# Dispersed Winter Recreation Use Patterns and Visitor Attitudes at Crater Lake - Diamond Lake, Oregon

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Winter recreation has increased rapidly in the Crater Lake - Diamond Lake area of Oregon in recent years. Park and forest managers are concerned about existing and potential impacts of the recreationists on the resources and other recreationists.

The purpose of this study was to describe the nature and extent of winter recreation in the area. Considered are the user's background, behavior and attitudes about area management and encounters with other users.

An on-site interview and mail-back questionnaire were used to gather information from recreationists at several locations within the study area. Low-level flights were made to determine user penetration into the study area based on mapped tracks. A trail was monitored by a time-lapse camera to determine the amount and distribution of use over the study period.

Recreationists differed in background, behavior and attitudes by type of use (cross-country skiing and snowshoeing, snowmobiling, sightseeing, snowplay, etc.) and by location of activity (south end of Crater Lake National Park, north entrance to the park and the Diamond Lake area).

# Dispersed Winter Recreation Use Patterns and Visitor Attitudes at Crater Lake-Diamond Lake, Oregon

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# DISPERSED WINTER RECREATION USE PATTERNS AND VISITOR ATTITUDES AT CRATER LAKE - DIAMOND LAKE, OREGON

## I. INTRODUCTION

Winter recreation use in the Crater Lake - Diamond Lake area such as snowshoeing, snowmobiling and cross-country skiing has followed national trends and has increased during recent years. Recognizing that the continued growth of winter recreation may cause undesirable ecological and social effects, park and forest managers have requested that research be undertaken to identify the nature and extent of winter activity occurring now and to determine what kinds of problems they may face in the future.

The objectives of this study have been:

1. To describe winter recreation use patterns in the Crater Lake - Diamond Lake area, Oregon.
2. To describe and compare views of winter recreationists at Crater Lake National Park and the Diamond Lake Recreation Area as to their:
    a. Expectations of winter recreation experiences in Crater Lake National Park as compared with the Diamond Lake area.
    b. Attitude concerning encountering other winter recreationists such as snowmobilers, snowshoers, and cross-country skiers.

c. Attitudes concerning existing or potential management practices or programs such as interpretive programs, signing, zoning and facility developments.

There appear to be popular images of motorized and non-motorized winter recreationists - cross-country skiers and snowmobilers. The images vary with the sources of opinion. Listening to an avid snowmobiler, one may get the impression that most snowmobilers are careful and courteous while cross-country skiers seem to be "the other guy", overly particular about sound and "purity of experience".

From a cross-country skier one may get the image of skiers as purists, people willing to work hard for purity and solitude while snowmobilers come across as noise-loving, sometimes careless people who do not want to exert themselves to get anywhere.

Where do the real users fit? With enough effort, someone to fit all these images could probably be found, in addition to a whole range of others. Little research has been done to characterize winter recreationists, and stereotypes persist. Where do the winter recreationists of the Crater Lake - Diamond Lake area fit into the range of images?

This research delineates some of the characteristics of the recreation user and presents some findings that consider the hypothesis that: attitudes, behavior and background of winter recreationists in the Crater Lake - Diamond Lake area differ by both

type and location of activity.

## Background

Although ecological impacts as well as social impacts are of concern to managers of the park and forest, this research focuses only on social impacts. Given the winter environment of the study area and the time limits of the study, it was decided that a study of the social interactions in the area had greater priority.

## Literature Review

In reviewing recent literature, a variety of studies have been identified, most of them done in the northeastern United States, that focus on the ecological impacts of snowmobiling.

Few studies were found that deal with the social impacts of snowmobiling and even fewer that concern the ecological and social impacts of other forms of dispersed winter recreation.

### Winter Use at Crater Lake

Nationwide, winter recreation use has grown rapidly in recent years. Activities such as snowmobiling and cross-country skiing have become increasingly popular.

Winter use has increased at Crater Lake, too, although little specific winter use data is available (Resources Basic Inventory for CLNP, July 1974, pp. 64-65). The Workshop Preliminary Draft,

Environmental Assessment for Crater Lake Master Plan states:

> Sightseeing is still the most popular winter activity although cross-country skiing, snowshoeing and snowmobiling uses are growing rapidly. Conflicts between snow machine users and cross-country skiers and/or snowshoers, while not now of major concern, can be anticipated, however. As a result, the need to address the types of winter use which are appropriate, the dimensions of each, and the necessary facilities to accommodate such uses is acknowledged. (p. 9-10)

The 1970 Resources Management Plan refers to possible negative effects of snowmobiling by noting that, "Comprehensive studies are needed to determine the effect of snowmobiles on wildlife populations and the visitor's park experience" (p. III-B-7).

