

FORESTRY

Clearcutting and Visual Quality

A Public Perception Study

NOVEMBER 1996

CANADA-BRITISH COLUMBIA PARTNERSHIP AGREEMENT ON FOREST RESOURCE DEVELOPMENT: FRDA II

Canada



Clearcutting and Visual Quality

A Public Perception Study

Summary Report

by

B.C. Ministry of Forests
Range, Recreation and Forest Practices Branch
Recreation Section

November 1996

CANADA-BRITISH COLUMBIA PARTNERSHIP AGREEMENT ON FOREST RESOURCE DEVELOPMENT. FRDA II

Canada 



Funding for this publication was provided by the Canada-British Columbia Partnership Agreement on Forest Resource Development: FRDA II – a five year (1991–96) \$200 million program cost-shared equally by the federal and provincial governments.

Canadian Cataloguing in Publication Data

Clearcutting and visual quality: a public perception study

ISBN 0-7726-3019-4

1. Clearcutting – British Columbia – Public opinion. 2. Forest landscape management – British Columbia – Public opinion. I. British Columbia. Recreation Section.

SD387.C58C54 1996 719.33'09711 C96-960303-7

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This is a joint publication of the Canadian Forest Service
and the British Columbia Ministry of Forests.

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Please note: this report makes extensive use of the following acronyms:

(See the glossary (Section 8.0) for definitions.)

EVC - Existing Visual Condition

PAR - Public Acceptance Rating

VQO - Visual Quality Objective

Acknowledgements

Recreation Section appreciates the people who have collectively contributed to this study.

We would especially like to thank those members of the public in Campbell River, Cranbrook, Kamloops, Prince George, Smithers, Nelson, New Westminster and Williams Lake who volunteered their time to participate in this study.

Thanks are also due to:

- LA West Landscape Architects for their assistance in carrying out the public perception study and associated analyses.
- Michael Paris Photography for many of the images used in conducting this study.
- Amanda Nemeč (International Statistics and Research Corporation) for designing the statistical analysis approaches used in the study.
- Vera Sit, Lynn Husted and Gerrard Olivotto of the MoF Research Branch for reviewing the analysis methodology and technical accuracy.
- Quantum Communications for editing and preparing the pre-published version of this report.
- TM Communications for preparing this report for printing.

It is also important to recognize the MoF region and district staff who participated in this study and provided many of the slides that were used.

Recreation Section also wishes to gratefully acknowledge the funding provided by the Canada-British Columbia Partnership Agreement on Forest Resource Development: FRDA II for carrying out the study and publishing this report.

1.0 Introduction

This study was undertaken to gain a better understanding of public perceptions about the visual impact of clearcuts.

Clearcutting is the predominant method of harvesting in B.C. and an understanding of how clearcutting affects the public's enjoyment of visual resources is important.

This study quantifies the naturalness of various scenes in terms of the percent of the landscape altered, and compares these percent alterations with a sampling of public response to the scenes, as measured by a "public acceptance rating" (PAR).

Public acceptance rating, as defined and used in this study, is a measure of the public's "enjoyment of the scenery." PAR does not mean or measure public acceptance or preferences regarding forest management practices or land use decisions.

This study was a standard public perception study. Colour slides were shown to a number of people in each of eight communities. These people rated the appearance of each scene according to how it would affect their enjoyment of it.

The results were collated and analyzed and then documented in *"Clearcutting to Meet Visual Quality Objectives: A public perception study."* This report provides a summary of the findings and conclusions. More detailed results are available from Recreation Section, Ministry of Forests.

Please note that this report contains a number of technical terms and acronyms which are defined in the glossary (see Section 8.0).

2.0 Objectives

The overall objective of this study was to investigate the relationship between the scale of visual alteration resulting from clearcutting and the public's enjoyment of the scene.

The specific objectives of the study were as follows:

- i) To describe and compare how the public rates a variety of slides from the five Existing Visual Condition (EVC) categories (Preservation, Retention, Partial Retention, Modification and Maximum Modification) and to assess whether EVC classes can be used to predict the Public Acceptance Rating (PAR) value of the slide;
- ii) To characterize and compare the percent alteration of slides in the five EVC categories and to test whether percent alteration can be used to predict the EVC class;
- iii) To assess the effectiveness of percent alteration in predicting the Public Acceptance Rating (PAR) value of each slide;
- iv) To describe and compare any regional differences in the Public Acceptance Rating (PAR) of the five EVC categories; and, in addition, to ascertain whether the sample group is demographically representative of the population of the region and province of British Columbia.

3.0 Methodology

3.1 Overview

This study was undertaken using standard procedures for public perception studies.

Meetings were held in eight communities around the province with a total of 494 participants. A set of 85 colour slides showing typical forest landscape scenes was shown to the participants.

Participants were asked to "rate" each photograph on a scale of 1-7 according to "the appearance of the scenery as it would affect their enjoyment of it."

Each rating was recorded on computerized scorecards and the results were analyzed using a variety of statistical procedures designed to address the objectives of the study.

Participants were also asked to fill out a questionnaire (after viewing the slides) providing demographic information about themselves and their views on scenic quality, clearcutting and forest management. The questionnaire results were not correlated with the ratings for the slides.

Note: This study deals only with perspective view of alterations or, in other words, the view a person would have from a ground level viewpoint. It does not deal with plan or map view.

3.2 Detailed discussion

Phase I: Public meetings

The study was undertaken in eight cities in British Columbia during the months of March and April 1995. The communities were chosen to include respondents from each Forest Region in the province: Campbell River, Cranbrook, Kamloops, Nelson, New Westminister, Prince George, Smithers, and Williams Lake (see Table 1).

Eighty-five slides (five practice slides and 80 study slides) were viewed and rated by 494 participants.

Participants were mainly from various non-aligned community groups with no direct association with either the forest industry or environmental organizations. Approximately sixty individual responses were tabulated from each community (see Table 1).

Each participant viewed each slide for 15 seconds and rated it on a seven point Likert scale from Very Unacceptable (1) to Very Acceptable (7), with (4) being Neutral (no like or dislike).

Slides were of midground forested landscapes and, where necessary, were cropped to reduce the influence of the foreground, waterbodies, or adjacent landscapes.

Survey Questionnaire

A questionnaire was included with the survey form to gather demographic information. Questions about views on scenic quality, clearcutting and forest management were also included, however the results were not correlated with the PAR ratings for the slides and are not included in this summary report.

Table 1 Community representation by participants

<i>Communities</i>	<i>Population</i> *	<i># Sampled</i>
<i>Campbell River</i>	<i>21,175</i>	<i>61</i>
<i>Cranbrook</i>	<i>16,445</i>	<i>58</i>
<i>Kamloops</i>	<i>67,060</i>	<i>69</i>
<i>Nelson</i>	<i>8,760</i>	<i>62</i>
<i>New Westminister</i>	<i>45,600</i>	<i>65</i>
<i>Prince George</i>	<i>69,655</i>	<i>59</i>
<i>Smithers</i>	<i>5,030</i>	<i>59</i>
<i>Williams Lake</i>	<i>10,385</i>	<i>61</i>
<i>Totals</i>	<i>244,110</i>	<i>494</i>

* Population figures from 1994 Census of British Columbia

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Phase II: Analysis of the results

Classification of Existing Visual Condition

Each of the photographs was evaluated by a group of Ministry visual landscape specialists and grouped into one of five EVC categories based on visual appearance and biophysical attributes.

Calculation of percent alteration

The percent of the dominant landscape unit altered (% unit alteration) and percent of the total scene altered (% total alteration) by human disturbance was calculated for each of the 57 photographs showing clearcuts (see Appendix 2 for details).

Statistical Analysis

A wide variety of statistical procedures and analysis techniques were used to analyze the data in keeping with the objectives of the study. The analyses included the Analysis of Variance (ANOVA) technique, discriminant analysis, and various regression analyses; linear, exponential, polynomial (2 & 3 power) and logarithmic.

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4.0 Results

This section presents:

1. the public perception ratings; and,
2. the demographic statistics.

4.1 Public perception ratings

A summary of the ratings received by each slide is presented in Appendix 1.

The detailed breakdowns of the ratings are available from Recreation Section, Ministry of Forests.

4.2 Demographic statistics

This section presents the demographic statistics collected from the respondents, and in some cases, compares these with socio-demographic characteristics for the provincial population taken from Statistics Canada's *1994 Summary Census for British Columbia*.

In general, the study sample was made up of mainly middle aged individuals, largely male, with higher than average income and education. A Chi-Squared test was used to determine if the sample was statistically different from the distribution that could be expected based on population.

In most cases, the tests showed that there was a difference between the sample proportions and the proportions that could be expected from the population. This was because of difficulties in attracting the general population; therefore, the sample was drawn mainly from service clubs.

Age Distribution: Sample vs Prov Population

Age	Sample	Prov Pop
20-29	11%	22%
30-39	27%	25%
40-49	34%	20%
50-59	21%	13%
60-69	6%	11%
70+	1%	9%

Income: Sample vs Prov Population

Total Income	Sample	Prov Pop
<\$20,000	7%	23.1%
\$20-29,000	4%	13.7%
\$30-39,000	7%	13.2%
\$40-49,000	7%	12.5%
\$50-59,000	14%	10.5%
\$60-69,000	13%	8.2%
\$70,000 +	49%	18.8%

Average: Sample \$59,631 Prov Pop \$46,909

Education: Sample vs Prov Population

Highest level attained	Sample	Prov Pop
Gr 9 or less	0%	8.7%
Some High School	5%	25.3%
Finished High School	15%	13.8%
Some Post Sec	24%	25.0%
Finished Post Sec	56%	27.1%

Gender: Sample vs Prov Population

Gender	Sample	Prov Pop
Female	27%	49%
Male	73%	51%

Residence: Sample vs Prov Population

Length of residence	Sample	Prov Pop
Less than 1 year	5%	
Between 1 and 5 years	20%	< 5 yrs 56.2%
Between 5 and 10 years	16%	> 5 yrs 43.8%
Over 10 years	59%	

Forestry Income: Sample vs Prov Population

Income directly dependent on forest industry?	Sample	Prov Pop
Yes	23%	5.5%
No	77%	94.5%

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5.0 Analysis

This section presents the results of statistical analyses of the data from the public perception study and the visual and biophysical characteristics of the scenes shown in the photographs.

