

AN ABSTRACT OF THE THESIS OF

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Title: Effects of Douglas-fir Tussock Moth Infestation on Outdoor
Recreationists in the Blue Mountains, Oregon.

Signature redacted for privacy.

Abstract approved:

Kenton Benson Downing

The purpose of this study was to examine the effects of the Douglas-fir tussock moth, spray control program and salvage operations have had on outdoor recreationists in the Blue Mountains in northeastern Oregon during the 1972-1974 outbreak.

Eight hundred ninety-four parties were interviewed one year after the outbreak in four separate surveys. The objective was to determine the respondents' awareness of the insect problem, and their behavior and attitude toward the problems and changes.

The study indicated that, over a long period of time, the secondary stage of the infestation has a greater impact and is of more concern than the direct annoyance and nuisance of the primary stage of the insect outbreak.

The greatest direct change attributable to the tussock moth was the visual appearance in the landscape of dead and dying trees. Comments about new roads, logging, and changes in the game populations and habitat were more noticeable and mentioned more often than those of the Douglas-fir tussock moth.

It is important that future environmental statements and analyses reports consider both the primary and secondary stage activity effects of insect and disease control projects on recreation in the future.

Effects of Douglas-fir Tussock Moth Infestation on
Outdoor Recreationists in the
Blue Mountains, Oregon

by

Philip B. Delucchi

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Typed by Verla Roettger for Philip B. Delucchi.

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EFFECTS OF THE DOUGLAS-FIR TUSSOCK MOTH
ON OUTDOOR RECREATIONISTS IN THE
BLUE MOUNTAINS, OREGON

I. INTRODUCTION

In 1972, the Douglas-fir tussock moth population grew to epidemic proportions in several areas in the Pacific Northwest. One of the largest and most heavily affected areas was located in the northeastern corner of Oregon and adjacent areas in Washington and Idaho. The outbreak occurred on public and private lands throughout the area.

Land owners and government agencies became increasingly concerned as the population grew in 1973. As a result a cooperative program was developed to try to reduce the population of moths by the only successful method known to date, the aerial spraying of the controversial chemical DDT. In addition to the control activity, roading and salvage harvesting of dead and dying trees was also initiated. Extensive coverage by the various news media kept the public up to date on the situation.

The intent of this paper is to examine the effects that the infestation of Douglas-fir tussock moth, spray control program and salvage operation have had on the recreationists who use this part of the state for outdoor recreational activities at various times of the year.

Problem

The USDI-USDA Environmental Impact Statement on Cooperative Douglas-fir Tussock Moth Pest Management Plan, Idaho-Oregon-Washington prepared

by the U.S. Forest Service, Regional Office, Portland, Oregon, stated, "The effects of the tussock moth defoliation on recreation in the Blue Mountains area is primarily on aesthetics, hunting and fishing. There are several high use, highly developed state parks in the infestation area, as well as two forest waysides which were purchased for the purpose of preserving timber stands on hillsides adjacent to and visible from Interstate Highway I-80N. These parks and waysides have high recreational value which is threatened by the tussock moth outbreak." (USDI-USDA, 1973)

Unfortunately, knowledge concerning the impact of major insect infestations, control and subsequent programs on recreation use patterns and visitor use is limited. The quantification of problems and changes on outdoor recreation users is difficult to achieve, particularly since some defoliation and mortality can be justified within forest environment as a natural occurring phenomenon (USDI-USDA, 1973). It was estimated in the Environmental Impact Statement written in response to anticipated DDT spraying that, "if no control is taken, recreation use in the State Park will be reduced by about 50 percent, and use on National Forests, which is much less concentrated, would be reduced by 10 percent." (USDI-USDA, 1973)

This study seeks to broaden our understanding of recreationists' responses to natural occurrences of this kind as well as to provide information that may assist resource managers in predicting recreation related impacts of future outbreaks.

Research Objectives

The objectives of this study are to describe recreationists' direct and indirect awareness of and the behavior resulting from the Douglas-fir tussock moth.

- a. Insect infestation and defoliation.
- b. Control program.
- c. Timber management salvaging operation and related activities.
- d. Public information about the tussock moth outbreak and related control activities.

The immediate (or short term) effects of the Douglas-fir tussock moth outbreak on recreation activity in the Blue Mountains of North-eastern Oregon occurred during the period 1972 through 1975.

Long term influences were not directly considered in this study, for example: (1) long term changes in the visual character of the landscape; (2) alteration of wildlife habitat which will influence hunting and wildlife viewing opportunities for many years; and (3) changes in recreation opportunities that result from the extension of timber salvage roads into previously unroaded country. These influences, though less obvious to recreationists, may be quite significant and provide subjects for further investigation.

II. AREA OF INFESTATION AND CHRONOLOGY OF THE OUTBREAK

Description of the Area of Infestation

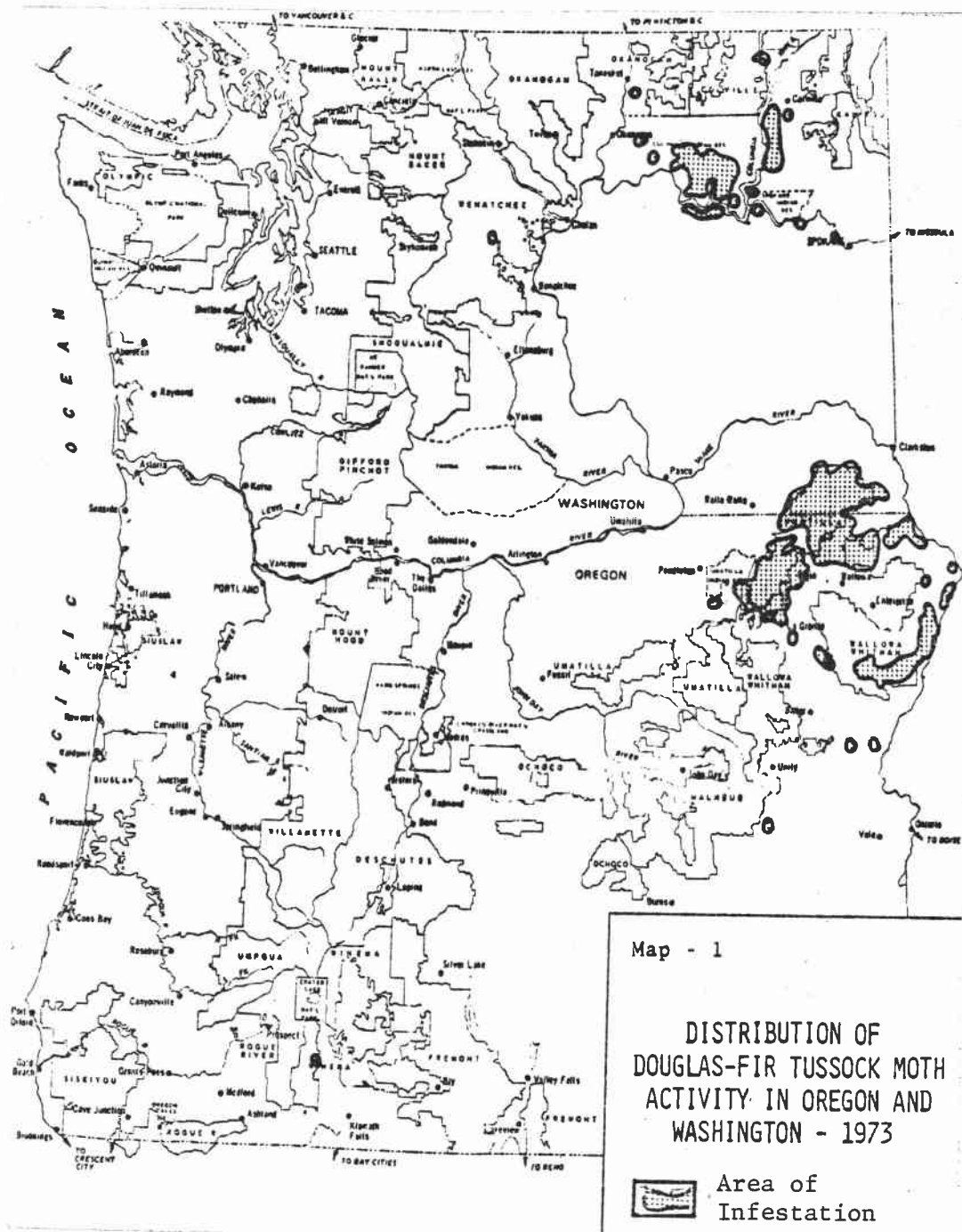
The five million acre (two million hectares) Blue Mountain Physiographic Province is made up of several mountain ranges separated by faulted valleys and basins. The mountainous area includes the Ochoco, Blue and Wallowa Mountains, as well as the Strawberry, Greenhorn and Elkhorn ranges. (Baldwin, 1964)

Of particular interest to this study are the northern and central portions including Blue, Wallowa and Elkhorn Ranges around La Grande, Pendleton, and Baker, Oregon. The following map shows the distribution of Douglas-fir tussock moth activity in Oregon and Washington in 1973. (See map 1)

The city of La Grande is the largest and closest community to the tussock moth problem area. Pendleton, Oregon and Walla Walla, Washington are also close but are not located in a forested environment.

History of the Douglas-Fir Tussock Moth in Blue Mountains

"The Douglas-fir tussock moth (Orygia pseudotsuga McConnough) is one of the most destructive defoliators of the true firs and Douglas-fir in western North America. Outbreaks of Douglas-fir tussock moth appear to develop almost explosively, and after about 3 - 4 years they usually subside because of virus, parasitism, and/or predator attacks on the insect population."



Source: Environmental Impact Statement - Cooperative Douglas-fir Tussock Moth Pest Management Plan, Idaho, Oregon, Washington.

The developing tussock moth larvae eat the needlelike foliage. "Heavy repeated attacks can kill the tops or the complete tree depending upon the extent of defoliation. Past outbreaks have caused serious damage to stands of Douglas-fir, white fir, and grand fir, killing as much as 100 percent of the stand in some cases." (Graham, 1975)

Chronology of Douglas-fir Outbreak

Chronological sequences of the tussock moth outbreak in the Blue Mountains are best described by Graham (1975).

1970-1971

"In 1970, the Douglas-fir tussock moth went through an insect release phase in several areas" in the Pacific Northwest, developing to epidemic proportion in some areas in July 1971. "Sub-epidemic populations of tussock moth were discovered on defoliator monitoring plots during 1971 on the Umatilla and Wallowa-Whitman National Forests in Oregon."

1972

"... The tussock moth population in the Blue Mountains in Washington and Oregon literally exploded during late June and caused visible defoliation on about 197,000 acres" (79,500 hectares). (See Maps 1 and 2) "About 15,000 acres (6,000 hectares) were heavily damaged near La Grande, Oregon and Walla Walla, Washington."

1973

"The tussock moth caused defoliation on some 800,000 acres (323,000 hectares) of fir timber type in the States of Idaho, Oregon and Washington." (See Map 2) Of the total defoliated, "about 88,000 acres (35,500 hectares) were seriously damaged with large numbers of trees killed, 292,000 acres (118,000 hectares) moderately damaged with scattered tree mortality and top kill, and 420,000 acres (170,000 hectares) lightly damaged with scattered top kill." (Graham, 1975)

Control of the Douglas-fir Tussock Moth

In 1972, a three state cooperative control program evaluated the Douglas-fir tussock moth outbreak and predicted that the problem was "likely to increase within the areas partially defoliated in 1972 and cause additional damage in 1973."

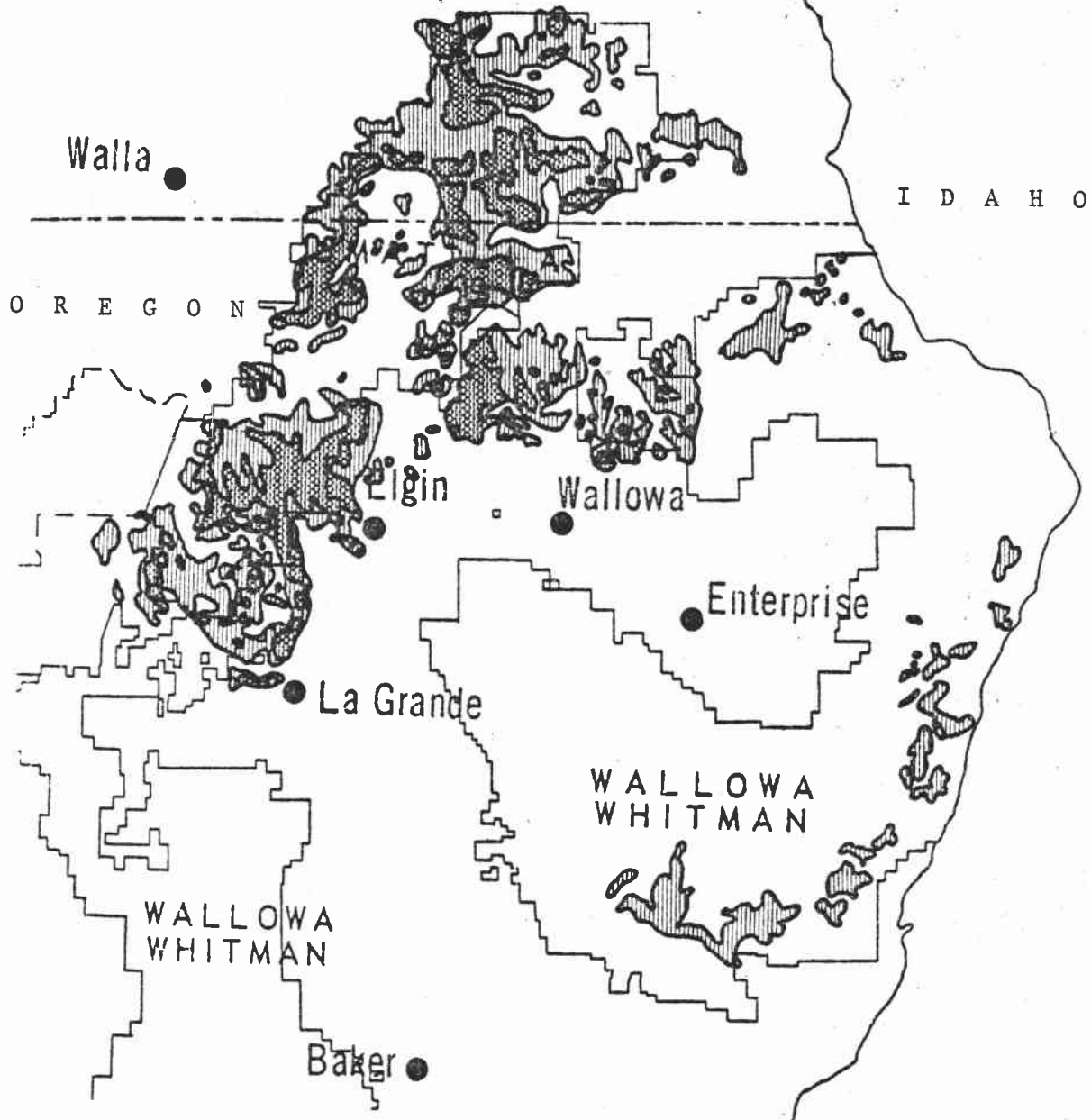
The report indicated that DDT had been successful in controlling the tussock moth insect population since 1947 and was the only insecticide available for adequate control. However, the Environmental Protection Agency (EPA) stopped the use of DDT in 1971, except under certain circumstances. The Administrator (EPA) may permit the use of DDT if it is determined that an emergency condition occurs.

DISTRIBUTION OF
DOUGLAS-FIR TUSsock MOTH
IN THE BLUE MOUNTAIN AREA OF
OREGON AND WASHINGTON

VISIBLE DEFOLIATION 1972 

VISIBLE DEFOLIATION 1973 

W A S H I N G T O N



Source: Environmental Impact Statement - Cooperative Douglas-fir Tussock Moth Pest Management Plan, Idaho, Oregon, Washington.

