand structure requirements designed to achieve goal # 3 and 6 of the Vanderwell DFMP.

Monitoring Procedure

A summary showing the number of each feature protected will be presented in the Final Harvest Plan with a summary given in the Stewardship Report.

In order to demonstrate that temporal protection measures have been implemented, commence and completion dates of annual operations will be summarized in the Stewardship Report.

Operating Plan Linkages

Final Harvest Plan to detail the location of areas identified as per this policy.

APPENDIX 8 - SILVICULTURE STRATEGY SUMMARY

Preharvest Condition		Harvest		Post Harvest Treatment						
Yield Stratum	AVI Species Group	Transition Assumptions	U/S Protection	Site Preparation	Establishment Type					Competition Control
		(% transition to stratum XX)	(Yes / no)	Mechanical, chemical, none	LFN (Yes / no)	Seed	Plant (range +/- 200 stems/ha)			Manual, Chemical, Mechanical, none
							Species	Original	Fill Plant	
1. C-Sw	C	100% to Stratum 1 0 year regen lag	Yes, No	Mechanical None	N	N, Y	Sw, Px, Sb	1400 - 2000	As necessary	Chemical, Mechanical, Manual, none
2. C-Px	C	100% to stratum 2 0 year regen lag	No	Mechanical None	N, Y	N, Y	Px, Sw, Sb	1400 - 2000	As necessary	Chemical, Mechanical, Manual, none
3. MX	CD/DC without under story	100% to stratum 3 0 year regen lag	No, Yes	Mechanical None	N	N, Y	Sw, Px, Sb	1400 - 2000	As necessary	Chemical, Mechanical, Manual, none
MX-U1	CD/DC with under Story between 1 and 5 meters tall	100% to stratum 3 at age 26. 0 year regen lag	Yes	Mechanical None	N	N, Y	Sw, Px, Sb	300 – 2000 Road & Landings	As necessary	Chemical, Mechanical, Manual, none
MX-U6	CD/DC with under Story 6 meters and taller.	100% to stratum 3 at age 26. 0 year regen lag	Yes	Mechanical, none, chemical	N, Y	N, Y	Sw, Px, Sb	300 – 2000 Road & Landings	As necessary	Chemical, Mechanical, Manual, none
4. D	D without under story	100% to stratum 4 0 year regen lag	No, Yes	Mechanical, none	N, Y	N, Y	Sw, Px, Sb	0 - 2000	As necessary	Mechanical, Manual, Chemical, none
D-U1	D with under Story between 1 and 5 meters tall.	100% to stratum 3 at age 26. 0 year regen lag	Yes	Mechanical, none, chemical	N, Y	N, Y	Sw, Px, Sb	300 – 2000 Road & Landings	As necessary	Chemical, Mechanical, Manual, none
D-U6	D with under Story 6 meters and taller.	100% to stratum 3 at age 26. 0 year regen lag	Yes	Mechanical, none, chemical	N, Y	N, Y	Sw, Px, Sb	300 – 2000 Road & Landings	As necessary	Chemical, Mechanical, Manual, none

This table outlines treatments used based on original stand compositions. All prescriptions are fine tuned or adjusted on a site-specific basis. Where more than one option is listed they are ranked as to the likelihood of each occurring. Any significant deviations (e.g. new technology) from these prescriptions will be highlighted in the silvicultural AOP.

Deviations could result from, but are not limited to: ecosite, regeneration standards, strata balancing, survey results, re-classification, understory protection, slash loading, terrain, residual overstory, season of harvest, type of harvest, cone crops, seed availability, season of access, adjacency, available microsites, weather, climatic factors, disease and insects, other resource values, drainage, seed zone limitations, new technology, etc.

It is important to understand that this table is a snapshot in time, and change is an integral component of site-specific silviculture and continuous improvement.