5.1 Objective I: Relationship between percent alteration and EVC

Classification of EVC

The eighty-five photographs were classified by a group of Ministry visual landscape management specialists according to EVC. The results are shown in Table 2.

Table 2 Breakdown of photos by scene attributes and EVC class

	Preservation	Retention	Partial Modification	Modification	Maximum Modification	Total
Practice slides	1	1	1	1	1	5
Non-harvest dist			1	1	4	6
Partial cuts		2	3	2	1	8
Natural scenes	7					7
Clearcut scenes		9	20	20*	10	59
Total	8	12	25	24	16	85

* Difficulty in clarifying the boundaries of visual landscape units resulted in the removal of 2 Modification photos from the analysis of percent alteration.

Calculation of percent alteration

This section presents a summary of the calculation of percent alteration for the 57 out of 80 slides that showed clearcuts (see Appendix 2 for detailed methodology).

Percent alteration or percentage of forest cover removed can be expressed in two ways:

- Percent Unit alteration, which is the amount of forest cover removed expressed as a percentage of the *dominant landform*; or
- Percent Total Alteration, the amount of forest cover removed as a percentage of the *total photo area*.

Percent alteration was calculated in two different ways to determine if the public forms their opinion based on the portion of a

land unit removed or the portion of the total area of the photo.

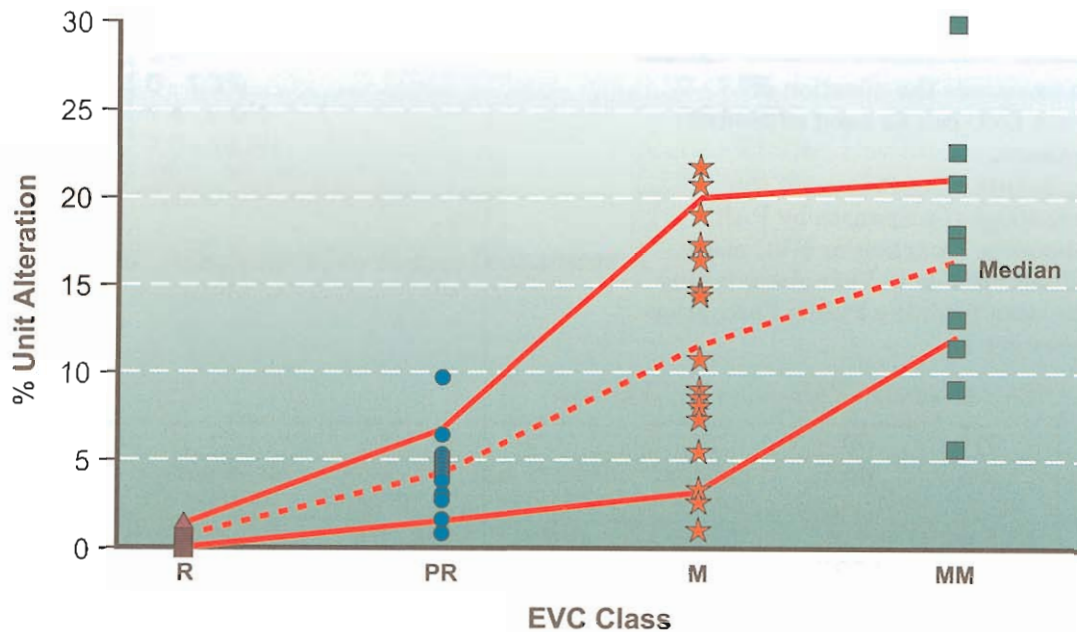
A summary of results is shown in Table 3 and Figure 1; for detailed results see Appendix 3.

Table 3 Measured range of % alteration by EVC class

EVC Class	% Unit Alt Range	% Total Alt Range
P	0	0
R	0 - 1.5%	0 - 0.6%
PR	0.8 - 9.8%	0.6 - 9.0%
M	1.2 - 21.9%	0.4 - 10.4%
MM	5.8 - 30.1%	3.8 - 14.9%

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Figure 1 Range of % Unit alteration by EVC Class



Predictive value of percent alteration for determining EVC

This section examines whether percent alteration can be used to predict EVC.

Using the Analysis of Variance (ANOVA) technique, percent landform (unit) alteration explains 58.87% of the variation in the EVC classification, while percent total alteration explains only 43.04%. As could be expected these two measurements are highly related and either one could be used to indicate EVC classification, but percent landform (unit) alteration is a marginally better predictor of EVC.

Percent landform (unit) alteration was found to be a better predictor of EVC than percent total alteration.

Figure 1 shows a graphical representation of the breakdown of 57 out of the 80 slides that had percent landform unit alteration calculated. There is considerable overlap in percent alteration between modification and maximum modification.

The EVC class ratings of Ministry landscape specialists were compared with

ratings for percent alteration by using discriminant analysis. The results show that both Retention and Partial Retention classes can be accurately predicted (accuracy rate is 77.8% and 85% respectively).

Modification and Maximum Modification EVC classes show a weaker relationship to percent alteration (61.1% and 60% respectively). This suggests that factors other than percent alteration play a strong role in the specialist's classification of Modification and Maximum Modification categories. Some of these other factors may include design and green-up.

Percent Alteration can be a useful predictor of EVC Class, particularly for Retention and Partial Retention.

It appears that factors other than percent alteration may become more important in determining Modification and Maximum Modification and percent alteration is therefore less effective in predicting these two classes.

5.2 Objective II: Relationship between EVC and public acceptance

This section examines the question of whether or not EVC can be used to predict public acceptance.

Table 4 presents a breakdown of the average percentage of responses by PAR rating for photos in a particular EVC class, from Very Unacceptable to Very Acceptable (based on the data from the Public Perception Study in Appendix 1).

Table 4 Average percentage PAR value by EVC class

Average Percentage	(7) Very Accep	(6) Mod Accep	(5) Slightly Accep	(4) Neutral/ No Opinion	(3) Slightly Unacc	(2) Moderately Unacc	(1) Very Unacc
P	58.30%	15.30%	7.70%	5.40%	4.70%	4.50%	4%
R	47.80%	24.80%	11.20%	6.70%	5.10%	2.80%	1.60%
PR	21.90%	22.30%	18%	11.50%	12.50%	8.30%	5.60%
M	6.30%	12.10%	15.30%	12.10%	20.20%	18.70%	15.30%
MM	4.60%	8.80%	11.20%	8.70%	17.80%	20.50%	28.40%

(See Figure 2 on the following page for a regression analysis of this data.)

A probability analysis of this data shows that EVC can be used as a significant predictor of Public Acceptance Rating of a photograph.¹

EVC can be a significant predictor of Public Acceptance Rating of a photograph.

¹ To determine how well EVC classification can predict the PAR value, two statistics can be calculated. The most common one is the P Value. The P value is the probability that the variance between EVC classes is the same as the variance within an EVC class. It is also the smallest level of significance at which the standard null hypothesis can be rejected. If there is a 5% probability (P value = .05) then we usually say that there is one chance in 20, (95%), that the variances are the same. The P value for the Provincial data is 2.3×10^{-19} so there is a very small, almost negligible chance that the variance between EVC classes is the same as the variance within the EVC class. Thus EVC can be used as a significant predictor of Public Acceptance Rating of a photographic slide.

The second statistic used to predict the strength of the relationship is the F statistic (45.58 in the Provincial sample). To have a relationship which is statistically significant the calculated F value would have to be more than the critical or tabulated F statistic of 2.494 at a 5% level of significance. Since this is certainly the case the EVC can be used as a reasonably good predictor of PAR. In fact when the sum of squares variation (SS) between groups is divided by the total variation ($90.378 \div 127.552 = 0.709$) the result is the coefficient of determination or R². This coefficient of determination (.709) is the percentage of variation that is explained by the EVC classification. What this means is that over 7/10 th's of the total variation in the PAR is explained by the EVC

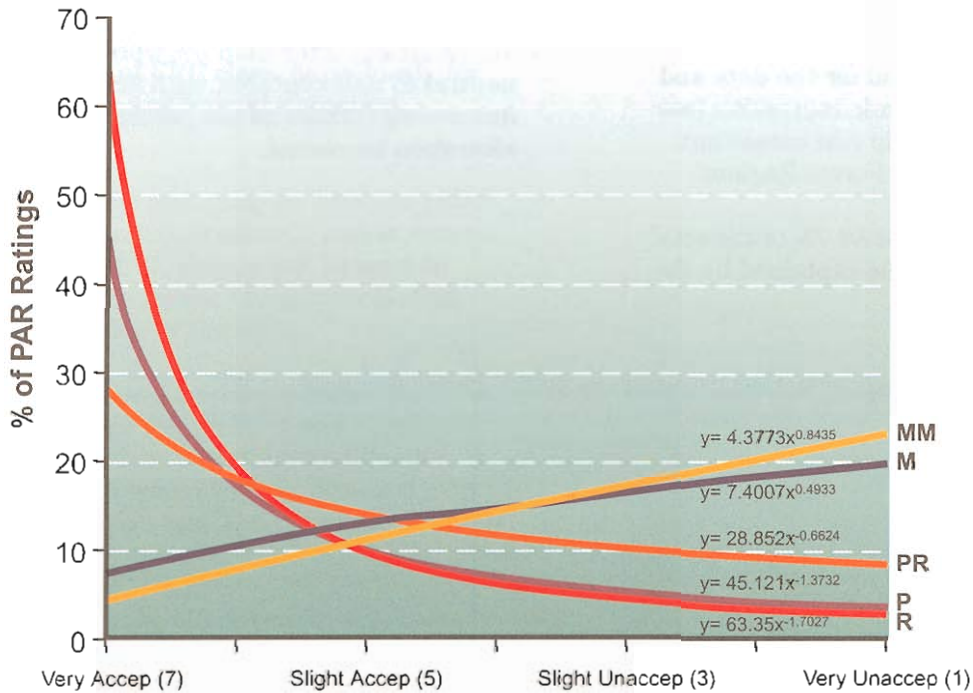
classification. For surveys dealing with public perception this is a strong relationship.