Map 2



Umatilla Road Sites #44
Umatilla Sites #18, 19
Umatilla Sites #11, 12, 13, 14

Emigrant Spring S.P. Site #31

Alternate Site #51, 52

Alternate Site #71, 72

Alternate Sites #61-63

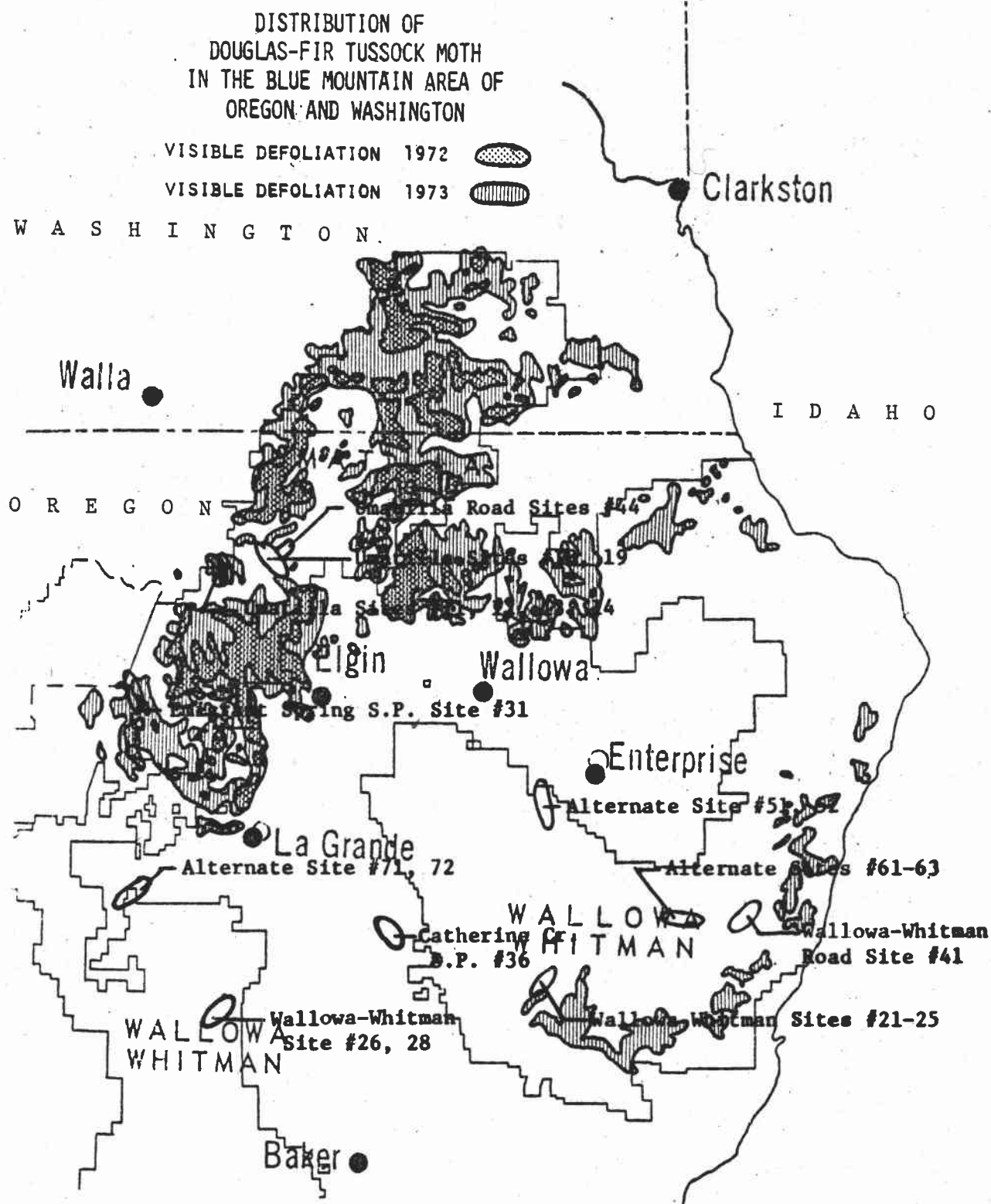
Catherine Cr.
S.P. #36

Wallowa-Whitman
Road Site #41

Wallowa-Whitman
Site #26, 28

Wallowa Whitman Sites #21-25

Interview Cluster Sites



Interview Cluster Sites

Source: Environmental Impact Statement - Cooperative Douglas-fir Tussock Moth Pest Management Plan, Idaho, Oregon, Washington.

Map 2

As a result, the Northwest Pest Action Council and the States of Washington, Idaho, and Oregon organized to develop a program to reduce the population in order to prevent future losses. These efforts led to the draft Environmental Impact Statement in support of DDT application which was submitted by the United States Forest Service with the support and assistance of the three states' Northwest Forest Pest Council and others.

The EPA granted the Forest Service emergency use of the DDT and in the early summer of 1973, 420,944 acres (170,354 hectares) were sprayed with 0.75 pounds of DDT per acre. The spray project started in mid-June and was completed by July 2.

Graham's report said the results "leave little doubt" that DDT was effective in decreasing the insect population to acceptable levels, as well as preventing additional damage to forest vegetation."

(Graham, 1975)

Timber Management - Salvage and Related Events

In order to salvage dead and weakened trees, roads must be built to provide access from the salvage area to market. George and Rettman reported that, as of March, 1976, a total of 320 miles of road had been built or reconstructed on the Umatilla and Wallowa-Whitman National Forests in order to salvage 56,000 (22,750 hectares) of timber.

Table 1

Salvage Logging and Road Related Activities
as of March 1976

	<u>Umatilla</u> ^{1/}	<u>Wallowa-Whitman</u> ^{2/}	<u>Total</u>
Roads (miles)			
New construction	68.6	46.1	114.7
Reconstruction	149.4	56.7	206.1
Timber Sale (acres)			
Net cut area	48,675	7,709	56,384

1/ Gordon George, Umatilla National Forest

2/ Dale Rettman, Wallowa-Whitman National Forest

III. REVIEW OF LITERATURE

Natural Events and Non-Normal Situations

Any human impact associated with a natural phenomena must be related to both the environment and man. It is a "joint product" both heavily dependent on man and the natural environment. Russell (1970) stresses that the measurement of change in the environment from a flood or an insect outbreak by itself is an insufficient indicator of the total impact. Without also considering the social values and social adjustments, the results may be misleading and erroneous. A natural event attains significance only when it requires human adjustment. Does a tree falling in a forest make a noise if no one is there to hear it fall? Does the tussock moth create a "problem" if people are not in some way required to make an adjustment? "Studies which ignore the role of human adjustment are at best very limited in usefulness and at worst may be seriously misleading guides to public expenditure."

Russell also observes that normal events are constantly taking place at different rates over different time periods. Nature is dynamic and ever changing. Few landscapes remain the same. Some changes are hardly noticeable due to the slow process in which they evolve. Other events become classified as "hazards, disasters or catastrophies." These are the significant changes. Why do these differ from the slower, more acceptable natural events? Russell summarized the difference between the two -- that the more significant tend to be extreme events found at extreme ends of probability distribution. When does a natural

event constitute a major change or adjustment? Presently, nothing is available to define or indicate that point in the curve that differentiates the level of severity. When a landscape has been identified as having occurrences that fall toward the extreme tails of distribution for natural events, human adjustments will probably be necessary.

Insect outbreaks and the losses from the natural event should reflect the consequences for human adjustment. The concern here is with adjustments in recreation patterns and activities in the Blue Mountains.

Attitude of People Toward Natural Events

Some researchers have found that people living in areas where the larger, less frequent natural events occur tend to adopt one of several views (Kates, 1962). Some accept the notion that the phenomenon is a recurring, repetitive event. Others feel that there is no need to worry about an event until just before the recurrence is due. A naive law-of-averages approach claims that the occurrence of an event in year t reduced the probability of experiencing one in year $t + 1$. After an abnormal event takes place, people feel relatively safe. Still another philosophy is to "wish away" the event even by "renaming it or lowering its amplitude to commonplace." "A flood becomes a spring freshet or just high water. The Douglas-fir tussock moth outbreak could, for example, be labeled a large spring hatch." Others try not to think about the event at all "by invoking a higher power - in particular by referring to God's will" (Russell, 1970).

Cause of Recreational Effects

Forest recreationists can be affected by insects in two ways: By annoyance and by damage to vegetation in and around recreation use areas (Addy, 1971). The two can be defined into the following stages.

Primary and Secondary Stages of Insect Infestation

The impact of an insect infestation and defoliation on recreationists can be divided into primary and secondary stages. The primary stage includes the time period when the outdoor recreationist may have direct personal contact with the insect. The secondary stage includes the period when damage caused by the insect outbreak can be observed. This includes the observation of the sable brown color of the dead and dying vegetation, and any subsequent man-made activities resulting from the insect outbreak such as road building or salvage logging.

Primary Stage Insect Effects

Some annoyances might be by insect bites or contamination of food, or shelter or other personally offensive means. Some insects transmit disease if the right conditions exist (Addy, 1971).

Secondary Stage Insect Effects

Insects can also affect outdoor recreationists by decreasing visual quality of a landscape as well as damaging forest vegetation and changing the ecological composition of a plant community. Changes in the bird

population will change the patterns of those watching (Addy, 1971). Game herds may seek newly created openings which may change herd size, resulting in hunter pattern changes.

Other secondary stage activities affecting recreationists may be stimulated by insects. Insect damaged areas that have not been roaded in the past changed recreation use patterns in two ways. Those that sought more remote hunting are now displaced. Those that did not have access before now have new areas available. Visitors may have also encountered trucks and other heavy equipment involved in control activities, logging road construction, or timber salvage operations. Dust and noise could have caused irritation and traffic creating physical hazards.

Direct and Indirect Awareness

Direct awareness is defined as the awareness of visitors who personally observed and experienced either the primary or secondary stages of the infestation or both.

Indirect awareness refers to the awareness of the recreation visitor who gained knowledge and awareness through secondhand information sources such as from reading or hearing about the infestation and defoliation, but did not have a direct experience with the insect infestation. Mass media and hearsay effects are two important methods in conveying indirect awareness.

Mass Media Effects

The ability of the news media to bring the effects of natural occurrences into every home and to vast numbers of people has created a background climate of awareness and concern about possible local events (Russell, 1970).

Newspaper, radio and television coverage of the tussock moth control project was extensive. Considerable nation-wide publicity was received in Time, National Wildlife and Conservation, and National Geographic. An Information and Education Coordinator was assigned to Oregon and Washington project headquarters and to each large control unit. Daily status reports were provided to news media during spraying operations.

For example, organized "Show-Me Trips" of the spraying on three areas, including the Halfway Unit in Oregon, were conducted for news media people and other interested groups (Graham, 1975).

Local and regional stories covered the many details of the infestation. Films, meetings, personal interviews and local talk shows touched many people.

Over 2700 individual input or signatures were recorded in response to the Environmental Impact Statement written in support of the DDT spray program (Kelley and Rompa, 1973).

Hearsay (Word-of-Mouth) Effects

News of the insect problem may have spread by word-of-mouth. It made little difference whether people had visited the area or just heard about it from others. This means of gaining information could be an

important element in the awareness and perception of the visitors to the areas.

Behavior and attitude changes could have influenced the amount and type of visitors as well as their use patterns. People could have changed activities, their length of stay, stayed away or stopped coming altogether just from having heard a casual conversation with a neighbor over the back fence or a coworker during a coffee break.

Evaluating Recreational Effects

Evaluating the recreation effects of insect infestation may take many forms including an analysis of direct impacts on the resource, visitor perceptions and the satisfaction of recreationists who visit affected areas.

Recreational Values

The impact of Douglas-fir tussock moth defoliation on recreation values was the subject of a research paper on a three-acre, eight-unit campground at Stowe Reservoir in the Warner Mountains, Modoc National Forest (Wickman, 1975).

The Stowe outbreak, which occurred in 1965, offered a unique opportunity to evaluate direct damage to trees on a recreation site after an insect infestation. Unfortunately, no evaluation was made of the effects on the users of the facilities in that study. The report does mention, however, that the tussock moths were first detected as a result

of complaints from campers. "Larvae and their fecal pellets fell on picnic tables, cars and tents, causing annoyance to the visitors. There were also reports that the garbage collectors suffered skin irritation from contacting the poisonous hairs of the caterpillar" (Wickham, 1975).

Visual Perception

Studies directed at measuring perceptual qualities of natural and managed landscapes have increased in number the last few years. Of necessity, much of the work has focused on developing methodologies and identifying how psychological principles of perception relate to visitors' preferences for different landscape characteristics (Lucas, 1964; Shafer, 1969; Craik, 1969)

Recreation carrying capacity studies have also addressed problems of perception of the natural resource and understanding how physical features of the recreation environment can influence the quality of recreation experiences (Stankey, 1973).

Recreation Satisfaction

The complexity of the satisfactions derived from outdoor recreation experience is clearly evident in studies of hunters (Potter, 1973).

Studies such as these illustrate the complexity of the relationship between characteristics of the recreationist and the quality of experience offered. Concepts developed from these investigations are helpful

in the examination of impacts that may have resulted from the tussock moth outbreak.

We must focus on the relationship between the recreationists' perception of change, his adjustment to it, and the prevailing social views of the resulting impacts.

The degree of annoyance and the resulting behavioral change are difficult to quantify without direct contact with forest recreationists.

In 1960, La Page started to work on a study to find methods of answering some of the questions in the broad field of forest recreation.

"The basic proposition of the study was that public opinion, or more precisely, user preference and satisfaction surveys, can be useful tools for decision-making in forest recreation resource management. Ideally, such reference and satisfaction surveys should accompany the more conventional tools of the recreation planner, such as landscape architecture and engineering." (La Page, 1960)

Today, we might add the Environmental Assessment and Environmental Impact Statement to the group of conventional tools.

La Page (1960) went on to note that "Individual satisfaction and frustrations become more important when they are used in contributing to average group satisfaction." It is highly possible that carefully designed social surveys of forest visitors could be conducted "for the purpose of assaying their motivations, preferences, satisfactions and frustrations." Several research studies implemented this approach

including the Quetico-Superior Wilderness, Maine State Park Commission, 1959; Tares, 1960; Hutchins and Trecker, 1961; and La Page, 1960 as cited in La Page (1960).

Recreation Priorities

Insects of North Central forests were rated and ranked in descending order of their scores for research priority considering timber, wildlife, and water values, as well as recreation. As a result, a hierarchy was established. If the effects on timber were greater than on recreation or the other two, the cumulative score balanced out, giving a priority for research based on the four resource values rather than on any one resource value. The maple bud miner had the highest effect on timber but recreation effects rated low. This was similar to the pine tussock moth but not as great (Addy, 1971).

It is an interesting approach but this investigator could not find any correlation to this study without investigating other insect problems in the northwest for comparison.

IV. METHODOLOGY

Rationale of the Study Design

The primary stage of infestation and climaxing of insect population, and resulting defoliation, control spraying, and news coverage had already occurred prior to the start of this study. This created the problem of investigating the primary and earlier secondary stage effects two to three years after the fact. Contacting recreationists who visited these areas at the peak of infestation is extremely difficult and in some cases nearly impossible. As a result, in planning the study, it was necessary to consider the population of potential recreationists who knew of the Blue Mountains as falling into two groups: (1) the potential recreationists who avoided affected or sprayed areas from 1972 to 1974 and continued to avoid these areas in 1975, and (2) recreationists who knew of the moth but visited anyway.

Non-Visitors or Potential Visitors

The non-visitor and the non-returning visitor population is the most difficult to study. Except for one category of recreationist, elk hunters, there appeared to be no source, list, or information available to help the research team in contacting these individuals.

One approach considered randomly selecting and contacting people from throughout Oregon to find out if they had planned to visit the Blue Mountains in recent years, but had changed their plans. If so, it would then be necessary to ascertain if the reason for not visiting was

connected in any way with the insect problem (specifically the tussock moth). This approach and the sampling of this population is recognized as being important but difficult and costly to measure.

The only contact with this category of recreationist came from a telephone survey of people who hunted elk in the area in 1971, 1972 and 1973. Lists of names for each year were provided by the Oregon Wildlife Commission and a short survey was conducted with a random sample of people taken from the three lists.

On-Site Visitors

Contacting those interviewing who actually visited the area prior to or during the infestation can also be difficult. Interviewing those who visited the area after the outbreak is obviously the most direct and poses the least amount of problems.

One major concern is the problem of inaccurate recall, which could cause some bias to this approach. We assumed that recall bias would not be significant. Most questions were general in nature and did not require a high degree of technical detail. By asking recreationists in the on-site survey if they visited the site prior to or during the outbreak, their response was helpful in describing changes and problems during those periods.

Basic Approach of Study

The approach to this study was to personally contact recreationists visiting the study area in August, October and November, 1975, to

determine if a significant number of them were aware of the tussock moth, what their attitude may have been toward the tussock moth, and what behavioral changes may have resulted.

Two approaches were investigated in this survey. The first was an on-site survey in 1975 that would contact the return visitor or those visiting for the first time. The second approach was a telephone survey to contact hunters that applied and received a special hunting permit to hunt in the Blue Mountain area during 1971, 1972 and 1973.

