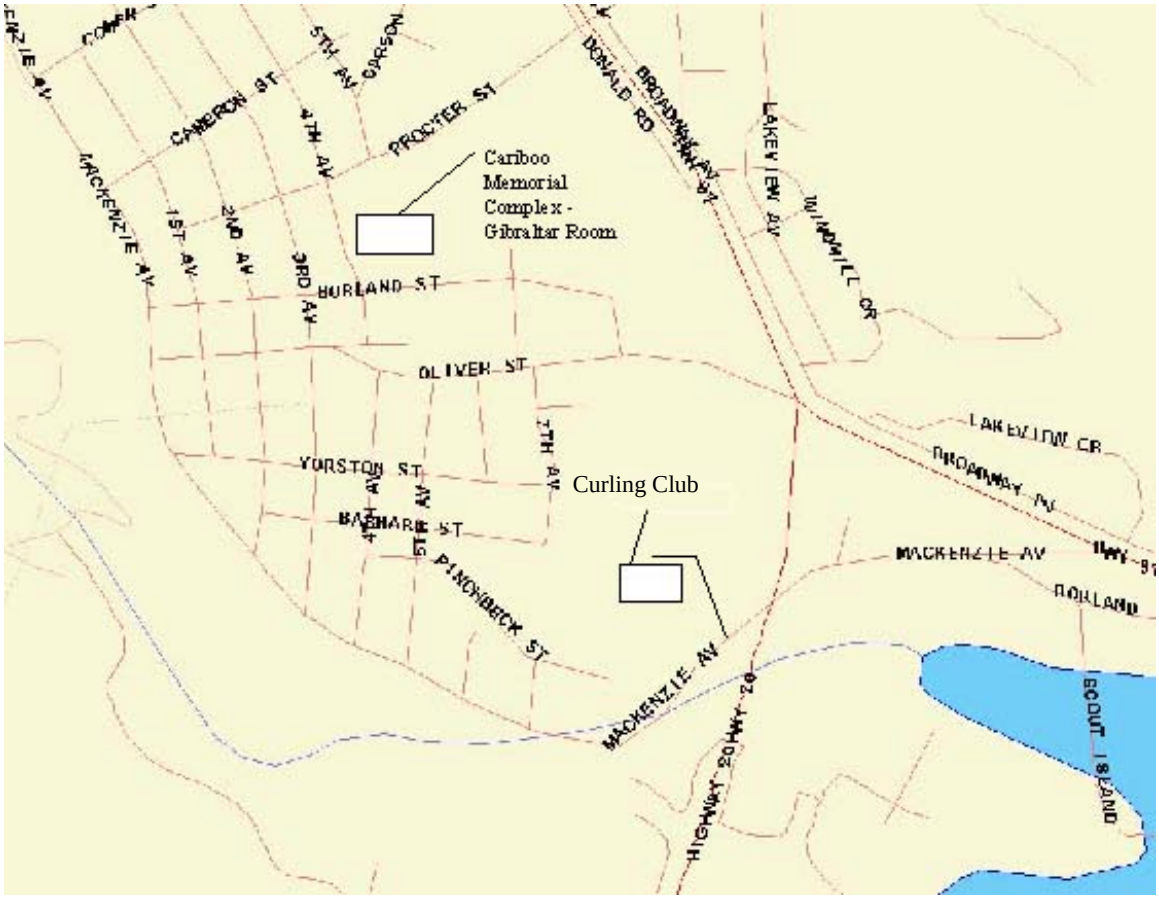
PartCuts ’01

UBC Alex Fraser Research Forest
Williams Lake BC

September 27-28, 2001

Package Outline

Williams Lake




UBC/Alex Fraser Research Forest
Block Location
7000 0 7000 14000 Meters
N
LEGEND
Streams
Primary Roads
UBC Research Forest
UBC Research Forest
Communities
Forest Distr. Boundary
Lakes
Gavin Lake Block
Big Lake
Williams Lake
150 Mile House
Knife Creek Block

Issues and Concerns

Partial cutting is an important management tool in British Columbia. There are a variety of silvicultural systems to address all forest values, and partial cutting is a viable alternative to clear-cutting for those forest conditions where it is ecologically, socially, and economically appropriate.

Employers, land managers and the public are demanding that forests be managed in ways that are socially, environmentally and economically acceptable and sound. Multiple entries require sophisticated long-term planning and understanding of the biological processes of ecosystems.

This 2-day equipment demonstration and workshop demonstrates the skilful application of partial cutting techniques.

The first day, speakers will focus on understanding the theory and principles of partial cutting and how they can be used to achieve the goals stated in higher level plans (biodiversity, visuals, safety, etc.). The second day will focus on the practical application of partial cutting with demonstrations of equipment from horses to forwarders. These two field days will highlight the challenges and solutions of implementing partial cutting in a variety of forest types.

Acknowledgements

The PartCuts Organizing Committee gratefully acknowledges the contributions of the many individuals and organizations who helped to make this field tour and demonstration a great success including:

- **Forest Renewal BC**
- **The BC Ministry of Forests, Horsefly Forest District**
- **The University of British Columbia Alex Fraser Research Forest**
- **The Canadian Forest Service**
- **The BC Ministry of Forests, Forest Practices Branch**
- **The Forest Engineering Research Institute of Canada (FERIC)**
- **The Canadian Woodlands Forum**
- **The Cariboo Lumber Manufacturers Association**
- **The Southern Interior Forest Extension & Research Partnership**
- **Riverside Forest Products**

PartCuts '01 Organizing Committee

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Agenda

Wednesday September 26

6:30 – 9:00 Participant check-in and late registration – **Fraser Inn**

Thursday, September 27
Presentations

7:00 – 730	Participant check-in and late registration – **Fraser Inn**
8:00	Buses depart Curling Club
9:00	Buses arrive at UBC Alex Fraser Research Forest, all day spent listening to various presentations.
4:30	Buses depart for return to Williams Lake
5:30	Buses arrive at Williams Lake Curling Club
6:00	No host bar at Gibraltar Room
6:30	Banquet
7:30	Guest speakers

Friday September 28
Equipment Demonstrations

8:00	Buses depart Curling Club
9:00	Buses arrive at UBC Alex Fraser Research Forest, all day spent listening to various presentations.
3:30	Buses depart for return to Williams Lake
4:30	Buses arrive at Williams Lake Curling Club

Guest Dinner Speakers

Ken Day and Rob Anderson

Biography

Ken is the director of the UBC Research Forests and the manager of the Alex Fraser Research Forest in Williams Lake, B.C. Ken came to UBC in 1987 after working for various consultants and sawmills in the Okanagan Valley. Ken received his Honours Bachelor of Science in Forestry from Lakehead University in Thunder Bay, Ontario and has been a Registered Professional Forester since 1982. In 1998 he received his Masters of Forestry from UBC, focussing on the management of uneven-aged Douglas-fir in the IDF. Ken is married and has two children.