Planning for the use of the national parks, including use by off-road vehicles (ORV's), must comply with federal laws, agency guidelines and park regulations. In 1974 the Bureau of Outdoor Recreation, Department of Interior, issued the Final Environmental Statement, Departmental Implementation of Executive Order 11644 Pertaining to Use of Off-Road Vehicles on the Public Lands. In it are guidelines for agencies to use as they establish required ORV regulations. It recommends adoption of five use criteria:

i. Areas and trails shall be located to minimize damage to soil, watershed, vegetation, or other resources of the public lands.

ii. Areas and trails shall be located to minimize harassment of wildlife or significant disruption of wildlife habitats.

iii. Areas and trails shall be located to minimize conflicts between ORV use and other existing recreational uses of the same or neighboring public lands, and to ensure the compatibility of such uses with existing conditions in

populated areas, taking into account noise and other factors.

iv. Areas and trails shall not be located in officially designated Wilderness Areas or Primitive Areas. Areas and trails shall be located in areas of the National Park System, Natural Areas, or National Wildlife Refuges and Game Refuges only if the respective Bureau head determines that ORV use in such locations will not adversely affect their natural, aesthetic, or scenic values.

v. Areas and trails shall not be located in areas possessing unique natural, wildlife, historic or recreational values unless the Bureau head determines that these unique values will not be adversely affected. (pp.4-5)

The National Park Service (NPS) Resources Basic Inventory, for Crater Lake, 1974 states that snowmobiles are to be restricted to unplowed roads and areas designated by the Park Superintendent. No restrictions on other winter uses were mentioned.

Winter Use Studies in Other Areas

Studies of winter uses in other locations may provide helpful insights to the situation at Crater Lake. Previous studies of snowmobiles, a major component of winter use, have considered a variety of topics including:

1. The snowmobile user
2. Snowmobile trails and facilities
3. User conflicts
4. Environmental impacts
    a. Noise

b. Wildlife

c. Vegetation

d. Erosion

## The Snowmobile User

Snowmobile users have been surveyed in several northeastern areas, including Minnesota, Ontarior, central New York and Michigan. Such studies have concluded that most snowmobile users are between 30 and 50 years old, male, married, with 1.8 children. They graduated from high school and are likely to be skilled workers, manager or owners of their own businesses. They make more than $10,000 a year and own a house costing more than $20.000.

Users average five overnight trips a year and spend about $130.00 per trip. Two-thirds of snowmobilers attend snowmobile races and about 1/3 of them are race competitors. Snowmobilers are also active in other outdoor recreation activities. Eighty-nine percent of users hunt, 80 percent fish and 69 percent have a boat and motor. (Chubb, 1972; Masyk, 1973; USDI, 1971).

## Facilities

When asked what trails and facilities they preferred, snowmobilers in a Minnesota study preferred marked trails and cross-country trails for one-day trips up to 50 miles in length. Seventy-five percent felt that warming shelters were unnecessary. Ontario snowmobilers preferred

unorganized open areas with some bushes or woods and hills. The only facilities they wanted were trails (Chubb, 1971).

In addition to surveying users, comprehensive inventories of significantly used ski and snowmobile areas and trails have been conducted in at least one state, Utah. Facilities described include the access roads, trailhead staging areas, parking facilities and trail ingress and egress. These facilities were then evaluated in terms of location, safety, design, length, connections, trail amenities, and environmental protection considerations (Nicholes, 1975).

## User Conflicts

Evidence of user conflicts and public interest comes from several sources. Articles in popular magazines have dealt with people's concerns about wildlife harassment, vegetation damage and destruction of ski trails by snowmobiles. Snowmobilers have also been accused of destroying the serenity and solitude of the cross-country skiing and snowshoeing experience (Bloomfield, 1969, Line, 1972, Lucking, 1969). Litter and air pollution are two more environmental abuses attributed to snowmobilers. Other studies cited in a report by the International Snowmobile Industry Association (ISIA) suggest, however, that litter and air pollution from snowmobiles are insignificant, especially relative to other sources (ISIA, 1976 b).

Non-snowmobilers also cite environmental damages by snowmobiles to support their arguments for strict snowmobile regulation. Studies have determined several types and degrees of impacts of snowmobiles. As yet, no studies of skiing or snowshoeing impacts have been found in the literature.

Another way to look at user conflict is to explore snowmobiler and non-snowmobiler attitudes on issues relating to environmental protection and public land management. These two issues probably influence the nature of interactions between the groups as they compete for the use of the same areas on public land. Results of a Minnesota study show consistent and significant differences between the attitudes of the two groups. The cross-country skiers studied appeared much more likely to support controls in order to maintain the environment than snowmobilers (Knopp, 1973).

