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UNIVERSITY OF ALBERTA

EVALUATION OF ALBERTA'S FOCUS ON FORESTS

BY

ANA L. SALAZAR

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of Master of Science.

DEPARTMENT OF FOREST SCIENCE

Edmonton, Alberta

Spring 1994

ISBN 0-612-11353-1

UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled EVALUATION OF ALBERTA'S FOCUS ON FORESTS submitted by ANA L. SALAZAR in partial fulfillment of the requirements for the degree of MASTER OF SCIENCE.

Dr. Bruce P. Dancik (Co-Supervisor)

Dr. Jack D. Heidt (Co-Supervisor)

Mr. G. Burn Evans

Dr. Ken L. Ward

November 26, 1993

UNIVERSITY OF ALBERTA

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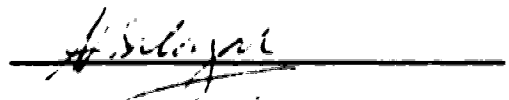
DEGREE: MASTER OF SCIENCE

YEAR THIS DEGREE GRANTED: 1994



Ana L. Salazar
#204, 10883 Saskatchewan Drive
Edmonton, Alberta
Canada T6G 4S6

December 6, 1993

To my family

Abstract

This study is an evaluation of a forest and forest management education program called "Alberta's Focus on Forests"[1] for use at elementary and junior high levels. This program was developed by the Alberta Forestry Association with support from: Alberta Forest Service, Alberta Forest Products Association, Alberta Education, Ontario Ministry of Natural Resources, Forestry Canada, the City of Calgary and the Town of Peace River. Alberta's Focus on Forests was primarily developed, supported and reviewed by foresters. Apart from teachers and educators, no other stakeholder was involved in the development, support and initial reviewing stage of the program. This gave a strong suggestion that the program could be biased.

The objective of this study was to determine if Alberta's Focus on Forests reflects a balance of biases. The methodologies used to determine this objective were interviews and content analysis of the program's manuals. Interviews with various stakeholders were conducted to determine their perceptions as to the balance of biases in the first draft of the program's manuals. The stakeholders interviewed were: environmental groups, government, forest industry, and teachers and educators.

Content analysis of the program's manuals was undertaken to determine if there is a balance of biases in the first draft of the manuals and to determine the changes as to the balances of biases in the evolving drafts. The four drafts for the elementary manual and the three drafts for the junior high manual were analyzed using content analysis procedures.

Analysis of the responses to the interviews show that the first draft of the program is perceived not to reflect a balance of biases. Content analysis of the first draft of the

[1] Refers only to first draft of manuals unless otherwise stated.

manuals revealed bias in the choice of topics, topics omitted, biased phrases, quantity and quality of information presented for different viewpoints which tended to emphasize forests as a source of fibre over other uses and values and also trees over other components of the forest. Content analysis of the final drafts suggest that the junior high manual has not had major changes, and therefore does not reflect a balance of biases; whereas in the elementary manual the changes are significant to suggest that it reflects a balance of biases.

Acknowledgements

I would like to acknowledge the Canadian International Development Agency (CIDA) for the scholarship that made possible my studies in Canada, and the Faculty of Graduate Studies and Research for the funding necessary to complete my program. I would also like to acknowledge the Alberta Forestry Association (AFA) for their support during the evaluation of Alberta's Focus on Forests.

I would like to thank the members of my supervisory committee: Dr. Bruce Dancik, Dr. Jack Heidt, Mr. Burn Evans and Dr. Ken Ward for their guidance and support during my master program.

I would also like to thank: all the people I interviewed in this study for their time and dedication; the Department of Forest Science staff, specially Darlene Saunders and Mike Bokalo for their help; Cristina Vega and Jorge Alcazar for their friendship and spanish language; Luis Quadri for his feedback and insightful discussions and my family in Argentina for their continuing support.

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Introduction

More than half of Alberta is forested. These forests offer a mosaic of products and values, providing various forest products, wildlife habitat, recreation, nature appreciation, wilderness, aesthetic and spiritual values and others. Eighty-nine per cent of Alberta's productive forest land is owned by the public (Forestry Canada 1990). As owners of this valuable resource, Albertans have the right to express their values and concerns regarding forest management. The challenges faced today cannot be answered by scientific and technical criteria alone. They also require a variety of social criteria. Forest management can involve decisions which include value judgements and that once they are made and implemented, are not easily reversed (Expert Panel on Forest Management 1990). A wide cross-section of society should be involved in determining the socially optimal mix of benefits to be obtained from the forest (Environment Council of Alberta 1990). Thus, the importance of public involvement becomes evident.

As stated in Sustainable Forests: A Canadian Commitment, "public participation is essential in the development of sound forest policy, and in the planning and review of forest management practices" and "an informed public is essential to effective participation and discussion of forest management".

Increasing the role of the public can be accomplished by increasing the opportunities for public involvement, by expanding the information available to the public, and by developing educational programs and improving public awareness (Canadian Council of Forest Ministers 1991). Regarding education, in Sustainable Forests: A Canadian Commitment it

is stated that:

> - Provincial and territorial forestry staff will work with educators to introduce and enhance forestry as part of the school curriculum in each province and territory, through programs such as 'Focus on Forests' and field trips for teachers and students.
> - Special initiatives will be undertaken by the forest industry to increase public access to their forestry operations.
> - A cooperative national program will be launched to encourage individuals and groups to become actively involved in forestry through tree planting and care in their community.
> - Outdoor-based programs to involve Canada's youth in forestry, such as the Junior Forest Wardens, will be encouraged and supported in each province and territory in Canada.

Education of school children, specifically forest and forestry education, could have two effects. One effect would be on the children themselves, ensuring that when they grow up they will have the information and the skills necessary to make informed decisions and to be able to understand and to be able to evaluate decisions made by others. The second effect would be on their parents and other adults who could be educated by the children.

Until 1991, forestry education for school children in Alberta consisted of the following programs (Vermeer 1991; FEESA 1991).

- Forever a Tree: A program developed by the Alberta Forestry Association.
- Bertie Beaver Reading Club: A program developed by the Alberta Forestry Association.
- Junior Forest Wardens: An outdoor based program sponsored by Alberta Forestry, Lands and Wildlife.
- Project Wild: An activity program from the Fish and Wildlife Division.
- Classroom presentations by people from Alberta Forest Service and Alberta Forestry Association, who sometimes use educational videos.

In 1991, FEESA[1] an Environmental Education Society organized a Forestry Education Institute for Alberta teachers whose objective is to educate teachers who will in turn educate their students on forests and forestry issues (FEESA 1992).

In April 1991, the Calgary Board of Education introduced a draft of an educational resource for junior high environmental and outdoor education course called: "The Forest Booklet".

That same year the Alberta Forestry Association developed a forests and forest management educational program called "Alberta's Focus on Forests" for use at elementary and junior high levels. The following are the stated objectives of the program[2]:

> "1. To provide students with the opportunity to observe and examine trees and forests in their immediate environment.
> 2. To develop an understanding of the forest as a complex community of living and non living components
> 3. To develop an understanding of the interrelationships that exist among the components of the forest community.
> 4. To observe and analyze the ongoing processes of change in the forest community and to examine the role of various agents of change in shaping the forest environment.
> 5. To develop a general understanding of the concept of responsible forest management and emphasize the importance of multiple forest values."

Alberta's Focus on Forests was adapted from a similar program in Ontario which has been used in their school system since 1988. It has received support from Alberta Forest Service, Alberta Forest Products Association, Alberta Education, Ontario Ministry of Natural Resources, Forestry Canada, the City of Calgary and the Town of Peace River. It is a teaching resource that provides opportunities to develop science, social studies and

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[1] Until 1993, FEESA was an acronym for Friends of the Environmental Education Society of Alberta; the acronym was retained after its name changed.

[2] As stated in Draft I of the elementary manual.

environmental and outdoor education curricula through practical activities. It was piloted by 32 teachers in Alberta in 1991-1992. In September 1993, this educational program was made available to all Alberta teachers.

Any educational material has to be carefully analyzed to detect potential biases. Judging by the supporters of the program, the only stakeholders present in the development of Alberta's Focus on Forests were forestry-related organizations. This gave a strong suggestion that the program could be biased. A way to solve this could have been the use of reviewers from different stakeholder groups or at least from one that evidently was missing: environmental organizations. The fact that the reviewers selected by the program developers, apart from teachers, came from the same groups as the supporters and developers of the program, was another strong indication of possible bias. No environmental organization was consulted at the development stage or at the initial reviewing stage. It became evident that the program needed to be evaluated to determine if Alberta's Focus on Forests reflects a "balance of biases". The term balance of biases is used instead of objective or unbiased because the latter two probably can never be achieved. There are no objective or unbiased programs. There are programs that include many different perspectives and thus can be called bias balanced.

The rationale for the selection of this type of evaluation derives from the controversial nature of forestry in Alberta and elsewhere. Different societal stakeholders can often be in conflict over uses of forest lands. The integration of these different views represents a significant management challenge. There is a need to make forest management decisions which involve value judgements. As children today will be the decision makers of the future, they need to be presented with bias-balanced information to ensure that their minds will not be shaped to the needs of a particular interest group.

Equally important is the acceptance and use of the program by the teachers. The success of the program will depend largely on this. If teachers detect a bias in the program, they will probably discard the program and not use it even if, with regard to other aspects, it is a good educational program.

Frequently evaluators are concerned with determining the success of a program by measuring students' achievement or performance. The intrinsic value of the program is often not evaluated. Evaluators often determine if the objectives of a program are met, and if students have learned the content of the program, but they do not analyze the appropriateness of these objectives or content. Why were these objectives and content selected and why were other objectives and contents not included?

Evaluation should also be concerned with "questions of justification (why should they learn X?) as well as the unintended consequences of learning (by learning X, what else do they learn, and what else do they fail to learn?)" (Lawton 1980). Thus, two crucial questions may arise: what is worthwhile to learn? and, who makes the selection of knowledge? (Lawton 1980; Porter 1991)

When we deal with education we must be cautious and realize that knowledge is not neutral and that "the knowledge taught in schools is the result of political and economic decisions" (Spring 1988). Decisions and choices have to be made about what is to be taught from what might be taught (Harlen 1980). The particular selection of knowledge and "facts" reflects the priorities of the decision makers which respond to a determined philosophy (Layton 1986; Straughan and Wrigley 1980). This is particularly important when we deal with topics such as forest management that involve different values. What kind of information will be presented to children, what "facts" will be shown, which side of the story will be emphasized? Will it focus on ecology, on environmental issues, on forest management or on

industry, and who will define these terms?

The education of young people might be viewed as political in the sense that it is the imparting of knowledge and values (Pring 1986) which may benefit a particular group of people. "Politicians, individuals and organized groups use schooling to gain political power and economic advantages" (Spring 1988). "To some extent, the control of the curriculum is the control of young people's minds, and then the control over the future shape of society" (Pring 1986).

Chapter Two

Design of the Study

2.1 Introduction

The primary objective of this study was to attempt to determine if Alberta's Focus on Forests[1] reflects a "balance of biases". The term balance of biases was defined, in the context of this study, as the absence of a dominant viewpoint. The sub-objectives were the following:

i) To determine the perceptions of different stakeholders as to the balance of biases in the first draft of the program's manuals.

ii) To determine if there is a balance of biases in the content of the first draft of the program's manuals.

iii) To determine if there are changes as to the balance of biases in the evolving drafts.

Interviews with various stakeholders were conducted to determine the first sub-objective. Content analysis of the program's manuals was the methodology used to determine the second and third sub-objectives.

A description of data sources, data collection procedures, assumptions, ethical considerations, and limitations of the design are included.

[1] Refers only to first draft unless otherwise stated.

2.2. Data Sources

2.2.1 Data Sources for interviews

Reviewers and pilot teachers selected by the program developers were contacted. It was felt that additional reviewers were necessary, so other teachers, industry representatives and representatives from various environmental groups were identified and asked to participate. If they agreed, they were provided a copy of the program to review and were subsequently interviewed.

The interviewees for the environment group represent a broad spectrum of environmental groups in Alberta. People from the following groups were contacted: Alberta Wilderness Association (AWA), Friends of the North, Friends of the Athabasca, Canadian Parks and Wilderness Society (CPWA), Environmental Resource Center, Alberta Environmental Network and Western Canada Wilderness Committee.

The interviewees for the forest industry group represent the following companies and associations: Weldwood of Canada (Hinton), Weyerhaeuser Canada Ltd., Zeidler Forest Products, Canadian Forest Products Ltd. and Alberta Forest Products Association.

The teachers and educators can be divided into three sub-groups:

i) **pilot teachers:** These teachers were selected by the program developers. They come from rural and urban schools throughout the province and teach elementary or junior high.

ii) **other teachers who had contact with the program :** These teachers were identified by the researcher. They have a background similar to the pilot teachers and also teach elementary or junior high.

iii) **educators:** This group consists of reviewers selected by the program developers, the

majority of them from Alberta Education.

The government group consists of reviewers who work for Alberta Forest Service and Forestry Canada and was selected by the program developers . Also placed into this group were respondents from the Alberta Forestry Association, since their background was similar to other respondents in this group. It is important to note that although the program developers distributed the manuals broadly in the forestry sector, especially in the Alberta Forest Service, many government officials admittedly only skimmed the manuals. All of those who had read the manuals and were interested in participating, were either interviewed or responded to the interview questions received by mail.

2.2.2 Data Source for Content Analysis

Content analysis is the analysis of the written or visual content of a document. "A person's or group's conscious and unconscious beliefs, attitudes, values and ideas are often revealed in the documents they produce." (Fraenkel and Wallen 1990) Alberta's Focus on Forests consists of an elementary and a junior high manual. Multiple drafts were produced for each of the manuals that were not dated or numbered. All of the drafts of the elementary and junior high manuals were the data source for the content analysis.

2.3 Data Collection

The primary methods of data collection were interviews and content analysis of the program manuals.

2.3.1 Pilot Study

A pilot study was conducted prior to the interviews and content analysis of the manuals. The methodology for the pilot study consisted of face-to-face interviews and mailed interview questions sent to a small sample of teachers, educators, environmentalists, forestry university professors and industry and government representatives in order to obtain their views as to what topics should be included in a program such as Alberta's Focus on Forests. The objective of this pilot study was to develop a questionnaire in which respondents from the different stakeholder groups had to choose among different possible contents and rank their choices. It was hoped that with the questionnaire, possible differences between groups would be observed. Although a questionnaire was developed, it was concluded that it would not measure what was intended since differences in usage and knowledge of terms between groups would make respondents choose the contents presented in the most familiar terms. Nevertheless, the development of the questionnaire served as an introduction to issues in forestry and to the biases of the different stakeholders and, therefore, was useful in designing the interview questions and in determining the appropriate categories for the content analysis.

2.3.2 Interviews

All interviews were conducted by the author who was trained by formal study of literature on interviewing techniques (Borg and Gall 1989; Berg 1989). Interviews with most of the reviewers of the program were arranged on a scheduled-appointment basis and took place at a location convenient to the participants.

Most of the pilot teachers were interviewed in Hinton, Alberta, on a two-day official

evaluation organized by the program developers. The rest of the pilot teachers who were not present received the interview questions by mail. They were asked to consider the interview questions and to submit a written response. A few of the reviewers from government and industry were also interviewed in Hinton, Alberta. Other teachers were contacted during a two-week Forestry Environmental Education Institute organized by FEESA. These teachers attended an Alberta's Focus on Forests workshop and then had time to look at the manuals and engage in a discussion.

The remaining interviews were conducted in the working place of the interviewee or in the researcher's office. Sixty-one face-to-face interviews were conducted. Eight interviews were conducted on the telephone due to either convenience or the location of the interviewee. Each interview began with an explanation of the objectives of the evaluation and its independence from the program developers. With the permission of the respondents, the face-to-face interviews were audiotaped and subsequently transcribed. In these semi-structured interviews, the following questions were asked:

1) What is your overall impression of the program?
2) Do you think this program is relatively balanced or biased towards particular sectors?
3) Would you say a particular view is emphasized?
4) Would you say a point of view is very well presented and discussed and other views are not as well presented, lacking good information and discussion?
5) If you were to change the program, what changes would you make and how would you go about making those changes?
6) Are there some topics or ideas that you would like to see which are not included in the program?

7) Is some content unnecessary and, therefore, could be left out?

8) How do you think the program deals with controversial issues?

9) Which stakeholder's views do you think are mainly represented?

10) Are you aware of the comments of the ND environment critic John McInnis regarding the program and do you agree with him? (Note: Mr. McInnis was a member of the New Democratic Party, the opposition party in the Alberta Legislature at the time of the study)

11) If you had to grade the program from 1-10, what grade would you assign to it and why?

When direct contact was not possible, a mailed questionnaire, with the above-noted interview questions, was sent to the participants. Nineteen questionnaires were returned; data from them was integrated into the interview data.

2.3.3. Content Analysis

The four drafts for the elementary manual and three drafts of the junior high manual were analyzed using content analysis procedures. "Content Analysis is any technique for making inferences by systematically and objectively identifying specified characteristics of messages" (Holsti 1968). Systematic refers to the consistent application of rules for the inclusion or exclusion of content (Holsti 1969) and objective refers to the use of explicitly formulated rules called criteria of selection (Berg 1989).