Rob Anderson is the Horsefly Superintendent for the Cariboo Woodlands Operations, Riverside Forest Products Ltd. Rob came to Williams Lake after graduating from University of New Brunswick in 1991. Travelling back and forth across Canada a couple of times in search of a challenge, first to Alexis Creek as a Ministry of Forests Silviculture Audit Forester, then back to New Brunswick to work with the Southern New Brunswick Wood Co-operative. Finally, back to Williams Lake to work for Riverside Forest Products Ltd., Cariboo Woodlands. Rob is involved with two professional organizations, Association of B.C. Professional Foresters and the Association of Professional Foresters of New Brunswick. Rob is involved in local community organizations and activities. Rob is happily married and proud of his three children.

Day One, Thursday, September 27, 2001

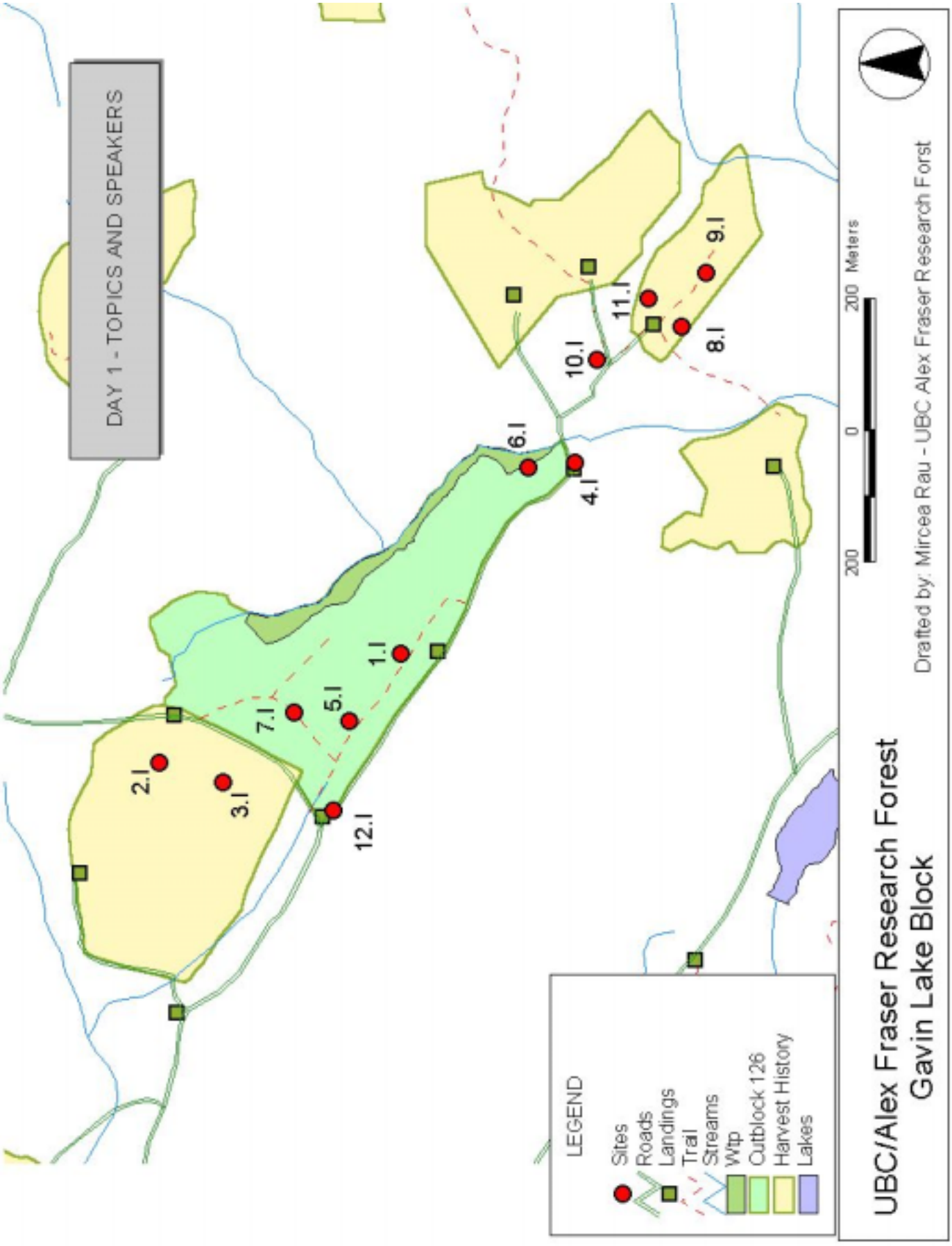
Day One - Topics and Speakers

Code	*Topic*	*Speaker*	*E-mail*
1.I	Mule deer habitat	Harold Armleder and Rick Dawson, MOF, Cariboo Region	Harold.Armleder@gems6.gov.bc.ca Rick.Dawson@gems7.gov.bc.ca
2.I	Operational Aspects	Don Skea, UBC Research Forest Kelly Tate, Weldwood of Canada	skea@interchange.ubc.ca Kelly_tate@weldwood.com
3.I	Regeneration	Michaela Waterhouse & Teresa Newsome, MOF, Cariboo Region	michaela.waterhouse@gems4.gov.bc.ca Teresa.Newsome@gems8.gov.bc.ca
4.I	Safety	Dave Rowe, Worker's Compensation Board	Drowe@wcb.bc.ca
5.I	Management Objectives and Silviculture Prescriptions	Mike Jull, University of Northern BC	jullm@unbc.ca
6.I	Biodiversity, Small Mammals, and Birds	Tory Stevens, MOWLAP	Tory.Stevens@gems1.gov.bc.ca
7.I	Beetle proofing	Roger Whitehead, Canadian Forest Service	rwhitehead@pfc.cfs.nrcan.gc.ca
8.I	Pests	Bob Erickson, Canadian Forest Service	berickson@pfc.cfs.nrcan.gc.ca
9.I	Root disease	Bill Chapman	Bill.Chapman@gems8.gov.bc.ca
10.I	Visual Quality and Recreation (Poster display)	John Lewis, UBC PhD candidate Unable to attend	johnlew@interchange.ubc.ca
11.I	Windfirmness	Ken Zielke, Symmetree Consulting Group, North Vancouver	kzielke@telus.net
12.I	Wood Quality	Les Jozsa, Forintek, Vancouver	les@van.forintek.ca