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Figure 2, *Regression analysis of average percentage PAR value by EVC class*, is a graphic representation of a regression analysis of the data in Table 4. This analysis shows that the public acceptance rating made a pronounced shift between Partial Retention and Modification EVC classes.

Based on the results, EVC can be a useful predictor of public acceptance. Preservation, Retention and Partial Retention were strongly favoured over Modification and Maximum Modification classes.

Figure 2 *Regression analysis of average percentage PAR value by EVC Class*



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5.3 Objective III: Relationship between percent alteration and public acceptance

This section examines the predictive value of percent alteration for determining public acceptance.

In order to determine if there is a cause and effect relationship between percent alteration and PAR, the data was analyzed using various statistical techniques including linear, exponential, polynomial (2 & 3 power) and logarithmic.

A relationship was found for the data and the best fit was a logarithmic regression (see Figure 3). This relationship was consistent across the province for all Forest Regions.

The analysis shows that 59.7% of the total variation in the PAR can be explained by the

percent unit alteration. (The provincial average for the R^2 for the logarithmic regression is 0.597.)

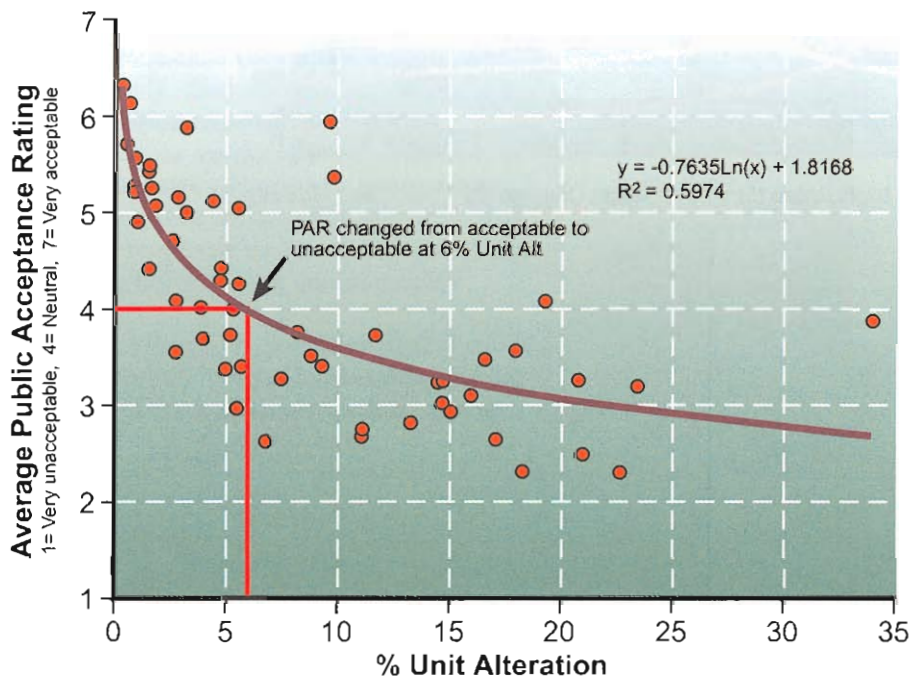
Therefore, percent alteration can be used as an effective predictor of public acceptance.

Percent alteration can be a useful predictor of public acceptance.

Key points for Figure 3:

- Alterations of 6% or less were rated as neutral to acceptable.
- Alterations greater than 6% were rated as neutral to unacceptable, with acceptability decreasing further as the percent unit alteration increased.

Figure 3 Regression analysis of % Unit Alteration vs PAR – Entire Province



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5.4 Objective IV: Assessment of regional differences in public acceptance ratings

This section addresses the question, "Are there any regional differences in Public Acceptance Ratings?"

Table 5 and Figure 4 show that there are regional differences. In all regions and communities, however, the trends are the same; public acceptance is higher for

Preservation vs Retention, Retention vs Partial Retention, and Partial Retention vs Modification.

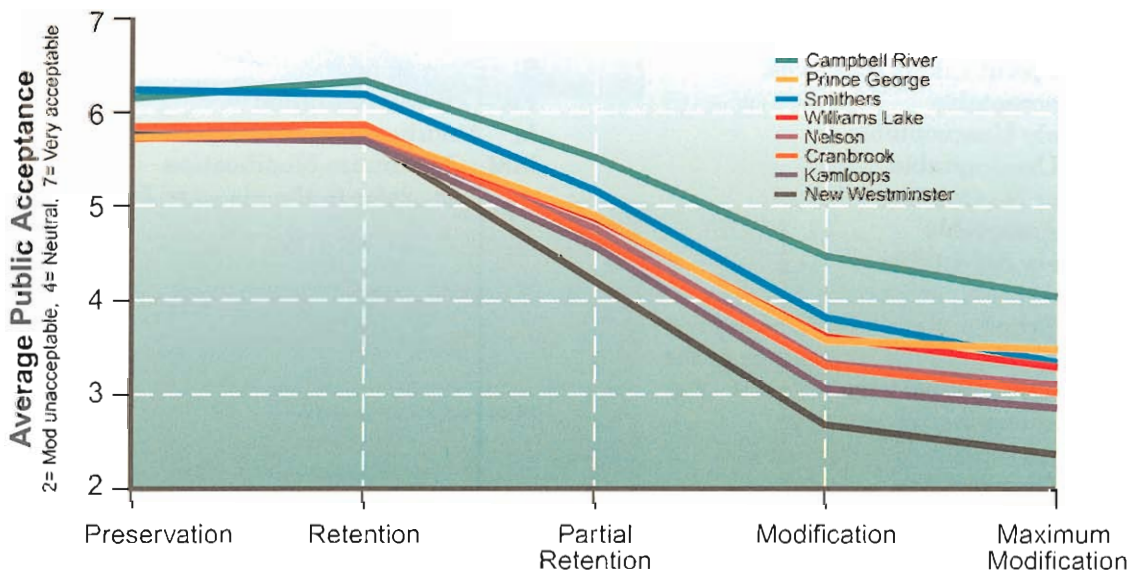
Campbell River had consistently higher tolerance of clearcuts in all EVC classes, while New Westminster had consistently lower tolerance of clearcuts in all EVC classes.

There were regional differences in PAR, however the trends were the same.

Table 5 Average Public Acceptance Rating (PAR) by Region

Regions	Preservation	Retention	Partial Retention	Modification	Maximum Modification
Campbell R	6.15	6.33	5.51	4.47	4.05
Cranbrook	5.84	5.86	4.66	3.30	3.02
Kamloops	5.72	5.68	4.57	3.05	2.85
Nelson	5.83	5.74	4.75	3.33	3.11
New West	5.76	5.73	4.21	2.68	2.36
Prince George	5.72	5.78	4.88	3.58	3.47
Smithers	6.23	6.19	5.16	3.82	3.35
Williams Lk	5.71	5.78	4.86	3.61	3.30
Provincial Av	5.81	5.83	4.77	3.41	3.16

Figure 4 Average Public Acceptance by EVC and Region



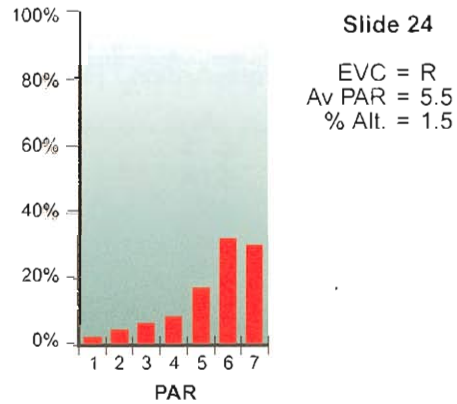
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5.5 Sample study photographs and Public Acceptance Ratings

Using the study photographs

This page explains how the sample photographs are organized and what the accompanying data refers to.

The photographs are organized by EVC class, with three photos from each class, including three showing non-harvesting disturbances.



Public Acceptance Rating graphs

Participants were asked to rate each slide on a scale of 1-7 according to “the appearance of the scenery as it would affect your enjoyment of it.”

The seven point Likert scale was:

- 1 = Very Unacceptable
- 2 = Moderately Unacceptable
- 3 = Slightly Unacceptable
- 4 = Neutral or No Opinion
- 5 = Slightly Acceptable
- 6 = Moderately Acceptable
- 7 = Very Acceptable

The PAR graph accompanying each photo is a visual depiction of the percentage of the response received for each rating (1-7). For example, in the graph on this page, participants gave the following ratings:

- (1) Very Unacceptable 2%
- (2) Mod Unacceptable 4%
- (3) Slightly Unacceptable 6%
- (4) Neutral/ No Opinion 8%
- (5) Slightly Acceptable 18%
- (6) Mod Acceptable 32%
- (7) Very Acceptable 31%

EVC (Existing Visual Condition):

This letter gives the EVC class of the slide, as determined by Ministry of Forests visual landscape specialists:

- P = Preservation
- R = Retention
- PR = Partial Retention
- M = Modification
- MM = Maximum Modification

Please refer to the glossary for definitions for each class.