APPENDIX 9 - PRE-HARVEST ASSESSMENT POLICY AND PROCEDURE

Policy

Vanderwell Contractors' intend to have pre-harvest assessments conducted on all cutovers prior to harvest. The reasons for conducting pre-harvest assessments are as follows:

1. To link harvesting and reforestation systems,
2. Identifying areas of concern and potential hazards associated with harvesting and silviculture activities,
3. Specify site preparation, planting species, stock type, and projected tending needs,
4. Specify harvest methods and season,
5. Provide ecological classification,
6. Estimate harvest volumes, trees per hectare, and site index,
7. Identify areas of special biological significance, and
8. Identify historical/unique values.

By carrying out pre-harvest assessment surveys the success rate of reforestation activities will increase and failures will be minimized.

Procedure

Surveys will follow the format found in "Forest Site Interpretation and Silviculture Prescription Guide for Alberta", and in the field guides the Canadian Forest Service publishes for the various natural sub region ecosites Vanderwell Contractors operates in.

Acceptable Variance

Blocks with similar characteristics (for example pine dominated blocks) may not have PHA's complete for each block.

Implementation Schedule

Ongoing.

Monitoring Procedure

The Final Harvest Plan will detail the blocks that have had pre-harvest assessments complete on them. The Stewardship Report will summarize the number of blocks that have had pre-harvest assessments complete on them compared to the total number of blocks harvested. Where pre-harvest assessments have not been complete, reasoning will be provided in the Final Harvest Plan and summarized in the Stewardship Report.

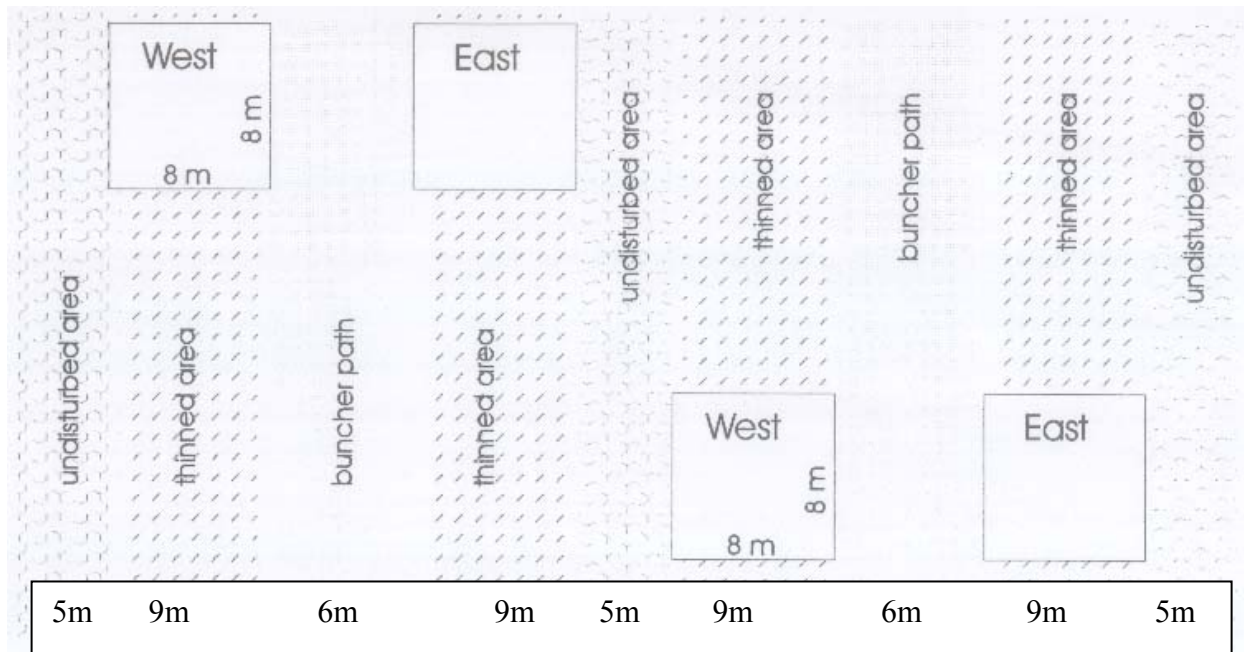
Operating Plan Linkages

Pre-Harvest Assessments are not required for submission, the information is used in the development of the Final Harvest Plan and the Silviculture Schedule.