The methodology of content analysis consists of defining categories into which content units are classified. Content analysis depends on how well these categories are formulated

and adapted to the content and the objective of the study (Berelson 1952). Categories can be defined using inductive, deductive or a combination of both methods (Abrahamson 1983). Indicators are later defined, which are a selection of the possible items in each category. Sometimes indicators are found in the document to be analyzed and then the categories are defined from them (Berelson 1952). In this evaluation, categories were determined inductively, the first category using data from the interviews and the second one after indicators were found in the manuals. A qualitative approach (Lincoln and Guba 1985) was used in which the manuals were searched for the appearance of the indicator (Holsti 1969). Results from the interviews indicated that the program was seen as biased, emphasizing the views of the forest sector. With this in mind, the following two categories, with their indicators, were defined for the first draft of the elementary and junior high manuals. The manuals were searched for the appearance of these indicators.

a) Emphasis on fibre use of forests (category)

1- Biased words (indicator)

2- Biased phrases

3- Biased sentences

4- Biased paragraphs

5- Omission of some uses and values

6- Insufficient information on other uses and values

7- Omission of environmental topics

8- Insufficient information on environmental perspective

9- Inadequate information on environmental perspective

10- Presentation of environmental perspective as emotive, non-factual (latent content)

11- Presentation of environmental perspective as an opinion (latent content)

b) Forests imply only trees

1- Manifest content in words

2- Latent content in words

3- Latent content in drawings

Another category was defined for the subsequent drafts of the elementary and junior high manuals. The manuals were searched for the appearance of the following category and indicators:

Bias editing (category)

1- Change of biased words (indicator)

2- Change of biased phrases

3- Change of biased paragraphs

4- Addition of information for environmental perspective

5- Deletion of biased information

The intensity of bias (Carney 1972) was classified as strong bias, bias and subtle bias. This analysis was not limited to the manifest content, that is the surface meaning, but it also includes the deeper meaning or latent content.

2.4 Data Analysis

2.4.1 Interviews

There have been several drafts of each manual. Most of the responses to the interviews were based on the first draft of either the elementary or junior high manuals or both. The teachers who attended the Forestry Environmental Education Institute were the only ones that read the second draft of the manuals. Their responses were included in all subsequent analyses. Since the differences in both drafts were slight, and, considering the overall responses of the teachers, the change in draft did not cause a shift of perceptions. It would have been better to have all respondents review the first draft, but, given the timing of the draft releases, this was not possible.

The reviewers who analyzed the second and third draft of the elementary manual were also interviewed, but their views were not included in the data.

2.4.2 Content Analysis

The analyses of the various drafts for both the elementary and junior high manuals were done with the objective of determining if some form of bias in the content of the program existed. The manuals were carefully analyzed and compared, and specific sentences and paragraphs were identified.

It is important to note that this analysis refers only to the biased portions of the manuals and only attempts to determine if a balance of biases is achieved. The analysis does not try to evaluate any other aspects of the program. It should be noted that many good

qualities of the program were not part of this evaluation.

2.5 Ethical considerations

University of Alberta ethical guidelines for research involving human subjects were followed. Although confidentiality of the respondents was not assured, any information that would identify the respondents was deleted.

2.6 Assumptions

The following assumptions were made in conducting the interviews and analyzing the data obtained:

1- that all respondents comprehended the questions as intended by the researcher.

2- that the participants' responses were a true reflection of their perceptions.

3- that, although many respondents read only the elementary or the junior high manual, their opinions were valid for the program as a whole.

4- that, although many respondents did not read the entire manual, they still considered themselves capable of giving a qualified opinion, and their responses are valid.

5- that in the case of the teachers who read the second draft of the manuals, the differences with respect to the first draft are not sufficiently large to alter perceptions of the program.

2.7 Limitations

The data collected in interviews and mailed interview questions reflect the perceptions of a sample of stakeholders, with respect to Alberta Focus on Forests first draft manuals, and in the case of some teachers, to the second draft manuals. Perceptions are only true for the first draft and may not be applicable to the final program.

Chapter Three

Analysis of the Data

3.1 Interviews

The four groups interviewed were: environmental groups, teachers and educators, government and industry, and consist of ten, fifty-five, fifteen and eight interviewees respectively. The environmental groups are abbreviated as environment in all graphs. The teachers and educators group is abbreviated as teachers in all graphs.

Figure 1 shows responses to the question: What is your overall impression of the program? The group of teachers and educators, and the industry group responded identically, with all interviewees giving positive comments. The government group responded in a similar way with the majority of interviewees giving positive comments. The environment group responded in a very different way with nearly two-thirds of interviewees giving negative comments.

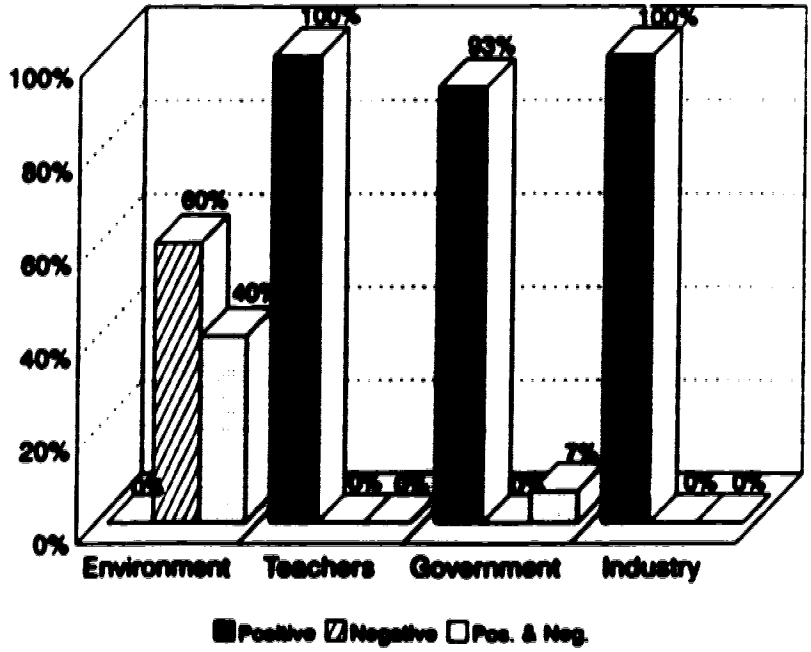

Figure 1. What is your overall impression of the program?

Figure 2 illustrates responses to the question: Do you think this program is relatively balanced or biased towards particular sectors? Again the groups of teachers and educators, government, and industry respond with the same relative magnitude: roughly two-thirds of teachers and educators, and about three-fourths of government and industry interviewees indicated it was a balanced program. On the other hand, all of the interviewees from the environment group considered it to be a biased program.

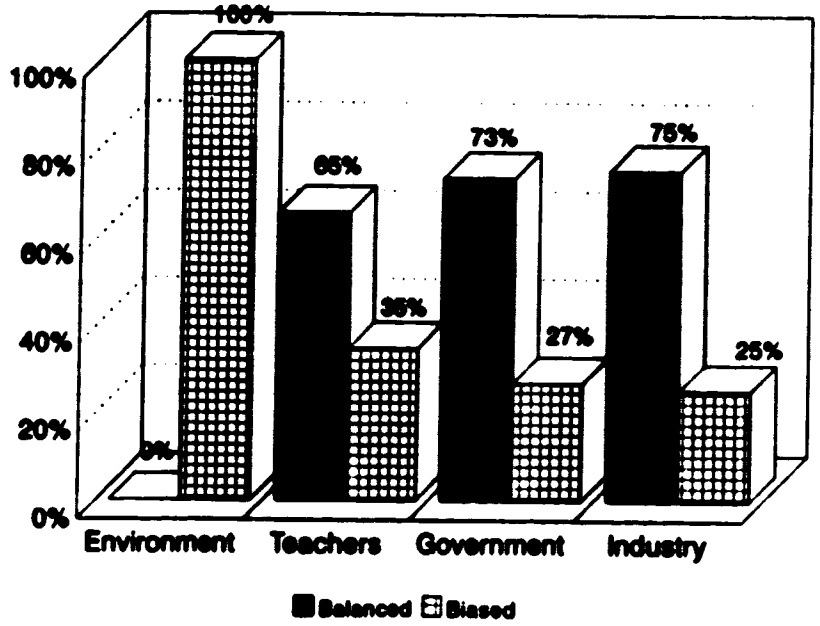

Figure 2. Do you think this program is relatively balanced or biased towards particular sectors?

The third question: Would you say a particular view is emphasized?, although asked as one question, is illustrated in two graphs for a clearer analysis of the responses. In **Figure 3A**, we see the government and industry group responding in the same direction with one-third of government interviewees and one-fourth of industry interviewees responding "yes". In the teachers group, roughly half responded "yes" to this question. Again the environment group responses are very different from the other groups with all interviewees responding "yes".

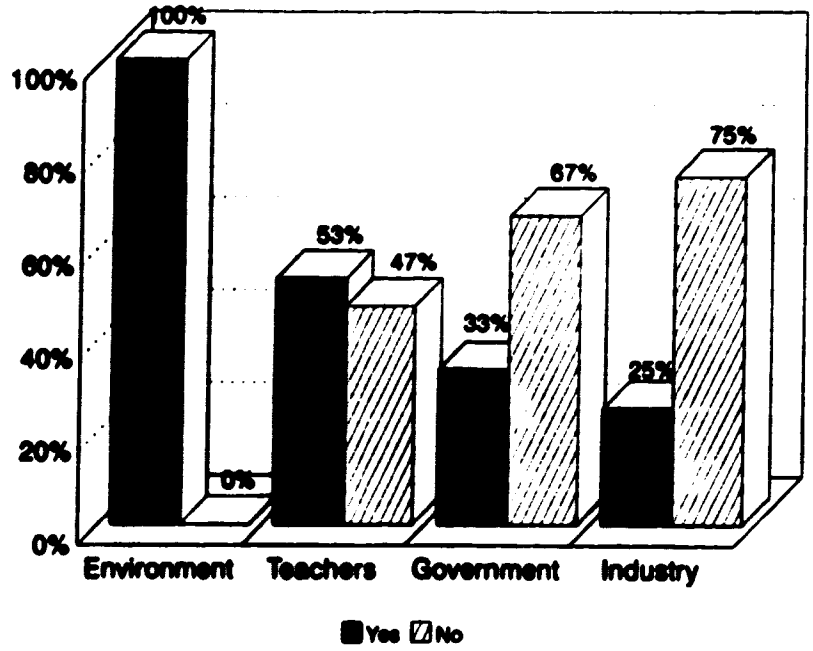

Figure 3A. Would you say a particular view is emphasized?

Figure 3B shows that the majority of the teachers and educators that responded "yes" to the first part of the question, indicated the "forest sector" as the main view represented. The "forest sector" is a category that includes response terms such as industry, government, management, forestry and development, that although different are perceived by the public as pertaining to the forest sector. The "environment-related" is a category that includes response terms such as environment, wilderness, preservation, conservation, old growth, wildlife, natives, and other uses and values. The response terms of teachers and educators for the forest sector category were: 16% industry and government, 12% forester, 40% industry, 20% management, 4% government and 8% development. In the government group, three-fifths of interviewees that responded "yes" to the first part of the question indicated the forest sector as the main view represented. The response terms for this group were: 67% industry and 33% management. Figure 3B shows that the environment and the industry group responded in an identical way with all of interviewees that responded "yes" to the first part of the question, indicating the forest sector as the main view represented.

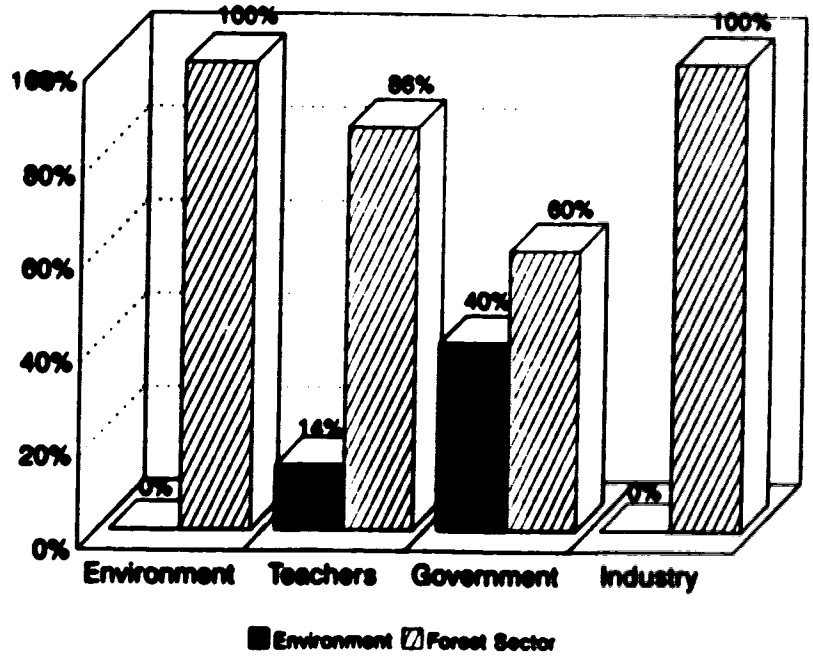

Figure 3B. If the answer is yes, which view?

The fourth question: Would you say a point of view is very well presented and discussed and other views are not as well presented, lacking good information and discussion? is illustrated in three graphs for a clearer analysis of the responses. **Figure 4A** shows that the teachers and educators, government and industry groups responded with the same relative magnitude, with roughly two-thirds of the interviewees in all three groups responding "no". Again the environment group responded in a very different way with all interviewees responding "yes".

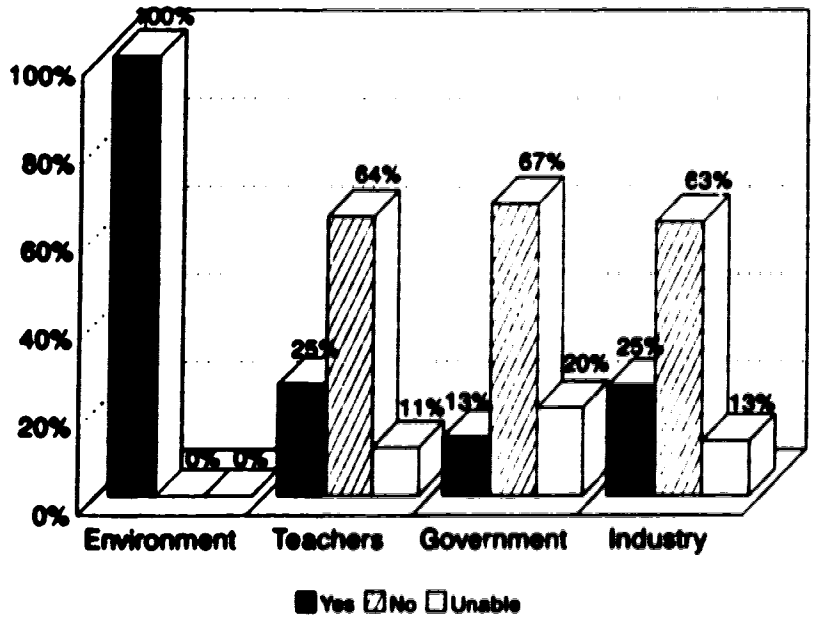

Figure 4A. Would you say a point of view is very well presented and other views are not?

Figure 4B shows that the environment, government and industry groups responded identically, with all interviewees that responded "yes" to the first part of the question indicating the forest sector as the view well presented. The specific terms included in this category in the environment group were 60% industry, 30% industry and government and 10% management. The specific term used by all interviewees in the government group was industry. In the industry group, the specific terms included in this category were: 50% government and 50% industry. About four-fifths of the teachers and educators that responded "yes" to the first part of the question, indicated the forest sector as the view well presented. The response terms used for the forest sector category were: 36% industry, 18% industry and government, 18% forest management, 9% government, 9% consumptive use of forest and 9% development.

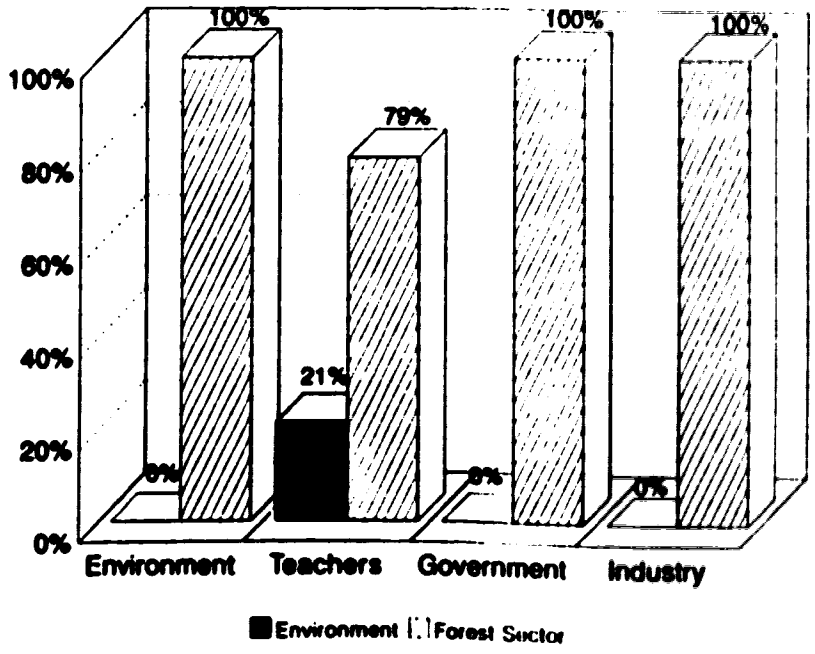

Figure 4B. If the answer is yes, which view is well presented?

Figure 4C shows that all of the environment group interviewees indicated that the environment was the view not well presented. In the teachers and educators group, roughly four-fifths of interviewees indicated that the environment views were not well presented. The response terms used by the teachers and educators in the environment-related category were: 73% environment, 9% wilderness/preservation and 18% environment and natives. In the industry group, half of interviewees considered that the forest sector was not well presented and half, the environment. The response term used by all interviewees in the environment related category, was other uses of the forest. In the government group, half of interviewees indicated the environment as the view not well presented.