The assumption upon which this approach was based was that, if the tussock moth had affected recreationists, the effects should be detectable even though the most immediate and direct influences occurred in 1972-1974. We were seeking data that would enable us to conclude something about the nature of the people's responses to the insect outbreak and to estimate the relative magnitude of the effects.

Design of the Questionnaires

Three different on-site personal surveys and a telephone survey were selected for this study to gather information necessary to meet the study objectives. The individually administered interview type questionnaire began with gathering the respondents' general knowledge of any changes noticed in the Blue Mountains followed by specific questions dealing directly with their awareness of the Douglas-fir tussock moth and its effect on their recreation behavior. This sequence of questioning was done so as to not reveal the nature of the survey and bias the results.

The questionnaires were prepared with the assistance of Dr. Arnold Holden, Department of Sociology, Oregon State University, after consultation on the problem, purpose, and objectives of the study.

Survey Design

The primary target populations included road and campground visitors during (1) the August summer season, (2) the October mule deer season, and (3) the November Rocky Mountain elk season.

Winter and spring season visitors were not included in this study. The spring visitors picking mushrooms are the subject of another study being conducted by Ralph Lewis, Assistant Professor of Geography, Eastern Oregon State College, La Grande, Oregon.

According to Forest Service Recreation Information (RIM), the heaviest summer recreation use occurs in the mid-summer months. Field investigation began in August, after the questionnaire had been developed and pre-tested.

The survey sampling period avoided the major holidays; 4th of July and Labor Day weekends. These weekends were expected to be exceptionally busy and the use patterns may not have been typical of the normal summer period. Deer bow hunting season also was included in the survey starting on August 23.

The Oregon State Wildlife Commission set dates for the deer season from October 4 to October 10, and elk season from November 1 to November 19, 1975. The survey period was selected within both dates. Appendix A lists relevant hunting dates set for 1975.

The telephone survey was delayed until after the 1975 deer and elk season and Christmas and New Year holidays. This was done to include the recent hunting season comments and to avoid holiday season conflicts and absenteeism.

Field Work

Interviewers

During the study, six interviewers helped with the survey. Two interviewers with alternates for each survey were trained and given instructions by the principal investigator according to methods outlined in the Michigan Research Center Handbook. Copies of the Handbook (except for Chapter one) were given to each interviewer for field reference. Vehicles from Oregon State University Vehicle Pool were used bearing the State Seal and Oregon State University on the doors. The interviewers had Forest Service radios during the elk hunting survey for their safety and to assist hunters if an emergency occurred. A safety vest was worn during the road interviews. Two of the previously trained interviewers conducted the telephone survey using telephones located in Corvallis.

Interviews

The on-site interviews were taken on randomly selected weekdays and weekend days between 0930 to as late as 1930. The telephone survey interviews were completed prior to 2100 hours.

Appendix B indicates the dates, day and number of interviews completed. Table 2 on page 29 the total number of people contacted during each of the four surveys.

On-Site Survey

The survey was to contact as many visitors as possible at areas selected during the survey period. On days of extremely low use, the interviewer, if close to other campground interview clusters, included them as well. This occurred on several days on the Umatilla National Forest.

At the largest site, Emigrant Springs, the interviewers were trained to use a random selection process. The process was to select a motor vehicle at some distance. The interviewers were instructed to start at the campsite that corresponded with the last two numbers on the license plate and interview systematically every other campground unit. There was never a need to use this random start method because the campground was only partially filled when interviews started in the mornings.

For the on-site surveys, sampling dates were stratified proportionally to include week days and weekends at each interview site and to avoid consecutive interview dates as much as possible.

Recreation sites were clustered by location, then identified as to whether they were (1) within infested tussock moth areas, or (2) out of infested areas. Appendix C shows all cluster area roads and sites considered and priorities for use in the on-site survey.

The road interview sites were signed for both traffic directions. Signs stated "Stop, Survey Ahead, OSU School of Forestry." Two interviewers worked together on road survey days in order to handle the heavier traffic volume. This also added a greater element of security for the potential women interviewers. Only on a few occasions did traffic back up to the point that vehicles were waived on. Several vehicles failed to stop and drove through without stopping. Detailed sampling design criteria for the on-site survey is included in Appendix D.

Telephone Survey

For the telephone survey, three special elk tag permit holder lists were obtained from the Oregon Wildlife Commission, Portland, Oregon; one each for 1971, 1972, and 1973. Names were stratified as to home origin; local, eastern Oregon, western Oregon. Initially, a target sample of 50 interviews from each of the three areas was considered to be adequate. A problem developed due to the low number contacted from the local area. Many had moved or could not be contacted. Therefore, this local sample strata was highly dependent on the number of contacts made.

After conferring with Dr. Faulkenberry, at the Oregon State Research Center, it was felt that any additional interviews from the eastern Oregon or western Oregon areas would not increase the precision for area comparative purposes. (See Table 17 in Results)

Data Analysis

Each interview was recorded on a separate questionnaire. The questionnaires were later coded according to the survey codebook (Appendix E). The codes were then transferred to an optical scan mark-sense sheet and later keypunched onto IBM cards. Data was cleaned for both possible-punch and contingency type errors. (Babbie, 1973)

All four surveys were processed in the above manner. Each survey was analyzed separately. Due to the similarity of the three on-site surveys, the data from these three surveys were also run together for a total result.

Statistical Package for the Social Science (SPSS) Standard Computer Program (Version 6.0) was used to analyze the data. General Statistical frequencies and cross-tabulation programs were run to answer the study objectives (Nie et al, 1975). The next chapter presents the results of this analysis.

V. RESULTS

The results are presented in three sections: (1) On-Site Survey, (2) Special Elk Tag Telephone Survey, and (3) Summary of the On-Site and Telephone Survey.

On-Site Survey

The on-site survey describes a) the survey sites, b) characteristics of the visitors interviewed, c) their awareness, depending on whether they were repeat visitors or first-time visitors; and d) the effects of the Douglas-fir tussock moth on their behavior and attitude.

A total of 12 recreation area clusters were included in the on-site survey. (See Appendix D) A total of 780 people were interviewed on 32 sampling days. About half (49 percent) of the respondents were interviewed at the road survey points in the National Forests. Fifteen percent were interviewed in State Parks, and the remaining 36 percent contacted in Forest Service recreation sites.

The three on-site surveys were conducted between August 1 - 28, October 1 - 9, and November 1 - 11.

Fifty-three percent of the respondents were interviewed during the August general recreation season, 21 percent in October during deer season, and the remaining 26 percent in November during elk season.

Table 2

Summary of the Number of parties Interviewed

August Survey			412	(53%)
National Forest Road Sites	157	(38%)		
Umatilla National Forest	75	(18%)		
Wallowa-Whitman National Forest	61	(15)		
State Parks	119	(29%)		
		(100%)		
October Survey			162	(21%)
National Forest Road Sites	133	(82%)		
Umatilla National Forest	18	(11%)		
Wallowa-Whitman National Forest	8	(5%)		
Dispersed Recreation Sites	3	(2%)		
		(100%)		
November Survey			206	(26%)
National Forest Road Sites	94	(46%)		
Umatilla National Forest	13	(6%)		
Wallowa-Whitman National Forest	16	(8%)		
Other Alternate Sites	34	(16%)		
Dispersed Recreation Sites	49	(24%)		
		(100%)	780	(100%)

Of the total 780 on-site interviews, 40 percent were completed on weekdays and the remaining on weekends. Most interviews occurred on Sunday (37 percent), and fewest on Monday and Friday (3 percent each). Weekday survey days equalled weekend days during the August survey but due to the shorter October and November survey periods, 4 additional weekdays were included during those months.

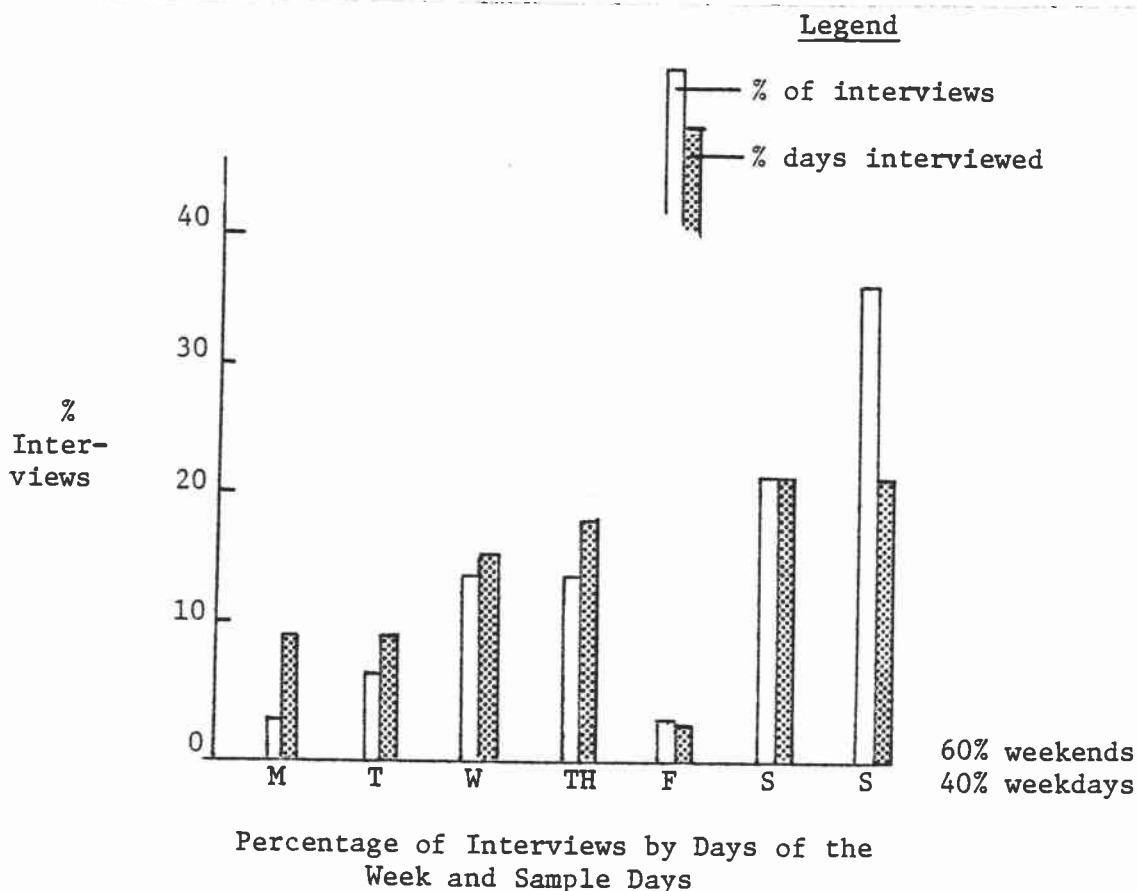


Figure 1

Figure 1 shows the percentage of days of a week for interviews and the percent of parties contacted on each day of the on-site survey. The lower proportion of interviews to interview days from Monday - Thursday is very noticeable due to the low weekday use.

The weather on interview days varied from warm August days to cool days in October and November. Thirty-four percent of interviews were administered on warm clear days. Many local recreationists came from the hot open areas to the cool forest sites during the August survey to escape the heat.

On-Site Survey Results

The following on-site survey results are divided into three parts: characteristics of respondents, their awareness of Douglas-fir tussock moth changes, and their attitude and behavior toward them. The on-site questionnaire and codebook are included in Appendix E.

Characteristics of Respondent

One individual from each of the 780 parties was interviewed. Eighty-two percent indicated they had been to the site before. The remaining 18 percent were visiting for the first time. Of those returning to the site, 37 percent indicated that they visited prior to the 1972 outbreak. Sixty-one percent visited between 1972 and 1974.

As shown in Table 3, most of the respondents had previously been to the area where they were interviewed and had visited other parts of the Blue Mountains.

Table 3

Respondents' Familiarity With the Area

First Time Visitors	18%
Repeat Visitors	82
	<u>100%</u>

Visits to Other Areas of the Blue Mountains

Had Not Visited Other Areas	18%
Visited 1-2 Other Areas	41
Visited 3-5 Other Areas	13
Visited More than 5 Other Areas	28
	<u>100%</u>

The parties surveyed varied from 1 to over 8 members and averaged 3.8 people per party (Figure 2). Forty-one percent of the parties included children. Most of the larger party groups were encountered during elk hunting season, although those visiting friends and relatives (mostly during the August survey) were also in the larger parties.

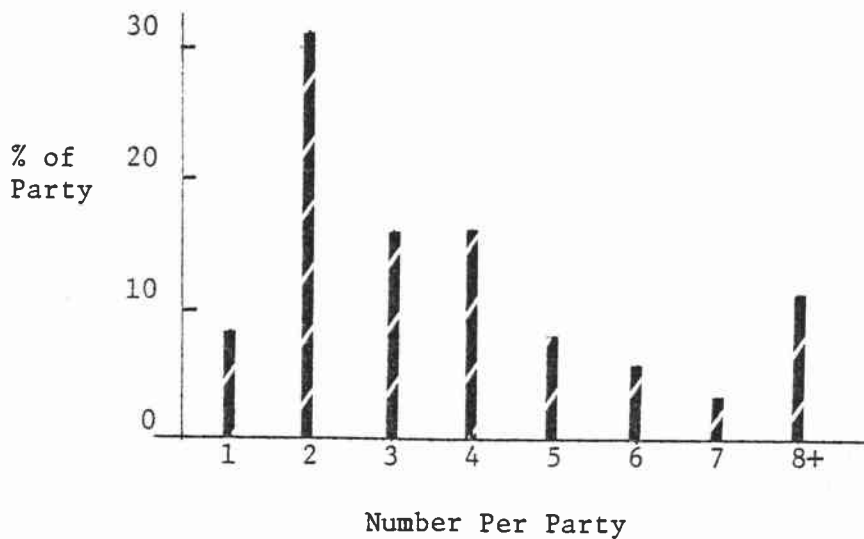


Figure 2 - Size of Party

Sixty-nine percent of the parties drove at least 1 sedan, station wagon, carryall or pickup without camper; 17 percent had a camp trailer; 16 percent pickup with camper; and 3 percent a motor home. Other vehicles included log trucks, stock trucks, vans, or buses. Some parties had more than one primary vehicle.

Many parties had a recreational vehicle. Three percent of the parties had at least one motorcycle; 1 percent a bicycle; and 4 percent an off-road vehicle which could have varied from a jeep to a snowmobile.

Figure 3 shows the party composition of those interviewed. Thirty-seven percent were individual families with children or multiple families with children, 30 percent responding were in groups that included teenagers, young adults and adults. Only 8 percent of the people were alone, of which one-third were involved in work-related activities.