APPENDIX 10 - UNDERSTORY PROTECTION HARVEST STRATEGY DESCRIPTION

The following diagram shows a schematic of the harvest strategy that is to be implemented in stands requiring understory protection.

FIGURE 10.1: UNDERSTORY PROTECTION HARVEST STRATEGY.



Description

The harvest pattern consists of a 6-meter buncher path with a 9-meter thinned area on each side. There is a 5-meter undisturbed buffer between each consecutive treatment areas. This results in 17% of the overstory deciduous being left on site, and 21% of the conifer understory being removed on the buncher path.

An additional 5% of the conifer understory is removed for road and landing construction, resulting in a total of 27% of the conifer understory being removed during harvest operations. In the process of removing the deciduous overstory in the treatment area it is felt that up to 3% of the conifer understory in this area may be lost. This results in a total of 30% of the conifer understory being removed during the harvest operations, and 17% of the overstory (both conifer and deciduous) being retained on site.

Acceptable Variation

Vanderwell will strive to implement operational strategies that maximize the amount of conifer understory retained on site post-harvest. Trials in order to achieve this are acceptable variations from the above harvest strategy.

Implementation Schedule

Ongoing

Monitoring Procedure

The protocols outlined in the Interim Understory Protection Harvest Assessment Protocol will be implemented.

APPENDIX 11 - INSECT AND DISEASE POLICY AND PROCEDURE

Policy

Vanderwell Contractors (1971) Ltd. will cooperate with the Land and Forest Service in the identification and suppression of insects and disease epidemics, restricted and noxious weeds within Vanderwells operating areas. Vanderwell woodlands employees should be able to demonstrate an awareness of forest health issues for the applicable forest types and eco-systems. This includes the types and signs of insects and disease outbreaks as well as identification of noxious/restricted weeds and applicable government contacts.

Procedure

Vanderwell will designate a forest health coordinator, this person is responsible for corresponding with government agencies to exchange information on the companies reporting/monitoring programs as well as to get updated on government issues. The forest health coordinator is responsible for ensuring that all woodlands employees are provided training and information regarding forest health issues and is updated/reinforced on an annual basis.

Vanderwell maintains information on forest health issues in our woodlands library. This information is available to all woodlands staff for reference.

All woodlands staff are supplied forest health tally sheets to record incidents. Contractors are instructed to notify woodlands staff of any forest health concerns, and will have basic signs of insect/disease reviewed with them on an annual basis.

If possible, physical evidence and/or photos will be collected and returned with the tally card to the Forest Health Coordinator.

The Forest Health Coordinator will then verify the correct documentation, assess the problem and report them to the Woodlands Manager and the local Forest Health Officer. A copy of all information is to be filed in the Woodlands filing system.

With regards to noxious/restricted weeds, action taken will be in compliance with the Weed Control Act.

APPENDIX 12 - DWARF MISTLETOE MANAGEMENT PLAN*

Introduction

Dwarf mistletoe is widespread in pine stands within the Vanderwell FMA. Dwarf mistletoe can reduce tree growth, lower wood quality and cause mortality. Forest Management activities can either limit or enhance the spread and intensification of dwarf mistletoe. In the Vanderwell FMA the goal is to minimize the amount of area infested with dwarf mistletoe.

Background Information

Dwarf Mistletoes are parasitic seed plants affecting jack pine trees in the Vanderwell FMA. Trees of all ages can be infected by dwarf mistletoe. Dwarf mistletoe grows in the tree bark and wood, absorbing water and nutrients of the host tree that otherwise are used for growth. The parasite induces a localized swelling of bark and wood and often nearby buds and branches are stimulated to grow excessively, resulting in abnormal clumps of branches called ‘witches brooms’.