Av PAR (Average Public Acceptance Rating):

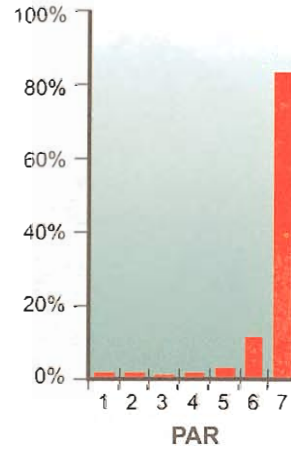
This is the average of all the PAR ratings received by the slide. This is calculated as the arithmetic average of each slide $[\sum x_i/n]$.

% Alt (Percent Unit Alteration):

This is the percent of the forest cover removed expressed as a percentage of the dominant landform or landscape unit. (For details, see Appendix 2: Calculation of percent alteration).

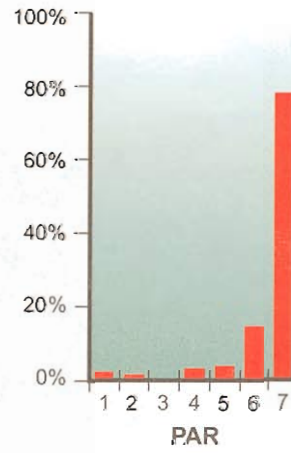
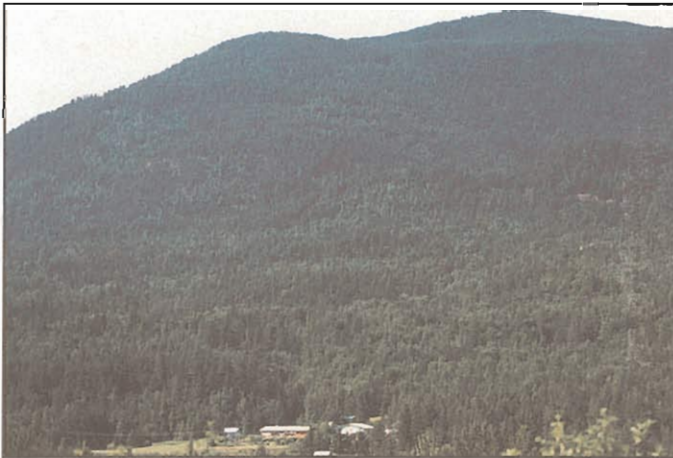
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Preservation EVC slides



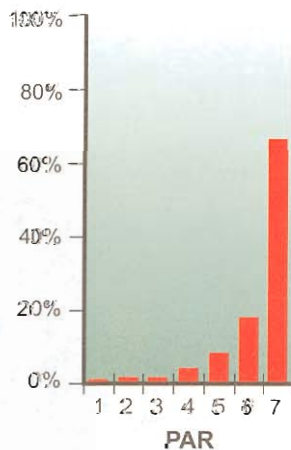
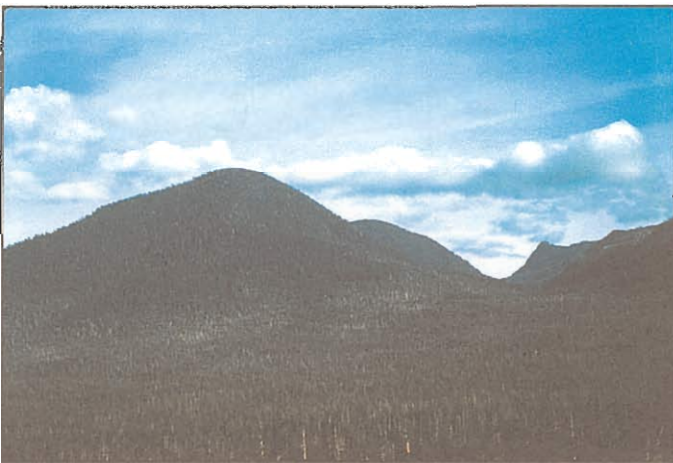
Slide 57

EVC = P
Av PAR = 6.7
% Alt. = none



Slide 84

EVC = P
Av PAR = 6.6
% Alt. = none

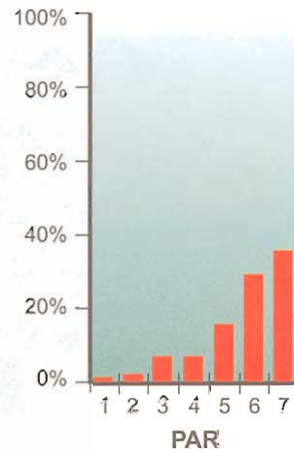
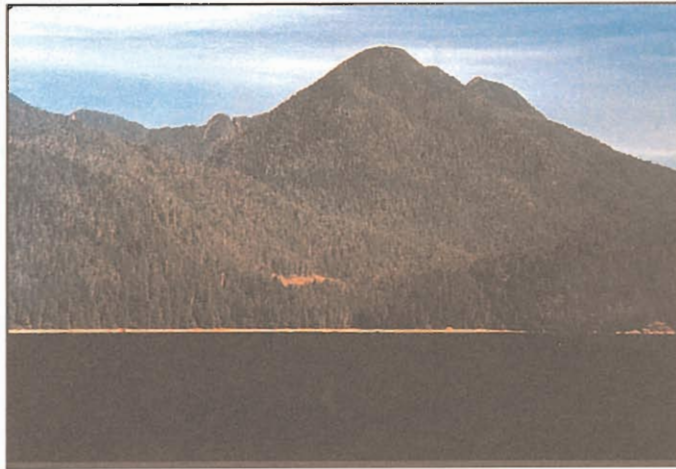


Slide 79

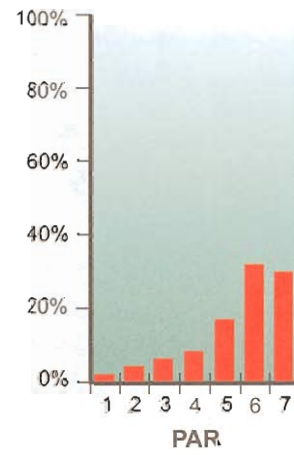
EVC = P
Av PAR = 6.4
% Alt. = none

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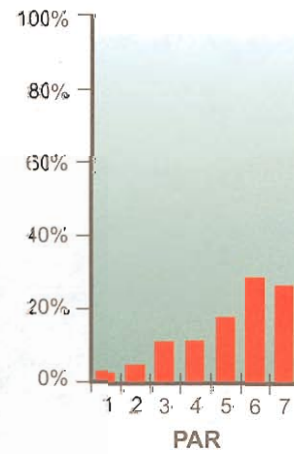
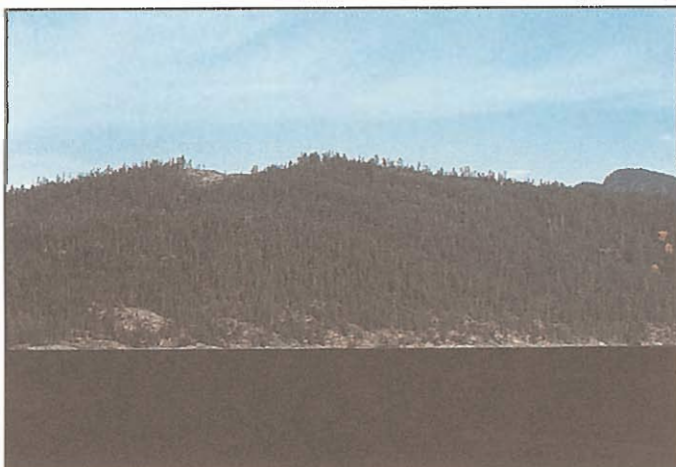
Retention EVC slides



Slide 64
EVC = R
Av PAR = 5.6
% Alt. = 0.9



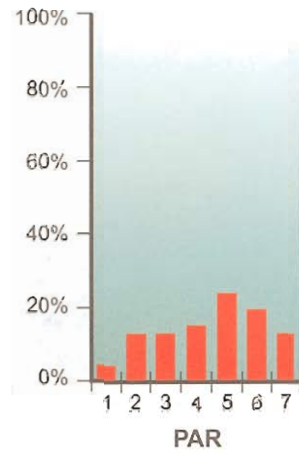
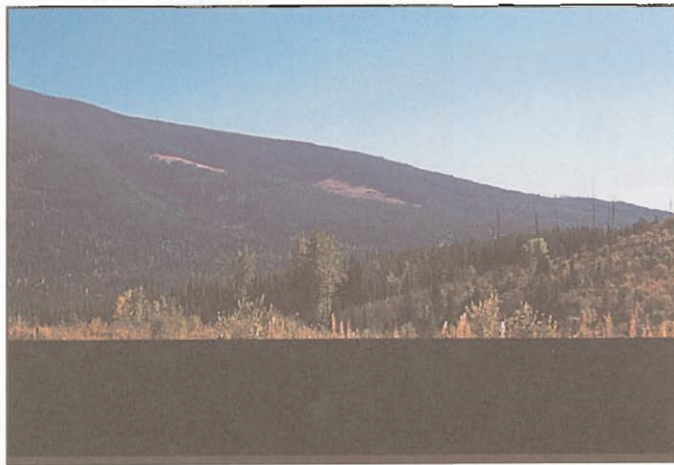
Slide 24
EVC = R
Av PAR = 5.5
% Alt. = 1.5