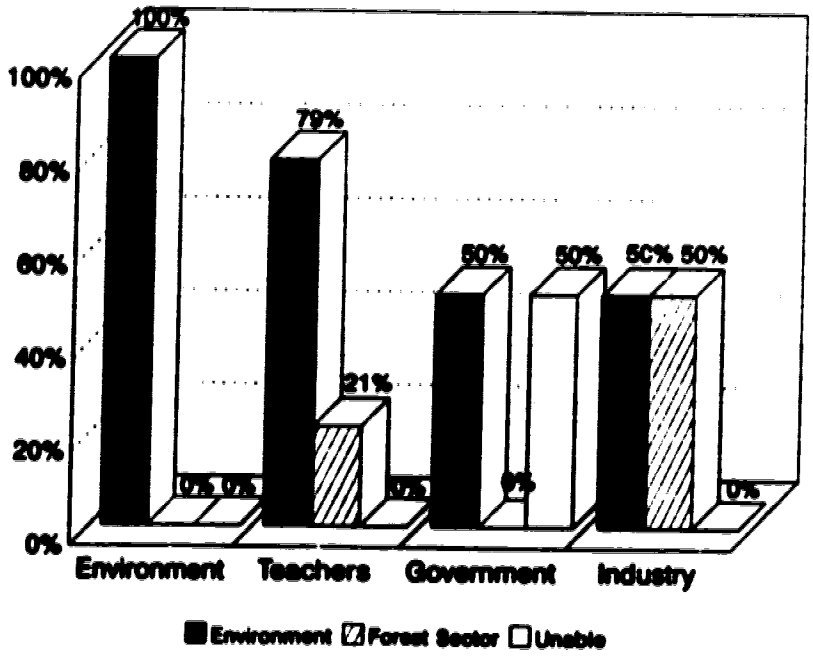

Figure 4C. If the answer is yes, which view is not well presented?

Figure 5 displays the responses for the question: If you were to change the program, what changes would you make and how would you go about making those changes? The responses were divided into four categories: bias changes, other changes, no change and unable to respond. Bias change was defined as any response that included a topic that has to do with the balance of biases.

In the environment group, all of the respondents mentioned bias changes. In the teachers and educators group, the responses were roughly equally divided into bias changes, other changes and no change. In the government group, about half mentioned other changes, while only 7% mentioned bias changes. In the industry group, three-fourths mentioned other changes, and only 12.5% mentioned bias changes. The majority of the respondents were unable to respond satisfactorily to making suggestions as to how they would go about making changes to the program.

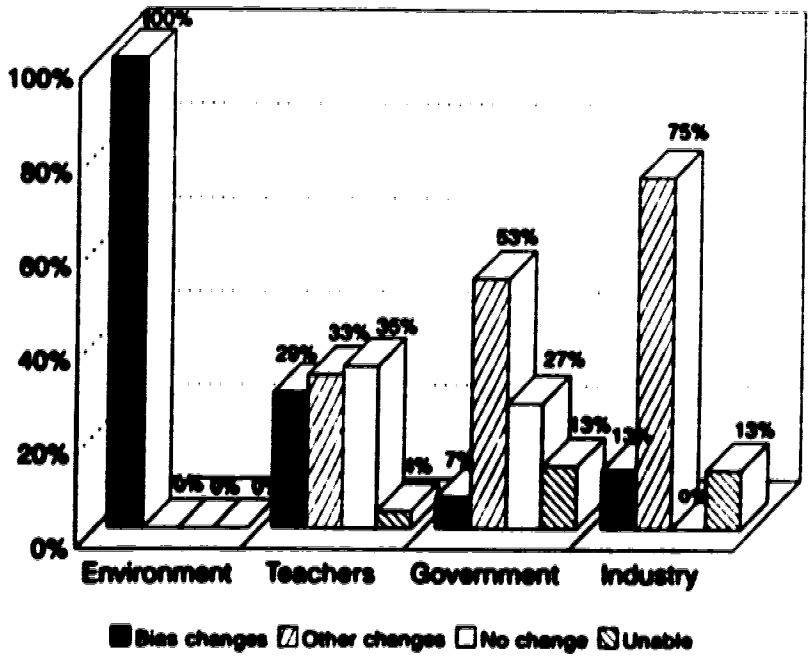

Figure 5. If you were to change the program, what changes would you make?

The sixth question : Are some topics or ideas that you would like to see not included in the program? is also illustrated in two graphs. **Figure 6A** shows that a "yes" response was used by almost all the interviewees in the environment group, by roughly three-fourths of interviewees in the government group, by half of interviewees in the teachers and educators group, and by over one third of interviewees in the industry group.

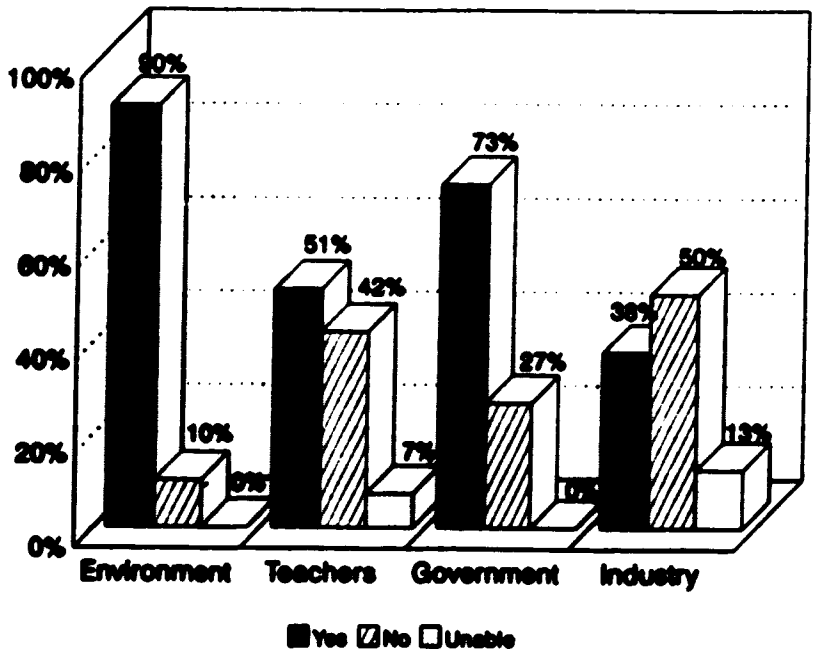

Figure 6A. Are some topics that you would like to see, not included in the program?

Figure 6B, shows that the majority of the interviewees in all groups indicated environment-related topics: all of interviewees in the environment group, about two-thirds of teachers and educators; roughly half of interviewees in the government group and almost two-thirds of industry interviewees. In the category of environment-related topics, the following topics were mentioned: biodiversity, conservation, wilderness, stewardship, natives, alternative practices, ecotourism, environmental perspective, wildlife, old growth and other values and uses.

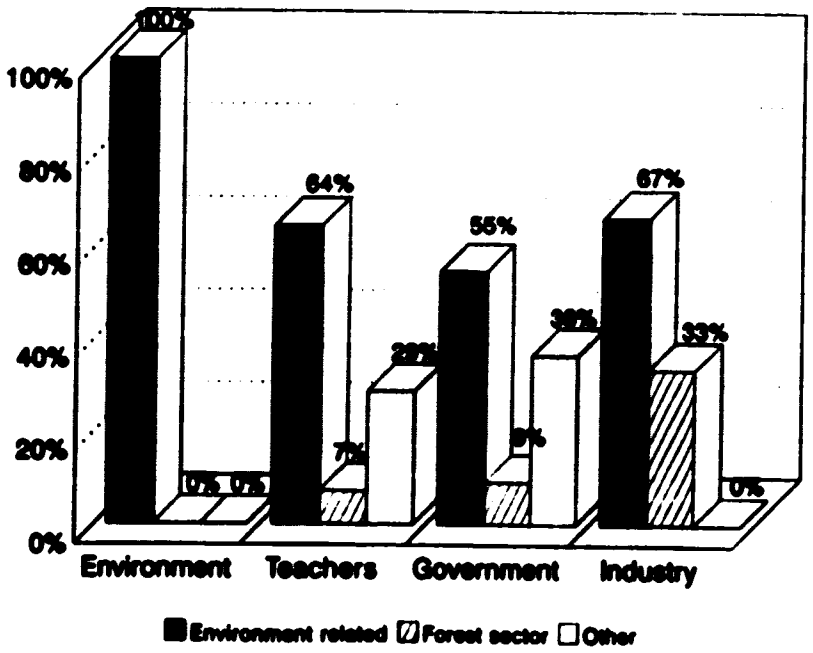

Figure 6B. If the answer is yes, which topics?

Figure 7 shows that for the question: Is some content unnecessary and, therefore, could have been left out?, the teachers and educators, government and industry interviewees responded in a similar way, with the majority considering there was no unnecessary content. On the other hand, almost two-thirds of the environment interviewees considered some content unnecessary. All of the topics mentioned by the environment group are related to the industrial use of forests. Few teachers and educators considered that some topics were unnecessary. The ones mentioned were: excessive number of activities dealing with trees and not the forest as a whole, industrial topics at elementary level, and forestry in Brazil . Few government interviewees considered that some topics were unnecessary but none of these topics mentioned had to do with the balance of biases. In the industry group, no interviewee considered topics to be unnecessary.

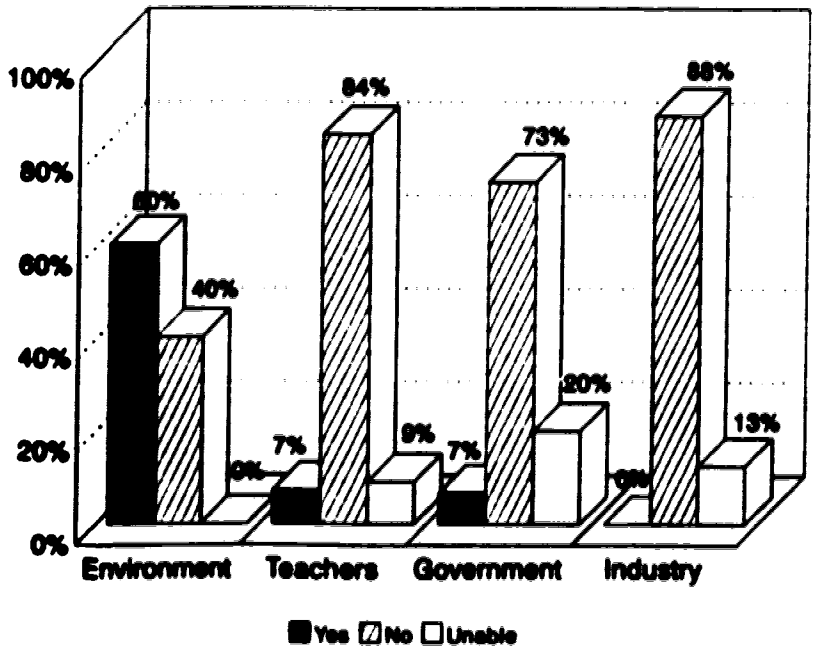

Figure 7. Are some contents unnecessary and could have been left out?

Figure 8 shows that for the question: How do you think the program deals with controversial issues? the majority of teachers and educators, government and industry interviewees were satisfied with how the program dealt with controversial issues. On the other hand, the majority of environment interviewees reported being unsatisfied with how the program dealt with controversial issues.

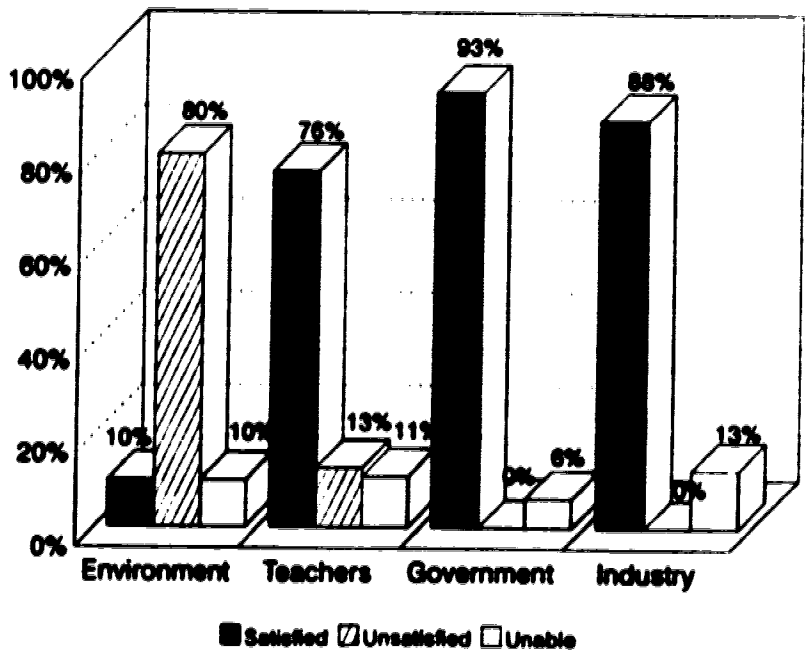

Figure 8. How do you think the program deals with controversial issues?

Figure 9 portrays responses for the question: What stakeholder's views do you think are mainly represented? Again the views of the environment group are very different from the other groups. All environment interviewees considered the forest sector as the stakeholder's views mainly represented. The response terms used in this category were: 50% industry, 40% government and industry and 10% foresters. About half of teachers and educators also considered the forest sector as the primary stakeholder's views represented. The response terms used in this category were: 46% industry, 27% government and industry, 15% forester, 7% government and 4% management. Over one-third of teachers and educators considered that all views were represented. The majority of government and industry interviewees considered that all views were represented, and in both groups about one-fourth considered that the forest sector was the view mainly represented. The response terms used in this category for the government group were 50% industry and 50% industry and government and for the industry group were 50% timber operator and 50% government.

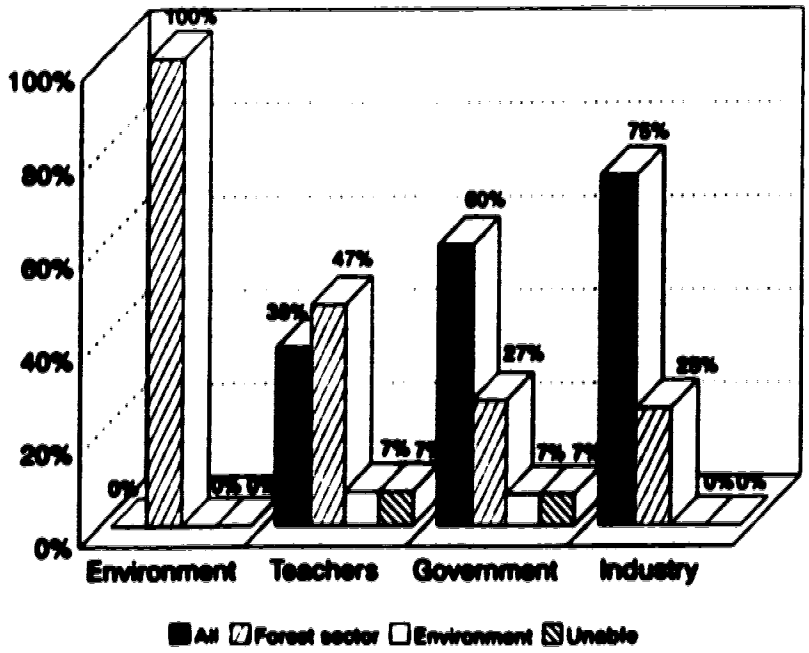

Figure 9. Which stakeholder's views do you think are mainly represented?

The responses for the tenth question: Are you aware of the comments of the ND environment critic, John McInnis, regarding the program and do you agree with him? were not graphed. Mr. McInnis, a member of the opposition party (New Democrat Party), publicly criticized Alberta's Focus on Forests, indicating that it was biased in favour of the commercial use of forests. In the environment group, half of the interviewees were aware of his comments, 30% were not, 20% were unable to respond and 10% were interviewed before he made the comments. In the teachers and educators group, 42% were not aware of his comments, 31% were aware, 25% were interviewed before and 2% were unable to respond. In the government group, 40% were not aware of his comments, 33% were aware and 27% were interviewed before McInnis' comments became widely publicized. In the industry group, 37.5% were unable to respond, 25% were aware of his comments, 25% were not aware and 12.5% were interviewed before.

The second part of the question regarding if the interviewee agreed with John McInnis was not answered by most interviewees and therefore was not included in this analysis.

Figure 10, for the question: If you had to grade the program from 1-10, what grade would you assign to it and why?, shows that, again the environment group responded very differently from the other groups. The majority of the interviewees of the environment group assigned a low grade to the program. In the other groups, roughly three-fourths of interviewees assigned a high grade to the program.

The second part of the question regarding the reason for the grade assigned was not answered by the majority of interviewees and, therefore, was not included in the analysis.

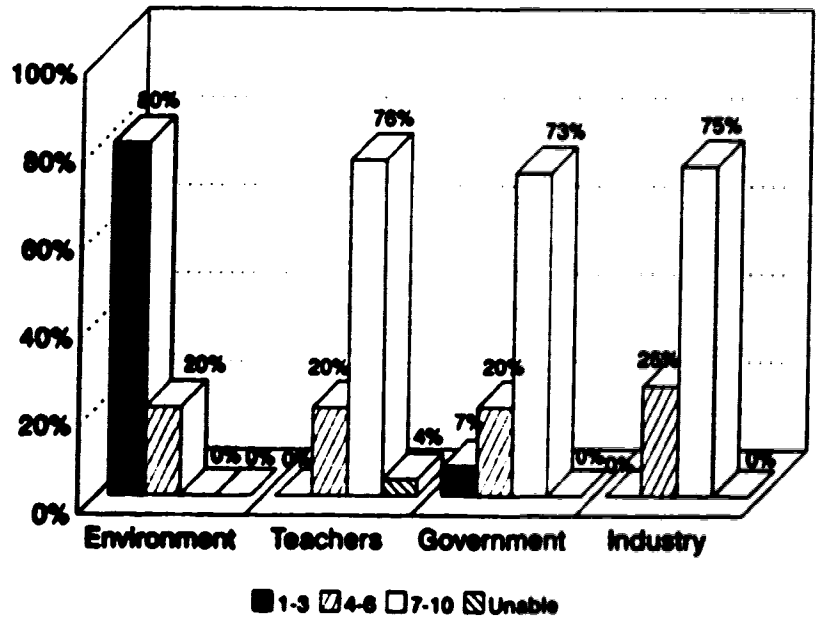

Figure 10. If you had to grade the program from 1 to 10, what grade would you assign to it?