Parasitic and pathogenic effects of dwarf mistletoe include reduced growth rates and decreased strength and quality of infected wood. Individual small trees can be killed, and in time, growth of infected, living trees can become completely stagnated. Severely infected trees are also more susceptible to other damaging agents.

Management Implications

Several features of dwarf mistletoe should be kept in mind when developing stand management prescriptions:

- Dwarf mistletoe only survive on live branches or stems of live trees. They die as soon as the branch or tree dies.
- In forests disturbed by logging or fire, dwarf mistletoe survive on the living residual trees, and eventually spread to nearby regeneration.
- Dwarf mistletoe seeds are explosively ejected from plants to horizontal distances up to 15 meters and land on tree branches or stems with needles to cause a new infection.
- Depending on species and other conditions, three to five years (or more) elapse before new infections produce seeds. Seeds mature one year later, and are dispersed in late summer or autumn.
- Initial spread of dwarf mistletoe from infected residual trees to susceptible regenerating trees depends on several factors, including:
 - Age and size of young target trees
 - Amount of dwarf mistletoe seed spreading to the target trees
 - Stand density and distribution of both residual and target trees.
- Trees can be infected at any age.
- Spread of dwarf mistletoe into young trees is more extensive from single, isolated residual trees than from relatively uniform, dense, even-aged stands of residual trees.

Spread appears to be accelerated when dense infected residual stands are partially disturbed by cutting or wildfire.

- Within even-aged stands, dwarf mistletoe spreads slowly (1 to 1.5 meters per year), with faster spread rates in less dense stands.

Dwarf mistletoe depends on the continuous presence of host trees from one forest generation to the next. Clearcut harvesting, coupled with eradication of all host-tree residual stems, successfully eradicates dwarf mistletoe from a stand. After, dwarf mistletoe may spread from adjacent infected trees along cutblock boundaries to infect newly generated trees.

Partial harvesting in infested stands can greatly enhance the impact of dwarf mistletoe because latent infections are activated by increased light in tree crowns. It is virtually impossible to ensure that all remaining overstory trees are free of dwarf mistletoe unless all host species are cut.

Other Forest Management Considerations

This plan must consider the potential impacts of managing dwarf mistletoe infested stands on other goals of the Detailed Forest Management Plan. At the same time keeping in mind that trees infected with dwarf mistletoe can be used to help achieve other forest management goals.

Objective 13.6 of the DFMP is to mitigate the impact of forest management activities on scenic values. In order to achieve this a map has been created that shows the location of visually sensitive areas, management strategies have been developed striving to maintain or enhance the visual quality of these areas. It is essential that strategies developed to meet these two objectives are considerate of the other.

One of the strategies developed under objective 13.6 is to limit harvest activities within 50 meters of Highway 2 for the first 20 years.

Management Objectives

Three objectives have been developed to help achieve our goal of minimizing the amount of area infested with dwarf mistletoe.

1. Minimize the spread of dwarf mistletoe into regenerating stands.
2. Reduce the area of merchantable infested stands.
3. Integrate with strategies developed under objective 13. 6.

Management Strategies

The following is a list of strategies to be implemented in stands infested with dwarf mistletoe within the Vanderwell FMA.

1.1: With a dwarf mistletoe resistant species, plant a 50-meter buffer on the boundary of any block harvested within the 2001 Chisholm Fire that borders dwarf mistletoe infected stands.

1.2: Monitor the buffer areas for the presence of species susceptible to mistletoe infestation.

1.3: In areas of the buffer with species susceptible to mistletoe infestation, tend the area to ensure only dwarf mistletoe resistant species are present.