AGENDA Day I. – September 27, 2001

Speakers Session - Blue Labels

	Red	Trv. Time	Blue Group	Trv. Time	Green Group	Trv. Time	Yellow Group	Trv. Time	Orange Group	Trv. Time	Pink Group	Trv. Time
7:45	**Bus**		**Bus**		**Bus**		**Bus**		**Bus**		**Bus**	
9:00	Coffee/Intro		Coffee/Intro		Coffee/Intro		Coffee/Intro		Coffee/Intro		Coffee/Intro	
9:30	STOP # 12	5	STOP # 1	3	STOP # 5	3	STOP # 6	3	STOP # 11	5	STOP # 8	3
10:00	STOP # 2	2	STOP # 5	2	STOP # 1	5	STOP # 4	5	STOP # 9	5	STOP # 11	5
10:30	STOP # 3	5	STOP # 7	5	STOP # 12	5	STOP # 10	5	STOP # 8	5	STOP # 9	2
11:00	STOP # 7	2	STOP # 3	2	STOP # 2	2	STOP # 8	5	STOP # 10	5	STOP # 4	8
11:30	STOP # 5	3	STOP # 2	5	STOP # 3	8	STOP # 9	5	STOP # 4	3	STOP # 6	3
12:00	STOP # 1	5	STOP # 12	0	STOP # 7	8	STOP # 11	8	STOP # 6	8	STOP # 10	8
12:30	**Lunch**		**Lunch**		**Lunch**		**Lunch**		**Lunch**		**Lunch**	
1:00	STOP # 6	3	STOP # 11	5	STOP # 8	3	STOP # 12	3	STOP # 1	3	STOP # 5	3
1:30	STOP # 4	5	STOP # 9	5	STOP # 11	5	STOP # 2	2	STOP # 5	2	STOP # 1	5
2:00	STOP # 10	5	STOP # 8	5	STOP # 9	2	STOP # 3	5	STOP # 7	5	STOP # 12	5
2:30	STOP # 8	3	STOP # 10	5	STOP # 4	8	STOP # 7	8	STOP # 3	5	STOP # 2	5
3:00	Coffee LND 2		Coffee LND 2		Coffee LND 2		Coffee LND 1		Coffee LND 1		Coffee LND 1	
3:15	STOP # 9	5	STOP # 4	3	STOP # 6	5	STOP # 5	3	STOP # 2	5	STOP # 3	5
3:45	STOP # 11	8	STOP # 6	8	STOP # 10	8	STOP # 1	5	STOP # 12	0	STOP # 7	8
4:15	**Bus**		**Bus**		**Bus**		**Bus**		**Bus**		**Bus**	


DAY 1 - TOPICS AND SPEAKERS
1.I
2.I
3.I
4.I
5.I
6.I
7.I
8.I
9.I
10.I
11.I
12.I
LEGEND
Sites
Roads
Landings
Trail
Streams
Wtp
Cutblock 126
Harvest History
Lakes
UBC/Alex Fraser Research Forest
Gavin Lake Block
Drafted by: Mircea Rau - UBC Alex Fraser Research Forst
200
0
200 Meters

Mule Deer Winter Range: Partial Cutting Tailored to Snowpack Zone

Biography:

Harold Armleder, RPF, R.P.Bio.
Harold is the Wildlife Habitat Ecologist for the Cariboo Forest Region, Ministry of Forests.

Rick Dawson, RPF, R.P.Bio.
Rick is the Research Associate – Forest and Wildlife, for the Cariboo Forest Region Ministry of Forests.

Abstract

Winter ranges in the Cariboo Forest Region are located in a wide diversity of biogeoclimatic units ranging from the shallow snowpack Interior Douglas-fir very dry, mild (IDFxm) subzone to the very deep snowpack of the Interior Cedar-Hemlock wet, cool (ICHmk) subzone. Most winter ranges are located in the IDF in moderate snowpack conditions.

Experimental partial cutting trials on mule deer winter have been underway in the Cariboo Forest Region since 1983. This has led to the development of a clumpy single-tree selection system for winter ranges in the IDF. There has always been recognition that silvicultural systems may have to differ across the wide diversity of winter ranges to address the silvics of Douglas-fir and the biology of mule deer.

Group selection is another option for stands on certain slopes and aspects in subzones with deeper snowpack. Openings can range from 0.1 to 0.6 hectares depending on slope and aspect. The larger openings address the decreasing shade tolerance of Douglas-fir while recognising the snow interception and forage (litterfall and shrubs) requirements of mule deer.

Commercial thinning is another harvest opportunity on winter ranges in all zones but may be applied differently by snowpack zone. An over-stocked pole layer, often the result of fire suppression, is not ideal stand structure for mule deer. Lower stocking encourages the development of wider, deeper crowns that are more useful as mule deer winter habitat.

Mule deer winter range has been the subject of research attention in the Cariboo Forest Region since 1980 providing a sound foundation for management recommendations. The Cariboo-Chilcotin Land-Use Plan (CCLUP) and subsequent Integration Report have provided a higher level framework for proceeding with winter range plans.

These plans will include:

1) Long-term objectives: The proportions of each of three habitat types varies with the snowpack that each winter range experiences; habitat types are mapped to guide long-term development.
2) Current condition: An assessment of current condition based on speciality stand structure mapping is compared to the long-term objectives.
3) Transition strategy: Specific stand management opportunities are identified for the 30-year transition period, which will encourage more rapid development toward long-term conditions. It balances habitat development with CCLUP short-term timber objectives.

At the stand level, management plans provide direction on the application of various partial cutting harvest types.

The plans are designed to provide certainty to managers while allowing flexibility for the prescribing forester to select stands and prescriptions that fit with the objectives for a given part of the winter range. Plans will eventually be written for all of the 100 identified winter ranges in the region.

Operational Aspects

Biography:

Don Skea, AScT,
Forest Operations Supervisor
University of British Columbia, Faculty of Forestry, Alex Fraser Research Forest

Primary responsibilities are the harvesting program; bark beetle detection and the design, construction and maintenance of the road network.

Kelly Tate,
Area Supervisor
Weldwood of Canada

Kelly has been with Weldwood for 22 years, dealing with many aspects of forestry from planning and layout to supervising harvesting activities from horse logging to cable systems.