3.2 Content Analysis

The general approach of the Alberta's Focus on Forests program is relatively narrow, focusing on a narrow definition of forests and forestry. This is likely a consequence of what Thorstein Veblen (1914) called 'trained incapacities'. Foresters, like other specialists, have trained incapacities that disable them from having a broader view. The specialization of their professions in a certain way, incapacitates them from looking at other perspectives. The concept of trained incapacities was also described by Robert Merton (1968) as "the state of affairs in which one's abilities function as inadequacies or blind spots." In addition, foresters, like other specialists, have a tendency to work independently (Hitch 1961, as cited by Dorfman 1973), thus limiting interdisciplinary input from other professions and other views.

Alberta's Focus on Forests was developed and supported mainly by forestry organizations and thus, in the manuals produced, the trained incapacities of foresters can be observed. There is a tendency to use the word forest, but actually imply only trees, and this can be seen as a form of bias. The title of the program is a clear example of this. Alberta's Focus on Forests does not reflect the actual focus of the program; it does not focus on forests but on trees. The following quote is an example of how the word forest is implicitly replaced by the concept of trees:

> "What happens to our forests very much affects the plants and animals which live within them." (Junior High manual, Unit 5, p. 9)

It is also interesting to note that in the final draft, the cover has a colourful drawing, not of a forest as the title of the manual would imply, but of a tree. This can also be interpreted as a subtle bias and is another example of trained incapacities.

There is also an implied narrow definition of forestry that focuses on the fibre

resource, while paying only scant attention to the other values of the forest. This is the other bias manifest throughout the program. There is an emphasis on the industrial use of forests as is currently practiced in Alberta. This use of the forest clearly predominates over other forest uses and values, both in terms of quality and quantity of information presented. This contradicts the fifth stated objective of the program: "...(to) emphasize the importance of multiple forest values."

The following is a detailed analysis of the elementary and junior high manuals and of the changes made from draft to draft.

3.2.1 Elementary manual

3.2.1.1 Draft I

The elementary manual is directed to grades four, five and six. It is divided into five units with each unit divided into activities. A brief description of each activity under the various unit headings is provided. In the case of activities that show a bias, there is a discussion.

Unit 1, "Adaptations for Life", has twelve activities, dedicating one activity to each of the following topics: tree parts and function, characteristics of a favourite tree, trees as living organisms, stages in the life cycle of a tree and its adaptative characteristics, pigments in leaves, germination and seed dispersion. There are two activities each dealing with transpiration, factors affecting transpiration and evaporation rates. There are also three activities dealing with tree classification.

Activity 2 , "A Tree for Me", an activity that deals with characteristics of a favourite

tree, has a statement that shows a clear bias favouring the forest industry. Under the heading Forest Facts, "students will develop understandings that... trees are the resource base in Alberta for a multi million-dollar industry".(p. 31) This sentence is out of context as the activity deals with tree traits and not industry.

Unit 2, "Ecosystems - Everything Matters", has five activities dealing with the following topics: tree growth rings, food chain, forest succession, effect of humans on environment and environmental requirements of some species of Alberta trees.

Unit 3, "Environmental Factors - of Beasts and Bean Plants", has five activities, two dealing with germination, and the others with the effect of overcrowding on plant growth, some differences between plants and animals, and photosynthesis.

Unit 4, "Forest discovery - Activities for the Outdoors", has nine activities dealing with topics such as: tree parts and function, blindfolded exploration of trees, tree characteristics, tree observation and adopting a tree, seed dispersion, invertebrate animals, and natural and man-made changes. There are also two activities dealing with tree identification.

Unit 5, "Natural Resources of Alberta - Forestry", has seven activities dealing with the following topics: location of natural resources and trees in a map of Alberta, wood products, problem solving applied to a forest management problem and to any problem, opposing views about use of Alberta's forests, forest management, 3 R's and recycling paper, quotes about forests, forestry and the environment. The introduction to this unit is clearly biased in referring only to the forest industry:

> "Until recently, the forest industry in Alberta , though thriving and strong has lived in relative obscurity. The construction of new pulp mills in Northern Alberta has raised many environmental and social questions. As Alberta's third largest industry our forests have provided much more than building products and the Sunday news. They offer employment and progress, but at what cost? In all things there are trade-offs." (p. 1)

This unit is supposed to be about forestry, not only about the forest industry. This is a very one-sided introduction. The phrase "though thriving and strong" for example, looks like an industry advertisement. And the sentence: "In all things there are trade-offs" appears to be a justification for environmental consequences.

In the Background Information, thirteen lines of text were dedicated to the four topics of wildlife, ecology, watershed, recreation and scenic beauty, while twenty-three lines of text were dedicated to the timber industry.

The information presented in the portion dedicated to the timber industry seems well explained, detailed and up to date, emphasizing its positive aspects and the contribution, in terms of jobs and wood products, to the well-being of the province.

Wildlife and ecology are grouped together and are discussed in these three sentences:

> "One of the most important roles of the forest is the provision of shelter and food for a variety of wildlife. What happens to our forests affects the plants and animals which live within them. Forest management attempts to ensure that areas which are unique or have special significance are protected from loss or damage."(p. 5)

The part dedicated to watershed management is written in such a way that it is not absolutely clear that harvesting trees could produce problems of erosion and flooding.

> "when vegetation is removed from hillsides, rainfall runs off the land unimpeded and can cause serious erosion problems and reduction of soil fertility."(p. 5)

How vegetation is removed is not explained nor discussed. No connection is made to clearcutting. The final sentence says: "By managing the forests, the rate and timing of runoff can be controlled", implying that management only has positive or usable effects and no negative effects or problems.

Recreation and scenic beauty are grouped together and discussed in three sentences. The scenic beauty of provincial and national parks is mentioned.

Activity 2 contains a story called "The man who couldn't stop sneezing" that focuses on wood products in our daily lives. The story is of a man who is not aware that he is allergic to wood, so he tries to eliminate the source of his allergy, eliminating different objects. The idea behind the story is that many more things than we think are made out of wood. In the reader's guide, the first sentence reads "Trees play very important roles in our lives."(p. 13) But the next sentence and the whole activity emphasizes not the importance of trees in our lives but of wood products. This is an activity that emphasizes man's need of wood products, but does not talk about the other services, products and values of a forest. It may be appropriate to teach children all common and not so common uses of wood, provided there was a balance with other values of the forest.

Activity 3, "Decisions, Decisions, Decisions", deals with problem solving and decision making processes. In this activity it is stated that "students will develop understandings that: forestry problems can be solved in several ways." (p. 15) Instead of focusing on multiple use and decisions as to land use, the opportunity is used to present two 'problems' of timber management: nibbling of spruce seedlings by moles and rabbits and caterpillar infestation of a young aspen stand. Two other problems are presented, one of them having to do with erosion and the other one having to do with multiple use as the cows of a neighbour are trampling the student's tree seedlings that are being grown for lumber.

Activity 4: "Forests, Forestry and I - A Simulation", presents the following problem: should three multi-billion dollar pulp mills be constructed in Alberta? Students are divided into five groups to play the following roles in a simulation: environmentalists, people, government, industry and the press. Students engage in discussion attempting to build consensus about the solution to the problem. There is a specific reading for each group and a general reading for all the groups. The general reading has the format of a newspaper

article that subtly leans in favour of the construction of the pulp mills. It has quotes from a government spokesman talking about the jobs and all the additional benefits that would be generated by the pulp mills. "This will give the north the economic boost its been needing." (p. 27) A spokesman from the pulp mill to be built is also quoted talking about the good quality of pulp that will be produced. Regarding the chlorine bleaching pulping process, he sa: : "We've developed a process that's pretty near 100% safe to the environment. We think that all parties involved will be satisfied with our environmental precautions."(p. 27) On the other hand, "Environmental and Native groups were unavailable for comment at press time."(p. 27) In this way, only the views in favour of the construction of the pulp mill are included in this general reading. This general reading is to be read by all the groups at the beginning, followed by a preliminary discussion and a vote. Bias is subtly introduced as students engage in discussion and vote after reading only the views in favour of the construction of the mill.

After this preliminary vote, each group reads and discusses their specific reading. Finally all groups present their views and students vote again on whether or not the pulp mill should be built.

The information in the reading for the industry group shows the positive aspects of the construction of the pulp mills and the reasons for choosing Alberta. There is a list of the requirements as well as the commitment (if the pulp mills are built) of the Alberta government. The information presented might not satisfy an industry representative because it emphasizes the very large size of the mills to be constructed, goes into considerable detail as to the requirements of the government, and also mentions that "it will eventually make the company shareholders millions of dollars a year in profits."(p. 41) As one interviewee stated: "Unit 5 in the elementary text introduces the BigCo Pulp Company. This immediately

creates a negative (big-bad etc.) in people's minds, reinforcing what is seen in the media. How about Aunt Martha's Fine Pulp Products instead?"

The information in the reading for the government group presents the views of a Member of the Legislative Assembly, a forest manager who works for Alberta Forest Service and a biologist who works for the Department of Fish and Wildlife. The part that discusses the role of the politician subtly favours the construction of the mills. The people against the construction of the mills are stereotyped and shown as emotional, not factual.

> "Environmentalists are protesting because they believe the mill will hurt the animals and pollute the waters, Alberta's native groups are screaming because they think we are taking away their land and their livelihood."(p. 35)

Then, in favour of the construction of the mills, "university students who want summer employment "(p. 35) are cited which seems more of an assumption than a reality.

In the last paragraph:

> "But the decision has been made unless everyone in the province suddenly screams No! The Premier and the cabinet have decided that the huge influx of money into the province plus the long term employment taking people out of the unemployment lines will make our province that much richer and will make their party look good when it comes time for the next election. They say the risks to the environment are not significant and that for every expert who says they are, there is one who says they are not. You want to do the right thing but you're not sure what the right thing is." (p. 35)

The paragraph, as a whole, seems like a conclusion and the sentence "They say the risks to the environment are not significant and that for every expert who says they are, there is one who says they are not." , in particular discredits environmental concerns. The phrase "unless everyone in the province suddenly screams No!" at the beginning of the paragraph shows only overly emotional responses of opponents of the mill.

In the reading about the forest manager there are two contradictory sentences. First,

it is stated that "you know the forest is more than just trees."(p. 36) Two sentences later it reads: "One of the biggest parts of your job is to protect forests from fire, insects and disease."(p. 36) Although the word forest is used, its usage in the sentence implies only trees. The last sentence comes with a fibre bias: "Every year, these three (fire, insects and disease) destroy more wood than is harvested by pulp and paper and lumber companies."(p. 36)

The part titled Wildlife in Danger consists only of a paragraph, that makes reference to the scarcity of money and trained people in the Department of Fish and Wildlife (see quotation below) and a list of endangered, threatened and vulnerable species. The paragraph is written in a very unclear way and it is an inappropriate introduction of wildlife concerns in timber operations. It gives the impression that for this section, the writer was satisfied with just copying part of the Report of the Expert Review Panel (1990), as this report is known to be critical of some current forestry practices.

> "You are a biologist for the Department of Fish and Wildlife and though there is not enough money nor enough trained people to do all the jobs which need to be done to implement the objective of 'supporting' the maintenance and recovery of rare, threatened and endangered species of wildlife and that it take precedence over other forest uses.(Alberta Fish and Wildlife 1989)"(p. 36)

This is followed by a list of endangered, threatened and vulnerable species of wildlife that would be affected by timber operations in the province. No other wildlife concern is addressed, giving the impression that the main interest of the Department of Fish and Wildlife is to save threatened and endangered species. As one interviewee stated "To teach students that the main interest of the Fish and Wildlife Division and the public/environmentalists is to save threatened and endangered species is outdated and wrong. Ecosystems and maintaining biological diversity are the overriding concerns."

Also, simplifications are made in explaining what is being done regarding endangered or threatened wildlife that give the impression that the problem is solved. Two examples of

these follow:

> "Woodland Caribou: In many of the areas where timber is cut the size and shape of clearcuts has been changed to protect places where caribou live. In some cases the logging practice is changed to protect the caribou. "(p. 36)
>
> "Endangered Bird Species: Populations are monitored, birds are moved and the birds and their habitat are protected."(p. 36)

The reading for the group representing the People is divided into two headings: Campers and Jobs in the Future. The first one is quite well done, but in the second one, a strong industrial bias is evident as this quote suggests:

> "Great jobs, great wages and benefits, and a great place to work are the story of Alberta's Forest Industries!"(p. 40)

This sentence shows a clear bias and an exaggeration of the positive attributes of a job in the forest industry.

> "Whether you are a student planting trees in some of Canada's most beautiful country, making as much money as you can, a lover of the outdoors working in e forest cutting trees, or a person who finds computers and robots fascinating, the forest industry has a job for you." (p. 40)
>
> "The number of jobs are growing daily. Security for the future is yours in Alberta's Forest Industry!"(p. 40)

In this paragraph, the number of jobs and money provided by the forest industry is again emphasized. Loggers are portrayed in a positive manner, maybe in an effort to improve public perception. This paragraph looks more like an advertisement for the industry than the point of view of the people.

In the reading for the Environment, environmentalists are stereotyped as emotional and intransigent. The following are examples of this:

> "an environmentalist's (a person who fights to preserve the environment) responsibility is to protect the environment." (p. 43) ; "...

> you must always be on the side of the environment, No compromises!" (p. 43); "As an environmentalist you have fought every possible harm to nature that has come your way." (p. 43); "...by the time you have finished reading the news article you are very angry." (p. 43)

Some environmental concerns related to the construction of a pulp mill and harvesting are addressed but not in a way that best shows this perspective. A list of endangered wildlife species is given without a proper discussion, giving the impression that all wildlife concerns have to do with endangered and threatened species. And, again, Alberta Fish and Wildlife's objective of "supporting maintenance of threatened and endangered species that may take precedence over other forest uses."(p. 43) is stated together with the lack of proper funding. These statements seem isolated and have little to do with the objective of the reading.

Soil erosion caused by clearcuts and pulp mill effluent are fairly well explained. Old growth forests are only mentioned without definition or discussion. Global warming is discussed unclearly and in an oversimplified way. The following quote subtly presents environmentalists as extreme and unreasonable:

> "They will tell you that 400 people work at their mill. They will say that their mill produces the same amount of pollutants as a mill which is much smaller than it. That seems like a pretty good trade off but you know that it doesn't matter how many people are working : 10 litres of pollution is still 10 litres of pollution whether it comes from a mill with 1 employee or a mill with 500." (p. 44)

There is also a paragraph that tries to take the blame for environmental problems from companies and spread it to all the population.

> "It's not just the fault of big companies. The products they are producing are being used by people and people must take responsibility for reducing their consumption of disposable diapers, lumber and paper products." (p. 44)

As one environmentalist stated during an interview: "If you are a person that is raising serious questions about a project, if you are not environmentally perfect, then you feel that you

should not be able to speak out. If you make an environmentalist become a martyr, then their voice becomes very small."

In Unit 5, Activity 5 "The Forest Managers", students make decisions about managing a forest. They are divided into five teams each with a different forest management task : timber management, recreation management, wildlife management, watershed management and fire, insects and disease management. There is a general reading on forest management. The first part of the text is almost identical to the reading from the previous activity of the forest manager who works for the Alberta Forest Service, so the same comments apply. The second part shows a clear bias in favour of timber harvesting over other uses of the forest. The reading states that the forest management cycle is made up of six steps: planning, harvesting, site preparation, reforestation, tending and protection from fire, insects and disease. This implies that, at least for the writers of this portion, forest management is in fact timber management. Under the first subheading Planning, there is a paragraph that fully demonstrates this bias.

> "Managing a forest is a little like farming. First you must plan what you wish to grow and where you wish to grow it. To make this decision you must need to know how much land is available and what trees will be profitable to grow. Profit, after all, is the most important reason for our forests."(p. 51)

This last sentence was the one cited by the NDP Environmental critic John McInnis that generated a substantial amount of controversy as reported in the media. The controversy proved to be positive as the importance of having a balance of biases in this program became a matter of public interest and the program developers recognized its importance. More reviewers were contacted and several drafts of the manuals were produced, at least in part due to Mr. McInnis' public criticism.

Under the heading Harvesting, three methods are discussed. Twenty-one lines of text

are dedicated to clearcutting, whereas only three are given to shelterwood and three to selection cutting. In the discussion of the shelterwood method it is stated that lodgepole pine does not grow well with this method. The reading should probably also include that spruce often does not regenerate best when it is clearcut. Without much discussion, it is concluded that " For a number of reasons, clearcutting is the most effective way of foresting." (p. 52) Due to the controversial nature of clearcutting in the province at this time, a better discussion of the pros and cons of each harvesting method is needed. Another sentence that is biased in favour of clearcutting and therefore in favour of industry, as it is the most commonly used harvesting method in Alberta, is the following: "Clearcutting does provide a different environment for other species of plants and animals, and as a result, the numbers and variety of wildlife increase." (p. 45) There is no other mention of implications of this or other harvesting practice on wildlife. This sentence clearly implies that clearcutting is good for all wildlife, discrediting important wildlife concerns.

Under Reforestation, it is stated one more time that "Hundreds of tree planters and other summer workers make good wages during the summer planting season."(p. 53) This is a clear bias and it is irrelevant to the topic of reforestation. The process of reforestation should be discussed, not the economic side of it. Its inclusion shows a bias favouring the economic benefits of timber harvesting.