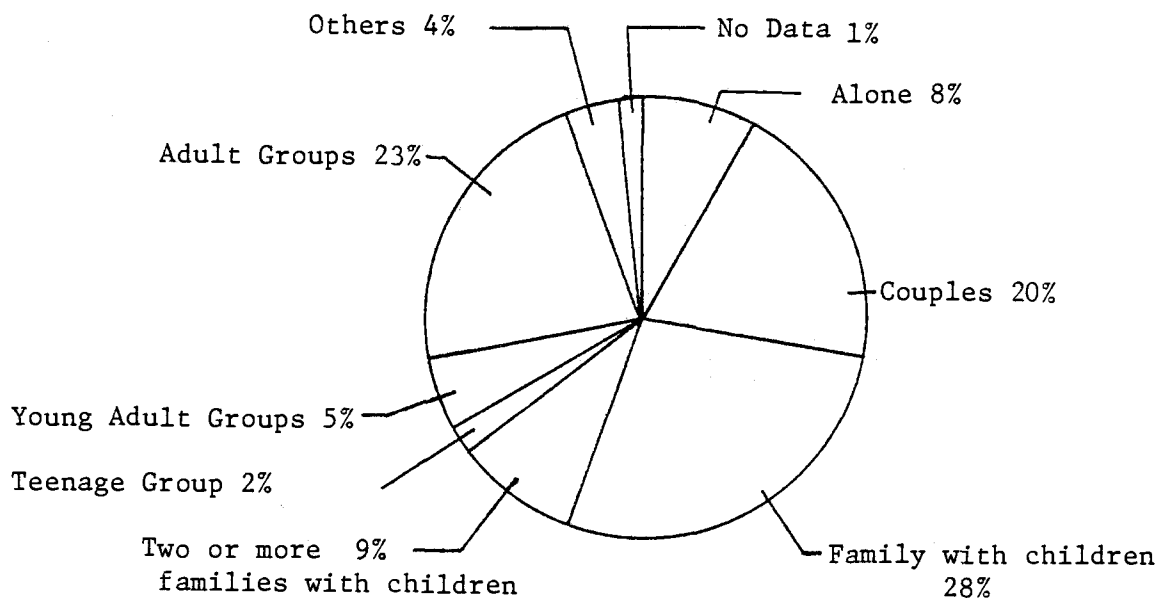


Figure 3 - Party Composition

Almost half of the people interviewed were estimated to be in the 30-50 year group (47 percent). Both the 20-30 and 50-60 year group had 20 percent representation. Nine percent were 60 and over, and 3 percent were 15-19 years old. (See Figure 4)

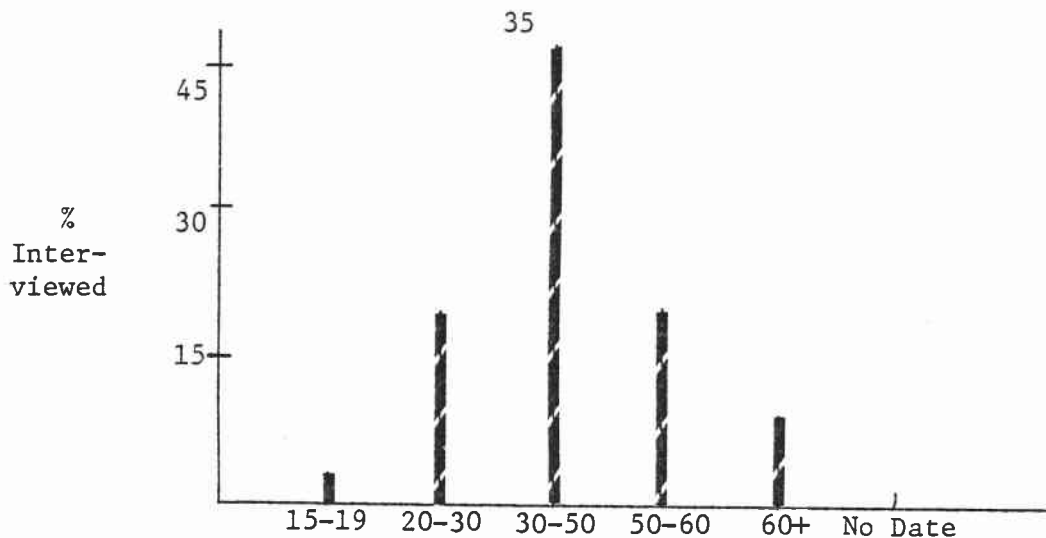


Figure 4 - Age of Respondent

Over half (54 percent) of the parties interviewed were from the local area. The local area consisted of the counties in which the Umatilla and Wallowa-Whitman National Forests are located and nearby Idaho locations. (Figure 5) A home origin list and map are included in Appendix F. Only 14 percent of the outdoor recreationists were from outside Oregon. State parks and road surveys accounted for 95 percent of the total out-of-state respondents. Only 5 percent of the out-of-state visitors were interviewed in Forest Service campgrounds.

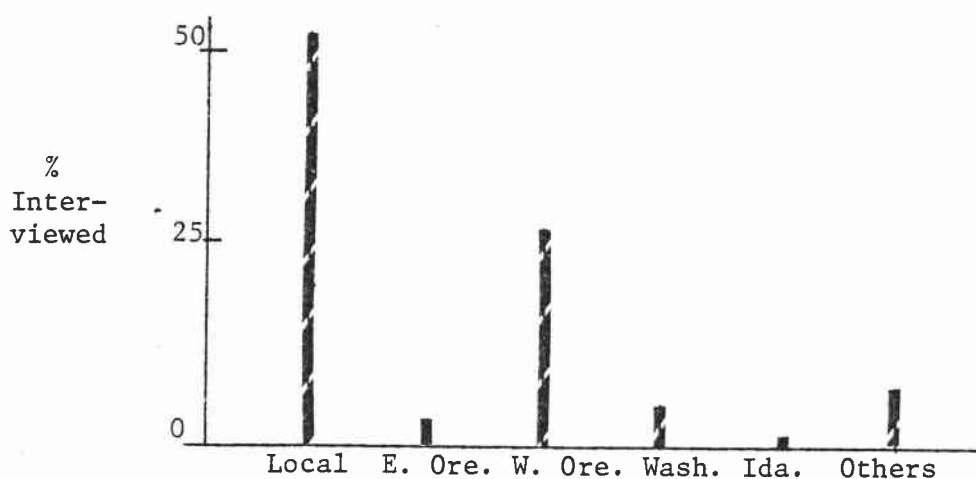


Figure 5 - Home Origin of Recreationists Interviewed (Percent)

The general recreation activity category consists of activities that are done in and around camp. This was the most frequent response of 47 percent of the people. (See Appendix G for activities included in activity groups.)

Two of the three on-site survey sampling periods were selected to coincide with the regular deer and elk seasons in the Blue Mountains. Consequently, 39 percent mentioned hunting as one of the activities included on the trip. Fishing, hiking, traveling, gathering forest products and active sports were also popular. Complete definitions of the activity categories are in Appendix G.

Table 4 illustrates the percent of respondents who engaged in each recreation activity category during the three different on-site survey periods. General recreation and fishing were popular in the summer August survey. Many of those interviewed indicated more than one activity; therefore, the sum total of activities exceeds 100%.

Table 4

Recreation Activities by Season*

Recreation Activity Category	All Respondents N = 780	Aug. Summer Season N = 412	Oct. Deer Season N = 162	Nov. Elk Season N = 206
Friends	4%	6%	2%	2%
General	47	54	26	48
Travel	16	23	9	6
Fish	19	31	9	3
Hunt	39	3	62	93
Gather	13	16	18	4
Hike & sports	28	38	7	23
Others	10	7	11	14

*Respondents engaged in more than one activity; therefore, the columns total more than 100%.

When asked the main purpose of the trip, 39 percent stated hunting and 25 percent general recreation as the primary activity. (Figure 6)

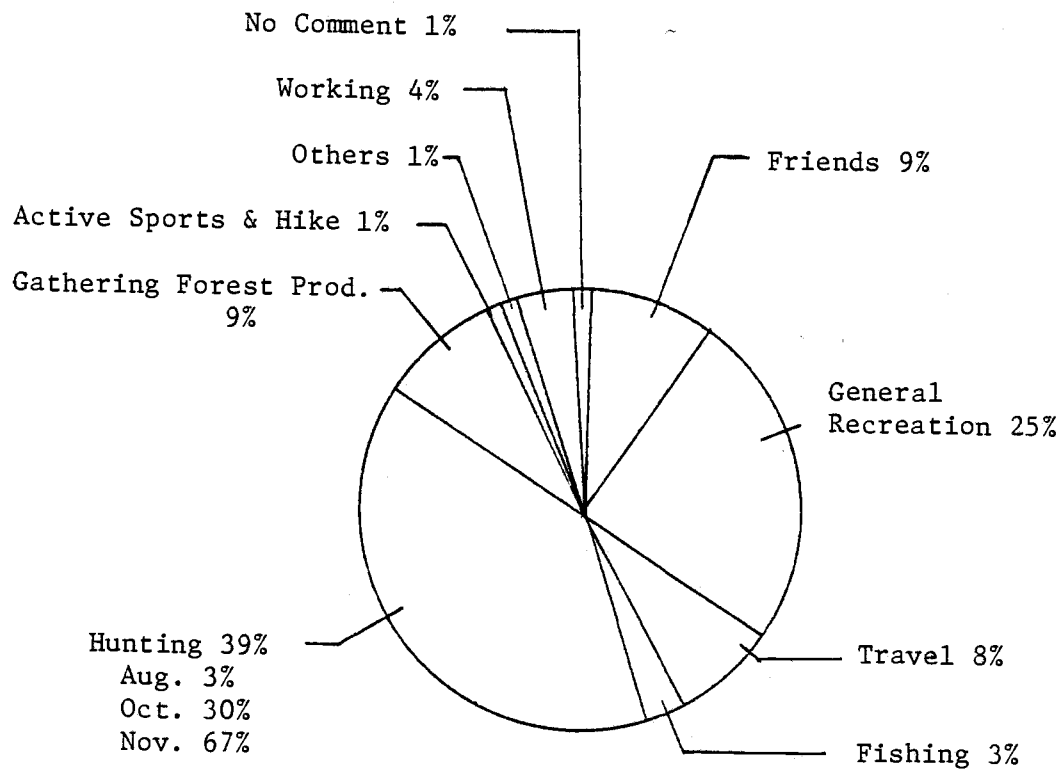


Figure 6 - Main Purpose of Trip

Forty-two percent said that they were camping some time during their visit to the Blue Mountains.

Table 5

Camping by Season

	All Respondents (N = 780)	August Summer Season (N = 412)	October Deer Season (N = 162)	November Elk Season (N = 206)
Did not camp	58%	63%	81%	32%
Camped	<u>42</u> 100%	<u>37</u> 100%	<u>19</u> 100%	<u>68</u> 100%
<u>Campers Only</u>	<u>(N = 324)</u>	<u>(N = 153)</u>	<u>(N = 31)</u>	<u>(N = 140)</u>
Camped 1 night	14	27	0	3
Camped 2-4 nights	42	56	45	26
Camped 5-7 nights	22	9	42	32
Camped more than a week	<u>22</u> 100%	<u>8</u> 100%	<u>13</u> 100%	<u>39</u> 100%

Of the 324 people who camped, 56 percent camped 4 days or less and 22 percent stayed 8 days or longer. There was a significant difference, however, between the August and November campers. Of the August campers, 83 percent stayed 4 days or less, and only 8 percent stayed 8 days or longer. In contrast, only 29 percent of the November campers stayed 4 days or less, while 39 percent stayed 8 days or longer.

As shown in Table 6, a higher proportion of hunters camped and had significantly longer lengths of stay than all others. The length of stay of the fishermen, people visiting friends, and general recreationists are similar; they are more transient with shorter visits.

The day use pattern of those gathering forest products differs significantly from other activity categories. One hundred percent of the gatherers did not camp.

Table 6
Number of Camping Nights by Main Purpose of Visit

Recreation Activity Category	N=729	% Not Camped	Transient 1	Short 2-4	One Week 5-7	Long 8+
		Percent				
Friend	70	54	14	32	-	-
General	197	54	12	26	4	4
Travel	59	88	4	8	-	-
Fish	26	69	12	11	4	4
Hunt	301	42	2	16	20	20
Gather	69	100	-	-	-	-
Others	7	57	14	14	-	14

Gathering forest products such as firewood, pine cones, or vegetation is primarily a local activity. (Table 7)

A high proportion of hunters came from outside the local area; 81 percent of the hunters came from outside of the local area during elk season, while all of the deer hunters interviewed were local residents.

Table 7

Home Location by Main Purpose of Visit

	N	Local %	Other Oregon %	Wash. %	Others %	Total %
Friends	70	63	9	7	21	100
General	197	63	20	10	8	100
Travel	59	69	10	10	11	100
Fish	26	69	19	0	12	100
Hunt	301	33	62	1	4	100
Gather	69	91	0	9	0	100
Others	7	57	43	0	0	100

Table 8 shows the percent of activities recreationists engaged in by home location.

Table 8

Main Purpose of Visit by Home Location

Home Location	N=780	Friend	General	Travel	Hunt	Gather	Other	Total
Local	425	11	29%	9%	23%	15%	13%	100%
Other Oregon	251	2	16	2	75	0	5	100
Washington	42	12	45	14	5	14	10	100
Other areas	62	24	24	11	21	0	20	100

780

A significantly higher proportion of people surveyed from other Oregon locations were hunting compared with those from other home locations. This is due to the heavy use of the Blue Mountains by the western Oregon residents for elk hunting.

General recreation was the most popular activity by the respondents from Washington and the local area.

Table 9
Percent of Repeat and First-Time Visitors by
Main Purpose of Visit

	N=729	First-Time	Repeat
Friends	70	40%	60%
General	197	31	69
Travel	59	32	68
Fish	26	23	77
Hunt	301	20	80
Gather	69	13	87
Hike & sports	7	29	71

Gathering forest products had fewer first-time participants than any other first-time activity. Most of the visitors interviewed had been to the area before regardless of main purpose.

Awareness of the Douglas-fir Tussock Moth

On-site respondents were separated into two distinctive groups:

(1) those visiting the interview site for the first time, and (2) those who had been to the site before. This was done on the assumption that repeat visitors might be more aware of changes or problems such as those caused by the Douglas-fir tussock moth.

As stated previously, of the 780 parties interviewed, 82 percent had visited the site previously; the remaining 18 percent were first-time visitors.

Awareness of the Repeat Visitor

Repeat visitors (N = 640) were asked two general questions to determine their awareness of any recent changes in the Blue Mountains. The questions were:

"Since you have been coming to the Blue Mountains, have you noticed any major changes?"

If a negative response was given, a second question was asked:

"What changes or problems have you read or heard people talk about?"

Overall, 80 percent of the repeat visitors mentioned personally observing changes or problems. (Table 10) Roads, campground and people-related changes or problems were the most prevalent of those mentioned. Only 7 percent (44) voluntarily stated changes or problems created by the tussock moth.

Table 10

Repeat Visitors' Awareness of Changes in the
Blue Mountains
(N = 640)

Changes Mentioned	Percent of Repeat Visitors Who Directly Observed Changes	Percent of Repeat Visitors Who Only Read or Heard About About Changes	Total %
Roads	38	2	40
People in area	22	1	23
Campsite and facilities	34	3	37
Insects (other than TM)	1	*	1
Tussock moth	7	2	9
Other	16	2	18

*Less than 1%

Of the repeat visitors who had not directly noticed changes in the Blue Mountains, 14 people - or an additional 2 percent - mentioned they had read or heard about the moth. Other changes and problems mentioned were related to roads, people in the area, campsites and recreation facilities.

Awareness of the First-Time Visitors to the Site

The first-time visitors (N = 115) were also asked two general questions:

"Are there any aspects of the Blue Mountains that have not lived up to your expectations?"

and

"Have you read or heard about changes or problems in the Blue Mountains?"

Of the 115 responding to the first question, 23 percent indicated that one or more aspects of the Blue Mountains did not live up to their expectations. Reasons given included not as much game, poor weather, hospitality, information, facilities, roads, no garbage collection, fishing, and too much brush. Tussock moth was not mentioned. Only 2 of the first-time visitors (2%) indicated that they had heard or read about tussock moth related changes; one during the summer survey and one during the November survey.

Summary of Repeat and First-Time Visitors Awareness

Table 12 summarizes the respondents' awareness before specific questioning about insects or Douglas-fir tussock moth.

After respondents indicated any changes they had noticed, they were asked, "How do you feel about these changes?" The responses were grouped as to whether they felt satisfied, good or generally positive; felt unsatisfied, poorly or negative; or did not indicate a feeling and were neutral toward the change. (Table 11)

Table 11

Attitude of Repeat Visitors About
Tussock Moth Changes
(N = 606)

Type Change	No Responding	Pos.	Neg.	Neutral	No Comment	Total
Tussock moth	44	11%	71%	8%	10%	100%

All comments concerning tussock moth were negative. Although it is interesting that five people said they felt positive about the change, it is important to note that these five said that the situation was bad but has improved and is getting better, and felt good that the problem is or has been solved. Forty-eight people favored the use of DDT, while 4 people did not when asked about insects.

Table 12

Respondents' Awareness of Changes Before Specific
Questioning About Insects or Douglass-fir Tussock Moth

	Repeat Visitors (N = 640)		First Time (N = 115)		All Respondents (N = 755)	
	<u>N</u>	<u>%</u>	<u>N</u>	<u>%</u>	<u>N</u>	<u>%</u>
Directly observed tussock moth changes	44	7	0	0	44	6
Only heard or read about changes	<u>14</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>16</u>	<u>2</u>
	58	9%	2	2%	60	8%

Behavior and Attitude of Respondents Toward Douglas-fir Tussock Moth

Questions relating to the behavior and attitude of the respondents were included in the questionnaire.

Behavior of Respondents

Behavioral questions were asked both repeat and first-time visitors.

One question was:

"Are there changes or events over the last two to three years that influenced your decision to visit the Blue Mountains?"

Of the 758 responding, 29 percent indicated that some changes or events did change their plans. Table 13 summarizes the response.

Table 13

Changes or Events That Influenced Respondents'
Decisions to Visit the Blue Mountains

<u>Change or Event</u>	<u>Percent of All Respondents (N=758)</u>
No influence	71%
Gasoline (Price or Availability)	1
Roads	2
People in the Area	1
Campsites and Recreation Facilities	2
Douglas-fir Tussock Moth	1 (7 people)
Various Other Comments	22
	<u>100%</u>

Of the seven indicating tussock moth, only two stated that it influenced their decision to visit. One went to a different area in the Blue Mountains, while the other stayed home. Dust from logging moth-killed trees was reported to have made one respondent sick for one week. However, the other four did not mention how it changed their plans.