Abstract

Discussion, about the logistics of harvesting within a shelterwood silvicultural system using Basal Area (BA) controls. Initial stand BA was $60m^2$ reduced in the first entry to be between 40 and 30 m^2, in the second entry reduced to $15m^2$. In the second entry it was important to:

- relocate the original designated trails
- identify which trees to cut and or leave
- identify where the division of skid directions between landings/roads is going to be
- select the appropriate sized equipment to ensure that it is capable of handling the size of wood effectively and efficiently
- keep phases separated (e.g., harvester separated from skidding or forwarding) to improve project quality, safety and reduce costs.

Partial cutting to obtain Douglas-fir regeneration in the SBSdw

Biography:

Michaela Waterhouse, R.P.F., R.P.Bio.
Silvicultural Systems Researcher, B.C. Ministry of Forests, Cariboo Forest Region

Research scientist focusing on alternative silvicultural systems to meet multiple resource objectives. Specific topics of research include: mule deer, caribou, breeding birds, and tree regeneration.

Teresa Newsome M.Sc., R.P.F.
Silviculture Researcher, B.C. Ministry of Forests, Cariboo Forest Region

Research scientist focusing on silviculture issues including hardwood competition, repressed pine, regenerating partial cuts, planted stock and site preparation.

Abstract

Introduction:

The dry, warm Sub-Boreal Spruce subzone (SBSdw) comprises 495,000 ha of the most productive forest land in the Cariboo Region. Currently, about 93,000 ha are mature (100- 140 years old), predominantly Douglas-fir forests mixed with varying levels of pine.

This project was initiated in the Cariboo Forest Region in 1990 to provide a viable alternative to clearcut harvesting in the SBSdw. Douglas-fir stands mixed with lodgepole pine were being clearcut then planted with Douglas-fir; however, there was excessive plantation failure due mainly to frost damage. This led, by default, to planting predominantly with lodgepole pine. Concern by Ministry of Forests staff for long-term economic losses and biological consequences by non-replacement of the Douglas-fir forest led to an informal deferral of these forests from further clearcutting.

In the SBSdw, Douglas-fir is less shade tolerant than it is in the IDF but it is apparent that some residual canopy is necessary for frost protection. Stands are generally even-aged, therefore an even-aged silvicultural system, the uniform shelterwood, was proposed to provide suitable environmental conditions for regeneration.

The initial study design included two levels of canopy retention created via two methods of harvesting: handfalling and line skidding or feller-buncher with grapple-skidding. The initial stand basal area was 60 m^2 (600 m^3/ha). In the preparatory cut treatment, the stand was reduced to 40 m^2 and was mainly intended to reduce the risk of windthrow and stabilize the stand prior to the regeneration cut. In the regeneration cut treatment, the stand was cut to 30 m^2 and was intended for establishment and growth of Douglas-fir regeneration.

Conclusions from the first ten years:

- Wind throw was not a problem in the regeneration cut (50% basal area retention) units, or preparatory cut units (70% basal area retention).
- Bark beetle infestation was minimal (fewer stressed trees in the cut units).
- Frost was not a problem in either partial cut treatments.
- There was flexibility in time of harvest and type of equipment, though site preparation may be necessary to improve establishment.
- Seed falls were abundant and frequent enough to initiate natural regeneration.
- The best growth and survival, of Douglas-fir regeneration, were in the 30 m^2 residual basal area units.

Knowledge gaps that this study continues to address:

- What level of residual basal area will maximize Douglas-fir regeneration performance without resulting frost damage?
- Will vegetation competition become a problem?
- How much volume has accrued on the residual stand?
- Will stands at lower residual basal area continue to be wind firm and beetle resistant?
- What are the harvesting costs associated with partial cutting in a uniform shelterwood?

The trial was harvested for a second time in February, 2001 using feller-buncher and grapple skidder equipment. A regeneration cut was made in one of the preparatory cut units and a second regeneration cut was made in one of the original regeneration cut units. This resulted in a range of residual basal area treatments. Specific studies include: natural regeneration, planted Douglas-fir stock, vegetation, micro-climate, seed fall, site preparation, wind throw and snow interception.

Study Design 2001:

1991 Treatment Unit	1991 post –harvest residual basal area	2001 Treatment Unit	2001 post-harvest residual basal area
1 – uncut control	60 m^2	1 – uncut control	60 m^2
2 – preparatory cut	40 m^2	2 – preparatory cut	40 m^2
3 – preparatory cut	40 m^2	3 – first regeneration cut	20 m^2
4 – regeneration cut	30 m^2	4 – first regeneration cut	30 m^2
5 - regeneration cut	30 m^2	5 – second regeneration cut	15 m^2

This is an ongoing co-operative research project since 1990 between the Ministry of Forests (Cariboo Region), University of British Columbia (Alex Fraser Research Forest), Weldwood of Canada (Williams Lake) and BC Environment (Williams Lake). Operational support has been provided by the Williams Lake and Horsefly Forest Districts. Forest Renewal BC has contributed to the funding of the project over the past five years.

Safety in Partial Cutting

Biography:

Dave Rowe,
Worker's Compensation Board, Prince George

Dave is currently the Industry Specialist – Forestry and Trucking, Worker's Compensation Board of B.C. His primary focus is on accident and injury reduction in the forestry, trucking, gas and oil industries. Since Dave joined the WCB in 1988, he has been involved with the regulation review process for forestry, the B.C. Wildlife Tree Committee and WCB forestry regulations. Prior to 1988, Dave was logging superintendent and supervisor for 17 years and with the Ministry of Forests for five years.

Worker's Compensation Board,
Prince George, British Columbia
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Silviculture Prescriptions and Partial Cutting

Biography:

Mike Jull, R.P.F.
University of Northern B.C., Prince George

Mike is the Manager, Aleza Lake Research Forest. Mike has extensive operational experience with the planning, design, and evaluation of different partial-cut silvicultural systems in a range of central and northern B.C. forest types. Mike has written, and advised on, silvicultural prescriptions in spruce-balsam, Douglas-fir, cedar-hemlock, and mixedwood forest types, including a wide range of systems such as group selection, single-tree selection, shelterwood, seed-tree, and clearcut with reserves. These systems have been designed and prescribed to meet a range of resource issues such as mountain caribou habitat, visually-sensitive areas, maintenance of structural biodiversity, management of northern Douglas-fir, and old-growth retention. Mike's past and current silvicultural systems research has focussed on the effects of different cutting methods on post-harvest regeneration, stand growth, and windthrow management. He has previously held the position of regional Silvicultural Systems Ecologist with the Prince George Forest Region, B.C. Ministry of Forests. Mike is an instructor for the Forest Management Institute of B.C. (FMIBC). He has written many extension publications relating to partial-cutting, and contributed to both the Silvicultural Systems and Silviculture Prescription guidebook.