Under Tending, the idea of the use of herbicides is introduced. The paragraph also talks about the need for thinning and the "free to grow" standard to allow the healthiest and strongest trees to grow and produce seed for the next generation:

> "The forest needs to be thinned to remove poorer, slow growing trees or worthless species to make room for the others to grow." (p. 53)

It ends with this isolated sentence:

> "Some people have said that this will cause Alberta forest to look like tree farms and many species of plants and animals will not be able to live in them." (p. 53)

Although there is an attempt to introduce another perspective, the quantity and quality of it is inferior. There is only one sentence, against six sentences that talk about the advantages and the need to tend a forest. In terms of quality, this latter is much better explained, while for the average teacher the quoted sentence without any other information could be meaningless. Also, the need for tending a forest is presented in a factual, serious manner, while the other perspective is not, as seen by the use of "some people".

Under Protection, again the idea that forests need protection from fire, insects and disease is repeated. Frequently when the word forest is used it seems that the correct definition has been forgotten and implicitly replaced by the concept of trees or timber. Fire, insects and disease are part of the forest ecosystem. The forest does not need to be protected from them, and these disturbances cause changes in the forest ecosystem that may be desirable or undesirable depending upon the species and values present.

There are readings for each of the management tasks: timber management, wildlife management, watershed management, recreation management and fire, insect and disease management. In the section on Recreation Management, ways to improve recreational opportunities are given. Wilderness areas and old growth forest are mentioned, but probably should be covered in more detail due to their intrinsic value and to the public interest in them. National and provincial parks, wilderness areas and old growth could be discussed in a section separate from recreation.

In the section on Fire, Insect and Disease Management, again the narrow definition of forests is the problem:

"...your task is to protect the forest from fire, insects and disease"(p. 59)

Fire, insects and disease are part of the forest ecosystem. The forest does not need to be protected, trees (or timber) do, and the difference between the two should be noted.

The section on Wildlife Management shows a clear bias in that it only refers to ways to increase the numbers of game species. This implies that the only wildlife worth consideration are game species. This is a clear bias since many game species are favoured by clearcutting.

In the section on Watershed Management, no references are made to the impacts of forestry practices and road construction on watersheds and the problem of erosion.

Activity 5, "The Three R's", emphasizes the importance of reducing and reusing paper products. In this activity, students learn how to make recycled paper in the classroom. Recycling is discussed, nevertheless, the disadvantages of recycling are subtly emphasized. Although the title of the activity seemed to indicate that this is an activity that would have an environmental focus, steps in the pulping process are briefly summarized and 'paper facts' such as the number of mills, and species of trees that give the best quality of paper are given.

Activity 6, "Quotable Quotes" presents different quotes that students are expected to read and interpret the message that goes beyond the words. The quotes focus on emotional awareness of the forest from a biocentric perspective. Nevertheless, as an educator pointed out in the interview, few teachers will use it because the activity itself is uninteresting. Teachers will most likely use other activities that involve student action especially if in the outdoors. This could be seen as a form of unintentional bias. The activities that are fun, and therefore more likely to be utilized by teachers, generally deal with trees and the activities focusing more on the general environment are less fun and thus less likely to be used.

3.2.1.2 Draft II

In the second Draft of the elementary manual, two types of changes can be observed. The first type of change is referred to as an 'editorial change' and consists of corrections of information, additions and deletions of text, changes in diagrams and activity guides and others. The other type of change consists of additions or deletions of words sentences or topics that will affect the balance of biases. This type of change is referred to as 'bias change' or 'bias editing'. All of the bias changes observed in this draft are discussed in the following analysis.

In Unit 5, a significant bias change was made in the activity "The Forest Managers". In this activity, there was a sentence that was noticed by the NDP environmental critic John McInnis and generated very negative press. The controversial paragraph in Draft I is:

> "Managing a forest is a little like farming. First you must plan what you wish to grow and where you wish to grow it. To make this decision, you must need to know how much land is available and what trees will be profitable to grow. Profit, after all, is the most important reason for our forests." (p. 51)

In Draft II it was changed to:

> "Managing a forest is a very complex job. First you must plan what you wish to manage for. If you are going to manage a forest area for wood production you need to know how much land is available and what trees will be profitable to grow." (p. 79)

Although this paragraph shows an improvement, the important concept that you could be managing for other values and uses is still missing.

Another significant change in the text is the change of the term clearcutting to patch cutting. It appears to be a deliberate replacement of the word clearcut with all of its associated negative connotations with the likely more neutral term patchcut. This shows a clear bias as patchcutting is the preferred word usage by industry, although it is only a

cosmetic change.

In this activity there are the same five forest management roles as in the first draft: timber management, recreation management, wildlife management, watershed management and fire, insect and disease management. There are some changes in the readings for the roles. An improvement is shown in the reading for the Timber Management role. Two examples follow: Draft I says " you may clearcut six blocks"(p. 57) and Draft II says "you may cut six areas on your model."(p. 85) The latter one does not imply a particular harvesting method. The following sentence that negatively alludes to old growth was deleted: "...beginning the harvest of mature and overmature stands of trees. (Their growth has nearly stopped and they are susceptible to attack by insects and disease.)" (p. 57)

The reading on Recreation Management is also slightly improved as the following quotes suggest: "Make sure you keep an area where no roads or any other permanent human activity is allowed. This is called a wilderness area.." (p. 86) Instead of "keep some areas in a wilderness state (no roads or other improvements) for hikers who want to get away from everything in the modern world."(p. 57) Also in Draft II "Set aside small areas for special purposes. Caves, old growth forests and rockfalls offer excellent possibilities."(p. 86) Instead of "Be alert to any special areas for rockhounds, amateur archaeologists and areas of botanical interest (like an old growth forest)." (p. 57)

The reading on Wildlife Management has been edited but it is still biased. Only the habitat requirements of some species are considered and other wildlife concerns are not addressed.

3.2.1.3 Draft III

In the third draft, editorial changes and bias changes are observed. Again, all bias changes observed in this draft, are discussed in the following analysis. In Unit 1, Activity 1.2 "A Tree for Me", in the section called Forest Facts, the following sentence was added: "trees provide important habitat for wildlife and contribute to the air we breathe "(p. 33) This is an example of bias editing.

In Unit 2 there is some bias editing. The Background Information in this Draft says: "In order to protect the trees, important wildlife and recreational areas, it is necessary to control serious infestations."(p. 6) In Draft II the term valuable timber was used instead of trees .

Also, in Activity 2.1 under Forest Facts, the last point is changed: "factors affecting the whole forest include climatic conditions (drought, growing season and temperature), fire, disease and insect infestations and human manipulation."(p. 9) The phrase "human manipulation" is new to this draft and is another example of bias editing.

In Unit 5 there is some bias editing in the introduction, as biased sentences were deleted. In Draft I and II, the introduction consisted of the following paragraph:

> "Until recently the forest industry in Alberta, though thriving and strong has lived in relative obscurity. The construction of new pulp mills in Northern Alberta has raised many environmental and social questions. As Alberta's third largest industry our forests have provided much more than building products and the Sunday news. They offer employment and progress, but at what cost? In all things there are trade-offs."(p. 1)

This paragraph shows a strong bias as it only refers to the forest industry. Other values of the forest and other stakeholders are not included in this unit which is supposed to examine the issue of environment versus development as stated in page 1.

In Draft III it was changed to:

> "Until recently, little attention was focused on the forest industry in Alberta. However, construction of new pulp mills in the northern part of the province has now raised many environmental and social questions. Although the forest industry does offer employment opportunities, there is a cost." (p. 1)

The Background Information of Unit five has some bias editing. The section on watershed management is improved by the addition of the last two sentences:

> "Through forest management, any harvesting is carefully planned to ensure erosion is minimized and sufficient vegetation remains to protect the soil. Sensitive watersheds are managed to ensure continuence of the forest cover." (p. 5)

Instead of:

> "By managing the forests the rate and timing of runoff can be controlled."(p. 5)

In Activity 5.4 there is significant bias editing. The reading: "Rules for the Environmentalist" was bias edited as the following sentences show. The first sentence in Draft III reads: "An environmentalist is a person who works to preserve the environment." (p. 41) In Draft II it read "fights" instead of "works". In the same paragraph that describes an environmentalist, the phrase "No compromises" was deleted. Draft III reads: "...by the time you have finished reading the news article you are very agitated." (p. 43) In Draft II instead of the word agitated, "angry" was used. In Draft III: "There are several unsupported statements and you think important information has been omitted." (p. 43) in comparison to Draft II: "The number of unsupported statements and omissions of what you think is important information look like a cover-up."(p. 43) "When portions of a forest are cut or burned..."(p. 43) instead of "When a forest is patchcut" in Draft II and "When a forest is clear-cut" in Draft I. Additional information regarding public consultations is also included

in the third draft.

The paragraph regarding harmful chemicals produced by the chlorine bleaching process is improved. The toxicity of dioxins and furans is more clearly stated. Draft II read:

> "Chemicals which have been proven to be extremely harmful to animals like guinea pigs and chickens are produced when pulp is produced using chlorine bleach. These chemicals, called dioxins, are produced no matter how "clean" a mill claims its process to be." (p. 44)

Draft III reads:

> "Dioxins and furans, two of the most toxic types of chlorinated organic compounds, are released in the effluent of bleached kraft pulp mills. These compounds are known to be many times more toxic to animals than PCBs. Further, they remain for a long time in the bodies of many animals, including humans."(p. 44)

The reading: "Rules for the Government members and Employees" has the following bias editing:

> "Today we know that even though timber is a renewable resource (one that can be used over and over), it must be carefully managed along with the rest of the forest."(p. 65)

In Draft II the word forest was used; in Draft III it is replaced by timber. The phrase "along with the rest of the forest" is new and shows an improvement as it includes other aspects of forest management, not only timber management.

In Activity 5.5 called "The Forest Managers" there is bias editing. Again the same sentence regarding timber and not forests as a renewable resource is edited. The controversial sentence that was bias edited again in this draft states:

> "Managing a forest is a very complex job. First you must plan what you wish to manage for. If you are going to manage a forest area for wood production, you need to know how much land is available and what trees will be best to grow."(p. 79)

The word 'best' replaces 'profitable' of Draft II.

Another example of bias editing is the replacement of the word 'crop' by 'seedlings' in a sentence and the deletion of allusions and comparisons to a farmer. The replacement of the term 'patchcutting' by 'clearcutting', is another example of bias editing. The following sentence in Draft II:

> "Patchcutting is used when all the trees are about the same age. Areas in Alberta are usually clear-cut in two stages."(p. 80),

is replaced in Draft III as a result of bias editing by:

> " In Alberta, clearcutting usually occurs using a two or three pass harvest system, depending on the age/condition of the timber and whether there is a significant conflict with other important forest values or resources." (p. 80)

The following sentence in Draft III:

> "The size of the cutblock and the harvest pattern may vary somewhat depending on the requirements of the tree species and the management/conservation objectives for the timber and other resources." (p. 80).

replaces the following sentence in Draft II:

> The size of these blocks vary but the maximum size for pine and aspen may average no more than 60 hectares but may be as large as 100 hectares in size. Spruce blocks may be harvested in 32 hectare strips or 24 hectare patches."(p. 80)

In the discussion of shelterwood cutting there is also bias editing as is shown in: "This system is most useful for shade-tolerant species such as spruce, but can accommodate intolerant species (e.g. lodgepole pine) as well."(p. 80) Instead of: "Trees, like lodgepole pine, do not grow well when this method is used."(p. 80)

There is also some bias editing as seen by the following sentence:

"For a number of reasons, clearcutting is the most efficient method

of timber harvesting." (p. 80)

that replaces the following sentence in Draft II:

> "For a number of reasons, patch-utting is the most effective way of foresting."(p. 80)

Also the following phrase was deleted: "workers make good wages during the summer planting season."(p. 80) indicating bias editing.

In the section titled Tending there was bias editing by deleting references made to herbicide use.

Under forest management tasks in this same activity, the section titled Wildlife Management has had major bias editing. These concepts are introduced: importance of snags for wildlife, reduction of access routes for hunters, buffers and waterbodies. In Draft II only game species were considered and in one of the points it encouraged the building of roads so hunters and fishermen could have access.

The section on Watershed Management has been bias edited and has been significantly changed, focusing on minimization of the impact of harvesting and stream crossings on water quality, stream flow and soil, including erosion and flood control.

3.2.1.4. Final Draft

Again, in the final draft the two types of changes are observed. The following analysis refers only to bias changes. On page one, the following two sentences were added showing a recognition, not observed in previous drafts, that the manual may not be considered balanced by some people:

> "We expect that the information supplied in the issue-related sections

> may be viewed differently by different people. Teachers are encouraged to research issues further and use their discretion in delivering this program." (p. 1)

Bias editing is also observed in the general objective of the program. The first objective has been changed to include not only trees, but other forest organisms as well.

> "...observe and examine trees and other organisms that make up a forest in their immediate environment." (p. 3)

In previous drafts, the first objective read:

> "...observe and examine trees and forests in their immediate environment." (p. 3)

The Background Information for Unit 2 has some examples of bias editing. The following negative allusions to old growth forests were deleted:

> "...but only in old growth forests will you find large numbers up high. Many insects don't like healthy plants. Insects are found on the forest floor or in the herb and shrub layer where there is less light and more decay. In the old growth forest there is a chance that the tops of the trees will be unhealthy or dying." (p. 5)

The following sentences show a slight bias editing in the usage of the verbs 'may be' and 'may' instead of 'is' and 'will' in the previous draft:

> "In order to protect the trees, important wildlife habitat and recreational areas, it may be necessary to control serious infestations. If left unchecked, insects such as the spruce and jackpine budworm and the tent caterpillar may defoliate millions of hectares of trees." (p. 6)

In the same paragraph, the addition of the following sentences shows a more evident bias editing:

> "Nature has many ways to check insect predators and diseases in forests, like insects that prey on other insects and birds like

> woodpeckers that eat countless thousands insects. Diseases are also organisms, and some organisms like viruses and bacteria, also prey on each other. Biological pest controls rely on some of these natural prey-predator relationships." (p. 6)

Activity 2.1, "Stored in the Rings" has one example of bias editing under Forest Facts. Draft III read:

> "factors that affect individual trees include insect attack and physical trauma, such as large objects falling against them, lightning strikes and wind and snow damage." (p. 9)

The final Draft reads:

> "factors that affect individual trees include insect attack, damage by animals (including humans), lightning strikes and wind and snow damage." (p. 9)

Unit 3 has a new activity called "Forests on Fire!". Although the addition of this activity is not a bias change, it is included because this topic was not addressed in previous drafts. The activity is divided in two parts: the first part deals with the nature of fire and forest fires, and with the control and prevention of forest fires; the second part discusses the role of fire in succession. This activity appropriately presents different perspectives on forest fires.

Unit 5 shows a significant improvement regarding the balance of biases. A well known person from an important environmental organization reviewed the elementary manual and rewrote large portions of unit 5. The title of the unit changed from "Natural Resources of Alberta - Forestry" to "The Resources of Alberta's Forests". This clearly demonstrates a holistic approach to forest uses and values that is seen throughout the unit in this final draft. The introductory paragraph to this unit was slightly changed. Draft III read:

> "Until recently, little attention was focused on the forest industry in Alberta. However, construction of new pulp mills in the northern part

> of the province has now raised many environmental and social questions. Although the forest industry does offer employment opportunities, there is a cost. (p. 1)

The final Draft reads:

> "Until recently, little attention was focused on Alberta's forests or the forest industry. However, construction of new pulp mills in the northern part of the province and timber production in most of Alberta's forests, have raised environmental, economic and social questions. Although the forest industry does offer employment opportunities and wood products, there are costs." (p. 1)

The Background Information at the beginning of the unit has been completely rewritten. The topics presented, many of which are new to this draft are discussed with a holistic perspective. It is apparent that a writer with a different perspective was involved in this last draft. The following quote suggests this:

> "This Unit has been designed to provide students an understanding of the dual role that forests play in contributing to the world's natural systems, and in supplying human needs." (p. 4)

The following topics are discussed: the changing role of a forest manager as human population and use of natural resources increases; biodiversity; forest sustainability; integrated resource planning; environmental impact assessment; public hearings; forest stewardship; timber management and forest regeneration; and resources provided by the forest (including wood products, employment, way of life for native people, water, wildlife, recreation, tourism, wilderness, and natural areas.)

In the first activity "What is Alberta", there is some bias editing. Ecological regions are introduced in maps of the province and it is stated that students will develop skills and understandings in:

> "identifying the natural resources of Alberta, both commercial and non-commercial." (p. 11)

Activity 5.4, "Integrated Resource Planning - More Decisions!" is a role playing activity that replaces the activity "Forests, Forestry and Me - A Simulation" of the previous drafts in which students had to discuss if large pulp mills should be built in Alberta. In this new activity, students are placed into a land planning situation and therefore can learn about the different and sometimes conflicting uses of forests and how to make consensus decisions. Integrated Resource Planning is the focus of this activity. The simulation activity involves a round table meeting of consultant groups to discuss the future of the Carcajou river area. The consultant groups are: Aspen Grove citizens, forest industry, oil and gas industry, livestock industry, ATV recreationists, environmentalists, native people, local business, government scientists, and integrated resource planners. There is information on Integrated resource Planning in Alberta. There is also a reading for all groups on the Carcajou river area. Present uses and values of this area are described including native hunting, tourism, aesthetics, birdwatching, wildlife habitat, possibilities of establishing a wilderness area, cattle grazing, oil and gas exploration, and timber operations. This is an activity in which the protection of the environment and people's need to use resources are emphasized. Various views are presented and the choice of groups is appropriate as it shows the complexity of real land use planning. The different consultant groups are realistic and appropriately discussed.