1.4: When designing cut blocks in dwarf mistletoe infested stands, block boundaries should border dwarf mistletoe resistant species. Where this is not possible, a 50-meter buffer should be planted of dwarf mistletoe resistant species on the edge of the cut block.

1.5: When dwarf mistletoe infested stands are harvested, no dwarf mistletoe susceptible trees should be retained on site within the harvest area.

2.1: Target dwarf mistletoe infested stands for harvest at the times determined in the spatial harvest sequence.

3.1: In the spatial harvest sequence, restrict harvest activities within a distance of 50-meters of Highway 2 for the first 20 years.

3.2: In stands also identified as being visually sensitive, all dwarf mistletoe resistant species will be retained on the site post harvest.

3.3: In stands also identified as being visually sensitive, reforestation activities will occur within one-year of the skid clear date.

Acceptable Variance

As approved by the Public Lands and Forest Division.

Implementation Schedule

The following table outlines the implementation schedule for each strategy.

TABLE 12.1: DWARF MISTLETOE MANAGEMENT PLAN IMPLEMENTATION SCHEDULE SUMMARY.

Strategy	Implementation Schedule
1.1	End of 2006
1.2	As per regeneration standards
1.3	As required
1.4	Final Harvest Plan
1.5	Final Harvest Plan
2.1	As per spatial harvest sequence
3.1	DFMP submission
3.2	Final Harvest Plan
3.3	Final Harvest Plan

Monitoring Procedure

The following table outlines the monitoring procedure for each strategy.

TABLE 12.2: DWARF MISTLETOE MANAGEMENT PLAN MONITORING PROCEDURE SUMMARY.

Strategy	Monitoring Procedure
1.1	Stewardship Report
1.2	Stewardship Report
1.3	Stewardship Report
1.4	Stewardship Report
1.5	Weekly Block Inspection Checklist/Stewardship Report
2.1	Preferred Forest Management Strategy
3.1	Preferred Forest Management Strategy
3.2	Stewardship Report
3.3	Stewardship Report

Operating Plan Linkages

Where the above strategies are planned to be implemented they should be detailed in the Final Harvest Plan.

* Much of the information contained in this plan was first published by the Government of British Columbia in 1995 in a document titled Dwarf Mistletoe Management Guidebook.

APPENDIX 13 -STREAM CROSSING ASSESSMENT POLICY AND PROCEDURE

Policy

Vanderwell Contractors (1971) Ltd. will ensure that all creek crossings are maintained and reclaimed in a manner that allows the creek to flow as it did prior to installation, while ensuring that no deleterious material enters the watercourse and ensuring that no person carries out any work that results in the harmful alteration, disruption or destruction of fish habitat.

Procedure

Each watercourse crossing that is removed in all Vanderwell operations will be inspected as per the schedule outlined below. The assessment will take place after the crossing has been removed and will be assessed to the categories discussed below.

All inspections will be recorded on the applicable crossing inspection report form, which will then be put into either the LOC binder, or the creek crossing file for each licence and filed in the Woodlands Filing System.

Stream crossing assessments have been broken down into two categories, those on LOC roads, and those on non-LOC roads. Each category will be discussed separately.

Each crossing should be issued a unique identifier at the planning stage, a unique identifier should be given to any crossings that were not identified at the planning stage, but were identified at the operational stage. At the time of the crossing classification, the stream should be classified as per the Alberta Timber Harvest Planning and Operating Ground Rules.

At the time of assessment, the following information is required to be recorded:

1. Location (LOC or Licence)
2. Crossing number
3. Crossing Classification (temporary or permanent)
4. Creek classification
5. Date of installation
6. Date of inspection
7. Crossing Category (as defined below)
8. Crossing Type (bridge, culvert, snow fill, log fill, half culver)
9. Allows Fish passage (hanging culvert and large pool on downstream side are signs that a crossing does not allow fish passage)

Any crossings that require further work prior to being classified as blue should be brought to the attention of the Senior Forest Technologist or Planning Forester.