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Biodiversity, Small Mammals, and Birds
[Biodiversity and Partial Cutting]

Biography:

Tory Stevens
Senior Ecologist with the Ministry of Water, Land and Air Protection's Habitat Branch. She has been in that position for about 2 years. Prior to her direct employment by government, she was consulting in BC for 15 years. Her consulting work was primarily related to biodiversity including Identified Wildlife, coarse woody debris, riparian issues and species diversity.

Tory has a Ph.D. in Wildlife Biology from the University of Washington, College of Forest Resources. She worked as a ranger and biologist for Olympic National Park in Washington State while conducting research on the non-native population of Mountain Goats that inhabits the Olympic Mountains.

Abstract

Habitat elements that can be positively affected by partial cutting
Several habitat elements have been identified as being important to forest dwelling vertebrates at risk. By maintaining these structures on a stand, many of the other organisms and functional relationships that make up the biodiversity of a forest can be maintained. The following are the elements that can be positively affected by well considered partial cutting.

Cavity sites – Large diameter live trees with evidence of heart rot, or standing dead trees.

Downed wood – This will be recruited into the stand from standing structure or can be created by the felling of hazard trees. Avoid crushing the downed wood on the site during harvest and subsequent stand-tending activities.

Shrubs – The shrub component of a stand will be augmented by creating canopy gaps. Excessive damage to shrubs on the stand during harvest should be avoided where possible.

Broadleaved trees – Broadleaf (deciduous) trees are comparably fast growing and can often provide cavity sites and large size, much sooner than conifers. Leave standing where possible.

Large live trees – The extent of the vertical structure of a stand is defined by the presence of large live trees. This structural component is one of the most difficult to replace. Maintaining representative elements of this structure provides a functional bridge between the old stand and the new.

Riparian – Riparian areas are not represented by a single structural element. But as habitat elements, they provide: 1) a linear corridor that connects stands throughout a landscape, 2) vegetation distinct from the surrounding upland areas that is used by a

disproportionately large number of organisms, and 3) organic inputs to stream ecosystems, moderation of water temperatures, banks stabilization and a source of dead wood in the stream which is important to stream dynamics.

Although riparian reserves zones should not be entered, there are opportunities to use partial cutting in riparian management zones to hasten the development of old structural elements (large trees, canopy gaps, large diameter dead wood).

Situations or specific biodiversity objectives that can be met with partial cutting

Ingrowth – NDT4 ecosystems have historically been maintained by frequent fires that burn the understory but leave the large trees intact. Many years of fire suppression have created situations in which ingrowth has occurred in old forest stands or in former grasslands. This raises issues around build-up of fuels and habitat changes. Partial harvesting can be used to remove the ingrowth and leave the large, old trees, and thereby restore these stands to their previous structure.

Recruitment of old structure – In landscapes where old growth forests are in short supply, partial harvesting may be used to introduce gaps into the canopy which encourages the remaining trees to grow faster and allows the introduction of shrubs and more canopy layers. These structural changes can speed up the acquisition of old growth characteristics in dense, homogenous second growth stands.

Riparian systems – Partial cutting can be used in riparian management areas to encourage the retention and growth of select trees or to protect riparian areas from health hazards where there is an epidemic condition.

Protection of areas set aside for biodiversity that are threatened with health issues – Partial harvesting may be used in situations where an epidemic outbreak of insects is threatening to destroy a stand that has been set aside for biodiversity. This might be a WHA, an OGMA, a riparian management zone or some other designation.

Connectivity – For some species, connectivity between two habitat patches can be accomplished by leaving more structure between the patches (i.e., between a WTP and adjacent mature timber). Where this is desirable, partial cutting can be used to remove some merchantable timber while at the same time maintaining movement corridors for selected species.

Species specific issues: Both caribou and ungulate winter range are being addressed by other presenters, but they represent a species specific application of partial cutting for habitat purposes. Other species can also benefit if their habitat needs are known and attainable by partial cutting. A good example is the Northern Goshawk that needs large trees for nesting and open forest habitat for foraging. Partial cutting can open up forests which would otherwise be unusable to goshawks.

Negative implications of partial cutting for biodiversity

Greater area with access for same volume of cut – Partial cutting is not a panacea. The possibility exists that more area will be impacted by access which brings in exotic

species, predators (including human predators), and other human disturbances such as recreation or firewood cutting.

Lessons from AlPac

Leave decisions in the hands of operators – Operators understand the reasons for leaving structure in harvested blocks, and make the decisions on what residuals to leave and where to leave them. They are given some guidance in terms of the % to leave behind but the rest is left to them.

Think like a fire – In the boreal forests of Alberta where the landscape has been shaped by fire disturbance, the operators have been instructed to "think like a fire". This would affect where they leave retention on a block, the shape of blocks and what kind of structure is left. In BC, there are forests that are primarily fire disturbed, but we also have wet coastal forests where gap replacement is the primary agent of change. In these situations the reverse pattern would be prominent, with the small patches being the material removed rather than the structure retained.

Mountain Pine Beetle Susceptibility

Biography:
Roger Whitehead

Roger is a Research Silviculturist with the Canadian Forest Service, Natural Resources Canada. His work focuses on the silvicultural opportunities associated with treatments to reduce susceptibility of dense Lodgepole pine stands to mountain pine beetle attack, including stand conversion to mixed species using a shelterwood system.
Ph: (250) 363-0765; Fax: (250) 363-0775
E-Mail: rwhitehead@pfc.cfs.nrcan.gc.ca

Abstract

Stop Description:
Density management options for Lodgepole pine including commercial thinning will be discussed. Reducing stand and landscape susceptibility to Mountain Pine Beetle will be emphasized.

Pests

Biography:

Robert (Bob) D. Erickson

Bob works for the federal government in NRCan - the Canadian Forest Service. He is responsible for acquiring, compiling and reporting information on major forest pest disturbances. He has been responsible for surveying and tracking the Mountain Pine Beetle for several years. His other duties include monitoring and reporting on quarantine related activities and the ARNEWS/biomonitoring studies.
Ph: (250) 363-0716; Fax: (250) 363-0775
E-Mail: berickson@pfc.cfs.nrcan.gc.ca

Root Disease [Armillaria]

Biography:
Bill Chapman

William K. Chapman, Ph.D, Research Soil Scientist, Cariboo Forest Region. Speciality-Soil biology with an emphasis on ectomycorrhizal and wood decay fungi, soil reclamation, soil disturbance, contribution of soil organisms to ecosystem stability.