Activity 5.5, "Caring for the Forest - Forest Management (Even More Decisions!!)" replaces "The Forest Managers". The topic of the activity is the same as the activity it replaces: constructing a model of a forested valley, Coyote Valley. This activity was totally rewritten, appropriately discussing the different types of forest management and emphasizing the many different forest resources as the following quotes suggest:

> "When completed, the model will show many different forest resources. Where possible, it will show how they are used, protected and cared for."(p. 42)

"There should be discussion about the many purposes and resources of a forest."(p. 42)

Forest conservation and stewardship is also emphasized:

"Two areas within Coyote Valley are already protected under the government of Alberta's "Special Places 2000' program."(p. 42)

"Before the model is constructed, there must be a class discussion about how the different parts of the Coyote Valley forest are to be used, protected and cared for."(p. 42)

Students are divided into management groups and are expected to make decisions as to the future of Coyote Valley. The management groups are: timber managers, wildlife managers, recreation managers, wilderness managers, watershed managers, and fire, insect and disease managers. Comparing these groups to the previous draft, there is a new group added: wilderness managers.

The information presented for the timber management role has been largely bias edited, but still conserves the same structure. In contrast to previous drafts, the six steps of planning, harvesting, site preparation, reforestation, tending and protection, were appropriately classified as "forest management cycle for forests managed for timber"(p. 45) The controversial paragraph is once again edited in the final draft:

"Managing a forest is complex job. First, you must plan what you want to manage for. It may be for recreation, wildlife, wilderness, watershed or timber growth. In this case, you are a silviculturist, or one who grows forest trees, and you are going to plan for the growth of timber." (p. 47)

Draft III read:

"Managing a forest is a very complex job. First, you must plan what you wish to manage for. If you are going to manage a forest area for wood production, you need to know how much land is available and what trees will be best to grow." (p. 79)

Regarding clearcutting, a very different perspective is added as the following paragraph suggests:

> "Clearcutting is often the cheapest method of cutting the forest for the forest company because all of the trees can be removed at once and all of the reforestation can be done at once. Clearcutting is also the method that many people fear will create the most environmental damage, such as soil erosion, loss of wildlife habitat and replacement with only one type of age of trees (called monoculture). (p. 80)

The following sentences were not included in the final draft:

> "For a number of reasons, clearcutting is the most efficient method of timber harvesting." (p. 80)
>
> "Clearcutting creates a different environment for other species of plants and animals, and as a result the numbers and variety of wildlife often increase." (p. 80-81)

In contrast to previous drafts, the concept that "a forest being grown for timber production needs protection from fires and attacks of insects and disease" (p. 48) is introduced.

Under Reforestation, the allusion to the jobs provided by the forest industry for the purpose of reforestation was deleted.

The information for the wildlife management group was largely rewritten. In comparison to previous drafts, an important bias change is observed in the information presented. About thirty-five animals are mentioned, compared to only game species presented in Draft I and II. In relation to Draft III, this final draft has more detailed information and a greater variety of wildlife considered. The association of different wildlife species with aspen, balsam poplar, white spruce, lodgepole and jack pine, tamarack and mixed-wood forest and old growth is discussed.

The reading for the recreation management group was also rewritten. More

information is provided and the concept that forests can be damaged by visitors, and therefore need to be protected from them, is introduced.

Wilderness management is a group new to this final draft. It includes two sheets. The first one gives several reasons for the protection of wilderness. The second one discuses the different kinds of wilderness protection in Alberta: national parks, provincial parks and recreation areas, wilderness and wildland areas, natural areas, ecological reserves and heritage rivers.

The reading for watershed management was also significantly rewritten, with additional and more detailed information presented. The role of trees in the water cycle, the protection of streams from soil erosion, the reduction of flooding or erosion from harvesting and the human use of water for irrigation is presented.

In the reading for fire, insect and disease management, the concept that forests need protection from fire, insects and disease, is deleted in this final draft. Instead, it is emphasized that in managed forests, the prevention and control of fire and insect and disease infestations are important. One of the sheets for this group, 'Preventing Fires in Forests Managed for Timber' clearly shows, in its title, the recognition of the difference between fire prevention in forests managed for timber and forests managed for other uses. In another sheet titled 'Forest Insects', beneficial and harmful insects are presented and they are not referred to as pests as in previous drafts, but as insects.

Activity 5.6, "The 3 R's", also shows bias editing. The sheet 'Reduce, Reuse, Recycle' has been largely rewritten and more information is presented. The following paragraph shows how recycling, in this final draft, is presented in a positive manner:

> "Recycling is environmentally responsible. By recycling newspapers, we save trees. Newspapers can be recycled up to 12 times, before the fibres become too broken to make stronger paper. Although recycling paper saves trees, it does not save the water, air and soil. Inks must

> be removed and disposed of and the paper repulped. This takes energy and puts pollutants into the air and water. However, new vegetable oil inks and the use of natural fungi to help with the repulping and bleaching processes, are making paper recycling more environmentally friendly." (p. 79)

On the other hand, in the earlier Draft III, a very different perspective on recycling is given:

> "Recycling is better for our environment than throwing materials in the garbage. By recycling our newspapers, we save nearly as many trees as it takes to make the newspapers we place in the recycling bins. The problem with recycling is that we still pollute the water and air, and use the same or more energy in the repulping and deinking processes." (p. 95)

3.2.2 Junior High Manual

3.2.2.1 Draft I

There are also five units in this manual. Each unit is divided into lessons, and each lesson is subdivided into activities. A brief description of lessons and activities follows. In the case of activities that show a bias, there is a discussion.

Unit 1, "Forest Ecology" contains six lessons. The focus of this unit is the interrelatedness of biotic and abiotic factors in forest ecosystems. Lesson 1.1, "Field trip to a Forest", contains five activities that deal with the forest ecosystem as a whole, with its biotic and abiotic components and its interrelationships. Awareness activities using the senses of touch, sight and sound are included. In these activities trees are not emphasized in comparison to other components of the forest.

Lesson 1.2, "Forest Habitat" contains four activities that examine the role of trees in providing habitats for different animals. Trees are not the focus of this lesson, instead a

holistic view of the forest is presented. The importance of snags and fallen trees is discussed. Insects are not presented as pests, and the idea that they are also part of the food web is discussed; a paragraph is dedicated in the background information to birds that prey on insects.

Lesson 1.3, "Forest Creatures", contains three activities dealing with the food web and ecological niches. The activities present a holistic view of the forest without emphasis on just trees.

Lesson 1.4, "How Forests Affect the Environment", contains three activities that deal with how trees in a forest play a vital role in the exchange of gases, nutrient cycling, wildlife habitat, the water cycle and soil conservation.

Lesson 1.5, "Biosphere", contains two activities that are about an actual experimental, closed environment project called "Biosphere II". The idea in this experiment is to successfully recreate complete natural ecosystems.

Lesson 1.6, "Change in Forest Ecosystems", contains two activities that deal with succession and agents of change. Humans as agents of change are not discussed. Agents of change such as wind, ice, animals, pests, disease and fire are referred as "destructive forces" (p. 64). This is another example of the usage of the word 'forest' while referring only to trees.

Unit 2, "The Forest Tree", focuses on trees, their characteristics, adaptations, growth and reproduction. It contains the following seven lessons: "Finding the Light", which deals with leaf patterns and significance for photosynthesis and plant growth and survival; "Tree Waterworks I and II" that deal with the transpiration process; "Differences in Design" that deals with variations in tree structure and their functional significance; "Tree Keys" that deal with the development and use of tree identification keys; "New Trees from Old" that deals

with tree reproduction through flowers, cones, seeds and underground suckers; "How Trees Grow" that deals with tree growth and factors affecting growth rate.

Unit 3, "Conditions Affecting Growth", as stated in the title focuses on conditions that affect tree growth. It contains 5 lessons. Lesson 3.1 called "A Lot Depends on Location" deals with the effects of climate and soil factors in determining plant distribution. In this lesson there is a student sheet with a large diagram of a forested mountainous landscape and the title "Where to Cut? Where Not? Although the idea is to indicate to students that the growth of trees is slow on steep slopes with shallow soils, the activity sheet emphasizes harvesting decisions relating to slope. Having any student activity sheet involving harvesting puts too much emphasis on harvesting in a lesson that is about tree growth.

Lesson 3.2 "Life History of a Tree" deals with the interpretation of growth rings. Lesson 3.3 "Woodland Whodunit" deals with insect pests and diseases and the damage produced by them. The whole concept of damage produced by pests and diseases can be seen as a form of bias as forests are not only trees, the so called "pests and diseases" are also part of the forest ecosystem. Lesson 3.4 "Forests: Thriving or declining" deals with tree decline, its causes, symptoms and rating scales. Lesson 3.5 "Urban Wilderness at School" focuses on planting trees in urban areas.

Unit 4 is called "Forest Resources and Technologies". Lesson 4.1 "Trees of Alberta and Canada" deals with the distribution of trees in Canada and the adaptations of tree species to different environmental conditions. It contains three activities, two of them dealing with distribution and one of them with tree identification . In the student activity sheet Trees of Canada, for each tree, there is a silhouette, habitat description, map of distribution and uses in industry. The inclusion of industrial uses could be interpreted as bias as there is no need to have these mentioned in an activity that deals with distribution of trees that will not

necessarily become pulp or lumber. Industrial uses are well covered in other activities, therefore its inclusion in this activity is questionable.

Lesson 4.2, "Changing Forest Use" is actually about wood products and wood physical properties. It contains two activities; in the first one students test flexibility and strength of different types of wood. In the second activity, students discuss different uses of wood. Again a copy of Products from Canada's Trees is distributed. There is a student activity sheet on native uses of wood. There is bias in a student information sheet called 'Changing Forest Use' in the omission of many values and uses, and in the emphasis on wood products. Forty-eight lines of text are devoted to the discussion of wood products with only the following five lines of text to other values:

> "Economically important as these products are, forests have enormous value both regionally and globally for recreation, wildlife habitat, and watershed protection. They clean the air and regulate global temperatures. They are a source of peace and inspiration to us all." (p. 29)

On that same sheet, there is a chart titled Canada's Trees and their Uses. Both of these show how wood products and not forest use is the focus of this lesson. The next student information sheet is a chart of Products from Canada's Trees. This same sheet is repeated three times in this manual.

Lesson 4.3 is called "The Forest Resource" and contains two activities. In this lesson there is an industrial bias in the first sentence.

> "Today's forests provide the raw material for forest industries that employ many Canadians, provide a place for recreation and improve our environment." (p. 33)

The importance of the forest industry is emphasized, as it is the first of only three values mentioned. In the Background Information, there is an industrial bias in this justification for logging:

> "Many people feel a sense of loss as they see how logging changes a landscape that we like to think of as permanent. In truth, nothing stays the same - even in nature. Logging is only one of the many hazards faced annually by our forests. Losses due to fire, diseases and pests are almost equal to losses from harvesting. Together, they consume about 1% of our forests each year." (p. 34)

The use of "many people" when referring to alternate views is a form of bias that is repeated in several instances throughout the manual. When the foresters' view is given it is not preceded by "many people", instead, it is presented in a more factual manner.

In the Background Information, there is one paragraph about preservation and parks. This topic is not well discussed. The last sentence is "Some people argue for a larger area of protected land and oppose logging allowed in some parks such as in the Wood Buffalo National Park in Alberta". (p. 35) This is another instance in which an environmental perspective is preceded by "some people".

There is a sentence that shows a strong industrial bias:

> "The cost of keeping the industry clean can reduce our competitiveness in world markets."(p. 35)

This is certainly an industrial perspective, not an environmental one. It is also not necessarily true, as more and more countries are demanding products that have been manufactured in an environmentally friendly way. If this is the case, keeping the industry clean could increase world market shares or impede them from being boycotted.

Two of the objectives for Lesson 4.3 are: "to identify the economic significance of this resource" and "to appreciate the environmental importance of forests". The first one seems to be achieved, but not the second one. There is no mention of it in the Background Information and only one point out of five in one of the two activities actually deals with it. This lesson is heavily oriented towards wood products and their production.

There is a student activity sheet titled Forest Facts which shows an industrial bias

since eight out of nine have to do with logging. There are two other student activity sheets each entitled Forest Industry Subsectors and Products. In the second one, there are three points with attractive graphs that deal with the forest industry and in the last item of the third point, there is a mention of other values :"make a list of other ways that forests are important to us." This is clearly a bias in favour of the forest industry against other forest values and uses.

On page 38, in the second point in the section Extensions there is a clear bias in favour of the forest industry.

> "Create a tree to show how forests are at the root of many business and recreational activities. Each branch would represent a forest industry sub-sector such as sawmills or pulp mills. On these branches you can place the names or illustrations of all the businesses that depend on these products. Use the Information Sheet 'Forest Industry Subsectors and Products' as a source of ideas."

There is clearly an emphasis on the forest industry, as only this industry is discussed; recreation and other values are not discussed.

Lesson 4.4 "From Pulp to Paper (and Back Again)" deals with an industrial topic: pulp and paper production. There are several remarks that show an industrial bias and are not necessary, as shown in the following quotes:

> "Many Alberta mills have switched to this process (using hydrogen peroxide), at considerable expense."(p. 50)

> "But, does recycling represent a new opportunity for the pulp industry in Canada or does it mean a loss of employment?" (p. 50)

> "Regardless of the effects on the industry, recycling is becoming a priority in today's environmentally conscious world." (p. 51)

The following sentence in the Background Information gives the impression that some Alberta Kraft mills do not use chlorine when in fact they do.

> "Bleaching with chlorine was the method most commonly used..."
> "...pulp can be bleached with hydrogen peroxide which breaks down to water and oxygen leaving no unwanted by-products such as dioxins and furans." "Many Alberta mills have switched to this process, at considerable expense."(p. 50)

There are three activities in this lesson. Activity 1 deals with different types of paper and paper uses. Activity 2 deals with the pulping processes. Activity 3 teaches how to make recycled paper in the classroom.

Another industry bias is shown in a student activity sheet called Comparing Pulping Processes under the heading Disadvantages of the Kraft process; cost, yield and difficulty in bleaching are mentioned. There is no mention of the production of dioxins and furans as a disadvantage of the process. Environmental aspects are not mentioned for either of the processes presented.

Lesson 4.5 is called "Pulp and Paper : The Technology - Environment Connection". In the first paragraph of the Overview a strong industry bias is shown .

> "Albertans have a unique opportunity to asses the values of this industry..."(p. 63)

There are also signs of bias in the Background Information for this lesson as the following sentence shows:

> "But, can any industrial process be completely clean? Is some loss of environmental quality acceptable? What is important to our quality of life?" (p. 65)

This sounds like a justification for polluting the environment.

Regarding the production of dioxins and furans, the steps taken by industry to reduce them is emphasized. Again, in this lesson it is stated that some mills use hydrogen peroxide rather than chlorine. There are also instances in which industry's role is overrated:

> "To combat this problem, (dioxins and furans) the industry has tested a number of preventative measures with some success."(p. 66)

"This type of development has been referred to as multiple use and is a concept favoured by the forest industry."(p. 66)

There are two activities in Lesson 4.5. Activity 1 deals with the pulping process, and includes discussion of waste materials. Activity 2 consists of a simulation of a public forum on new pulp developments. In the second activity students represent the following stakeholder groups: government ("present its views on pulp mill development for the economic benefits" p 67), pulp and paper company, "local business people who see opportunities in the development" (p. 68) and "local residents who are concerned about environmental impacts of the development" (p. 68). The choice of groups clearly shows a bias as the number of roles assigned to development that favours pulp mills, outweighs the anti-development views by 3:1. Also the relative power of the latter group is inferior to the other groups. Government officials, business and industry people have more power than an ordinary citizen.

In Lesson 4.6 "Cutting Styles", the first two sentences in the Overview say: "There are many ways to harvest the trees from a forest. From the perspective of a forest company, the method should be efficient and ensure regeneration of trees." (p. 69) Other perspectives are not discussed. In the Background Information, when clearcutting is discussed, the only disadvantages presented are that wind and light patterns are changed and thus artificial regeneration may be difficult, while in natural regeneration other species predominate which "may not be the species that are most desirable from an economic perspective." (p. 70) Other disadvantages are not discussed.

There are two activities in Lesson 4.6. Activity 1 deals with different harvesting methods. It is divided into three points. In the second point of this activity, the teacher is asked to "discuss the potential impacts of each method on wildlife and on watershed management" without providing any good background information. Again, in the section Extensions of the same lesson, the third point deals with harvesting methods and how each

affect wildlife, aesthetics and soil erosion. There is not enough information in terms of quantity and quality for students to properly assess these. In Activity 2 students are given four hypothetical situations in which they have to decide which harvesting method to use. Again, a bias in favour of industry is shown as in the four situations, students have to harvest trees. Other possibilities are not presented.

Lesson 4.7 "Forest Research", in the second paragraph of the overview says:

> "The role of forest research is to look for better ways to monitor, manage, maintain and improve the forest for multiple use by industry, recreation and wildlife." (p. 75)

Although it is stated as a fact, there are differing opinions in this regard. Not all forests should be managed for multiple use; there are uses and values other than industry, recreation and wildlife; and this sentence does not summarize the role of forest research. Other research such as basic research does not fit this strict definition.

In the Background Information, some of the research in genetics is discussed. Only positive aspects are stated, no concerns are addressed. The following quote shows how industry's role is overrated:

> "Research into better ways of forest management is an ongoing activity conducted by forest companies, governments and universities." (p. 76)

There are two activities in this lesson. In Activity 1, students investigate natural regrowth of trees in an area that was cleared 10-15 years ago. In Activity 2, students play the role of a researcher by designing an experiment that will provide a solution to proposed problems.

> "So be creative and save our forest." (p. 83)

The problem of the proper definition of a forest occurs, since for the first four problems presented in Activity 2, the common denominator for the solutions is pesticides and

herbicides. Forests do not only include trees, as is implied in many instances throughout the manual. The fifth problem has to do with the application of fertilizer (and the solution with thinning). The sixth problem refers again to disease; the solution introduced is genetic alteration. There are many more areas of research that are not mentioned. Students are left with the impression that most of the research carried out in Alberta is to combat tree pests and diseases. However, in the lesson, it becomes a way to introduce herbicides, pesticides, use of fertilizer, thinning and genetic improvement to increase harvestable timber quality/quantity.