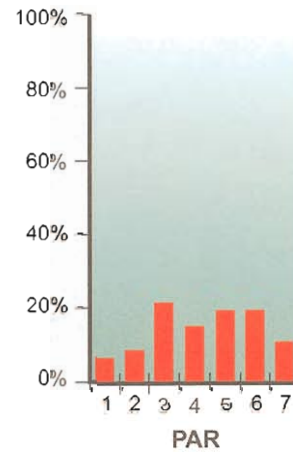
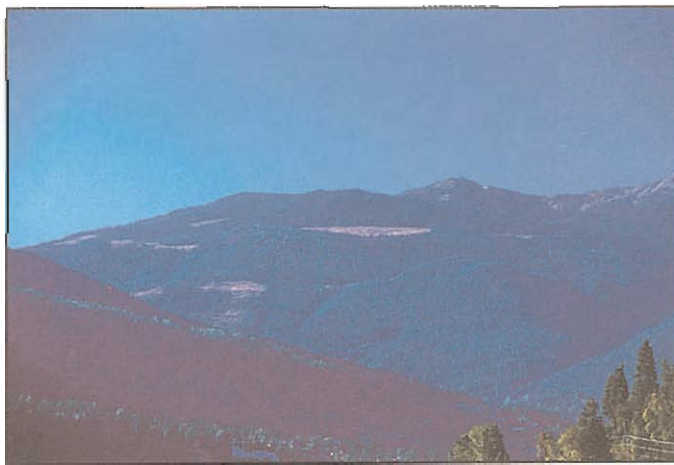
Slide 18
EVC = R
Av PAR = 5.3
% Alt. = 0.9

Clearcutting and Visual Quality

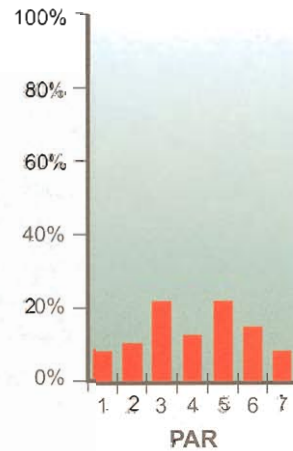
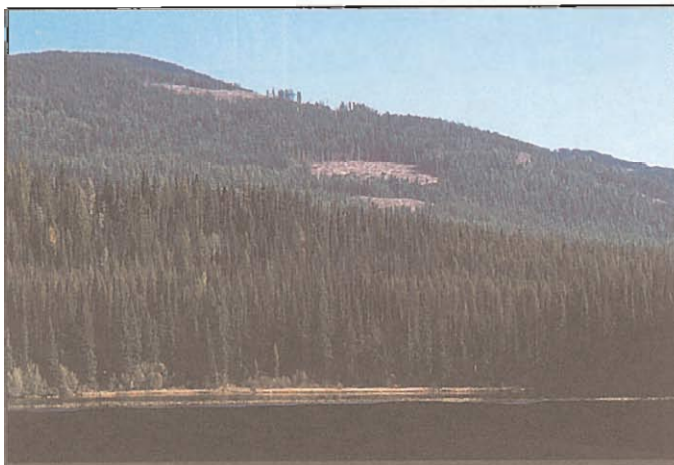
Partial Retention EVC slides



Slide 78
 EVC = PR
 Av PAR = 4.5
 % Alt. = 4.7



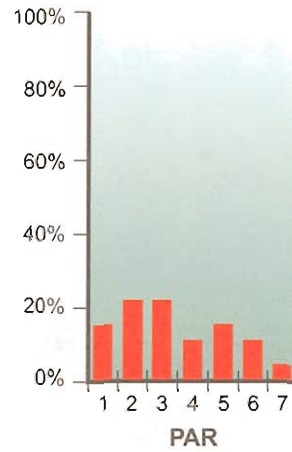
Slide 73
 EVC = PR
 Av PAR = 4.3
 % Alt. = 5.5



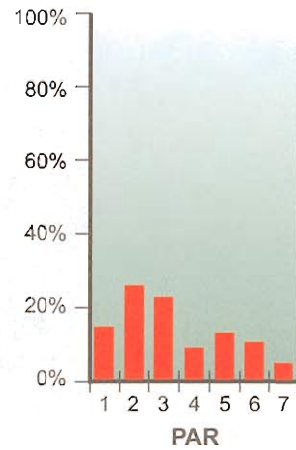
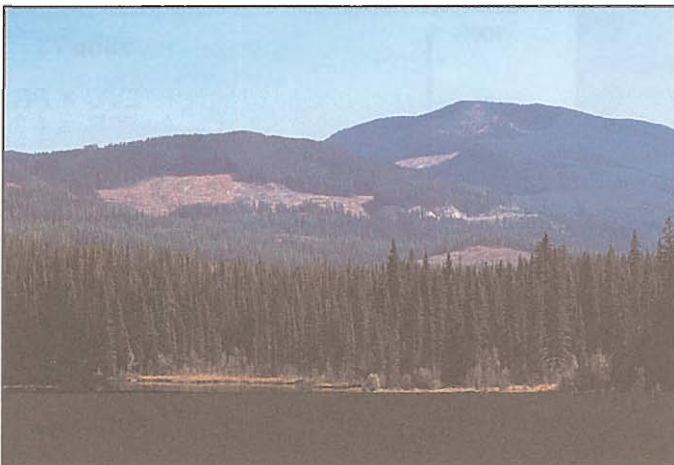
Slide 54
 EVC = PR
 Av PAR = 4.1
 % Alt. = 5.3

Clearcutting and Visual Quality

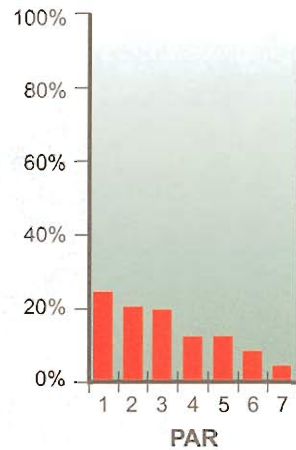
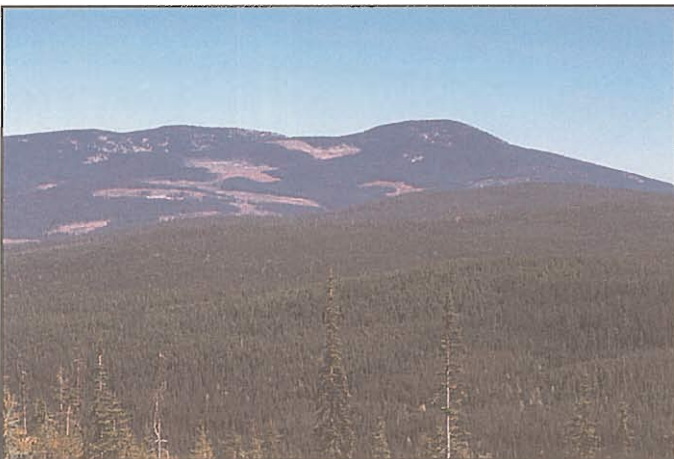
Modification EVC slides



Slide 8
EVC = M
Av PAR = 3.3
% Alt. = 9.2



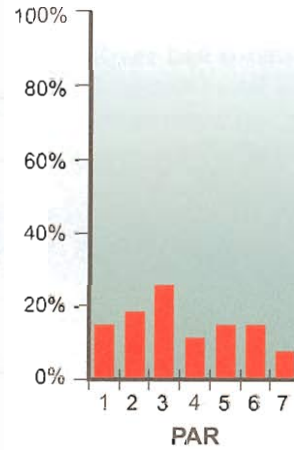
Slide 53
EVC = M
Av PAR = 3.3
% Alt. = 21.9



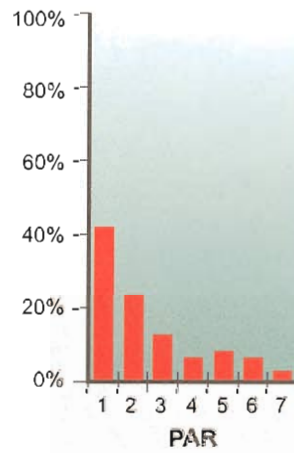
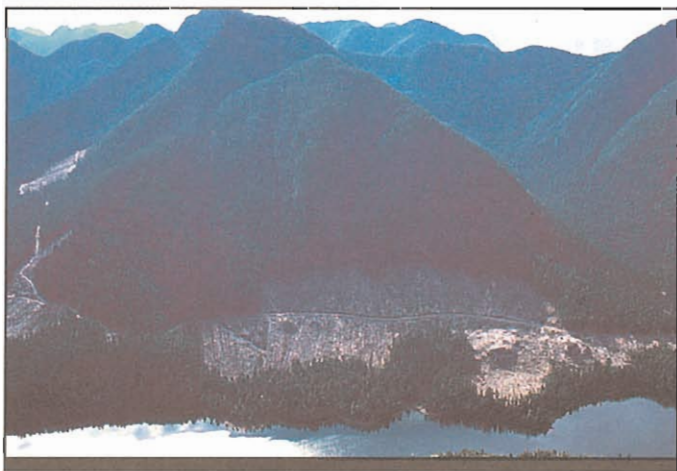
Slide 48
EVC = M
Av PAR = 3.1
% Alt. = 14.6