A second question probed more specifically about changes. It asked:

"Some of the things we are interested in were possible changes from gasoline shortages, inflation in our economy or insect problems. Did any of these affect your recreation activities?"

Two hundred eight of the 697 people who were asked the question mentioned tussock moth. (Table 14)

Table 14

Responses to General Insect Questions That
Related to Tussock Moth
(N = 697)

<u>Responses</u>	<u>No.</u>	<u>%</u>
Didn't mention tussock moth	489	70
Visual changes mentioned	70	10
Should have sprayed	48	7
Against spraying	4	*
Stayed out of area	30	5
Skin reaction	9	1
Other tussock moth	47	7
Total	697	100

*Less than 1%.

The most prevalent comment about the effects of tussock moth on recreationists was the visual appearance. Nine people mentioned skin irritation from the tussock moth. Of those, four actually reported having skin irritation problems. The other five had either heard or read about the skin problems from other sources. All nine were from the local area.

After the survey was underway, the questionnaire was modified by the addition of several questions at the end. This was done to determine if the two previous questions about insects were too general and, secondly, if the respondents did in fact know specifically about the Douglas-fir tussock moth. After August 12, to all of those not mentioning tussock moth (N = 285), a third question was asked:

"Are you aware of any tussock moth problems in the
Blue Mountains over the last two or three years?
If so, how did it change your plans?"

The following Table 15 resulted:

Table 15

Awareness of the Tussock Moth Situation
(All Respondents After August 12)

User Category	Sample Size	Mentioned the Tussock Moth Without Direct Probing About Insect Problems or the Tussock Moth	Mentioned Knowledge of the Tussock Moth When Insects or Tussock Moth Mentioned by Interviewer	Had No Knowledge of Tussock Moth Even when Tussock Moth Mentioned by Interviewer
<u>All Respondents (After Aug 12)</u>	580	9%	75%	16%
First Time Visitors	65	2	66	32
Repeat Visitors	515	9	77	14
Summer Visitors (August)	212	10	60	30
Deer Season Visitors	162	9	82	9
Elk Season Visitors (November)	206	7	87	6
<u>Recreation Activity</u>				
Hunting	305	6	86	8
Gathering	87	13	70	17
Fishing	79	15	62	23
Hiking	74	12	72	16
General	240	7	74	19
Friends	13	8	77	15
Travel	79	9	72	19
Sports	42	7	72	21
Others	62	10	79	11
<u>Location of Residence</u>				
Local (Appendix F)	305	10	74	16
Oregon (outside of local area)	219	7	83	10
Washington	26	4	65	31
Other (all other states)	27	7	56	37

Table 15 summarizes visitor awareness of the moth with various categories of respondents.

Fishermen, gatherers of forest products and hikers volunteered more information about the tussock moth. Hunters and persons the "other" activity category were more aware of insects and tussock moth after probing. The "other" category contained many people who worked in the area.

Table 15 also relates the tussock moth awareness by first-time visitors and repeat visitors. There is a significant difference in the awareness of the two when volunteering tussock moth information and of those having no knowledge at all.

There is also a significant difference in awareness between the summer visitors and those interviewed in October and November. Thirty percent of the summer visitors were not aware of the Douglas-fir tussock moth at all.

The local and Oregon visitors were more knowledgeable about the tussock moth than those from out of state. When asked specifically about the tussock moth, however, a high percentage of out-of-state visitors displayed awareness of tussock moth changes or problems.

In response to specific questioning about changing recreation plans because of tussock moth, an additional 8 people said they stayed out of infested or sprayed areas. This brings the total to approximately 40 people out of 580 (7%) surveyed after August 12 who stayed away from damaged acres. Because the questions were probed in a general way, this is likely to represent the minimum number of people who stayed away. If we had asked people specifically if they stayed away from sprayed or infested areas, we may have gotten a higher proportion.

Other Comments About Recreation Experiences

The general comments to the question: "Is there anything else you would like to add about your recreation experience?" may be of interest.

Four hundred eighty-four had more to say. (See Table 16)

Table 16

Other Comments About Recreation Experience (N = 484)

<u>Comment</u>	<u>No.</u>	<u>Percent</u>
Really nice	186	38
Facilities related	106	22
Resource related	68	14
Road related	52	11
People related	34	7
Others	34	7
Insects and tussock moth	4	1

Four mentioned insects. Only two specifically were directed toward the tussock moth. The attitude of the visitors was not analyzed.

Telephone Survey

This presents a description of the special survey using the elk permit lists and the results including characteristics of the respondents, their awareness of the Douglas-fir tussock moth, their behavior and attitude toward it, and the general comments about their recreation experience.

Fifteen percent of the hunters listed on the special elk tag permit during 1971, 1972 and 1973, were contacted in the survey. The lists were acquired from the Oregon State Wildlife Commission.

The following table summarizes the number and geographical distribution of the respondents. The hunters on the 1972 and 1973 lists were called in January 1976, and 1971 hunters were called in June 1976 when it appeared that tussock moth activity had already started in some areas in 1971.

Table 17

Summary of the Distribution of Those Interviewed
From the Oregon State Wildlife Commission Lists 1971-73

<u>Home Location</u>	<u>Hunters Interviewed</u>		<u>Total Nos. on 1971-73 Lists</u>
	<u>No.</u>	<u>%</u>	
Local	33	40	82
Eastern Oregon	39	21	188
Western Oregon	<u>42</u>	8	<u>514</u>
Total	114		784

Telephone Survey Results

Characteristics of Respondents

Sixty-three percent of the 114 respondents had hunted in the Blue Mountains more than five years. Ninety-five percent of those contacted in the telephone survey hunted in the Blue Mountains prior to 1972. Eighty-two percent hunted in the area during the tussock moth years of 1972 to 1974.

To the question, "Did you visit the Blue or Wallowa Mountains for other recreation?", 49 percent indicated that they did in 1973, 39 percent in 1974, and 35 percent in 1975.

Awareness of the Douglas-fir Tussock Moth

Of the 114 responding to the survey, 87 percent mentioned at least one change or problem when asked:

"Since you have been coming to the Blue and Wallowa Mountains, have you personally noticed any changes or problems?"

Table 18 presents the results of the changes. Eleven percent indicated tussock moth.

Table 18

Awareness of Change in the Blue Mountains

Change	Percent Who Mentioned Change (N=114)	Number Notice Change	Opinions of Those Noting Change (%)			No Comment
			Pos.	Neut.	Neg.	
People	41%	47	9	30	57	4
Roads	35	40	20	25	53	2
Game Mgt.	32	37	13	22	59	6
Administration	19	22	32	14	50	4
Logging	18	20	10	40	50	0
Road Closure	15	17	70	18	12	0
Tussock Moth	11	12	8	50	42	0
Scenery	8	9	0	11	88	0
DDT	6	7	86	0	14	0
Others	30	34	0	0	0	0

Eleven percent observed tussock moth. Eight of the 12 indicating tussock moth were from the 1973 list. There also was a higher percentage of those from the 1973 survey who were aware of tussock moth and recreated in the area during other seasons compared to the 1971 and 1972 survey.

Eighty-one percent said that they had read or heard of the changes or problems. Of these, 11 people (10 percent) specifically mentioned tussock moth. (Table 19)

Table 19
Changes Hunters Heard or Read About in
Blue Mountains

Type Change	Percent Notice Change	Number Notice Change (N=114)	Opinion of Those Noticing Change				No Comment	Total
			Pos.	Neut.	Neg.			
People	11%	13	8%	8%	30%	54%		100%
Roads	18	20	5	55	40	-		100
Game Management	19	22	5	-	77	18		100
Administration	22	25	20	16	48	16		100
Logging	16	18	17	11	33	39		100
Road Closure	16	18	22	17	11	50		100
Insects (other than tussock moth)	3	4	7	-	40	53		100
Tussock moth	10	11	-	-	-	-		100
Wilderness	11	13	-	-	-	-		100

After eliminating duplicate responses to the two questions, a total of 21 different respondents (18 percent) mentioned observing or reading or hearing about tussock moth without any specific probing by the telephone interviewer.

Attitude and Behavior of Respondents Toward Douglas-fir Tussock Moth

The respondents were also asked, "How they felt about the changes". Tables 18 and 19 also include their feelings.

The only change noted in the telephone survey that had a dominant positive feeling was the recent practice of closing roads. This was said to be done to protect wildlife habitat. Of the 13 commenting, 67 percent were in favor of the road closure, while 33 percent were opposed.

Three changes had proportions that appeared to be quite similar. People, Roads and Game Management changes all were reported to be at least four times more negative than positive. Game Management dealt with game and game habitat related concerns. Game Administration included policy matters.

Feelings toward Logging, Forestry and Game Administration were two times more negative than positive.

Tussock Moth and Insect changes were all reported to be negative. Of the 7 who mentioned DDT, 6 favored use and commented that it should have been used sooner. All 7 hunted in 1973 (5 from Western Oregon and the others from the local area).

Comments varied. Some stated that the tussock moth had "devastated the area"; that the forest has "really come back"; "looks bad - fire hazard"; and "plan to return."

The respondents were asked specifically about factors that may have influenced their decision to visit the Blue Mountains. The questioning followed the sequence shown in Table 20.

Table 20

Factors Affecting Respondents' Decisions to Visit
the Blue or Wallowa Mountains at Some Time

<u>Factor</u>	<u>Percent of Respondents Affected</u>
Gasoline shortages	15%
Insects (in general)	8%
Douglas-fir tussock moth infestation	18%
Mountain pine beetle	4%
DDT spraying	4%
Inflation or cost of living	23%
Game population	39%

Eighteen percent of the 114 respondents reported that tussock moth had affected their plans. Asking specifically about Douglas-fir tussock moth resulted in a much larger number of affirmative responses than asking about insects in general.

Table 21 compares the effect of different insect-related influences on the respondents' decisions to visit the area.

Table 21

Effect of Insects and DDT Spraying on
Decisions to Visit the Blue or Wallowa Mountains

Effects on Decisions	Percent of Respondents (N = 114)			
	Insects (in general)	Tussock Moth	Mountain Pine Beetle	DDT
Change to different area	1%	9%	3%	1%
Go at different time	1%	1%	0	1%
Won't return	1%	0	0	0
Other	4%	8%	1%	3%

Three of the 21 people (18 percent) that did not hunt during 1972-1974 mentioned tussock moth, but only one was affected and changed to another area. Two were forestry government employees.

Other Comments About the Recreation Experience

Of the general comments mentioned when asked, "Is there anything you would like to add regarding your recreation experience?", 25 percent said they enjoyed the area. Many commented on the administration by the Forest Service and Wildlife Commission, but, as indicated in Table 22, they had mixed feelings. No comments were made concerning the tussock moth directly, but three spoke of DDT. Several other comments listed may be of interest.

Table 22

Other Comments From Hunters Regarding
Their Recreation Experience

<u>Comment</u>		<u>Number</u> (N=114)	<u>Percent</u>
Enjoyed area		28	25
Administration		23	30
favorable	14		
unfavorable	9		
Special areas		8	7
Road Closures		6	5
Game Management		6	5
Stop Road Building		5	5
Off-Road Vehicle Control		4	4
Facilities Needed		4	4
Replant Logged Areas		3	2
DDT		3	2
Behavior Problems		3	2
People in Area		3	2

Summary of the On-Site Survey and Telephone Survey

Awareness

Personal awareness of changes caused by the tussock moth was relatively similar in both surveys. The difference was not significant.

Table 23

Summary of On-Site and Telephone Survey
Awareness of Tussock Moth Without
Specific Questioning

<u>Summary</u>	<u>On-Site</u> N=780		<u>Hunter</u> N=114	
	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>
Repeat visitors direct personal awareness	44	6	12	10
Repeat visitors having heard or read	14	2	9	8
First-time visitors having read or heard	2	*	0	-
Other comments	<u>2</u>	<u>*</u>	<u>0</u>	<u>-</u>
	62	8	21	18

*Less than one percent.

Telephone survey respondents read or heard about more changes than the on-site visitors. If an on-site respondent mentioned a change or a problem, the question relating to hearing or reading about changes was not asked. This can partially explain the difference in the percentage format in Table 23.

In both surveys, there was a greater awareness of non-tussock moth related changes and problems mentioned than Douglas-fir tussock moth. From this one could conclude that the tussock moth related changes and

problems are less noticeable and less prominent in the thoughts and minds of the recreationists than the other changes and problems mentioned at the time of the surveys. (Reference see Tables 10 and 18.)

Behavior

Behavioral changes were similar in both surveys. Seven percent of the on-site and 9 percent of the telephone survey respondents indicated they stayed away from damaged areas. Almost all who avoided the infested area, changed to other areas in the Blue Mountains or stayed away until the tussock moth problems were gone. Only one stopped coming to the Blue Mountains. Both surveys showed more behavioral changes as a result of other non-tussock moth related changes.

Attitude

In both surveys, the attitude of respondents who personally noticed tussock moth changes was similar. Most respondents expressed negative or neutral feelings toward the tussock moth although some respondents indicated positive feelings that the severity of the situation has diminished in 1975.

Table 24

Summary of the Attitude of Those Personally
Observing Tussock Moth Changes

Personally Observing Tussock Moth	N	Pos.	Neut.	Neg.	No Comment
Repeat on-site	44	11	8	71	10
Telephone survey	12	9	50	41	0
Total	56	11	18	62	9

Their attitude toward DDT spray control was also similar. They favored the spray program but would have preferred quicker action.

Other Comments

Other comments about their recreation experience in the Blue Mountains also supports the assumption that tussock moth changes were of less concern than other changes.

VI. DISCUSSION AND CONCLUSIONS

This study examined the effects of (1) the Douglas-fir tussock moth infestation, (2) related control program, (3) salvage operations, and (4) Douglas-fir tussock moth public information program had on the recreationists in the Blue Mountains of Oregon during the summer of 1975, one year after the rapid decline of the outbreak.

This study describes the recreationist's direct and indirect knowledge and awareness of the tussock moth infestation and the changes in their immediate behavior resulting from their awareness.

Insect Infestation and Defoliation

Awareness

Of the people who had direct awareness during the primary stage of the infestation, the present study identified changes and problems similar to those reported by Wickman (1975). Direct awareness during the active primary stage includes the nuisance and annoyance of the tussock moth flying into food and around the visitors throughout infested areas.

Another direct effect during the primary stage was skin irritations. Skin irritation occurred but did not appear to be a prevalent problem. Only one percent (nine) of the on-site respondents mentioned irritations, four individuals were directly affected. Five reported indirect awareness by hearing or reading about the problem from other sources.

The most prevalent comment mentioned by the direct awareness group was the visual damage that resulted from the outbreak. This secondary effect includes the sable color of the drying trees as well as the dead or top killed stands. After the interviewers probed the recreationists for their awareness of insects, 10 percent of the 697 respondents identified the visual effects of the moth.

The natural pattern of the damaged trees may have made it difficult for those visiting for the first time to become aware visually of the Douglas-fir tussock moth infestation during the secondary stage. One respondent related that, if one was not familiar with the native tamarack forest in the Blue Mountains, the fall and winter condition of the tamarack could be mistaken for a tussock moth killed tree.

Respondents with prior experience in the Blue Mountains also indicated the forest had begun to recover and the damage did not appear to be as noticeable as it had been in 1973 and 1974.

Although the tussock moth may not have been mentioned until later in the interview, one might assume that the tussock moth may have been taken for granted. Recreationists may have overlooked the obvious because of the length of exposure and duration of the tussock moth outbreak. Another thought might be that most recreationists were not immediately aware of the tussock moth and their awareness had to be drawn out by the series of questions. Even with probing, there were recreationists who did not perceive the tussock moth as a problem.

Behavior

The reported behavior of the recreationists appeared to be different during the primary and secondary stage. Seven percent (N = 694) avoided areas during the active primary stage but rather than stay home shifted to unaffected areas. Many of the respondents indicated that they returned to their favorite areas during the secondary stage only a year or two after the infestation. Only one individual said that he would not return again due to tussock moth infestation.

Attitude

Interestingly, a few people thought the moth was still on the rampage and said that "they should do something." Several indicated the tussock moth was beneficial by adding jobs and increasing the firewood supply, but most felt sad that mentioned tussock moth problems. Others stated that the insects were thinning dense forests - "a natural phenomenon."

Control Program

Of the respondents mentioning tussock moth, there was a high recollection of the spray program for controlling the tussock moth. Most of the respondents said that spraying should have occurred earlier, while a small proportion expressed concern about the use of DDT and the control program. Deer and elk hunters expressed a concern for game species, which is understandable.