Lesson 4.8 "To Spray or Not To Spray" deals with the issue of spraying for pest control. The mere choice of this topic for a lesson shows a bias, as this is a practice favoured by the forest industry, but has very negative public perception. The first two sentences in the Overview demonstrates clearly how pro-industry this lesson is:

> "Farmers have been using aerial spraying of chemical insecticides to control insect pests for many years. As forest companies assume more responsibility for regeneration and maintenance of forests, there will be a call for increased use of similar measures in forest applications."(p. 85)

Again an industry perspective on the subject is seen in the Background Information:

> "As of 1990, only one chemical has been licensed in Canada for commercial use on regenerated forests. New Brunswick is the only province to allow it to be sprayed from the air. However, this situation may change rapidly as more forests are regenerated and forest industries begin to depend on these trees for future timber resources." (p. 87)

There are two activities in this lesson. In Activity 1, the teacher is asked to "discuss the need to control pests and diseases that destroy valuable timber." (p. 89) Then students engage in a debate as to what kind of methods to use. In Activity 2, students debate the use of chemicals to control a particular insect. In this lesson, there are 4 student information sheets,

each on a particular insect: spruce budworm, forest tent caterpillar, the spruce beetle and white pine weevil. Each sheet has information on how each insect damages trees and the different types of pest control that can be used.

Unit 5 is called "Forest Management For All" and it contains six lessons. In Lesson 5.1 called "Forest Values", the first and only sentence in the Overview says:

> "In this activity, students identify how the forest and the products of the forest industry affect our lives." (p. 3)

This is certainly not a very balanced way to introduce the important topic of forest values. In the Background Information to Lesson 5.1, the first two values to be considered in forest management are: 1)"Economic Values: The value of the forest industry." (p. 4) The economic value of tourism, hunting and fishing are ignored; and 2) Commercial Products. On the same page, there is a sentence that mentions economic values but not other values, thus subtly emphasizing the importance of economic values over others.

> "The relative importance of economic values and other values of forests is now a matter of significant public debate."(p. 4)

There are four activities in Lesson 5.1. In Activity 1, students discuss wood products as shown on the student sheet called Products from Canada's Trees. Clearly, an industrial value of the forest is presented. In Activity 2 students brainstorm ideas for the following questions: "If you were to awaken one morning to find that trees had never existed, what things would disappear from the world, who would be affected by their disappearance and how would our world be different from the one we know now?" (p. 5) It is subtly leading students to think only of products rather than other values. In Activity 3 students read the story about a world without trees. The story strongly emphasizes the number of different wood products in our daily lives. The only other aspect presented is the production of oxygen

by trees. Nevertheless it is incorrectly presented; a world without trees is portrayed as a world in which humans need oxygen masks, as if trees were the only photosynthetic organisms. In Activity 4 students read a student information sheet called Forest Values and choose the most important value for them. This was already done in Activity 2 and in the last paragraph of Forest Values. One may ask, why the need to priorize? There are six values presented in the student information sheet Forest Values: wildlife and ecology, watershed management, recreation and scenic beauty, economics, people of the forests and forestry and the Greenhouse Effect. Under Wildlife and Ecology the following sentence reveals the narrow definition of forest implied in the manual:

> What happens to our forest very much affects the plants and animals which live within them." (p. 9)

Under Economics, the number of jobs provided by the forest industry is overemphasized and overrated:

> "...They also include research scientists who experiment with ways tree species and their growth; forest ecologists who study the interactions within the forest community; nursery workers who grow and package tree seedlings; biologists who study living organisms and their environments and entomologists who specialize in forest insects." (p. 10)

This sentence is misleading students to think that only industry provides these jobs, and that industry is the major employer of these professionals. The reality is that a small percentage of scientists work for industry, most of them work for universities and government.

Also, the economic importance of tourism and other consumptive and non-consumptive uses of the forest are not mentioned. This seems to imply that forest-related jobs are only provided by the forest industry. The last forest value presented is Forestry and The Greenhouse Effect. It is not evident why this is considered a forest value and included in this section when important forest values are not.

Also in this lesson, the student activity sheet Products from Canada's Trees is included for the third time in the manual.

Lesson 5.2, "Decisions for Change", contains two activities. Activity 1 is a role-playing simulation activity that discusses the complex issue of deforestation in the Amazon rainforest. The roles are presented simplistically. There could be doubts as to the ability of students to understand the complexity of an issue so remote from their reality. Also, the inclusion of such a topic could be a biased way of presenting an example of very negative forestry practices in order to induce a favourable comparison using Alberta's situation.

In Activity 2 students debate the following question:" Is it possible to have a sound economy without a healthy environment?" Although the inclusion of this question is positive, there is not sufficient background information to help students to properly address this topic. It is interesting to note that sustainable development is not even mentioned.

Lesson 5.3 "Forest Perspectives" has three activities. In the first activity, students brainstorm the following question: "Who is affected when large companies begin harvesting trees for pulp and paper?" (p. 25) In Activity 2, students read a story called Moving Day. It is an analogy of how clearcutting "feels" for the animals of the forest. In Activity 3, students read about different forest perspectives and attempt to reach a compromise on forest use.

In the Background Information, there is a sentence that could be interpreted as misleading:

> "Within the green area about 54% of the land is productive forest. In all about 26% of Alberta has the potential of being economically productive forest" (p. 24)

It is misleading because, if not read with close attention, it leads people to believe that only 26% of the forest is economically productive. It makes little sense to consider the total land

instead of the forested land of the province when calculating the percentage of productive forest.

There is also one paragraph that has an evident bias as it discusses how, in 'conflicting interests like logging and deer habitat' , a compromise can be reached. It is also misleading as the teacher might not be familiar with other wildlife that is negatively affected by clearcutting.

> "In some cases these interests may conflict but in others an effective compromise can be reached.(e.g., Logging can enhance deer habitat by opening up spaces that encourage the growth of new shoots (the deer's food) near ground level." (p. 25)

The last paragraph shows a strong industry bias:

> "When thinking about the removal of trees from a forest and balancing this against other uses, it is important to understand the reasons for harvesting trees. Each of Each of the products into which the trees and their parts are manufactured - the newspapers, paper bags furniture, sports equipment, matches as well as less obvious products such as paints and polishes (from turpentine), plastics (from lignin), adhesives (from bark) and sugar and syrup (from sap)."(p. 25)

The importance of harvesting trees is discussed, but there is no discussion of topics such as the importance of maintaining wildlife habitat, of preserving natural areas, or of old growth forests.

The following groups have been identified for Activity 3: Alberta Forest Service, industry, other users, native groups. There are several readings for each of these groups. These readings appear as leaflets or pamphlets and apparently were adapted from other sources. In the student information sheet, Stakeholders in Forestry Decisions, the different views are well presented. The economic importance of tourism, native concerns,and the importance of old growth forest are discussed. The two readings for the Alberta Forest

Service group are the following: "Clearcutting : A Forester's Perspective" [1]; "Selective Harvesting : A Viable Alternative?" [2]

The three readings for the industry group are: "Clearcutting: A Wooduser's Perspective"[3]; "Clearcutting: An Economic Perspective of Alberta Forestry" [4]; "Clearcutting and the Industry"[5].

There are six readings for the environmentalist perspective. Four of these readings are: "Wildlife Habitat", of unknown source, "Clearcutting: An Environmental Perspective"[6] and "Animals in Trouble"[7]. The latter consists only of a list of endangered, threatened and vulnerable species together with the confusing paragraph about the objective of Alberta Fish and Wildlife and the scarcity of money and trained people included in page 36, Activity 4, Unit 5 of the elementary manual. This is a very simplistic way of describing environmental concerns. Environmentalists are more concerned about sustaining ecosystems than saving rare and endangered species unless these are indicator species. In "The Role of Herbicides in Reforestation: An Environmental Perspective"[7] the writers assume that, as it was adapted from a report generally considered to be critical of some forestry practices, this will always give an environmental perspective. There is a paragraph that discusses the competitive disadvantage of Alberta in the world as it is the only place where herbicide use is not allowed.

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[1]Pamphlet apparently derived from remarks of Jack D. Heidt, Rocky Mt Section, Canadian Institute of Forestry.

[2]Pamphlet apparently adapted from Environment Council of Alberta(1990).

[3]Pamphlet apparently derived from remarks of Peter Gomorood, Tsuga Forestry Contractors.

[4]Pamphlet apparently adapted from :Perspectives Economic Review and Outlook '91. Edmonton Canada Employment Centers. Employment and Immigration Canada.

[5]Pamphlet apparently adapted from: The Clearcutting Issue: MacMillan Bloedel. Forest Perspectives. April, 1990.

[6]Pamphlet apparently derived from remarks of Lorraine Vetsch, Edmonton Friends of the North.

[7]Pamphlet apparently adapted from Expert Panel on Forest Management (1990).

This is definitely not an environmental view on that matter. Two other readings are: "Answers not Rhetoric, Needed on Reforestation"[8] and "Impacts of Forestry on Watershed and Water Quality"[9]. Again, as the latter was adapted from the same report, it is assumed that it is an environmental perspective. This particular selection actually does not discuss the impacts of forestry on watershed and water quality as the title of this reading says.

For the group 'other users' there is one reading called "Clearcutting and other forest Users"[2].

For the natives group there are three readings: "Natives and Forestry development"[2]; "Reimer Roasted for Pulp Stand"[9] which actually provides no information on natives views; and "The Forest: My Home" of unknown source.

Lesson 5.4 is called "Reforestation: Forests or Tree Farms?". This question is certainly not answered in this lesson. In the Background Information, approximately 50% is dedicated to discuss genetically superior trees and their advantages.

> "Many of these trees (superior) will grow in managed plantations where fertilizers, herbicides and other modern production technologies will be applied. The overriding objective is to produce more wood of the highest possible quality in less time." (p. 66)

> "It is the goal of research that all seedlings are of the highest quality so that after the planting they survive and grow as quickly as possible reducing the rotation time of the forest." (p. 66)

There are student information sheets on the policy of reforestation; regeneration techniques and hypothetical treatments and costs. In Regeneration Techniques herbicide spraying is included although it is not used in the forests of Alberta. This could be considered a bias in

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[8]Pamphlet apparently adapted from Letters: Edmonton Journal. D.W. Schindler, Killam Professor of Ecology, University of Alberta. Aug. 24, 1991.

[9]Pamphlet apparently adapted from the Edmonton Journal. Oct.9, 1991.

that it is introducing the notion of the use of herbicides.

There is one activity in this lesson in which students will design a plan to replant a harvested area. Although the directions say to do this in a economical and environmentally acceptable way, students actually only have information on the economical aspects. When they say environmentally acceptable way, they are referring to meeting provincial requirements. This activity is heavily oriented to costs of reforestation. The problem presented to students has information on clearcutting costs, market value of pulp and money per m3 left for reforestation and profit. The student information sheet on Hypothetical Treatments and Costs is quite detailed giving costs of site preparation; natural, acrial and hand seeding; planting container and bareroot stock; scarification and spot seeding; thinning and manual release costs; and herbicide spraying costs. All of these costs are calculated for excellent, fair and poor sites. Again herbicides are included in this chart: "Herbicide spraying costs. (presently only for land use)" (p. 75). Herbicide use is not allowed (except experimentally) in the forests of the province and as this manual takes pride in being Alberta related, the continued references to herbicides is a clear form of bias.

Lesson 5.5 is called "Integrated Resource Management". In the Background Information there are ten lines of text dedicated to other values of forests and forty-one lines to timber operations. Integrated resource management is not defined or discussed. There are two activities in this lesson. In the first one, students have to read and discuss the student information sheet called The Manager's Task. In this sheet, planning, harvesting, site preparation , regeneration, tending and protection are discussed. There is no mention of any integrated resource management, which is the topic of the lesson and part of the management tasks. It only deals with timber management, not with integrated resource management. The text in this student information sheet is almost identical to Elementary Draft II Unit 5,

Activity 5, pages 79-82, although in the junior high manual the word clearcut and not patchcut is used. The same comments apply here. Management is referred only to timber management. The only reference made to other uses is in the following sentence:

> "It is your job as a forest manager to decide how much and where to cut but you must also consider maintaining or improving the value of certain areas for other users such as campers and wildlife. (p. 83)

The student activity sheet Management Tasks contains five forest management roles: timber management, recreation management, wildlife management, watershed management, fire, insect and disease management and integrated resource management. Each role is identical to Elementary Draft I, Unit 5, Activity 5, pages 85-87, except for the inclusion in the junior high draft of integrated resource management. All comments expressed earlier in relation to the elementary lesson are valid here. In the Integrated Resource Management (IRM) role we find the only direct reference made to IRM. There should be more emphasis on it; the Background Information should probably focus on it.

Lesson 5.6, "What's in the Wastebasket? - Reassessing Our Needs" has in the Background Information a table of present uses of Alberta's forest products, their production, distribution and value. This shows an industry bias, even in a typically environmental topic, where the writers have managed to include a chart of forest products. There is only one activity in the lesson and it begins by examining, once more, the list of Products from Canada's Trees. The students have to write a personal environmental action plan for reducing, reusing and recycling. The student information sheet called What's in the Wastebasket consists of a list of facts. Although the title would suggest that they would all refer to wastes, only 20/36 have to do with paper wastes, 6/36 with forests and 10/36 with forest industry and wood products. This is also a bias as the inclusion of forest industry facts is irrelevant to the implied topic of the sheet.

3.2.2.2 Draft II

In the second draft of the junior high manual, the two types of changes previously described for the elementary manual can be observed. All of the bias changes observed are discussed in the following analysis. In Unit four, there is one instance of bias editing: On page 70 it says:

> "The loss of the forest is a further concern which must be addressed on planning for pulp mills. Is there a program in place to establish new growth? Will programs designed to regenerate the timber be successful? Will other parts of the forest ecosystem regenerate?"

The last sentence was added in this Draft.

There is also an example of editing that favours the industry as the term "patchcut" is introduced:

> "For main methods are used to harvest trees. With clear cut (patch-cut) methods, large areas of trees (usually in blocks less than 80 hectares in size) are cut in one operation." (p. 74)

In Unit 5, Lesson 5.1, there is some bias editing in the Background Information. The order of forest values is changed, now ecological and not economical values are first. Also "commercial products" was deleted as a value in itself and the information added to economic values. Lesson 5.2 has improved the Background Information including mentioning sustainable development and Lesson 5.3 has one new paragraph regarding public hearings. In lesson 5.4, and in the Background Information, there is an explanation that is new in this draft: "The following information provides a forester's perspective on the reforestation process." (p. 66).

In lesson 5.5, the introductory paragraphs in the Background Information are improved as they focus more on integrated resource management. The student information

sheet The Manager's Task also has some bias editing. Draft II reads:

> "Managing a forest is a very complex job. First you must plan what you are managing for and where this task is to be done. If you are managing for wood production you need to know how much land is available and what trees will be profitable to grow." (p. 85)

On the other hand, Draft I reads:

> "Managing a forest is a little like farming. First you must plan what you wish to grow and where you wish to grow it. To make these decisions you must need to know how much land is available and what trees will be profitable to grow." (p. 83)

The concept that forest managers can also manage for other uses is not discussed in this sheet. The emphasis is evidently on timber management.

3.2.2.3 Final Draft

The second Draft of the Junior High manual was not reviewed by external reviewers and consequently, the final draft does not have major changes as the elementary draft did. Nevertheless, the two types of changes identified in previous drafts are observed. In the Introduction to the manual, the following sentences are new to this final draft:

> "We expect that the information supplied in the issue-related sections may be viewed differently by different people. Teachers are encouraged to research issues further and use their discretion in delivering this program." (p. 1)

The sentences show an improvement in the approach recognizing that the manual may not be considered a "balanced and unbiased resource" (p. 1, Elementary manual Draft I, II,and III)

In Unit 3 there is a new lesson called "Controlling Fire". There are two activities in this lesson. The first one deals with the history of fire management in Alberta and the development of the Forest Service. The second activity is a role playing simulation activity

that uses the controversy regarding the Yellowstone fires of 1988 as a case study of fire control policy. The following roles in this activity show the different perspectives presented: area resident, industry forester, forest ecologist, business owner, firefighter, tourist, environmentalist, park ranger, park historian and Chief administrator - Yellowstone Park.

Unit 4, Lesson 4.1 "Trees of Alberta and Canada" shows an improvement in the student activity sheet Canada's Forest Regions, since one paragraph dedicated to the definition of forests was added . This can be seen as a form of bias editing if we consider that to equate forests to trees is a form of bias, as it is the view of traditional foresters.

Lesson 4.2, "Products from Canada's Forests" has a new name instead of "Changing Forest Use" in the previous drafts.

Lesson 4.3, "Surveying the Forest Resource" also has a new name instead of "The Forest Resource". In the Background Information for this lesson, there is some bias editing as the following paragraph suggests:

> "A forest inventory will help to answer these questions. This is a first step in a forest management process that also involves setting reasonable cutting levels, monitoring the progress of reforestation and setting aside the most suitable land for parks, recreation and wildlife." (p. 36)

In Draft II it says: ...it may also involve setting aside...". Although it is a slight change, it is considered to be an improvement in terms of balance of biases. A more definite bias change is observed by the addition of the following paragraph:

> "Note that the forest inventory is primarily focused on the economic value of Canada's forests. From an ecological perspective, productivity might be measured in other terms such as the diversity and abundance of plant and animal species. For further information on the ecological significance of the forest resource, readers may want to refer to Unit 1.2- Forest Habitat or to Appendix 2 - Wildlife of Alberta's Forests" (p. 36)

More bias editing is seen by the deletion in this draft of the following sentence:

"The cost of keeping the industry clean can reduce our competitiveness in world markets." (p. 37)

Lesson 4.3, Activity 1 also has some bias editing. In the last item of the last point of the activity guide, the following sentences were added:

"Be sure to consider other uses such as private wildlife sanctuary, a campground or resort, or even a golf course. Wildlife and Recreation uses should be considered as part of forest management."(p. 39)

Lesson 4.4, "From Pulp to Paper (and Back Again!)" has a slight bias editing in the Background Information as seen in the deletion of the phrase " that we enjoy" at the end of the following sentence:

"When wood is turned into pulp, wood fibres are released that are processed into the wide variety of paper products." (p. 50)

There is also a slight bias editing in the Background Information of Lesson 4.5 "Pulp and Paper: The Technology - Environment Connection" as shown in this quote:

"...but as with all industries, ways must also be found to minimize the environmental impacts caused by extraction of natural resources and production of waste material during manufacturing." (p. 71)

The phrase "as with all industries" is deleted in the final draft, showing an improvement in terms of biases.