Abstract

Armillaria ostoyae, a troublesome root pathogen, has been an integral part of forests in the area that is now southern British Columbia for at least millennia. Well spaced stands of large trees have been able to grow up in areas where Armillaria occupation predates the trees. In natural stands, Armillaria ostoyae and susceptible tree species co-exist, while in managed stands, Armillaria ostoyae can sometimes cause devastating damage. Understanding of the functionality of the natural co-existence between fungus and tree, should provide the basis for strategies for mitigating Armillaria root disease in managed stands. One approach we have been trying is to increase the levels of a saprophytic fungus that is antagonistic to Armillaria in Armillaria infected stands. Our hypothesis is that, after natural stand destroying events, levels of saprophytes would increase with the large inputs of fresh woody debris and persist for a few decades, which would hold Armillaria in check while new stands establish. With this idea in mind, we have started managing woody debris in Armillaria infected areas to increase populations of saprophytes in general, as well as inoculating our particularly aggressive saprophyte. This approach is still experimental, as is the widely used approach of attempting to remove root systems to mitigate Armillaria losses. Given the mounting evidence of the ineffectiveness of root removal approaches, it is very important to continue to try many new approaches to dealing with Armillaria root disease.

Visual Quality and Recreation

Biography:

John L. Lewis, M.Pl., M.Sc.; Collaborative for Advanced Landscape Planning, Faculty of Forestry, University of British Columbia, 2045-2424 Main Mall, Vancouver, British Columbia, V6T 1Z4.

John completed his Master's in forest resources management in 2000, and is currently working towards an interdisciplinary PhD in forest management and regional land-use planning. Prior to joining CALP, John has worked as a planner for the City of York in southern Ontario, as a GIS technician for the Ontario Ministry of Natural Resources, and earned his Master's degree in regional planning in 1996 from Queen's University. Through CALP, he has completed a series of consulting and academic projects with UBC's Alex Fraser Research Forest where he explored the visual impacts of different partial cutting systems using simulation technology of varying levels of realism. Most recently, John has worked with the Cheam Indian Band and the Shuswap Nation Tribal Council to explore the benefits of landscape simulations as an aid to improved communication and land-use consultation with First Nation communities. His research interests include the use of GIS and photo-realistic visualisation media for gathering information on landscape preferences and perceptions, the influence of cultural factors on environmental perceptions and preferences, and the integration of traditional cultural and Western scientific knowledge using bio-regional and socio-cultural planning methodologies.

Abstract

The importance of effective simulation appraisal is rooted in the practical, legal and ethical aspects of planning practice. Simulations are often used to depict future environmental conditions in light of a proposed resource management plan such as timber harvesting or riparian restoration. When used properly as an input to the decision-making process, simulations can assist decision-makers in evaluating the merits of a proposal. However, in the absence of careful simulation planning, a set of images may be presented to a forest manager that conveys the wrong message or, at the very least, results in confused and conflicting interpretations of the message. Ultimately, decisions will be made without the correct visual information which may result in expensive litigation procedures and attacks on the professional credibility of the forest manager when the implemented plan does not meet the expectations established by the simulations.

Visual what if exercises have now become a key facet of professional and academic practice. Computer simulation technologies have taken artists renderings and GIS displays of proposed projects to new levels of detail and accuracy. The proliferation of visual simulation techniques in environmental planning and forest management in particular has been met by a relative paucity of standards that guide the development and presentation of landscape simulations. In the absence of such standards the potential for poor or misguided planning decisions that are based on simulations that use inaccurate data, untested methods or biased presentation formats is a matter of considerable concern

for professional foresters. Through this presentation, I would like to present a case for simulation development and presentation standards in forest management and, more particularly, explore the principles and guidelines that have been spelled out in the planning literature and applied in two related timber and recreation management projects with UBC's Alex Fraser Research Forest.

Windthrow Considerations for Partial Cutting

Biography:

Ken Zielke,
Symmetree Consulting Group Ltd. (ph. 604-921-6077 / email. kzielke@telus.net)

Abstract

Risk of windthrow is a common concern in forest management. Windthrow has always been an important consideration when planning cutblock boundaries in many portions of BC. It is little wonder that partial-cutting silvicultural systems raise even more concerns regarding windthrow.

The potential for windthrow must be considered prior to harvesting. In the early 1990's increasing interest in partial-cutting silvicultural systems in British Columbia led to the development and evolution of a diagnostic framework for relative windthrow risk assessment (Mitchell, 1998). The framework uses the combination of topographic exposure, soil and stand features together with treatment parameters to help categorize risk for a given situation. The framework is used in conjunction with areas previously harvested to provide a feedback loop that refines previous judgements.

Windthrow risk only defines the likelihood of windthrow occurring. The threat to management objectives from the resulting windthrow is the more important issue facing a forest manager. If management objectives are threatened by the windthrow expected with the assessed windthrow risk, then the manager must consider either changing the prescription, including a crown-modification treatment, or developing a plan for salvage – depending on the nature of the impact.

If the potential impact of anticipated windthrow is high, alternatives may have to be considered. Partial-cutting prescriptions may have to be altered in a manner that can reduce anticipated windthrow risk. In some cases a partial-cutting prescription may be virtually impossible without high levels of windthrow. It is best if this can be anticipated in advance of harvesting so that the alternative options can be considered. Sometimes a high windthrow risk may be acceptable if salvage can easily be accommodated. Again, it is best if this is anticipated ahead of time. While crown modification treatments have shown success when properly applied, they are expensive and should only be used where they are really necessary.

All prescriptions to deal with windthrow should be monitored and adjusted over time.

Wood Quality

Biography:

Les Jozsa

Les recently retired from Forintek Canada Corp. as a Resource Properties Specialist. His current clients include Forintek, BCIT, Ministry of Forests, Forest Management Institute, UBC, Weyerhaeuser, Western Red Cedar Lumber Association, and WoodLINKS. His contract work with these agencies includes technology transfer, training and education. His expertise includes planning, coordinating and conducting research on wood quality studies, involving particularly the use of X-ray densitometry. His resource evaluation studies have deal with both the present and the future forests; to maximize returns from present forests, and to determine the impact of silvicultural treatments on wood production and wood quality in futures forests. Les has published over 150 scientific papers, technical reports and articles, while being very active in training and education through lecturing and giving workshops. He received his Bachelor of Science in Forestry degree at the University of British Columbia, Canada. His work experience includes forestry, pulp and paper R&D, X-ray densitometry, and dendrochronology specialization. He is also an expert witness in Forensic Dendrochronology in the Supreme Court of Canada. In his spare time, Les developed a high level of skill in wood carving as well.