News reports noted that DDT could accumulated above acceptable levels in some game species. Ten people mentioned concerns of DDT in animals and meat.

Pest spray control programs can be viewed as "invisible" activities that are not noticeable after completion. For example, the Douglas-fir tussock moth spray control program had an extremely short primary stage and the secondary stage was almost non-existent.

Kates (1962) cited a similar invisible example referring to a river flooding its banks. Once the water recedes and time passes, it is difficult to visualize and comprehend the magnitude of the flood event. At the time of this survey, the direct effects were not easily observable. This follows the philosophy of "out of sight, out of mind."

Spraying may possibly create long range effects, but during this survey period, the effects of spraying was reported to be minimal. Concerned recreationists shifted to other areas in the Blue Mountains.

Timber Management Salvage Operation and Related Activities

In this survey, it was not possible to determine if timber management or related activities were directly attributable to the tussock moth change or to the regularly scheduled timber harvesting program of the wildland areas.

Related activities include road construction, reconstruction, detours, delays and dust as well as salvaging or roading of the respondent's favorite recreation area.

Whatever the situation, these changes and other changes mentioned during the survey were more evident or noteworthy and were mentioned more often than the tussock moth.

There was a significant difference between first time visitors and repeat visitors' visual awareness of the forest. One year after the primary stage, 9 percent of the repeat visitors noted tussock moth changes compared with 1 percent of the first time visitors.

Public Information About Spray Control of the

Douglas-fir Tussock Moth

The tussock moth spray control program received a great amount of news media coverage. This study shows that recreationists were more concerned with other changes and problems than those of the tussock moth spray control program.

Roading and salvaging appeared to be more noteworthy and of greater concern to the recreationists than insect infestation. Roding and salvaging should have been addressed in the environmental impact statement or should have been the subject of another statement, since this study has demonstrated that such secondary stage effects are of importance to the outdoor recreationist.

Conclusion

FUTURE ENVIRONMENTAL IMPACT STATEMENTS SHOULD COVER ALL MANAGEMENT ACTIONS RELATED TO OUR INSECT CONTROL PROGRAM. It appears that the primary stage of tussock moth insect infestation impact is short lived. The secondary stage activities related to Douglas-fir tussock moth may have longer lasting effects, some of which may be irreversible and irretrievable.

The human adjustment in the case of the tussock moth, if conditions became intolerable, was to leave the affected area. Some recreationists chose to stay away from the Blue Mountains altogether during the period of infestation, while most visited unaffected areas until the conditions and environment became acceptable and compatible for their use again. The mental and psychological adjustment may be slower for those who were aware of a change or problem (repeat visitors) than those who had no evidence or knowledge of the Douglas-fir tussock moth (first-time visitor).

The effects of a natural event must be placed in relationship to human social values. Natural events (such as fire, insect and disease) will occur and ecological losses should be considered as an aspect of the total long range plan.

In this study of the Douglas-fir tussock moth, as it appears from a recreationist's point of view, THE SECONDARY STAGE EFFECTS OF ACCESS AND SALVAGE MAY HAVE CREATED A GREATER PROBLEM OR CHANGE THAN THE PRIMARY STAGE EFFECTS OF THE DOUGLAS-FIR TUSOCK MOTH AND CONTROL PROGRAM. IN REGARD TO THIS POINT, RESPONDENTS EXPRESSED CONCERN OVER THE DOUGLAS-FIR TUSOCK MOTH INFESTATION, BUT IN RELATION TO OTHER PROBLEMS AND CHANGES PERCEIVED. THE TUSOCK MOTH APPEARED TO HAVE BEEN LESS SIGNIFICANT ONE YEAR AFTER THE PRIMARY OUTBREAK STAGE THAN OTHER SECONDARY IMPACTS.

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APPENDICES

APPENDIX A

Oregon State Wildlife Commission Game Season Dates

1975 General Big Game Season Dates*

Bow Hunting	August 23 - September 28
Early Deer	September 13 - 21
Eastern Oregon Deer	October 4 - 10
Rocky Mountain Elk	November 1 - 19
Bear	July 1 - December 31

*Dates established by the Oregon State Wildlife Commission in this survey area.

APPENDIX B

Dates, Days and Number of Interviews for Each Survey

<u>Month</u>	<u>Date</u>	<u>Day</u>	<u>Location Code</u>	<u>No. Inter-views</u>	
August	1	F		2	
	2	S	2	40	
	3	Su	3	47	
	6	W	3	22	
	7	Th	2	10	
	9	S	4W	24	
	10	Su	1	19	
	13	W	4U	39	
	14	Th	1	13	
	16	S	3	25	
	17	Su	2	19	
	20	W	2	13	
	21	Th	3	26	
	23	S	1	8	
	24	Su	4U	78	
	27	W	1	11	
	28	Th	4W	16	
				412	(53%)
October	1	W		1	
	4	S	1	11	
	5	Su	4U	95	
	6	M	2	8	
	7	T	1	10	
	8	W	4	20	
	9	Th	4	17	
				162	(21%)
November	1	S	2	25	
	2	Su	1	18	
	3	M	2	11	
	4	T	4W	35	
	6	Th	1	26	
	7	F	2	24	
	8	S	4U	45	
	9	Su	4W	10	
	10	M	1	4	
	11	T	4U	8	
				206	(26%)

*Location codes - 1 = N.F. cluster, 2 = N.F. cluster, 3 - State Parks,
4 = Road sites. See Appendix D.

APPENDIX C

Potential Road Interview Site Information

<u>Roads</u>		<u>Remarks</u>
*Ukiah-Hilgard (244) Starkey Junction	(IIA)	Alternate site that was surveyed in November, Mountain pine beetle.
Anthony Lakes Road (S73)	(OIA)	Alternate site that was not surveyed.
*Blackhorse Junction Halfway-Imnaha Road (393)	(OIA & IIA)	Surveyed in August, October, and November, light traffic.
Medical Springs - Eagle Cap (S679)	(OIA & IIA)	Campgrounds in area surveyed.
Lostine - Eagle Cap (S202)	(OIA)	Alternate site that was surveyed in November.
Jospeh to Imnaha		
Imnaha - Hat Point (N38, S114)	(IIA and OIA)	Not surveyed. Very far.
Sled Springs (N308)	(IIA and OIA)	Not surveyed. Major State route.
Summit Springs (N430) Wallowa-Troy	(IIA)	Not surveyed. Minor, light traffic.
Grandview - Mt. Emily	(IIA)	Not surveyed; close, light traffic.
*Tollgate-Jubilee Lake	(IIA and OIA)	Surveyed in August, October, and November. Close, heavy traffic.
North Streade-Edmiston-Godwin		Not surveyed. Light traffic mostly Washington
NE Complex		Not surveyed. Mostly Washington use.

*Site selected for road interviewing.

IIA - Infested area.

OIA - Out of infested area.

APPENDIX C (Cont)

Interview Cluster Data Information
CampgroundWallowa-Whitman National Forest Clusters

<u>Site</u>	<u>In-Out of Infested Area</u>	<u>Size 1/ Camp.</u>	<u>Pic.</u>	<u>Visitor Days</u>	<u>Elev.</u>
*Two Color	I	14	0	1,200	4800
*Tamarack	?	6	1	1,000	1600
*West Eagle Meadow		Trail			5450
Boulder Park		Trail			5000
Kettle Creek (road closed)	?	12	0	1,000	4600
Eagle Creek (road closed)		9	3	-	3,400
		41	4		
Indian Crossing	\$?	17	3	900	4526
Evergreen	\$?	25	0	Closed	4400
Hidden	\$?	10	0	200	4400
Cloverdale	\$?	10	0	100	4266
				Closed	
*Lick Creek) Alternate		7	5	-	5400
*Ollokot) Sites	\$	11	0	-	4000
*Blackhorse) November	\$	16	0	-	4000
		61	8		
McBride	?	5	0	1,600	4800
Halfway					
Lake Fork	\$	8	0		3200
North Pine					
		13	0		
Sacajawea	I	8	0	1,000	6800
Hat Point	?	2	0	2,000	6932
		10	0		
*Mud Lake	\$ 0	15	0		7100
*Anthony Lake	\$ 0	37	11		7100
*Grand Ronde Lake	\$ 0	9	0		7200
		61	11		

*Sites selected for interviewing for Aug., Oct. and Nov. unless indicated.

\$ - Fee

1/ Camping Sites and Picnic Sites

APPENDIX C (Cont)

Umatilla National Forest Clusters

<u>Site</u>	<u>In-Out of Infested Area</u>	<u>Size</u> <u>Camp.</u>	<u>1/ Pic.</u>	<u>Visitor Days</u>	<u>Elev.</u>
Stockade Springs	I	?		800	
Edmiston	I	6	3	1100	5000
Godman	I	5	5	1500	6050
Teepee	I	3	0	1500	5500
		14	8		
Pataha		3	6		
Big Springs	I	1	5	3400	5000
Teal Springs		5	5		5600
Spruce Springs	I	2	5	1900	5650
Wickiup	?	0	7	1600	5800
Misery Springs	?	1	1		
		12	29		
Bear Canyon	?	2	0	1400	4800
Mosier Spring		3	0		4400
Long Meadow	?			500	
		5	0		
Dusty Spring	0	7	1		5300
Jubilee Lake	\$ 0	47	37		4800
Mottet	0	7	2		5200
		61	40		
Woodward (closed in 1975)	0	24	14		4950
Tollgate (closed in 1975)	0	0	2		4900
*Woodland	0	6	4		5200
*Target Meadow	0	17	7		
		47	27		
*Umatilla Forks	?	7	30		2400
*South Fork	I	0	9	3700	2650
*Elk	I	0	6	800	2700
*Squaw Spring	I	9	0		4900
		16	45		
Grandview (W-W)	?I	2	1		
Deadhorse	?				

*Sites selected for interviewing in Aug., Oct., Nov. unless indicated.
\$ - Fee charged

1/ Camping and Picnic Sites

APPENDIX D

Detailed Sampling Design Criteria for
August, October, November Survey

The design criteria established for sampling considered the following elements that appeared important.

- Both interviewers work together on road interview.
- Both interviewers at separate State Parks on the same day.
- No campground should be sampled on consecutive days.
- One sample per weekend day (Saturday, Sunday) and equal number of samples on weekdays (2).

National Forest clusters were selected from the list after careful consideration as well as State Park and road clusters. (See Appendix C.)

Two National Forest clusters were selected from each forest, one in or near the infested tussock moth area, the second outside of the area.

One State Park within an infested area (Emigrant Springs) was included, as was one that was out (Catherine Creek).

Two road sites were selected on the same basis (Blackhorse and Tollgate).

APPENDIX D (Cont)

The calendar indicates the days that each site was to be visited by the interviewers. State parks were eliminated for the deer and elk season due to closure of the parks. Alternate areas also were substituted for Anthony Lakes Cluster due to the inaccessibility due to snow. Map 2 shows the locations.

Umatilla Forest Clusters

- U-1 North Cluster (Tollgate - out)
- U-2 South Cluster (Corporation - in)
- U-3 Emigrant Springs S.P. (in)
- U-4 Road Cluster (Tollgate)

Wallowa-Whitman Forest Clusters

- W-1 West Cluster (Anthony Lake)
- W-2 East Cluster (Boulder)
- W-3 Catherine Creek S.P.
- W-4 Road Cluster (Blackhorse).

Alternate Sites

- 50 Lostine - out for Anthony Lake
- 60 Lick Creek, Ollokot, Blackhorse - in for Anthony Lakes
- 70 Four Corners, Frazier - in for Boulder Creek
- 80 Dispersed Umatilla, Wallowa-Whitman, Starkey (varied)

APPENDIX E

Interviewer Col. 3
 Day Col. 4 Date Col. 5, 6, 7
 Time of Day Col. 8, 9, 10, 11

Location Col. 12 13
 Weather Col. 14 15

Interview # Col. 16, 17, 18

INTERVIEW SCHEDULE FOR HUNTERS, CAMPERS
 BLUE MOUNTAIN RECREATION STUDY

CODE BOOK S-1, 2, 3

INTRODUCTION

Hello, I'm _____ from Oregon State University School of Forestry. We're doing a study of recreational use of the Blue Mountains, and I would like to ask you a few questions about your visit.

- Col. 20 1. Is this the first time you have
 (INTERVIEWER CHECK ONE ACCORDING TO THE SAMPLE SITE)
- Col. 19 1 a. _____ been out along this road? 1 2
 2 b. _____ used this picnic area?
 3 c. _____ stayed in this campground? YES NO
- Col. 21 1975 2. When were you here before?
 Col. 22 1972-4 (YEAR, SEASON) _____
 Col. 23 1971 or earlier _____
- Col. 24 3. Have you been in other areas of the Blue Mountains
 before? 1 YES 2 NO
- Col. 25 4. Where have you been? (Probe: When was that?)
 1 1 or 2 areas visited
 2 3 - 5 areas visited
 3 More than 5 areas visited
- Col. 26 5. How many people, including yourself, are with you today? 1-7 8=8 or more
 Col. 27 6. How many children does that include? 1-7 8=8 or more 9=no entry
 Col. 28 7. (CAMPERS ONLY): How many nights will you camp in this spot? 1-7 8=8 or more
 Col. 29 8. Where are you from? See Zones 1-8 9=no entry
9. What kinds of activities have you done on this trip?
 Col. 30 Visiting friends or relatives
 Col. 31 General camping activities Col. 37 Gathering Forest Products
 Col. 32 Hiking Col. 38 Other
 Col. 33 Active sports activities Col. 39 Nothing or no entry
 Col. 34 Traveling (biking)
 Col. 35 Fishing
 Col. 36 Hunting

Revised 9/22/75

-2-

Col. 40 10. What would you say was the main reason for the trip? _____

11. (FOR REPEAT VISITORS): Since you've been coming to the Blue Mountains, have you noticed any major changes?

Col. 41 ----- 1 YES 2 NO

Col. 42 ----- 12. What changes are you thinking of?
 "A" List for #12,14,16,18 1 gasoline price
 2 inflation
 3 insects (general)
 4 others
 5 roads
 6 people
 7 site condition & facilities

Col. 43 13. How do you feel about these changes?
 1 Positive (good) 8 Tussock Moth
 2 Neutral (so-so) 9 no answer
 3 Negative (bad)
 4 NO ANSWER

Col. 44 14. What changes have you read about or heard people talk about?
 See List "A"

15. (FOR FIRST TIME VISITORS): Are there any aspects of the Blue Mountains that haven't lived up to your expectations?

Col. 45 ----- 1 YES 2 NO

16. What things are they? _____

17. Have you read or heard people talk about changes in the Blue Mountains?

Col. 46 ----- 1 YES 2 NO

18. What have you read or heard? _____

Col. 47-55
 Combined
 List A
 1-9

-3-

19. Are there changes or events over the last 2 or 3 years that influenced your decision to visit the Blue Mountains?

Col. 56 ----- 1 YES 2 NO

20. What changes or events are you thinking of?

(Probe: How did it change your plans?

Col. 57

See List "B"

- | | |
|---|-------------------|
| 1 | gasoline |
| 2 | resources |
| 3 | more leisure time |
| 4 | others |
| 5 | roads |
| 6 | people |
| 7 | facilities |
| 8 | Tussock Moth |
| 9 | no entry |

21. Is there anything else you would like to add regarding your recreation experience in the Blue Mountains, or elsewhere?

Col. 58 Yes = 1 No = 1

1 really nice

6 people

2 resources

7 facilities

Col. 59 See List "C"

3 insects

8 Tussock Moth

4 others

9 no entry

5 roads

22. Thank you for your observations. Some of the things we were interested in were possible changes from gasoline shortages, inflation in our economy, or insect problems in the Blue Mountains.

- a. (If one or more mentioned previously) You mention the effect of

Col. 60

Same as Col. 42

Did the other(s) affect your recreation activities?

Col. 61 ----- 1 YES 2 NO

How did it change your plans?

Col. 63,
64, 65,
66 Combin
ed List
"p"

- b. (If none of the above mentioned previously) Did any of these affect your recreation activities?

Col. 62 ----- 1 YES 2 NO

How did it change your plans?

Col. 63 Gasoline

1 quit going

2 slowed down

3 limit trips

4 stay closer to home

5 money

6 other

Col. 64 Inflation

1 money pinch

Col. 66 Other

1 make money

2 4-wheel drive

3 wildlife

4 Mt. Pine beetle

Col. 65 Insects

1 skin reaction (TM)

2 visually (TM)

3 stayed out of area (TM)

4 TM other

5 should have sprayed (TM)

6 against spray (TM)

7 other insects

8 -

9 No entry

-4-

23. Ask people who did not mention Tussock Moth problem:

Are you aware of any Tussock Moth problems in the Blue Mountains over the last two or three years?