Other differences between the groups include education and income levels. Most snowmobilers studied had completed high school while most skiers in the sample were college educated. Snowmobilers were over-represented in the $6,000 to $10,000 annual income range and skiers in the $10,000 to $16,000 range (Knopp, 1973).

*Noise*

Several studies have examined the degree to which snowmobile noise is a disturbance to the environment and a potential health hazard. The US Forest Service has tested 25 machines for sound levels at the operator's ear as he accelerated from stop to a maximum speed and the cumulative sound exposure received by the operator. The greatest proportion of noise comes from the exhaust system with some noise coming directly from the engine. Larger mufflers reduce the noise produced. Ninety-six percent of the time the sound levels exceed 85 dB (USDA - FS, 1974).

OSHA has established sound level standards for various durations of sound exposure. Ninety-seven dB is the maximum sound level that can be endured for three hours a day before protective ear covering is required. The sound levels experienced after riding the snowmobiles tested for three hours exceeded this OSHA standard (Federal Register, 1971, USDA-FS, 1974).

The ISIA reports voluntary efforts at sound reduction by snowmobile manufacturers in recent years. Seventy-eight dB measured at 50 feet was the target sound level for machines manufactured after February 1, 1975. To date, there are no federal regulations setting maximum sound levels for snowmobiles (ISIA, 1976 a).

Snowmobiling proponents have brought up several points in support of voluntary compliance with noise standards:

1. 90% of snowmobiling is done by choice
2. OSHA standards for sound levels are explained as being based on sound exposure for a five-day workweek, 50 weeks per year for 20-30 years and,

> "the average recreational snowmobiler could operate one of the newer snowmobiles, in the manner in which he usually does, for up to eight hours per day, five days a week 50 weeks a year for 20-30 years without suffering a snowmobile induced hearing loss." (p. 9-10)

3. "Typical snowmobile behavior" is described as differing greatly from the OSHA standards: from a magazine survey of snowmobilers, only a total of 10-14 hours per week are spend on machines during the winter season, about 14 weeks long (ISIA, 1976 a).

The key point here might be the use of newer snowmobiles, machines that have noise outputs lower than the early machines. One study documents snowmobile-induced hearing loss, but it was done in 1973 when more of the snowmobiles that produced more noise were in use (Holecek, 1973).

Snowmobile noise is also criticized as an annoyance to the non-snowmobilers in the area where machines are being operated.

The ISIA reports two documented experiences in New Hampshire where snowmobile noise was not a significant intrusion to residents whose homes were near trails. This is due to the attenuation of the sound through the space barrier between trail and dwelling, and the lowered sound output of the newer machines. According to a 1975 study in Fond du Lac, Wisconsin, sounds from a shopping center were found to be much lower from one comparative study (ISIA, 1976 b).

This sound attenuation also relates to non-snowmobilers outside. As the sound output, in dB is reduced, it becomes detectable at shorter distances. Ninety-two dB measured at 50 feet were detectable at 11,000 feet from the machine under normal forest conditions. Eighty-three dB were detectable at 6200 feet and 73 dB were detectable at 2800 feet. These data could be helpful when considering location of snowmobile trails (USDA-FS, 1974).

## Wildlife

Some research has shown that snowmoibles impact wildlife by:

1. Drivers harassing or illegally hunting larger species
2. Frightening and routing winter-weakened deer and elk

3. Compacting snow which influences the habitat of small subnivean mammals (mammals dwelling beneath the snow)

Deer, fox, and coyotes have been run down by snowmobiles. Subnivean mammal populations declined after snowmobiles used their meadow extensively. The snow compaction alters the temperature gradients of the snow. Compacted snow gets warmer on warm days and colder on cold days than does uncompacted snow, and such changes may be critical to the metabolism of these mammals. Compaction also destroys the air spaces in the snow, reducing the oxygen supply (Chubb, 1971, Holecek, 1973).

The study of snowmobiling effects is still in early stages, however. Research has been done so far on small study plots or consists of qualitative evaluations by managers or landowners. At this point, there are studies with opposing interpretations and conclusions. The ISIA, after referring to conclusions of wildlife-snowmobile studies by Bollinger and Rongstad and by Dorrance, et al. has suggested that there are not documented facts or incidents yet to show that snowmobiles and their sounds affect wildlife significantly more than do non-motorized recreationists. In the same report, the ISIA suggests that wildlife harassment and illegal hunting is not widespread. Snowmobile associations are reported as offering rewards for the arrest of anyone who does harass wildlife. The associations also police themselves and

encourage acceptance of a code of ethics which decries wildlife harassment of hunting from machines (ISIA, 1976 b).

Research is in initial stages. Most researchers conclude that further investigation is necessary before definite conclusions can be made. Additional research may resolve the apparently conflicting results.