The phrase "and the public" was added in the final draft and demonstrates an improvement, although the sentence is still biased in favour of the forest industry:

"This is referred to as multiple use, and is a concept favoured by the forest industry and the public." (p. 72)

Lesson 4.7, "Forest research" has additional paragraphs in the Background Information that improve the content. Other areas of forest research such as ecology, effects of forestry practices and silviculture are presented. The previous draft focused largely on genetics and pest management. There are also significant changes in the Activity 2. Several 'problems' are presented and students are expected to suggest a solution and design an experiment. The

previous draft presented six problems dealing with pesticides, herbicides, thinning and genetic improvement. In the final draft, three more problems are added that improve the activity in terms of biases, as two of them deal with disruption of migration routes of animal populations and reclaiming of surface mining sites.

Lesson 4.8, "To Spray or Not To Spray" has a new student activity sheet that contains the following biased sentence:

> "We all benefit from effective pest controls but it is the plants and trees that benefit most." (p. 109)

This quote suggests that the concept that microorganisms, fungi and vir .ses are part of the forest ecosystem is once again forgotten.

Unit 5, Lesson 5.1, "Forest Values" has some bias editing in Activity 3. In this activity, students read a story about a world without trees. In the final draft the title was changed from "The Nightmare" to "The Dream" which is an improvement as it is not implied by the new title, that the lack of wood products (which is the main focus of the story) is negative. The following introductory sentence to the activity was also deleted in the final draft:

> "This activity begins with a short reading in which students are painted a word picture of what might be a very frightening future." (p. 5)

Again, the implication that a world without wood products is very frightening demonstrates a bias. In the same lesson, in the student information sheet Forest Values, under the heading Economics, the following sentence was added showing a slight improvement in terms of biases:

> "Forests also provide employment in areas of recreation, directly and indirectly." (p. 9)

More information should be included about the economic value of tourism and recreation. Two lines of text dedicated to recreation compared to twenty-four lines of text dedicated to

forest industry clearly demonstrates the need for further bias editing.

There are several examples of bias editing in Lesson 5.3, "Forest Perspectives". In the Background Information, a paragraph was deleted in this last draft that presented logging and deer habitat as conflicting interests that can effectively reach a compromise. In the student information sheet Stakeholders in Forestry Decisions, the second and third sentence of the following paragraph were deleted:

> "Alberta Forest Service's primary task is to ensure the sustainability of Alberta's forests as a multiple use resource. Their stated goal is to provide trees for the future. As timber harvesting accounts for the greatest turnover of Alberta's forests (many times greater than forest fires) it seems reasonable to assume that the primary goal of the Forestry Service is to ensure a continual harvest of timber into the future." (p. 25)

This deletion is an improvement, because the sentences clearly emphasized harvesting and do not even discuss multiple use.

The following paragraph[10] was deleted in the final draft:

> "The great diversity of an old growth forest is increased by fire and storms. These forests support many different micro-environments and a great number of plants and animals. Compared with the old growth forest, the carefully managed forest is monotonous and barren."(p. 34)

This deletion does not improve the balance of biases, on the contrary, it takes away information on old growth that the program is lacking.

In the same lesson, the student sheet "Selective Harvesting: Pros and Cons" has been significantly bias edited. First, the title was changed from "Selective Harvesting: A Viable Alternative?" Second, a list of five 'pros' is included. In the previous drafts, only the 'cons' were presented showing a clear bias in favour of clearcutting, the harvesting method most commonly used by the forest industry in Alberta.

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[10]Paragraph apparently adapted from Expert Panel on Forest Management (1990)

Lesson 5.5, "Integrated Resource Management" has several examples of bias editing. The following examples show how, in the final draft, it is recognized that forest management is different from timber management. In the Background Information the following sentence was bias edited from: "Following are the key steps in the management of a forest site." (p. 80) in Draft II, to: "These are the management steps in an area of forest selected for timber production." (p. 64) in the final draft.

The title of the student information sheet, The Manager's Task, was changed to The Timber Manager's Task and in the text "forest manager" was replaced by "timber manager". Once again, the controversial paragraph cited by Mr. McInnis is bias edited.

> "Managing a forest for timber is a very complex job. First you must plan what you are managing for and where this task is to be done. If you are managing for wood production, you need to know how much land is available and what trees will be profitable to grow." (p. 69)

In the same student information sheet under the heading Tending, the biased term "worthless species" was replaced by a more neutral "non-commercial species". In this sheet the following sentence was deleted and shows another example of bias editing that favours the industry's view rather than improve the balance of biases:

> "Some people have said this will cause Alberta forests to look like tree farms and many species of plants and animals will not be able to live in them."(p. 86)

In the student activity sheet Management Tasks, a subtle bias editing was introduced as the order in which the different management tasks are presented was changed. Timber management was the first one in previous drafts, but in the final draft is the last one.

Chapter Four

Discussion and Conclusions

A truly unbiased educational program, like Alberta's Focus on Forests[1], is not achievable. What can be achieved, in a well developed program, is a balance of biases.

The two different methodologies used, interviews and content analysis, with the two data sources, stakeholder groups and program manuals (Denzin 1978), confirm that the first draft of Alberta's Focus on Forests does not reflect a balance of biases.

Alberta's Focus on Forests was developed primarily by foresters. Although the Alberta Forestry A sociation developed the program and its "membership is made up of teachers, foresters, environmentalists, hunters, resource planners and many others who are concerned with the uses of our forest resources" (AFA 1992c), nevertheless, seven out of eleven members of the program's steering committee are foresters or work for a forestry organization. Three members belong to the educational sector; the last member is involved in public relations. Supporters of the program, apart from the educational sector, come only from forestry organizations: AFS, AFPA, and Forestry Canada. Thus, the trained incapacities of the professional forester may be expected to appear, and can be observed in the manuals produced. These trained incapacities are translated into biases in the manuals. Bias is evident in the choice of topics included, topics omitted and differences in quantity and quality of information presented for different viewpoints which tend to emphasize forests as a source of fibre over other uses and values and trees over other components of the forest.

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[1] Refers only to first draft unless otherwise stated.

Analysis of responses to the interviews show that the program is perceived not to reflect a balance of biases. All interviewees from the environment group indicated that the program was biased, that the main view represented was the "forest sector" and that the "environment-related" perspective was not well presented. The forest sector is a category that includes terms such as industry, government, management, forestry and development, that, although different, are perceived by the public as pertaining to the forest sector. Environment-related is a category that includes terms such as environment, wilderness, preservation, conservation, old growth, wildlife, natives and other uses and values.

The above results are consistent with the findings of the content analysis of the manuals.[2] The fibre use of forests is emphasized while other uses and values are either not presented or not well discussed. Important environmental related topics such as biodiversity, preservation, wilderness, wildlife and others are not well addressed or simply not included. When the environmental view is presented, both the quantity and quality of the information presented is inferior to the emphasized view.

Although the majority of government and industry interviewees indicated it was a balanced program, this was probably due to the fact that the manuals were supported and reviewed by people from government and industry; it is likely not surprising that respondents from these groups found many of their professional and personal views represented and thus detected no bias.

The results of the interviews with the teachers and educators are harder to interpret. Although roughly two-thirds of teachers and educators indicated it was a balanced program, when asked what was the main view represented, approximately half of the teachers indicated the forest sector. This is somewhat contradictory. The program was seen as balanced but

[2] This comment does not refer to the final draft of the elementary manual.

also was seen as primarily emphasizing the forest sector viewpoint. This contradiction leads to alternate interpretations, it could be caused by a lack of understanding of the term balance of biases (although the term was explained at the beginning of the interview) thus causing some teachers to choose the more socially acceptable or non-critical term "balanced" over "biased"; they may have only understood the question fully when asked directly what was the main view represented. Alternatively it could mean that, although they did consider the program to be balanced, they indicated that the main view represented was the forest sector simply because the topic of the manual is forestry and not the environment.

Thus, depending on what question is considered more valid, somewhere between two-thirds and one half of teachers and educators considered the program to be balanced. This result is discrepant with the findings from the content analysis of the manuals. At least four alternate explanations of this discrepancy are available: teachers might have focused their attention on the educational aspect of the program; or, some teachers were not critical and did not question the appropriateness of the program in terms of biases as it was produced by a credible source and supported by Alberta Education; or teachers might not have the expertise or training necessary to detect these particular biases; or the need for educational material on forests and forestry could have made some teachers uncritical of the program presented to them.

It could be said that the program is balanced since three out of four stakeholder groups appeared to indicate it was balanced. Furthermore, between two thirds and one half of teachers and educators, who may be considered a neutral, non-biased group, indicated the program to be balanced. Why is it then concluded from the analysis of the interview data, that the program is not balanced?

Although only the environment group strongly indicated the program to be biased, the

perceptions of this group are assigned a greater weight for the following reasons:

- Environmentalists are a major stakeholder group.
- All interviewees from this group considered the program to be biased.
- Environmentalists also have trained incapacities and analyzed the manuals with their own biases. In this way they were able to detect the biases of the other stakeholders that teachers and educators, due to their lack of bias, were not able to detect.
- Their perceptions agree with the fact that environmentalists were not involved in the development or initial reviewing stage, thus increasing the likelihood of finding biases favouring the stakeholders present in these stages.

Alberta's Focus on Forests was primarily developed, supported and reviewed by foresters. Apart from teachers and educators, no other stakeholder was involved in the development or reviewing stage of the program. Inevitably, the trained incapacities of the professional forester can be observed in the first drafts of the manuals produced. These trained incapacities are translated into biases in the manuals. Content analysis of the first draft of the manuals revealed bias in the choice of topics included, topics omitted, biased phrases, quantity and quality of information presented for different viewpoints which tend to emphasize forests as a source of fibre over other uses and values and trees over other components of the forest. Interviews with stakeholders showed that the first draft of the program is perceived not to reflect a balance of biases.

Content analysis of the second and final draft of the junior high manual showed that there have not been major changes in terms of the balance of biases. It can be said that, although the final draft shows a definite improvement, as seen by the deletions of biased phrases, it does not reflect a balance of biases, specially since the quantity and quality of information for other perspectives is inferior and since important topics are omitted.

Content analysis of the second, third and final draft of the elementary manual showed that only in the last draft, significant changes were made as to the balance of biases. The last unit, the only one that deals with controversial issues, was largely rewritten by a person from a well-known environmental organization. Thus, the manual significantly improved in terms of the balance of biases as the trained incapacities of an important stakeholder were introduced. The majority of the indicators (biased words, phrases etc.) that appeared through content analysis of the first draft, were dealt with in the final draft: addition and deletion of information and entire activities, topics previously omitted are introduced and quantity and quality of information for different viewpoints is improved. Thus, the content analysis of the final draft suggests that the elementary manual is relatively bias-balanced compared to the first draft. The use of another methodology (such as interviews with a broad range of stakeholders) would be needed to confirm this finding.

The final draft of the junior high manual does not reflect a balance of biases, probably due to the fact that no "environmental reviewer" was consulted and, therefore, the trained incapacities and biases of this important group are still missing.

When producing educational material for schools, developers should be aware of the potential for stakeholders to introduce their biases in these materials. Education could be viewed as political in the sense that it is the imparting of knowledge, understanding and values which may benefit a particular stakeholder. Therefore, the need to present school students with bias-balanced information is evident. This need should be acknowledged by program developers and steps designed specifically to achieve this balance of biases should be taken. In order to overcome the consequences of trained incapacities, the broadest possible number and range of stakeholders must be identified and involved in the developing and/or reviewing stage of the program. This would produce educational material with a

higher degree of acceptability as all concerned parties are involved in its development. The third draft of the elementary manual was reviewed by a person from an environmental organization, and, as a result, the final product clearly improved regarding the balance of biases. This approach could serve as a model for future manuals for this and other programs, provided that it is introduced very early in the process of developing educational materials.

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APPENDIX (LETTERS)

LETTER TO STAKEHOLDER (PILOT STUDY)

January 6, 1992

Ana L. Salazar
Department of Forest Science
Faculty of Agriculture and Forestry
University of Alberta
Edmonton, Alberta T6G 2H1

Mr.XXXX
YYYYY
Edmonton, AB
T6G 4S6

Dear Mr. XXX:

I am a graduate student in the Department of Forest Science at the University of Alberta, working under the supervision of Drs. Bruce Dancik and Jack Heidt. As a topic for my thesis, I have chosen to conduct an evaluation of the contents and objectives of "Alberta's Focus on Forests". Alberta's Focus on Forests is a forest and forest management education program for use at elementary and junior high levels. It has been developed by the Alberta Forestry Association with support from: Alberta Forest Products Association, Alberta Forest Service, Alberta Education, Ontario Ministry of Natural resources, Forestry Canada, the City of Calgary and the Town of Peace River. The program is a teaching resource that provides opportunities to develop science, social studies and environmental and outdoor education curricula through practical activities. At the present time, it is being piloted by approximately 40 teachers in Alberta.

The purpose of the evaluation is to determine if the content and objectives chosen in this program are appropriate with regards to stakeholders' views. I will use a questionnaire to conduct part of my evaluation. In order to make sure this instrument contains the views of various stakeholders, I have selected a small sample of each stakeholder group to respond to

the following questions prior to the development of the questionnaire. The information you provide by answering the following questions will be very valuable for the evaluation of the program:

1) In your opinion, what content should be included in a forest educational program for schools and why?

2) In your opinion, what objectives should be set in a forest educational program for schools and why?

Thank you in advance for your time and participation in this study. Please feel free to contact me at 492-2493 if you have any questions or comments. Please return your answers in the enclosed envelope by February 10, 1992.

Sincerely,

Ana L. Salazar

LETTER TO OFFICIAL REVIEWER

October 30, 1992

Ana L. Salazar
Department of Forest Science
Faculty of Agriculture and Forestry
University of Alberta
Edmonton, Alberta T6G 2H1

CCCCCCC
XXX Center
9703-94 St.
Edmonton, Alberta
T6C 3W1

Dear Mr. CCC:

I am a graduate student in the Department of Forest Science at the University of Alberta. As a topic for my thesis, I have chosen to conduct an evaluation of the first draft of the manuals for "Alberta's Focus on Forests". The purpose of the evaluation is to determine if the program is relatively balanced or biased towards particular sectors.

The information you provide by answering the enclosed questions will be very valuable for this evaluation. In order to meet the ethical guidelines as set by the University of Alberta, the anonymity and confidentiality of all respondents will be assured.

Thank you in advance for your time and participation in this study. Please feel free to contact me at 492-2493 if you have any questions or comments.

Sincerely,

Ana L. Salazar

LETTER TO PILOT TEACHER

August 30, 1992

Ana L. Salazar
Department of Forest Science
Faculty of Agriculture and Forestry
University of Alberta
Edmonton, Alberta T6G 2H1

Ms. XXX
Mountain View School
McLeod Avenue
Hinton, Alberta
T7V 1T6

Dear Ms. XXX:

I am a graduate student in the Department of Forest Science at the University of Alberta. As a topic for my thesis, I have chosen to conduct an evaluation of the first draft of the manuals for "Alberta's Focus on Forests". The purpose of the evaluation is to determine if the program is relatively balanced or biased towards particular sectors. As you have piloted the program, the information you provide by answering the enclosed questions will be very valuable for this evaluation. In order to meet the ethical guidelines as set by the University of Alberta, the anonymity and confidentiality of all respondents will be assured.

Thank you in advance for your time and participation in this study. Please feel free to contact me at 492-2493 if you have any questions or comments. Please return your answers in the enclosed envelope by September 15th.

Sincerely,

Ana L. Salazar

LETTER TO ADDITIONAL REVIEWER 1

October 26, 1992

Ana L. Salazar
Department of Forest Science
Faculty of Agriculture and Forestry
University of Alberta
Edmonton, Alberta T6G 2H1

Mr XXXX
Box 1359
XYXYXTY
Edmonton, Alberta
T5J 2N2

Dear Mr. XXXX:

As we recently discussed, I am sending you a copy of the first draft manuals for "Alberta's Focus on Forests". The purpose of my evaluation is to determine if the program is relatively balanced or biased towards particular sectors. Your opinion regarding this matter will be very valuable for my research. I would appreciate if you could phone me at 492-2493 when you have read the manuals in order to schedule a meeting.

Thank you in advance for your time and participation in this study.

Sincerely,

Ana L. Salazar

LETTER TO ADDITIONAL REVIEWER 2

August 12, 1993
Ana L. Salazar
Department of Forest Science
Faculty of Agriculture and Forestry
University of Alberta
Edmonton, Alberta T6G 2H1

Mr. XXXX
Box 10,000
XYXYXY
Athabasca, Alberta
T0G 2R0

Dear Mr. XXXX:

As we recently discussed, I am sending you a copy of the first draft manuals for "Alberta's Focus on Forests". The purpose of my evaluation is to determine if the program is relatively balanced or biased towards particular sectors. Your opinion regarding this matter will be very valuable for my research. I would appreciate if you could return the answers to the enclosed questions regarding the program by September 15th.

Thank you in advance for your time and participation in this study. Please feel free to contact me at 492-2493 if you have any questions or comments.

Sincerely,

Ana L. Salazar