Any further work that is required on a crossing should be added to the annual road construction and abandonment plan section of the General Development Plan.

LOC Roads

LOC roads have been broke down into two categories, permanent and non-permanent. LOC's that have permanent crossings will be inspected on an annual basis. LOC's that do not have permanent crossings on them will be assessed as follows: Crossings will be inspected annually while in place, once pulled, the crossing will be assessed to ensure it meets the blue code, the crossing will then be inspected annually until it is classified as green.

Non-LOC Roads

Non-LOC roads are always non-permanent roads. Crossings on these roads will be inspected after being pulled until they meet the blue standard, the crossing will then be inspected annually until it is classified as green.

Stream Crossing Reclamation Classification Categories

Green – The culvert, bridge, log fill etc. have been pulled and the banks have been re-vegetated and stabilized, and there is no obstruction to the flow of water. Everything has been returned to pre-crossing condition. No further action is required.

Yellow – The crossing is still in place, and does not have a negative impact on the flow of water. Applies to culverts and bridges only. Allows fish passage.

Red - The crossing is still in place and is damaged or causes a negative impact on the flow of water, and/or passage of fish. The crossing needs to be removed or further work is required (i.e. seeding of banks, cross drains, or deactivation of road leading to crossing).

Blue – The crossing has been pulled, but time is needed in order to bring the site back to pre-crossing condition. Banks have been seeded but vegetation is not established. Crossing has to be re-evaluated.

APPENDIX 14 -ROAD MONITORING POLICY AND PROCEDURE

Policy

Vanderwell Contractors (1971) Ltd. will ensure that all roads are maintained and reclaimed in a manner that minimizes erosion and road surface degradation while ensuring the road can be used safely during its lifetime.

Procedure

Each Vanderwell road will be inspected as per the schedule outlined below.

All block roads will be inspected and documented on the Block Inspection Form (Section I. Operational Cleanup).

All other road inspections will be recorded on the applicable road inspection report form. Road assessments have been broken down into two categories, those on Vanderwell LOC roads, and those on non-LOC roads. Each category will be discussed separately.

Vanderwell LOC's

LOC roads have been broke down into two categories, permanent and non-permanent. LOC's that have permanent crossings will be inspected on an annual basis. LOC's that do not have permanent crossings on them will be assessed as follows: Road will be inspected annually while crossings are in place, once crossings are pulled, the road will be assessed annually until vegetation is re-established and erosion is no longer a concern. The inspection forms will then be filed in the LOC binder under the appropriate LOC number.

Non-LOC Roads

Licence roads (excluding block roads) that are not under LOC to Vanderwell Contractors are issued a unique identifier at the planning stage, a unique identifier should be given to any road that was not identified at the planning stage, but was identified at the operational stage. Non-LOC roads are always non-permanent roads. Roads will be inspected annually until erosion and surface degradation is no longer a concern. The inspection form will be filed in the roads and crossing file in the Woodlands filing system.

Roads should be assessed for the following:

- Cuts and fills properly sloped
- Burrow pits re-contoured
- Debris disposal complete
- Erosion control work adequate
- Re-vegetation work complete
- Road surface free of ruts or erosion trenches
- Other concerns specific to the road (eg. Signs, access control...)

At the time of assessment, the following information is required to be recorded:

10. Location (LOC or Licence)
11. Road number
12. Road Classification (permanent, non-permanent)
13. Date road used last
14. Date of inspection
15. Location of any required work
16. Type of work required

Wherever possible the road inspections should be completed in conjunction with the watercourse crossing inspections.

Any work that is required should be brought to the attention of the Senior Forest Technologist or Planning Forester.

Any further work that is required on a road should be added to the annual road construction and abandonment plan section of the General Development Plan.

Acceptable Variance

As approved by SRD.

Implementation Schedule

Ongoing.