Record #2

Col. 19 ----- 1 YES 2 NO

Col. 20

24. What problems? _____
 (1) aware (4) shouldn't spray
 (2) damage (5) skin reaction
 (3) should spray
 25. How did it change your plans? _____

Col. 21

See List below

26. Ask people who did not mention Mountain Pine Beetle:

Are you aware of any Mountain Pine Beetle problems in the Blue Mountains over the last few years?

Col. 22 ----- 1 YES 2 NO

Col. 23

27. What problems? _____
 (1) aware (4) hurt timber industry
 (2) damage (5) roads
 (3) control need
 28. How did it change your plans? _____

Col. 24

See List below

Col. 21 and Col. 24

- (1) Blank
- (2) Did not change plans
- (3) Changed plans - bother or aggravated
- (4) Changed plans - other
- (5) Changed plans - had to replan
- (6) Changed plans - didn't go into area
- (7) Changed plans - provide work and/or wood
- (8) Changed plans - mentioned animals or meat

Col. 25 Probe:

- (1) Pro DDT
- (2) Against DDT
- (3) Neutral or undecided

23
 Col. 67 yes = 1 No = 2)
 Col. 68 - - - - -) See Record #2
 Col. 69 24 yes = 1 No = 2)
 Col. 70 - - - - - -5-

INTERVIEWER NOTE:

25

Type of Vehicle(s) (check all that apply, giving number if more than one)

Col. 71 Bicycle _____
 Col. 72 Motorcycle _____
 Col. 73 Sedan, Station Wagon, Bus, Carry-all, Pickup (w/o camper) _____
 Col. 74 Pickup with Camper _____
 Col. 75 Vehicle with Camping Trailer _____
 Col. 76 Motorhome _____
 Col. 77 Other ORV (_____)

26

Type of Group

Col. 78 1 Single Individual _____
 2 Family with Children _____
 3 Families with Children _____
 4 Couple. _____
 5 Teenage Group _____
 6 Young Adult Group _____
 7 Adult Group _____
 8 Other _____ (_____)

27

Age of Principal Respondent

Col. 79 1 Teenager (15-19) _____
 2 Young Adult (20-30) _____
 3 Adult (30-50) _____
 4 Older Adult (50-60) _____
 5 Senior Citizen (Over 60) _____

Col. 80 1 Not aware of or no mention of TM with additional probe.
 2 Remembered (TM) with additional probing.
 3 Remembered (TM) with probing about insects
 4 Mentioned (TM) without probing (prior to Question 22)

APPENDIX E

On-Site Questionnaire and Codebook
August, October and November 1975Interviewer

1 - Baker	5 - Thompson
2 - Wolfe	6 - Blackmore
3 - Bye	9 - Delucchi

Day

Monday	=	1	Friday	=	5
Tuesday	=	2	Saturday	=	6
Wednesday	=	3	Sunday	=	7
Thursday	=	4			

Date

<u>Month</u>	August	=	8
	October	=	0
	November	=	1
	January	=	7

Time

Military time

Administrative Unit

10	Umatilla National Forest
20	Wallowa-Whitman National Forest
30	Oregon State Parks
40	Roads
50	Lostine
60	Dispersed - Halfway
70	Dispersed - Ukiah
80	Dispersed - Others

Site Clusters

10	<u>Umatilla National Forest</u>
11	Umatilla Forks
12	South Fork
13	Elk
14	Squaw Springs
18	Target Meadows
19	Woodland

APPENDIX E (Cont)

Site Clusters - Cont.20 Wallowa-Whitman National Forest

- 21 Two Color
- 22 Tamarack
- 24 Eagle Creek
- 25 West Eagle Meadow
- 26 Mud Lake
- 27 Anthony Lake
- 28 Grand Ronde Lake

30 State Parks (Oregon)

- 31 Emigrant Springs S.P.
- 36 Catherine Creek S.P.

40 Roads

- 44 Tollgate-Jubilee Lake Junction
- 41 Blackhorse

50 Lostine (Wallowa-Whitman)

- 51 Two Pan
- 52 Lily Vale

60 Halfway - Dispersed

- 61 Lick Creek
- 62 Blackhorse
- 63 Ollokot

70 Ukiah - Dispersed

- 71 Four Corners
- 72 Frazier
- Starkey Experimental Forest (87)

80 Dispersed - Others

- 81 Umatilla
- 82 Wallowa-Whitman
- 87 Starkey

APPENDIX E (Cont)

Weather - Temperature

- 1 = Less then 55 deg.
- 2 = More than 60 deg.; less then 80 deg.
- 3 = More than 80 deg.

Sky

- 1 = Rain or snow
- 2 = Heavy overcast, intermittent rain
- 3 = Overcast
- 4 = More clouds than sky (50% + clouds)
- 5 More sky than clouds
- = More sky than clouds
- 6 = Sunny and clear

APPENDIX E (Cont)

CODE SHEETS - OTHERS

Question 9 (Column 38)

Climbing
 Photography 3
 Typing on book
 Employment 24
 Tree ID
 Flower enjoyment
 Cards 6
 Crafts 8
 Feeding chipmunks
 Watch logging
 Botany
 Cabin
 Looking for property 2
 Work 13
 CB radio
 Drank 5
 Cards
 Worked on cars
 Snowmobile 5
 Party 5
 Chased women in Elgin

Question 10 (Column 40-8)

Employment 17
 Looking for property 4
 Love it here
 Jubilee Lake 6
 Parade
 Husband demands
 Build cabin 2
 Get to use trailer
 Wor 13
 Good weather
 Snowmobile 3

Question 12 (Column 42-4)

Deer population 5
 Logging 7
 Enjoy browsing in small towns
 Fishing
 Wildlife 25
 Houses
 Snowmobile
 Too much grazing
 Motorcycles
 Better land use

Question 14 (Column 44-4)

Catherine Creek dam 2
 Collect Litter
 Land use 3
 Water pollution
 Enjoy
 Gondola ride at Wallowa
 Jubilee Lake
 Using parks for groups
 Wildlife 7

Questions 16-18 (Column 50-4)

Land Use 10
 Logging 5
 Catherine Creek 10
 Recommend 2
 ORV 4
 More jobs to kids
 Wildlife 22
 Pollution study
 Wildlife 22
 Teach survival
 Write Congressman
 Weather 3
 Hospitality at lodging not good
 Got driver's license
 Didn't like power lines
 Canyons too deep

APPENDIX E (Cont)

Question 20 (Col. 57-4)

Homesick 2
 People 12
 Catherine Creek
 Insects
 Annual picnic 7
 Property
 Employment
 Camped at Bar Ranch
 Snowmobiler 3
 Closeness 2
 Moved here 15
 Traveling
 Cabin 5
 Purchased trailer
 Wanted to see area
 Jeep club
 Jubilee Lake
 Big Snake area
 Got a better fireplace
 Go further back on trail
 Cost of firewood
 Knows country 2
 Likes country
 Knows area 5
 Wont hunt anywhere else
 Think about not coming
 because of changes 2
 Always stays the same
 Always greener on the
 other side

Question 21 (Column 59-4)

Motorbikes
 Catherine Creek
 Get people away from TV
 Horses out of high country
 Cost cheaper to go
 Logging 2
 Management of area
 Snowmobile
 4-wheel drive
 ORV off the trails 5
 Helitack crew running game
 to death

Question 21 (cont.)

Game Commission check
 Cross-country ski
 Like to travel
 Makes own camp
 Coordinate experiment with
 recreation activities
 Should respect private
 property

Question 22 (Column 63)a. Gas, other

Never felt there was a
 problem 2
 Couldn't get gas
 Afraid couldn't find
 Bought gas ahead of time
 Small car

Question 22 (Column 65)b. TM Other

Caused logging 2
 People are doing what they
 can
 Under control 2

APPENDIX E

COMMENTS TO QUESTION 12 RELATED TO
DOUGLAS-FIR TUSSOCK MOTH

(Column 42-8 Summary. N = 44)

<u>Interview</u>	<u>Comments</u>
1-1-028	Pine Beetle - Tussock Moth damage - Flies and mosquitoes; unfortunate about damage.
1-1-033	Tussock Moth destruction - USFS doing fine job. Read or heard about little skin irritation.
1-1-053	Logging Middle Ridge - Terrific - salvaging timber from Tussock Moth damage.
1-1-083	Better roads - damage from TM - No comments.
1-1-099	Tussock Moth damage, sprayed too late. Knew of people who had skin irritations from moth. Moths were in campers' cars. No comments.
1-1-106	Tussock Moth damage - Should have sprayed sooner.
1-1-115	Tussock Moths - A lot of damage and ruined the trees on freeway. Should have sprayed sooner. Had seen damage as early as 1963.
1-1-138	We hope that no more damage is caused from Tussock Moth and have seen it along Route 80. Stop it earlier by spraying.
1-5-038	Bark Beetle and Tussock Moth kill - not good; but parks improved.
1-5-059	Tussock Moth eats up trees - Let's use DDT - all timber lost, may kill few birds and animals, but they will come back.
1-5-075	Tussock Moth - Bad, should have used DDT earlier. Been into infested areas, visual impact.
1-5-076	Put in roads, eliminate roads, beautiful scenery - TM and pine beetle damage - Grande Ronde area. They have ruined it.

Column 42 - Continued

- 1-5-096 Insects in trees, water lower. Not too happy.
- 1-5-098 Tussock moth eating up trees - more people, larger roads. Too bad (that we) lost so many trees, logging on Mt. Emily wrecked land, down berries.
- 1-5-121 A lot more roads, travel traffic; better roads; less trees. If used DDT earlier - better; big gripe, wasted MMBF timber, great fire hazard.
- 1-5-135 Roads - Tussock Moth not controlled; upsetting.
- 1-5-157 More dead trees - Tussock Moth - saw moth, worked in area. DDT started, good thing; TM under control now.
- 1-9-017 More crowded - more trees have died, more people all the time. Need more facilities. Kill the moth, bring back DDT. Seems that they can do something to save the trees.
- 1-9-011 More people, traffic and Tussock Moths. People problems cause disruption.
- 1-9-003 Tussock Moth last year, crushed to see damage. It sure has recovered. Other comments, etc. Enjoy nature - should let others enjoy it.
- 2-3-059 Tussock Moth - damage to trees. Negative - pro DDT.
- 2-6-015 Tussock Moth, logging
Nature's way of taking care of things.
- 2-6-036 Roads for Tussock Moth salvage.
Negative - roads over-designed.
- 2-6-039 Tussock Moth - Negative.
- 2-6-050 Population up, less fish, more dead timber, Tussock Moth. Too many people.
- 2-6-063 Tussock Moth - Better this year.
- 2-6-073 Roads, toilets - Tussock Moth, something should be done. Not too good.
- 2-6-074 Tussock Moth hit Grande Ronde - Don't like Tussock Moth, wish they had used DDT.

Column 42 - Continued

- 2-6-087 More coyote, less deer, less elk. Tussock Moth bug kills trees. Use poison for predators, stop hunting season and let game build up. Should have used DDT sooner.
- 2-6-094 Tussock Moth - trees dead, less animals, too many roads. Vehicles allowed into too many areas. Don't like it.
- 3-3-006 More roads, needs roads to get out trees that were killed by Tussock Moth. Negative, but roads are needed.
- 3-3-018 Devastation of moth, more people, better roads. Probably snowmobiles and hondas. Mostly good - some places have too many roads.
- 3-3-027 More roads, more logging. Timber had to be cut. Tussock Moth hard on game.
- 3-3-056 More people, logging increase, lots of waste and litter - Tussock Moth dead trees (pro DDT - waited too long. Should find something else. Read about a new chemical that dries up larvae. Grew up on farm and saw insect damage - doesn't know which is worse. (Negative)
- 3-3-060 Tussock Moth - since moth was here, no fir cones, saw damage - pro DDT but sooner (it pollutes, but is needed sometimes). Would not change plans. (Negative)
- 3-6-010 Douglas-fir Tussock Moth - Sad. Should have sprayed DDT.
- 3-6-075 Too many people - Forest Service won't let you camp because of bug (TM). Natural - you can't change people.
- 3-6-079 Trees went bad - TM. Wish there were no more bugs.
- 3-6-099 Trees - TM - Need to do something. Negative.
- 1-1-020 Trees - moth. Flies - difference in ratio. No comment.
- 1-1-021 Tussock Moth - damage. Improvements.

Column 42 - Continued

- 1-5-045 Fire west of La Grande, Tussock Moth problem. More picnic areas (State), more tables, wilderness, more restrictions on animals, too many people in wilderness, don't know how to treat it. Sick to see trees and salvage timber and burn defaces landscape.
- 1-5-154 Noticed TM at Emigrant Springs - fell in lunch, no skin problem. Facilities better here, campgrounds cleaner. Changes for better, more campers not better.
- 1-5-112 More logging - change pattern of deer and elk; TM - DDT spray - don't know. Why cut out, important in forest. Too good roads attract too many. Keep DDT - forest used a lot for recreation, some forest - more dollars to schools, some areas.

APPENDIX E (Cont)

COMMENTS TO QUESTION 14 RELATED TO
DOUGLAS-FIR TUSSOCK MOTH

(Column 44-8 Summary N = 14)

<u>Interview</u>	<u>Comment</u>
1-1-033R	Little skin irritation.
1-1-111	Tussock Moth = lots of tree tops are dead.
1-2-012	Tussock Moth.
2-6-816	Tussock Moth has eaten up a lot of trees.
1-5-080	Tussock Moth (seen some, worse at La Grande)
1-5-081	Tussock Moth here - suppose it has to be.
1-5-127	Tussock Moth - seen in La Grande.
1-9-005	Tussock Moth - that's about all, did not notice any changes.
2-3-008	Tussock Moth - seen areas from air. Didn't change plans. Neutral on DDT.
2-3-018	Chistinimus - stopped ORV't there. Tussock Moth - heard about it, didn't change plans.
2-3-027	Tussock Moth - had to be cut, hard on game.
3-3-031	Trees falling apart (TM), own property by Tollgate, Growth
3-3-053	Tussock Moth in certain areas - elk - not enough feed for them. Pro DDT sooner. Would not change plans.
3-6-097	Tussock Moth damage in trees.

APPENDIX E (Cont)

COMMENTS TO QUESTIONS 16 AND 18 RELATED TO
DOUGLAS-FIR TUSSOCK MOTH

(Column 54-1 Summary N = 2)

- 1-5-809 (#18) Concern about moth.
- 1-5-112R (#18) Same as 12 and 13 - more logging. Change game patterns;
Tussock Moth.
- 3-6-77 DDT spray - don't know why cut out important forests.
Keep DDT - forest used a lot for recreation, some
of forest; increase money to schools, some areas.

COMMENTS TO QUESTION 20 RELATED TO
DOUGLAS-FIR TUSSOCK MOTH

(Column 57-8 Summary)

- 1-1-088 Cleaning up area from Tussock Moth so came back up to
this area.
- 1-2-012R No. The Tussock Moth has had no effect on me personally.
- 1-2-064 Generally things are the same except for area around
Troy where they were logging TM killed trees.
Dust made me sick for a week.
- 1-5-112 (Same as Column 54-1 Summary)
- 1-5-153 TM ruined last year; out of normal berry spot.
- 2-3-026 TM - heard about it, noticed damage to trees.
- 3-3-052 Would not come here last year because of DDT (heard it
was in meat). Wouldn't got in DDT areas. Find
a better solution.

APPENDIX F

List of Local Use - state, County, City

WashingtonAsotin County

Anatone
Asotin
Cloverland
Clarkston

Garfield County

Peola
Columbia Center
Alpowa
Pataha
Pomeroy
Central Ferry
Gould City
May View
Ilia
Dodge

Columbia County

Dayton
Huntsville
Alto
Turner
Marengo
Delaney
Starbuck

Walla Walla County

Ayer
Pleasant View
Clyde
Sheffer
Prescott
Bolles
Lamar
Eureka
Rulo
Hadley
Walla Walla
College Place
Lowden
Reese
Touchet
Wallula
Two River
Burbank
State Line

IdahoCities

Lewiston
Sweetwater
Winchester
Weiser
Midvale
Cambridge
Payette

Counties

Nez Perce
"
Lewis
Washington
Washington
Payette

APPENDIX F - Cont.