Clearcutting and Visual Quality

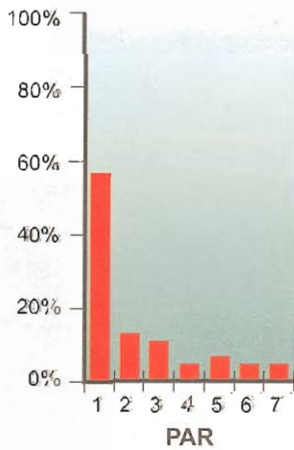
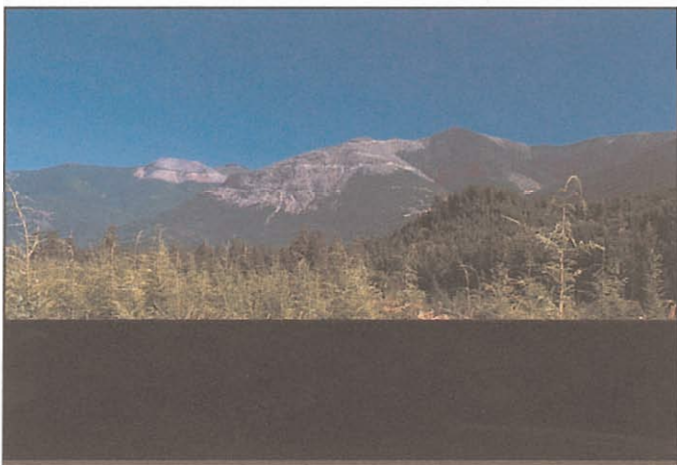
Maximum Modification EVC slides



Slide 21
 EVC = MM
 Av PAR = 3.5
 % Alt. = 17.9



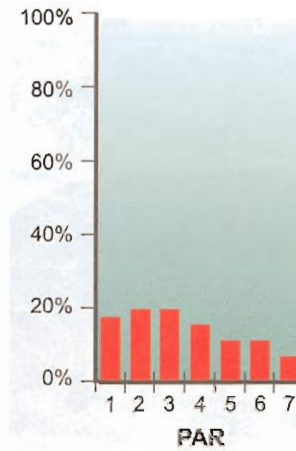
Slide 76
 EVC = MM
 Av PAR = 2.4
 % Alt. = 20.9



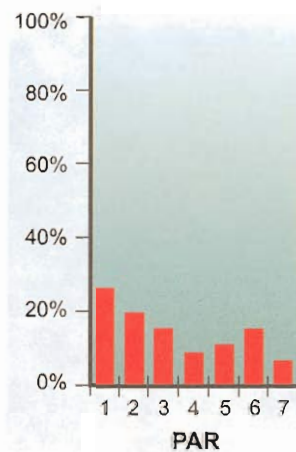
Slide 37
 EVC = MM
 Av PAR = 2.3
 % Alt. = 22.6

Clearcutting and Visual Quality

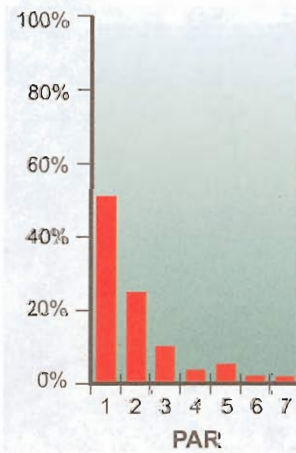
Non-harvesting Disturbance slides



Slide 44
EVC = MM
Av PAR = 3.5
% Alt. = NHD



Slide 13
EVC = MM
Av PAR = 3.3
% Alt. = NHD



Slide 61
EVC = MM
Av PAR = 2.0
% Alt. = NHD

6.0 Conclusions

This section provides conclusions based on statistical analyses of the results.

Objective i)

To characterize and compare the percent alteration of slides in the five EVC categories and to test whether percent alteration can be used to predict the EVC class;

Conclusion:

Percent alteration can be a useful predictor of EVC class, particularly for Retention and Partial Retention.

Objective ii)

To describe and compare how the public rates a variety of slides... and to assess whether EVC classes can be used to predict the Public Acceptance Rating (PAR) value of the slide.

Conclusion:

EVC can be a useful predictor of public acceptance (see Table 4 and Figure 2). Preservation, Retention and Partial Retention were strongly favoured over Modification and Maximum Modification.

Objective iii)

To assess the effectiveness of percent alteration in predicting the Public Acceptance Rating (PAR) value of each slide.

Conclusion:

Percent Alteration can be a useful predictor of public acceptance (see Figure 3).

Objective iv)

To describe and compare any regional differences in the Public Acceptance Rating (PAR) of the five EVC categories; and, in addition, to ascertain whether the sample group is demographically representative of the population of the region and province of British Columbia.

Conclusion:

There are regional differences in Public Acceptance of the EVC classes, however the trends are the same. Public acceptance was higher for Retention vs Partial Retention and Partial Retention vs Modification. It appears that some

communities, such as Campbell River and Prince George, have a consistently higher tolerance for clearcuts than other communities such as Kamloops and New Westminster (see Table 5 and Figure 4).

In addition, as shown in Section 4.2: *Demographic Statistics*, the sample group was not representative of the regional and provincial population. The sample group consisted of a greater proportion of males, with higher than average incomes and education.

7.0 Discussion

7.1 Using the results

A better understanding of the relationship between the scale of visual alteration resulting from clearcutting and the public's enjoyment of the scene will assist resource managers in providing input into land use planning and resource management decision making.

It is important to note that this study was not meant to address the implications of managing for various degrees of visual quality. This study was designed to gain a better understanding of how much landscape alteration the public finds acceptable from an aesthetic or visual enjoyment standpoint. The public, for the purposes of this study, is defined as a sample of the population that matches the socio-economic profile of the provincial population as a whole.

The results of this study are similar to comparable studies done elsewhere throughout North America [i.e.; *Managed Landscapes: What do people like?* (Magill² 1992) and *Logging in Kootenay Landscapes: The Public Response* (Berris and Bekker³ 1989)]. Namely, that respondents of these public perception studies expressed a preference for, or enjoyment of, natural over altered landscapes. It must be recognized that this and other studies did not take into account the economic and social implications of managing for different visual quality objectives.

However, this study provides useful results for those interested in understanding public perceptions about visual alterations to the landscape.

Using % Alt to predict EVC

Based on a logistic regression analysis of the study data, the relationship between % alteration and EVC can be graphed to yield a probability curve (see Table 6 and Figure 5). The resulting graph shows the probability that a randomly selected clearcut would be classified into a particular EVC class given the percent alteration value.

² Magill, Arthur W., 1992. *Managed Landscapes: What do people like?* Pacific Southwest Research Station, US Forest Service, US Dept. of Agriculture, Research Paper PSW-RP-213.

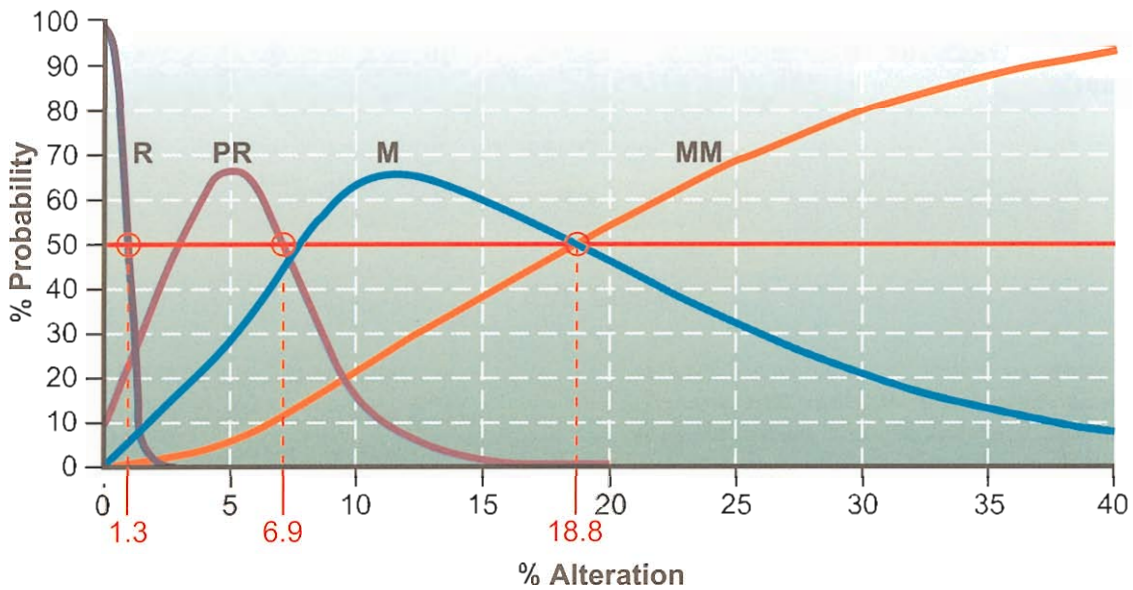
³ Berris, Catherine and Bekker, Pieter, 1989. *Logging in Kootenay Landscapes: The Public Response*. B.C. Ministry of Forests, Land Management Report #57, ISSN 0702-9861.

Clearcutting and Visual Quality

Table 6 *Estimated probabilities for EVC Classes and Measured Ranges for Alterations*

VQO/ EVC	Most probable VQO based on % unit alteration alone	Range for % unit alteration based on measurements from study slides
P	0%	0%
R	0 - 1.3%	0 - 1.5%
PR	1.4 - 6.9%	0.8 - 9.8%
M	7.0 - 18.8%	1.2 - 21.9%
MM	18.9 - 30.1%	5.8 - 30.1%

Figure 5 *EVC Probability (%) by Percent Unit Alteration*



7.2 Limitations

A fundamental limitation of any public preference study is that the results are highly dependent on the questions asked and the specific phrasing used.