Day Two, Friday, September 28, 2001

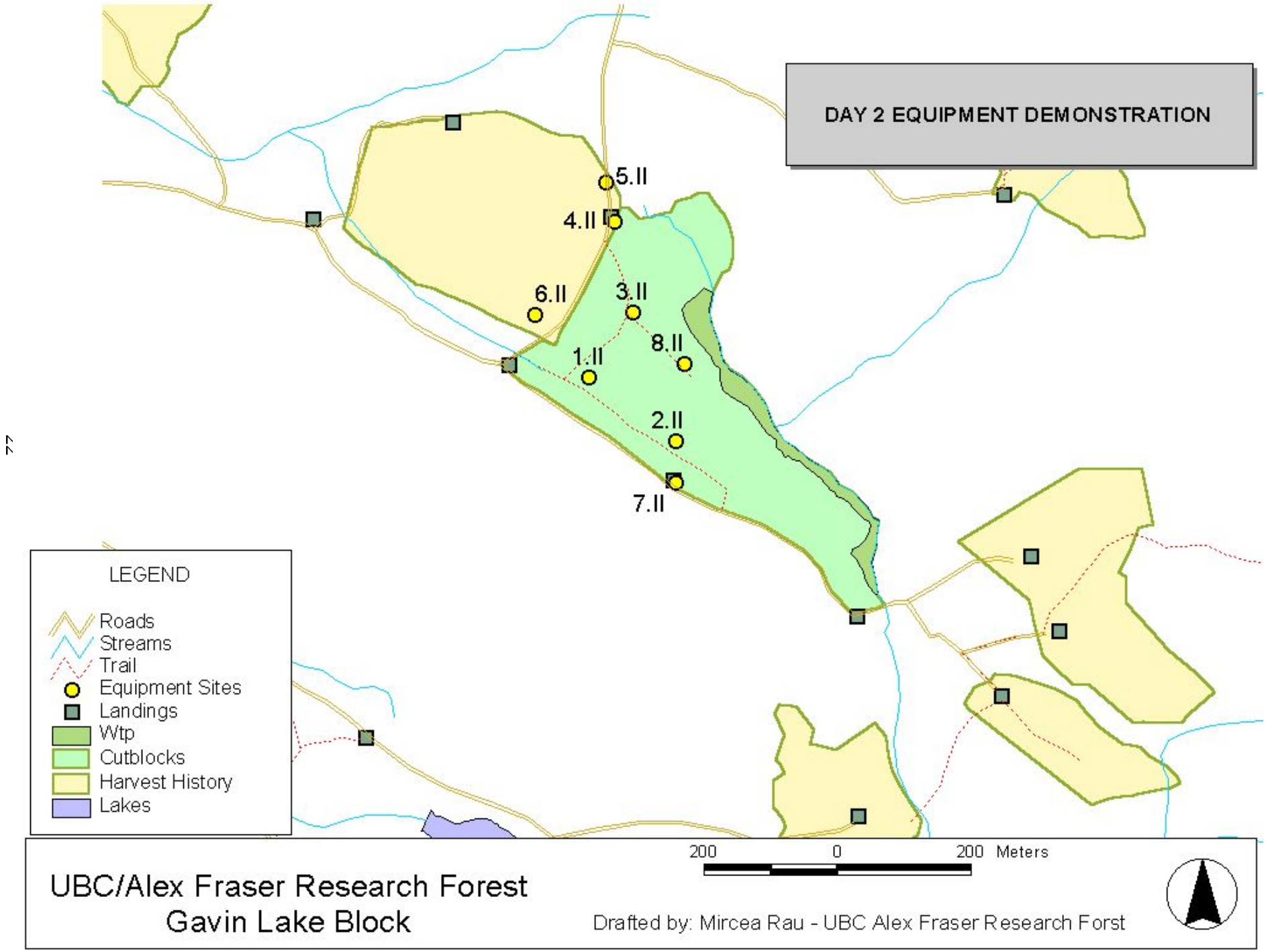
Day Two – Equipment Demonstrations

Priority	*Suggested Equipment*	*Representative*
1.II	Rottne Harvester and 2 Forwarders	Rocan Forestry Equipment
2.II	Timberjack Shortwood Harvester & Forwarder	Terratech
3.II	ATV Skidder/Forwarder	Future Forestry Products
4.II	Portable Sawmill, Wood-mizer	Bill Webb
5.II	Morgan SX-706 Swing Boom Grapple Skidder	Int. Silvatech Industries Inc.
6.II	Horse Logging	Delbert Dillman Triple D Horse Logging
7.II	Shortwood crane, Full tree crane	Northwest Cranes
8.II	Hand Falling / Line skidding	Real Begin

AGENDA Day II. – September 28, 2001

Equipment Session

	Red Group	**Blue Group**	**Green Group**	**Yellow Group**	**Orange Group**	**Pink Group**
7:45	**Bus**	**Bus**	**Bus**	**Bus**	**Bus**	**Bus**
9:00	Coffee	Coffee	Coffee	Coffee	Coffee	Coffee
9:30	STOP # 1	STOP # 8	STOP # 3	STOP # 2	STOP # 7	STOP # 4
10:10	STOP # 2	STOP # 3	STOP # 8	STOP # 1	STOP # 4	STOP # 7
10:50	STOP # 5	STOP # 4	STOP # 7	STOP # 6	STOP # 3	STOP # 8
11:30	STOP # 6	STOP # 7	STOP # 4	STOP # 5	STOP # 8	STOP # 3
12:10	**Lunch**	**Lunch**	**Lunch**	**Lunch**	**Lunch**	**Lunch**
12:40	STOP # 4	STOP # 6	STOP # 1	STOP # 7	STOP # 2	STOP # 5
1.20	STOP # 7	STOP # 1	STOP # 6	STOP # 4	STOP # 5	STOP # 2
2:50	Coffee	Coffee	Coffee	Coffee	Coffee	Coffee
2.10	STOP # 3	STOP # 2	STOP # 5	STOP # 8	STOP # 6	STOP # 1
2:50	STOP # 8	STOP # 5	STOP # 2	STOP # 3	STOP # 1	STOP # 6
3:30	**Bus**	**Bus**	**Bus**	**Bus**	**Bus**	**Bus**