Monitoring Procedure

General Development Plan to include a section detailing maintenance and upgrades required to roads as well as a schedule detailing when the work will be complete. Stewardship Report to include a section detailing maintenance and upgrades required to roads as well as dates of upgrade completion and results of post upgrade monitoring.

Operating Plan Linkages

General Development Plan to include a section detailing upgrades required to crossings and schedule of upgrades.

APPENDIX 15 - MANAGEMENT STRATEGIES FOR VISUALLY SENSITIVE AREAS

Introduction

The Detailed Forest Management Planning Team identified the importance of visual sensitivities within the Vanderwell FMA. It was decided by the planning team that strategies should be developed specific to operations within visually sensitive areas.

This document is intended to provide information on the location of these sites as well as the management strategies to be implemented surrounding the identified sites.

Background Info

The Alberta Timber Harvest Planning and Operating Ground Rules provide standards and guidelines on managing forest aesthetics. In this document visually sensitive areas are defined as major travel corridors, recreation trails and watercourses, recreation areas, tourism facilities, municipalities.

The ground rules do not provide management strategies to be implemented in these visually sensitive areas. The planning team proposes that strategies that impact the timing, location and amount of harvest should be used to mitigate the impacts of harvest operations on visually sensitive areas.

Visually Sensitive Areas

The Vanderwell DFMP Planning Team identified visually sensitive areas within the Vanderwell FMA. The location of these areas is shown in the Landscape Assessment (Section 5.0). The sites identified are meet the standards presented above. They consist of Highway 2, recreation sites and trails, and the Athabasca and Lesser Slave Rivers.

Management Objectives

The objective of management within visually sensitive areas is to mitigate the impact of forest management activities on scenic values.

Management Strategies

As the sensitivity of each identified site is different, different strategies have been developed for each. The four sites that have had strategies developed for them are (1) Highway 2; (2) Recreation sites; (3) Recreation Trails; (4) River Systems.

Highway 2

As Highway 2 is the main access route to Slave Lake from the South, most tourists traveling from the South to Slave Lake Area travel through the Vanderwell FMA. The majority of the area along Highway 2 within the Vanderwell FMA has burned in the 2001 Chisholm Fire. The fire has impacted the visual quality of the area along the highway. Because of this the remaining 'green' area is that much more important when considering aesthetics.

It is felt that only time will enhance the aesthetics along the highway. For this reason the management strategy proposed in this area is a restriction on harvest activities within a distance of 50-meters of Highway 2 for 20 years. After this time, these areas will be harvested as determined in the spatial harvest sequence.

Due to the visual impact concerns of these sites, all dwarf mistletoe resistant species that are present on site prior to harvest will be protected during harvest activities. These sites will also be targeted for reforestation treatments within one year of the harvest activity.

Recreation sites

There are two recreation sites identified within the Vanderwell FMA. These sites are located within a kilometer of Highway 2, and are located within the portion of the FMA that did not burn in the 2001 Chisholm Fire. The area these sites are located in are within stands infested with Dwarf Mistletoe, therefore management strategies implemented in these sites would have to consider this.

The management strategy being proposed in these areas strives to achieve a balance between maintaining aesthetics as well as forest health. These sites will be treated the same as the area along Highway 2, harvest activities are not to occur within 50 meters of these sites for the first 20 years. After this time, these areas will be harvested as determined in the spatial harvest sequence. Once these stands are selected for harvest, in order to achieve the goal of the Dwarf Mistletoe management plan, the strategies developed in the Dwarf Mistletoe Management Plan should be implemented.

Due to the visual impact concerns of these sites, all dwarf mistletoe resistant species that are present on site prior to harvest will be protected during harvest activities. These sites will also be targeted for reforestation treatments within one year of the harvest activity.

Recreation Trails

There are two identified off-highway vehicle trails within the FMA. Both of these trails are located in close proximity to the Athabasca River. One trail is entirely in the non-burned section of the FMA, the other is split between the burned area and un-burned area.