In this study the following instructions were given to the participants:

“Please respond to the appearance of the scenery as if you were experiencing it from a distance. Rate the scenes relative to each other on a scale of 1 to 7. One being very unacceptable and seven being highly acceptable. The midpoint is 4. Acceptability” can be considered to be the appearance of the scenery as it would affect your enjoyment of it.”

The terms “acceptable” and “enjoyment” are open to interpretation. If these terms had been defined, or different terms used

(e.g.: satisfaction versus acceptable) the results may have been different.

No sensitivity analyses were done to assess the dependence of the results on the question or other aspects of research methodology. This was due to a lack of time and resources to do so.

In addition, because of difficulties in attracting a wide enough range of respondents, the 494 respondents to this survey were not completely representative of the socio-demographic distributions of regional populations. The respondents were mainly middle-aged males with higher than average incomes and education.

As far as the photos are concerned, the scenes shown to the respondents may not represent the full-range of scenes found in the province, even though researchers did their best in selecting a representative range.

Clearcutting and Visual Quality

There were several variables in the photographs in addition to the relative scale of the alteration which could influence an observer's perception of the alteration, such as:

- the design and shape of the alteration;
- colour contrast relative to soil colour and the degree of green-up;
- the distance between the viewer and the alteration; and,
- photographic factors such as haze, sharpness, brightness and colour contrast.

Any interpretation or use of the research findings should take the above limitations into account.

Clearcutting and Visual Quality

8.0 Glossary

Clearcut: a silvicultural system that removes the entire stand of trees in a single harvesting operation from an area that is one hectare or greater and at least two tree lengths in width, or is designed to manage the area as an even aged stand.

Existing visual condition (EVC): a component of the visual landscape inventory that presents the level of human-made landscape alterations caused by resource development activities and expressed in terms of the visual quality objective categories.

Human-caused alteration: any type of disturbance to a landscape caused by human activity.

Partial cut: a general term referring to silvicultural systems other than clearcutting, in which only selected trees are harvested. Partial cutting systems include seed tree, shelterwood, selection, and clearcutting with reserves.

Percent alteration: the scale of human alteration to the landscape, including cutblocks, expressed as a percentage of a landscape unit or the total scene.

Public Acceptance Rating (PAR): a measure of the public's "enjoyment of the scenery."

Scenic area: any visually sensitive area or scenic landscape identified through a visual landscape inventory or planning process carried out or approved by the district manager.

Viewshed: a physiographic area composed of land, water, biotic, and cultural elements which may be viewed and mapped from one or more viewpoints and which has inherent scenic qualities and/or aesthetic values as determined by those who view it.

Visual Absorption Capability (VAC): a component of the visual landscape inventory that rates the relative capacity of a landscape to absorb land-use alterations and still maintain its visual integrity.

Visual impact assessment: an evaluation of the visual impact of resource development proposals on the forest landscape.

Visual landscape analysis: the process of recommending visual quality objectives based on the visual landscape inventory and social factors.

Visual landscape inventory: the identification, classification, and recording of the location and quality of visual resources and values.

Visual landscape management: the identification, assessment, design, and manipulation of the visual features or values of a landscape, and the consideration of these values in the integrated management of provincial forest and range lands.

Visually Effective Green-up: the stage at which regeneration is seen by the public as newly established forest. When VEG is achieved the forest cover generally blocks views of tree stumps, logging debris and bare ground. Distinctions in height, colour, and texture may remain between a cutblock and adjacent forest but the cutblock will no longer be seen as recently cut-over.

Visual quality: the character, condition, and quality of a scenic landscape or other visual resource and how it is perceived, preferred, or otherwise valued by the public.

Visual Quality Objective (VQO): a resource management objective established by the district manager or contained in a higher level plan that reflects the desired level of visual quality based on the physical characteristics and social concern for the area.

(continued...)

Clearcutting and Visual Quality

The specific VQOs are defined as follows:

Preservation: No visible alterations.

Retention: Human-caused alterations are visible but not evident.

Partial retention: Human-caused alterations are evident but subordinate and not dominant.

Modification: Human-caused alterations are dominant but have natural appearing characteristics.

Maximum Modification: Human-caused alterations are dominant and out of scale.

Visual resource: the quality of the environment as perceived through the visual sense only.

Visually sensitive areas: viewsheds that are visible from communities, public use areas, and travel corridors -- including roadways and waterways -- and any other viewpoint so identified through referral or planning processes.

Visual Sensitivity Class: a component of the visual landscape inventory that rates the sensitivity of the landscape based on biophysical characteristics and viewing and viewer related factors.

Clearcutting and Visual Quality

9.0 Appendices

Appendix 1: Table of results for the public perception study: provincial data

Percentage in each PAR category by EVC

Preservation EVC

PAR ->		1	2	3	4	5	6	7
Slide Position	% Unit Alt	Very Unaccept	Mod Unaccept	Slightly Unaccept	Neutral/ No Opinion	Slightly Acceptable	Mod Acceptable	Very Acceptable
S15	None	4%	8%	6%	12%	9%	22%	38%
S38	None	1%	1%	1%	2%	5%	15%	75%
S50	None	1%	2%	3%	6%	9%	18%	61%
S57	None	1%	1%	1%	1%	3%	11%	83%
S77	None	18%	18%	20%	10%	16%	11%	6%
S79	None	1%	1%	2%	4%	8%	18%	66%
S84	None	1%	1%	0%	3%	3%	14%	78%

Retention EVC

PAR ->		1	2	3	4	5	6	7
Slide Position	% Unit Alt	Very Unaccept	Mod Unaccept	Slightly Unaccept	Neutral/ No Opinion	Slightly Acceptable	Mod Acceptable	Very Acceptable
S34	0	0%	1%	2%	4%	5%	16%	72%
S11	0.3	1%	2%	2%	5%	5%	22%	64%
S29	0.5	2%	3%	5%	9%	10%	28%	42%
S10	0.6	1%	2%	2%	5%	10%	20%	60%
S64	0.9	2%	3%	7%	7%	16%	29%	36%
S18	0.9	2%	4%	10%	11%	17%	29%	27%
S32	1.0	3%	7%	11%	13%	19%	28%	19%
S24	1.5	2%	4%	6%	8%	18%	32%	31%
S12	1.1	1%	3%	4%	7%	9%	25%	51%
S26	PC*	1%	1%	3%	1%	6%	21%	67%
S72	PC*	1%	2%	3%	4%	10%	23%	57%

* PC - Partial Cut

Clearcutting and Visual Quality

Appendix 1 cont.

Partial Retention EVC

PAR ->		1	2	3	4	5	6	7
Slide Position	% Unit Alt	Very Unaccept	Moderately Unaccept	Slightly Unaccept	Neutral/ No Opinion	Slightly Acceptable	Mod Acceptable	Very Acceptable
S9	0.8	2%	5%	10%	11%	20%	26%	26%
S49	2.7	3%	4%	6%	9%	16%	28%	33%
S59	1.6	2%	4%	8%	11%	21%	33%	21%
S7	1.8	3%	6%	11%	14%	24%	20%	22%
S20	2.9	5%	5%	15%	14%	22%	23%	16%
S75	2.7	8%	11%	21%	15%	21%	16%	9%
S23	2.8	1%	5%	8%	15%	21%	26%	24%
S14	3.2	3%	7%	10%	13%	19%	25%	23%
S27	3.2	1%	3%	3%	5%	14%	33%	41%
S45	3.9	18%	17%	15%	13%	13%	14%	11%
S55	4.4	3%	5%	10%	12%	19%	24%	27%
S78	4.7	4%	13%	13%	14%	24%	19%	14%
S81	4.7	7%	10%	17%	15%	21%	18%	12%
S46	4.9	14%	21%	23%	11%	15%	12%	5%
S71	5.1	12%	15%	21%	12%	19%	12%	9%
S54	5.3	8%	11%	22%	13%	22%	15%	9%
S73	5.5	7%	8%	20%	15%	19%	19%	11%
S82	6.5	3%	6%	11%	10%	23%	24%	22%
S85	9.8	4%	8%	7%	9%	12%	28%	32%
S30	5.3	15%	14%	20%	11%	18%	16%	6%
S74	NHD*	8%	12%	14%	18%	17%	19%	13%
S41	PC**	1%	1%	2%	4%	9%	32%	50%
S52	PC**	2%	4%	8%	10%	15%	29%	31%
S70	PC**	1%	1%	2%	3%	7%	28%	57%

*NHD - Non-harvesting disturbance

**PC - Partial cut

Clearcutting and Visual Quality

Appendix 1 cont.