DAY 2 EQUIPMENT DEMONSTRATION
5.II
4.II
6.II
3.II
8.II
1.II
2.II
7.II
LEGEND
Roads
Streams
Trail
Equipment Sites
Landings
Wtp
Cutblocks
Harvest History
Lakes
200
0
200 Meters
UBC/Alex Fraser Research Forest
Gavin Lake Block
Drafted by: Mircea Rau - UBC Alex Fraser Research Forst

Horse Logging

Demonstrated By:
Delbert Dillman
Triple D Horse Logging
8223 Ross Road
Quesnel, BC
V2J 6M5
Tel: (250) 747-8690
Fax: (250) 747-8690

Advantages for Partial Cutting

- Can select single tree
- Trail width can be < 1m with a single horse (2-2.5m for a team)
- Minimal damage to surrounding trees
- Minimal site disturbance
- Can be used year-round

Hand Falling and Line Skidder

Demonstrated by:
Real Begin

Advantages for Partial Cutting

- Can select single tree
- Trail width can be < 4 m with a small skidder
- Low capital expenditure
- Able to use cable to pull logs out of difficult to reach areas
- Able to adapt designated skid trails to the terrain.

Woodmizer LT40 Hydraulic Portable Sawmill

Demonstrated By:
Bill Webb
Cariboo Custom Milling
Box 436
Horsefly, BC
V0L 1L0
Tel: (250) 620-8618

Advantages for Partial Cutting:

- Length of 8 m
- Width of 2 m
- Height of 2.4 m
- Milling done on site
- Portable

JR Arch

Demonstrated By:
Mark Havel
Future Forestry Products Inc.
PO Box 1083
Willamina, Oregon
97396

Tel: (503) 876-4488

Toll Free: 1-800-258-1445
Fax: (503) 876-4488
contact@futureforestry.com

Advantages for Partial Cutting:

- Lightweight
- Reduces damage to stand
- Easily moves through the forest
- Can move 500 lb logs
- 1000 lb rated capacity on tires
- Easily used by a single individual

ATV Forwarding Arch

Demonstrated By:
Mark Havel
Future Forestry Products Inc.
PO Box 1083
Willamina, Oregon
97396
Tel: (503) 876-4488
Toll Free: 1-800-258-1445
Fax: (503) 876-4488
contact@futureforestry.com

Advantages for Partial Cutting:

- Suitable for ATVs, small tractors and pick-up trucks
- Articulating suspension point resulting in better tracking
- Capable of handling 20" diameter logs
- 3200 lb winch with choker
- Up hill power is restricted only by the power of the ATV

Rottne SMV Rapid EGS Harvester

Demonstrated By:
Gary Macdonald
Dave Belyea
Rocan Forestry BC Ltd
5339A Hartway Drive
Prince George, BC
V2K 5B6
Tel: (250) 962-8244
Fax: (250) 962-8892
http://www.rocan.com/

Rocan@telus.net

Advantages for Partial Cutting

- Short and compact chassis
- Double articulated frame
- Available in 6 or 8 wheel models
- 2.86 m wide
- 10 m outreach on loader
- Computerized measuring and control system

Rottne SMV Rapid 16T Forwarder

Demonstrated By:
Gary Macdonald
Dave Belyea
Rocan Forestry BC Ltd
5339A Hartway Drive
Prince George, BC
V2K 5B6
Tel: (250) 962-8244
Fax: (250) 962-8892
http://www.rocan.com/

Rocan@telus.net

Advantages for Partial Cutting

- Large wheels result in minimal ground pressure
- Can accommodate tracks on the front bogie
- Rear section can be removed
- Available in 6 or 8 wheel models
- Low centre of gravity
- 2.88 m wide

Rottne Rapid 12T Forwarder

Demonstrated By:
Gary Macdonald
Dave Belyea
Rocan Forestry BC Ltd
5339A Hartway Drive
Prince George, BC
V2K 5B6
Tel: (250) 962-8244
Fax: (250) 962-8892
http://www.rocan.com/

Rocan@telus.net

Advantages for Partial Cutting

- Available in rigid or articulated wagons
- Rigid wagon is available in multiple lengths
- Available in 6 or 8 wheel models
- Low centre of gravity
- Tilting tower on RG83 Loader has a wide range of movement
- 2.85 m wide

Timberjack 1270 Harvester

Demonstrated By:
Peter Sirfalk
Terratech Equipment
1063 Great Street
Prince George, BC
V2N 2K8
Tel: (250) 564-8841
Fax: (250) 562-8891
www.terratech.ca
http://www.tjtoday.com

Advantages for Partial Cutting:

- Compact and lightweight for minimal site disturbance
- Parallel motion boom with 8.3 m reach
- Stems processed on trail in front of machine to provide debris mat for machine travel
- High visibility cab
- Computerized measuring and control system

Timberjack 1210 Forwarder

Demonstrated By:
Peter Sirfalk
Terratech Equipment
1063 Great Street
Prince George, BC
V2N 2K8
Tel: (250) 564-8841
Fax: (250) 562-8891
http://www.tjtoday.com

www.terratech.ca

Advantages for Partial Cutting:

- 8-Wheel double bogie drive
- Low pressure 700 mm tires result in low environmental impacts
- Loader has a reach of 7.1 m
- Log bunk headboard can adjust upward to accommodate high loads of short logs

Penz 9100/H/HL Log Loader

Demonstrated By:
Janet Janssen
North West Crane Ltd.
7015 Sparrow Drive
Leduc, Alberta
T9E 7L1
Tel: (780) 980-2229
Fax: (780) 980-2279
Nwcrane@connect.ab.ca

Advantages for Partial Cutting:

- 2.47 m width
- 2.50 m height
- 9.40 m hydraulic extension
- 12.5 m hydraulic extension boom

Morgan SX-706 Swing Boom Grapple Skidder

Demonstrated By:
David Heukelom
Marketing Director
Int. Silvatech Industries Inc.
27489 - 56th Avenue
Langley, British Columbia
Canada V4W 3X1
Tel: 604-607-8877
Fax: 604-607-8825
http://www.silvatechfluidpower.com/index.html

Advantages for Partial Cutting:

- 4.1 m in width
- able to perform on slopes up to 55%
- 7 m boom with a basket bunching head grapple (able to build a load)
- Hydrostatic drive system
- Low ground pressure
- Uphill yarding capability