OregonBaker County

Rock Creek
Haines
Wingville
Keating
Baker
Hereford
Unity
Bridgeport
Rye Valley
Pleasant Valley
Durkee
Line
Huntington
New Bridge
Richland
Pine
Halfway
Carson
Copperfield
Homestead

Union County

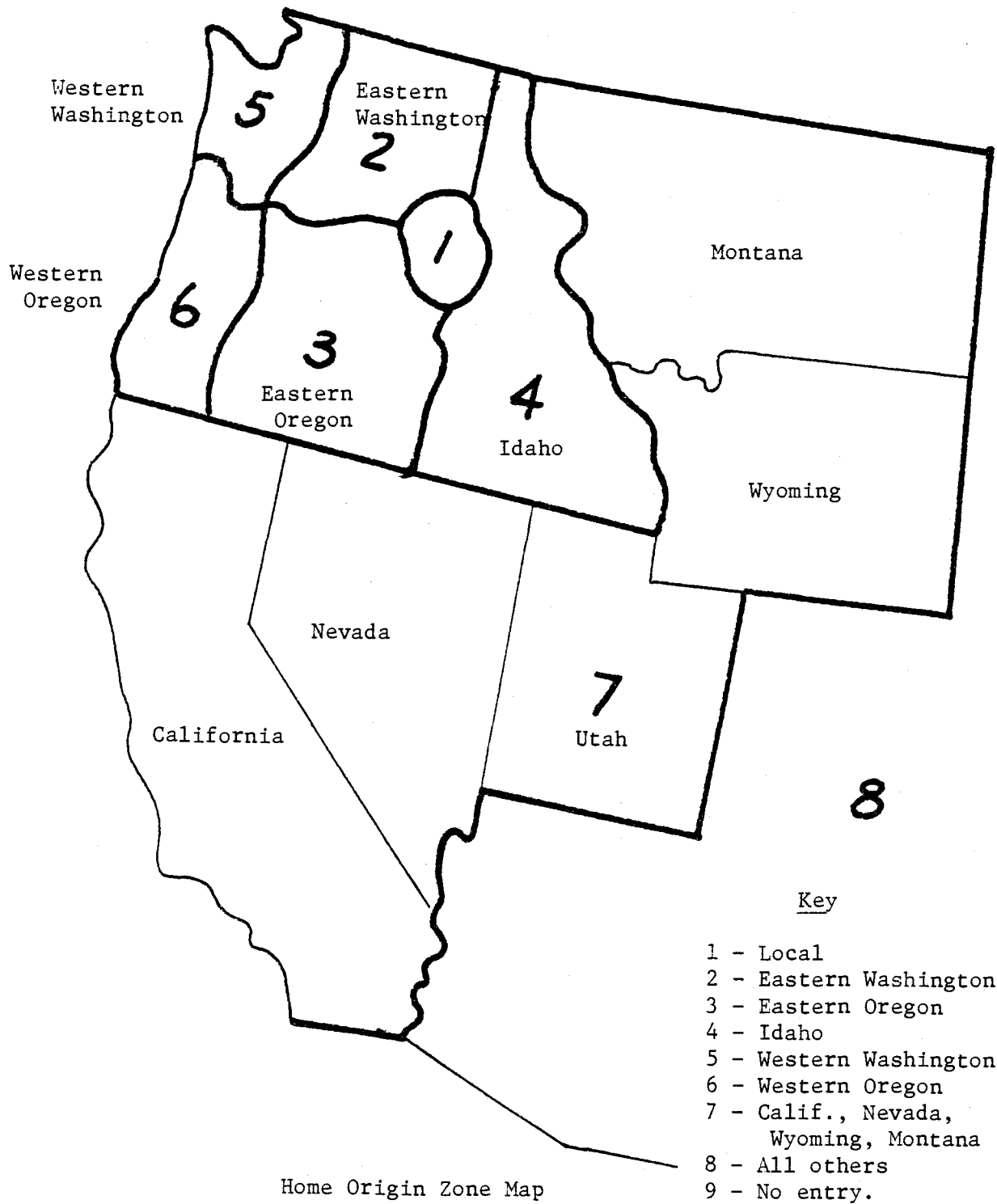
Palmer Junction
Minam
Elgin
Imbler
Summerville
Alicia
La Grande
Perry
Hilgard
Starkey
Hot Lakes
Union
Telocaset
North Powder
Medical Springs
Cove

Umatilla County

McNary
Umatilla
Hermiston
Stanfield
Echo
Nolin
Pendleton
Reith
Pilot Rock
Nye
Vinson
Ukiah
Kamela
Meacham
Havana
Adams
Myrick
Holdman
Smeltz
Vansycle
Waterman
Umapine
Milton-Freewater
Weston
Bingham Springs
Athena
Gibbon
Thornhollow
Cayuse

Wallowa County

Wallowa
Promise
Troy
Lostine
Enterprise
Joseph
Imnaha



APPENDIX G

Outdoor Activity Categories Code Sheet

0 - Friends

Visit friends and relatives, reunions

1 - General Recreation Activities

Eating
Picnic
Sleep
Rest
Camp
Sunbath
Vacationing
Get away
Escape heat, telephone, town, newspaper

2 - Hike

Walk

3 - Active Sports

Games, sports
Stickball, volleyball
Swimming

4 - Travel

Sightseeing
Jeeping
Motorcycle riding
See forest
Traveling through
Biking
Snowmobiling
Rafting
Boating

5 - Fish6 - Hunting

Shooting

APPENDIX G - (Cont)

7 - Gathering Forest Products

Cutting wood
Hauling wood
Collecting pine cones, berries

8 - Others

Working
Building cabin
Crafts, hobbies, handwork
Buy land
Husband demands

APPENDIX H

Douglas-Fir Tussock Moth
Telephone Survey
(Special Elk Season List)
Code Book S-4
N = 88

Interviewer: Co. 2, 3

Interview No. Col. 1
Location 1 3 6 Col. 4
Phone: _____
Source List: 1972 1973 Col. 5
City of Residence: _____
Respondent's Name: _____

Date _____ Time _____ IC _____ R _____
NA _____ NQH _____

1st: Col. 6, 7, 8
appt: _____
2nd: _____
3rd: _____

Hello. This is _____ with the School of Forestry at Oregon State University. I would like to speak with _____. (Is that you?) (Is he there now?) (When will he be there?)

(repeat intro) We are doing a study of recreation use of the Wallowa and Blue Mountains in North East Oregon. We randomly selected your name from 197__ Oregon State Wildlife Commission hunting records. I would like to ask you a few questions about visits to that area.

1. How many years had you hunted in the Blue or Wallowa Mountains for
Col. 9 elk before 197__? () years. (0) 0 yrs, (1) 1 yr, (2) 2 (3) 3 (4) 4 (5) 5 (6) 6-10
(7) 11-15
(8) 16-24
(9) 25+
2. Where in the Blue or Wallowa Mountains did you hunt elk in 197__?
Col. 10 *See Map (1) Troy Unit (4) Starkey (7) Other
(0) did not hunt (2) Chesnimnus (5) South (8) Blank
(3) Wallowas (6) Strawberry Mt. (9) Can't locate

3. Did you go back to hunt in the Blue or Wallowa Mountains:

What areas did you hunt?

- Col. 11 (in 1973) No Col. 12 _____
Col. 13 in 1974 No Col. 14 _____
Col. 15 in 1975 No Col. 16 _____

4. Did you visit the Blue or Wallowa Mountains for other recreation:
What kinds of recreation did you do?

- Col. 72 (in 1973) No Col. 73 (0) Visiting friends (5) Fishing
Col. 74 in 1974 No Col. 75 (1) General Camping (6) Hunting
(2) Hiking (7) Gathering Forest Products
Col. 76 in 1975 No Col. 77 (3) Active Sports (8) Other
(4) Traveling (9) Nothing - no comment - no entry

Col. 17 2 1

5. Since you've been coming to the Blue and Wallowa Mountains, have you personally noticed any changes or problems? No Yes---What changes are you thinking of?

Col. 18 thru Col. 29: Col. 18-People; Col. 19-Roads & Access; Col. 20-Deer-Elk Game Pop.;
Col. 21-Logging; Col. 22-Insects(TM,MPB); Col. 23-Road closures; Col. 24-Admin. Laws Fac.;
Col. 25-Behavior, litter, vandal; Col. 26-Private land posted; Col. 27-Scenery Change, Atmo
Col. 28-DDI, Control Insect; Col. 29-1
How do you feel about these changes? 2-home; 3-grazing; 4-erosion; 5-poachers;
6-ORV traffic; 7-wilderness, primitive;
Value for above Col. 18-29 & 31-42: 8-covotes

- (1) good (3) bad (0) blank.
(2) neutral (9) no comment

Revised 1/5/76

6. What changes or problems in the Blue and Wallowa Mountains have you read about or heard people talk about? Col. 30 Yes - 1 No. - 2

Col. 31 thru 42 - Same as Question #5 (Col. 18-29)

7. Did these changes you noticed or heard about effect your plans to visit the Blue or Wallowa Mountains? ^{Col. 43} No Yes -- What effect did each of these changes have on your plans?

<u>change</u>	<u>effect</u>
(1) Col. 44, 45	Col. 45-47
(2) Col. 48-49	Col. 50-51
	See List S-4 Q7 44-51

8. (Read for each:)

Did affect your decision not to go to the Blue and Wallowa Mountains at some time? Effect

Gasoline shortage.	Col. 52	Yes	No	Col. 53
Insect problems in the area.	Col. 54	Yes	No	Col. 55
The Douglas-fir Tussock Moth infestation	Col. 56	Yes	No	Col. 57
The Mountain Pine Beetle infestation	Col. 58	Yes	No	Col. 59
DDT Spraying for control of the Tussock Moth	Col. 60	Yes	No	Col. 61
Inflation or the cost of living.	Col. 62	Yes	No	Col. 63
Changes in deer or elk population.	Col. 64	Yes	No	Col. 65

*See List S4 Q7 44-51

- 9 That's all the questions I have to ask. Is there anything you would like to add regarding your recreation experiences in the Blue or Wallowa Mountains, or elsewhere?

(1) Col. 66-67 (2) Col. 68-69 (3) Col. 70-71

00 None. No comment.	04 More facilities	09 reduce hunting season
01 Special areas for deer hunting. E/Side-W/Side limits.	05 Enjoy area or hunting	10 Stop building roads
02 Reforest logging areas	06 Deer & elk mgt.	11 Reduce/eliminate ORV
03 Costs up	07 Administration good	12 Fishing good
04 Costs down	08 Administration poor	13 Fishing poor

Thank you very much for your time and your information.

- | | |
|------------------|-----------------|
| 14 People | 18 Tussock Moth |
| 15 Behavior | 98 Others |
| 16 DDT control | |
| 17 Road closures | |

Q5	Q6		
Col. 18	31	People)
19	32	Roads and access)
20	33	Deer & elk or game population)
21	34	Logging)
22	35	Insects (TM, BPB, etc.))
23	36	Road closure) 1 - good
24	37	Admin. law enforcement, facilities)
25	38	Litter, vandalism - behavior problems) 2 - neutral
26	39	Private lands posted)
27	40	Scenery changes - atmosphere) 3 - bad
28	41	DDT or controls) 9 - no comment
29	42	Others	
		2. Homes and cabins	
		3. Grazing and range	
		4. Erosion	
		5. Poachers	
		6. ORV's & helicopters	
		7. NRA areas, primitive areas, wilderness	
		8. Coyotes	

	1	2
Col. 30	Y	<u>N</u>

	1	2
Col. 43	<u>Y</u>	<u>N</u>

Col. 44 See next sheet.

List for Survey 4, Question 7, for Col. 44-51 and Col. 53, 55, 57, 59, 61, 63 and 65.

Col. 44-45 and 48-49

- 01 People
- 02 Roads
- 03 Game population
- 04 Logging
- 05 Insect
- 06 Road closure
- 07 Administration & mgt.
- 08 Scenery
- 09 Vandalism
- 10 Hippies
- 11 ORV's
- 12 Poaching game
- 13 Coyotes
- 14 Weather
- 15 Costs
- 16 Age
- 17 DDT
- 18. Gas shortage
- 19. Others

Col. 46-47 & Col. 50,51,53,55,57,59,61,63,65

- 01 Unroaded areas
- 02 Go to less populated areas
- 03 Don't go as far
- 04 Won't or may never go back
- 05 Stay home
- 06 Get different equipment
- 07 More or less elk
- 08 Too lazy
- 09 Spend less time in area
- 10 Change to other activity
- 11 Change to different area
- 12 Go at different time
- 13 Looking for another area
- 14 Continue to go
- 15 Other
- 20 No.

APPENDIX H

Comments to Question 5 Relating to
Douglas-fir Tussock Moth
N = 12

Column 22

<u>Interview</u>	<u>Comment</u>
969	Tussock moth - bark beetles. Unsightly and a fire problem. More fire restrictions. Public provide vacations and has caused restrictions.
950	Dead trees, tussock moth. Dead trees need to be logged out.
635	Tussock moth - frustrated, doubt about management policies, managers and why they are selected.
631	Tussock moth (1973) - Should have sprayed sooner.
628	Tussock moth - eating things up - bad hunting forest - want them to control (P) - favors control of tussock moth.
627	Proposal by Forest Service to log area, building roads through natural area - member of Isaac Walton League - Forest Service taking motorized vehicles (helicopters) at fire 2-1/2 years ago. Pristine drainage - tussock moth leads to this problem. Logging has taken action, destroying area. Not all tussock moth. Serious reservations on DDT.
612	Tussock moth - should have sprayed with DDT.
610	Tussock moth - dead and brown trees - moth is a phenomenon of nature (2).
609	Damage by tussock moth and timber killed (3).
610	Tussock moth - clearcut and lumbering (2)
603	Damage tussock moth caused - like every place else.
611	Tussock moth getting into timber - wish we could stop them - takes away food.

APPENDIX H (Cont)

Comments to Question 6 Relating to
Douglas-Fir Tussock Moth
N = 15

Column 35

<u>Interview</u>	<u>Comments</u>
951	Beetle infestation - spray or control as soon as possible. (9)
950	Tussock moth - keeping up on the reading - not being able to use DDT - lecture by OSU about other controls for tussock moth. (9)
936	Tussock moth - news that it killed the forest - I saw that the forest was coming back, the trees look better in 1975 than they did in 1973. (9)
931	Tussock moth (9)
925	Tussock moth and its devastation and DDT hassle to get release of spray.
922	Spruce bud moth. (9)
920	Disease of the trees - (P) didn't see any . . .
918	Tussock moth is the biggest topic (P) catastrophe - government should not be allowed to use DDT - killing the forest. (3)
917	Tussock moth - did a lot of damage.
913	Biggest problem - logging for the pine beetle was laid out to create a fire hazard. Wonder why you piled that way - eight years there will be little left anyway (P) game. (3)
906	Tussock moth - Game decline but that is true all over the State (mainly tussock moth). (9)
634	Tussock moth - in favor of DDT, with they could have done it with less publicity. (3)

Column 35 (continued)

<u>Interview</u>	<u>Comment</u>
627	Tussock moth as mentioned before - feel it solved itself. Best areas came back just as well as DDT areas - questioning DDT - Packwood Bill pesticides away from EPA jurisdiction. (9)
621	Tussock moth - limited on chemicals to kill moth - will lose forest and animals - environment o.k., but they all carrying it overboard. (3)
602	Tussock moth bug kill timber - they are logging now. Is a fire danger, believe in good environment; it makes sense on both sides.

APPENDIX - H (Cont)

Comments to Question 7 Relating to
Douglas-Fir Tussock Moth
N = 2

Column 46 (15)

<u>Interview</u>	<u>Comments</u>	
	<u>Change</u>	<u>Effect</u>
950	Tussock moth.	No change.
918	Tussock moth.	Government should control and get rid of it.

APPENDIX H (Cont)

Comments to Question 8 Relating to
Douglas-Fir Tussock Moth

N = 9

Column 56 (15)

<u>Interview</u>	<u>Comments</u>
964	They will come back - hate to see trees destroyed.
937	Saw a lot of damage in Ukiah to La Grande.
932	Yes - in Troy area.
908	Small animals.
628	Would if it kept spraying.
621	Makes him mad.
604	Worried elk habitat gone.
611	Wait until cut out given chance to improve.
616	Don't hunt - cut wood. Didn't hunt - changed areas and avoided moth.

APPENDIX H (Cont)

Codebook of the three who didn't hunt, but mentioned tussock moth in the telephone survey.

- 9-69 Department of Forestry employee, tussock moth and bark beetle. Unsightly and fire problem, more fire restrictions. (Did not affect plans.)
- 9-51 In snow area - noticed dead trees in area after we heard about it before we went . . . It's a shame that they can't control beetle - DDT or others.
- Read about beetle infestation - spray or control as soon as possible. (Did not affect plans.)
- 9-22 (Forest Service employee). Read or heard about spruce bud worm, tussock moth. Insects and tussock moth did affect plans. Tussock moth - read paper that heavy infestation caused hunting to move out of area.
- 6-12 Error column 22 = 0.