Modification EVC

PAR ->		1	2	3	4	5	6	7
Slide / Question	% Unit Alt	Very Unaccept	Moderately Unaccept	Slightly Unaccept	Neutral/ No Opinion	Slightly Acceptable	Mod Acceptable	Very Acceptable
S51	1.2	5%	9%	17%	15%	19%	22%	12%
S40	2.7	13%	16%	22%	15%	17%	11%	6%
S80	3.3	7%	13%	20%	15%	21%	17%	7%
S62	5.6	14%	20%	23%	13%	15%	11%	5%
S25	7.4	15%	22%	24%	14%	12%	9%	4%
S56	8.1	11%	17%	21%	13%	15%	15%	8%
S65	8.7	13%	16%	23%	17%	17%	9%	5%
S8	9.2	16%	22%	22%	12%	14%	10%	4%
S68	11.0	29%	23%	22%	8%	9%	8%	2%
S36	11.0	30%	24%	20%	10%	7%	6%	2%
S31	14.4	15%	24%	23%	11%	16%	7%	4%
S48	14.6	24%	20%	19%	12%	12%	8%	4%
S17	14.6	17%	22%	23%	10%	13%	11%	4%
S6	16.5	13%	20%	23%	15%	16%	10%	4%
S47	17.5	40%	26%	15%	5%	8%	4%	2%
S67	19.2	7%	18%	17%	16%	18%	14%	10%
S28	20.7	18%	19%	24%	10%	15%	9%	4%
S53	21.9	15%	26%	23%	9%	13%	11%	4%
S19	NHD*	8%	12%	15%	17%	20%	19%	10%
S39	PC**	3%	6%	13%	12%	26%	23%	16%
S69	PC**	2%	8%	13%	13%	23%	23%	18%
S22	Remove***	23%	24%	22%	7%	12%	9%	4%
S60	Remove***	14%	23%	24%	10%	14%	11%	4%

*NHD - Non-harvesting disturbance

**PC - Partial cut

***Remove - removed from analysis because of difficulty in clarifying boundaries of landscape units.

Clearcutting and Visual Quality

Appendix 1 cont.

Maximum Modification EVC

PAR ->		1	2	3	4	5	6	7
Slide Position	% Unit Alt	Very Unaccept	Moderately Unaccept	Slightly Unaccept	Neutral/ No Opinion	Slightly Acceptable	Mod Acceptable	Very Acceptable
S43	5.8	24%	26%	20%	8%	10%	8%	4%
S83	9.1	33%	23%	18%	8%	9%	6%	3%
S58	11.6	16%	17%	18%	11%	16%	13%	8%
S42	13.2	28%	23%	19%	9%	11%	9%	2%
S66	30.1	26%	22%	19%	9%	12%	8%	4%
S33	15.9	26%	18%	19%	10%	12%	9%	5%
S35	17.0	33%	23%	18%	7%	11%	5%	3%
S21	17.9	15%	17%	27%	9%	13%	14%	6%
S76	20.9	42%	23%	12%	6%	8%	6%	3%
S37	22.6	56%	13%	10%	4%	6%	5%	5%
S13	NHD*	26%	19%	15%	8%	10%	15%	6%
S16	NHD*	14%	15%	18%	13%	18%	14%	8%
S44	NHD*	17%	19%	19%	14%	12%	11%	7%
S61	NHD*	52%	25%	10%	4%	5%	2%	2%
S63	PC**	19%	23%	24%	10%	15%	6%	3%

* NHD - Non-harvesting disturbance

** PC - Partial cut

Clearcutting and Visual Quality

Appendix 2: Calculation of percent alteration

The percent of landscape unit and percent of total scene altered by human disturbance (percent alteration) was calculated for the 57 photographs that showed clearcuts, using the following methodology:

- i) Each 8" X 12" photograph was overlaid with acetate and the landform and its alteration(s) were outlined with a fine tip pen. The landform delineation's were reviewed by MOF specialists to ensure consensus on what constitutes the landform versus the entire scene.
- ii) An electronic planimeter and a computer digitizing tablet were used to determine the area of the landform and the altered area(s). A minimum of three planimeter measurements were taken, then averaged to control for accuracy.

Two types of measurements were taken: 1. Percent of the landform unit altered (percent unit alteration); and, 2. Percent of the entire scene altered (percent total alteration).

The foreground features, adjacent landforms, roads, water features and sky, while part of the total landscape, were not measured or considered in the calculation of percent alteration values.

Percent alteration was calculated as follows:

1. The percent *unit* alteration was calculated by dividing the area of alteration(s) by the total area of the landform:

$$\frac{A1 + A2 + A3}{A} = \%UnitAlt$$

2. The percent *total* alteration was calculated by dividing the areas of alteration(s) by the total scene:

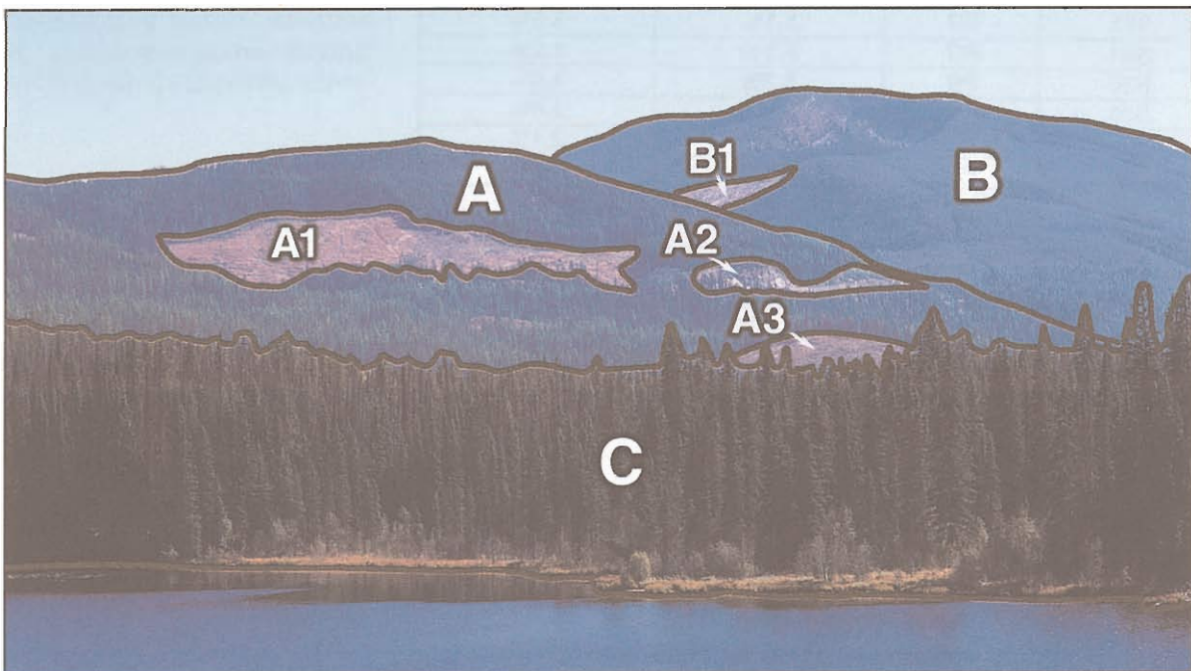
$$\frac{A1 + A2 + A3 + B1}{A + B + C} = \%TotalAlt$$

The sample photo below has the landforms and alterations outlined for illustrative purposes. The % alteration for this scene has been calculated as:

$$\% Total Alt = 10.4\%$$

$$\% Unit Alt = 21.9\%$$

Figure 6 Sample Slide 53 EVC=M



Clearcutting and Visual Quality

Appendix 3: Percent alteration by EVC class

Slide #	EVC Class	% Unit Alteration	% Total Alteration
S15	P - NS		
S38	P - NS		
S50	P - NS		
S57	P - NS		
S77	P - NS		
S79	P - NS		
S84	P - NS		
S34	R	0.0%	0.0%
S11	R	0.3%	0.2%
S29	R	0.5%	0.2%
S10	R	0.6%	0.2%
S18	R	0.9%	0.9%
S64	R	0.9%	0.4%
S32	R	1.0%	0.3%
S12	R	1.1%	0.4%
S24	R	1.5%	0.6%
S26	R - PC**		
S72	R - PC		
S9	PR	0.8%	0.6%
S59	PR	1.6%	0.7%
S7	PR	1.8%	1.8%
S49	PR	2.7%	1.1%
S75	PR	2.7%	2.0%
S23	PR	2.8%	1.3%
S20	PR	2.9%	1.0%
S14	PR	3.2%	1.0%
S27	PR	3.2%	1.9%
S45	PR	3.9%	2.8%
S55	PR	4.4%	3.1%
S78	PR	4.7%	1.6%
S81	PR	4.7%	3.0%
S46	PR	4.9%	1.1%
S71	PR	5.1%	3.5%
S54	PR	5.3%	1.8%
S30	PR	5.3%	3.8%
S73	PR	5.5%	2.8%
S82	PR	6.5%	2.1%
S85	PR	9.8%	9.0%
S41	PR - PC		
S52	PR - PC		
S70	PR - PC		
S74	PR - NHD***		
S51	M	1.2%	0.9%
S40	M	2.7%	1.2%
S80	M	3.3%	1.7%
S62	M	5.6%	5.3%
S25	M	7.4%	2.7%
S56	M	8.1%	4.3%
S65	M	8.7%	6.2%
S8	M	9.2%	9.2%

* NS - Natural Scene (no human-caused alterations)

** PC - Partial Cut

*** NHD - Non-harvesting Disturbance

Clearcutting and Visual Quality

Slide #	EVC Class	% Unit Alteration	% Total Alteration
S36	M	11.0%	10.0%
S68	M	11.0%	5.5%
S31	M	14.4%	16.9%
S17	M	14.6%	5.6%
S48	M	14.6%	2.7%
S6	M	16.5%	8.8%
S47	M	17.5%	13.0%
S67	M	19.2%	4.0%
S28	M	20.7%	5.0%
S53	M	21.9%	10.4%
S39	M - PC		
S69	M - PC		
S19	M - NHD		
S43	MM	5.8%	3.9%
S83	MM	9.1%	8.4%
S58	MM	11.6%	6.6%
S42	MM	13.2%	4.9%
S33	MM	15.9%	6.4%
S35	MM	17.0%	8.9%
S21	MM	17.9%	4.6%
S76	MM	20.9%	14.9%
S37	MM	22.6%	9.3%
S66	MM	30.1%	7.4%
S63	MM - PC		
S13	MM - NHD		
S16	MM - NHD		
S44	MM - NHD		
S61	MM - NHD		