It is felt that from an aesthetics point of view these trails do not require any special attention, and therefore have no management strategies designed for them regarding aesthetics. There is however a management strategy regarding the protection of the trail systems (Strategy 13.5.2).

River Systems

There are two river systems that are traveled for recreation purposes, the Lesser Slave and the Athabasca Rivers. According to the Alberta Timber Harvest Planning and Operating Ground Rules these river systems are required to have a 60-meter buffer left on them. The planning team feels that these buffers will sufficiently mitigate the visual impacts caused by harvest operations. If at the operational stage of planning these buffers do not mitigate visual impacts, Vanderwell will consider other means of reducing the visual impact.

Implementation Schedule

Each of the above strategies will be implemented at the DFMP stage of planning. These strategies will be implemented during the development of the Preferred Forest Management Strategy.

Monitoring Procedure

A section of the Stewardship Report will summarize how each strategy has been implemented as described.

APPENDIX 16 - HISTORICAL AND UNIQUE RESOURCE REPORTING AND PROTECTION POLICY AND PROCEDURE

Policy

Vanderwell Contractors (1971) Ltd. will strive identify and protect historical and unique resources that are encountered while carrying out our operations.

Procedure

Vanderwell woodlands staff and contractors will report historical and/or unique resources on a Historical/Unique Resource Report form. Historical and unique resources that are observed first hand will be reported.

Any identified historical/unique resource will be considered in our operations, photos should be taken if possible, and the location of the find should be mapped. The complete historical/unique resource report form along with all photos/maps will be submitted to the planning forester. The planning forester will ensure they are mapped digitally, and that the report and all photos and maps are filed in the Woodlands filing system.

A unique resource is any resource (biological, cultural, etc.) that is locally considered important, generally because it is somewhat limited in numbers.

APPENDIX 17 -REGISTERED TRAPPER NOTIFICATION POLICY AND PROCEDURE

Policy

Vanderwell will provide opportunities for Registered Trappers to provide input into our forest management planning activities.

Procedure

Vanderwell contacts registered trappers that will be impacted by our operations at three different phases of planning, all prior to the commencement of operations.

Firstly, Registered Trappers will be notified when an area is first identified on the General Development Plan (GDP). At this time a copy of the GDP Map will be sent via registered mail. The intent at this point in time is to notify the trapper that Vanderwell expects to be operating within their trapping area within the next five years.

Secondly, Registered Trappers will be notified when a Final Harvest Plan is complete on an area that overlaps with their Registered Fur Management Area. A copy of the harvest map showing the location of the proposed activities is sent via Registered Mail to each Registered Trapper. The intent of this communication is to notify the trapper when and where the activities will take place, and to request input from the trapper on any matters that may affect them.

The third method of communication comes roughly 2 weeks prior to operations commencing within an area. The Vanderwell operations supervisor will attempt to contact the trapper via phone or registered mail. The purpose of this communication is to let the trapper know exactly when and where we will commence operations, and allow the trapper time to remove any traps and caches that may get damaged if not moved.

Acceptable Variance

Situations arise where one or more of the methods of communication is not possible such as during salvage operations. Because these operations are not identified in the GDP, the appropriate trappers cannot be notified at that stage of planning. Vanderwell begins the notification process as early in the planning process as the situation allows.

Implementation Schedule

The implementation of this strategy is ongoing.

Monitoring Procedure

Dates of the General Development Plan and Final Harvest Plan (FHP) correspondence will be summarized in the Final Harvest Plan. Changes made to the FHP as a result of integration with the Registered Trapper will be detailed in the Annual Operating Plan.

The Stewardship Report will contain a section that describes all correspondence with Registered Trappers resulting from the implementation of this Policy and Procedure.

Operating Plan Linkages

Dates of the General Development Plan and Final Harvest Plan (FHP) correspondence will be summarized in the Final Harvest Plan. Changes made to the FHP as a result of integration with the Registered Trapper will be detailed in the Annual Operating Plan.