## Vegetation

Conflicting results can also be found concerning snowmobile's impacts on vegetation. Some research concludes that snow compaction by snowmobiles also affects vegetation and soil microbes. Compacted snow melts slower and may disturb growth of spring ephemeral plants. By the time the snow does melt, the ephemeral's growing season is past. The ground freezes deeper under compacted snow and the lower soil temperatures reduce the number of live plant roots which can destroy perennial plants. Soil microbes, especially bacteria, decrease with decreasing soil temperatures.

Snowmobiles also mechanically damage vegetation that protrudes above the level of the snow. Branches, small stems, and leaders of saplings, both conifer and hardwood, have been broken and crushed by snowmobiles. Grasses compacted after intensive snowmobile use of an area did not recover in the next growing season (Chubb, 1971, Holecek, 1973).

In contrast, the ISIA reviews compaction studies from Wisconsin, Maine and Utah that indicate no significant reduction of crop yields due to snowmobile use of the area. Crops included alfalfa, winter wheat and several grasses. Qualifications have also been put on plantation damage. Snowmobiling in tree plantations may damage trees. Damage, however, depends on snow cover and area traversed. Damage when considering a whole plantation may be insignificant (ISIA, 1976 b).

For most of these studies, details are not given for the various plot sizes used. It is not clear whether yield refers only to small study plots or to whole fields or plantations. A significant difference on a test plot may or may not be important when considering a whole field.

## Erosion

Snowmobiles have damaged the ground surface on steep slopes by removing the snow cover and by using south slopes, which melt frequently and expose the ground. Indirect ground damage occurs because snow compaction by snowmobiles delays the snow melt on trails which leaves the ground bare and soft and susceptible to erosion when they are used by hikers, trail bikes and horses (Masyk, 1973).

## Conclusions

The research reviewed here leads to the conclusion that the effects of snowmobiling on the environment are conditional. They depend on the snowmobiling behavior, snow depth, season length, temperature, wildlife and vegetation present in the area of concern. Because of this dependency, it is difficult and unreasonable to generalize about the effects snwomobiles have on the environment.

Although scientists are aware of this, many of those concerned generalize, taking incidents and research results out of context, creating images that would be difficult to support with the data currently available.

In the past, little research has dealt with user conflicts. User profiles have been compiled and different groups' profiles have been compared. Research into the environmental effects of winter recreation is just beginning. Most of the existing research deals only with snowmobiles.

User studies have been made at different locations but no follow-up studies of the same area after several years are reported. Most of the environmental impact studies have been limited to describing impacts in specific locations. No parallel studies relating winter use effects to two or more locations have been done. No follow-up studies of one area have been found in the literature either.

# II. METHODS

In order to characterize winter recreationists it was necessary to utilize a variety of data collection methods. Data provided by the recreationists themselves builds only a partial picture - what the users say they do. Physical evidence of activity is needed for balance.

The data for this study were collected in three ways:

1. On-site interview and mail-back questionnaire
2. Low-level flights for mapping and observation
3. Trail monitoring by time-lapse photography

## On-site Interview and Mail-Back Questionnaire

### Objectives

The objective of the interview-questionnaire was to describe the various user groups in the study area in terms of the users' background - age, sex, education, residence; activities undertaken in the study area, users' opinions about future management of the area and about other users.

### Interview-Questionnaire Design, Items and Procedure

An on-site interview schedule and mail-back questionnaire were developed in consultation with sociologists and statisticians and protested in the study area.

On-Site Interview

The on-site interview was short and involved recording site information, explaining the study, asking a few general questions and explaining the mail-back procedure for the questionnaire. Names and addresses were requested in order to contact respondents later in the study with a follow-up letter or study summary if respondents were interested. A copy of this interview form, the questionnaire and follow-up letter are presented in Appendix 1.

On-site Interview Procedure

At the site, the interviewers contacted users as they left or returned to their vehicles. This allowed respondents to be out of the weather during the interview and to give them a place to put the questionnaire. Several respondents were contacted while on snowmobiles, so the questionnairewas mailed to them. We attempted to contact as many parties at the interview sites as was possible. At the Diamond Lake Resort a few interviews were completed with winter visitors who had heard of the study and had requested questionnaires.

Interviewing began about 9 a.m. and ended about 5 p.m. Observations indicated that this was the interval of the day when most activity occurred.

For most of the parties contacted, one interview/questionnaire was handed out per party, usually to the driver. However, to include

responses from other members of the group, questionnaires were handed out to all members of the party for approximately one out of every five parties. Other parties were given a questionnaire for each member of the group if they requested.

The questionnaire was given to the group. No particular member was asked to complete it, so there is no way to determine specifically who filled it out.

Questionnaire

A mail-back questionnaire format was chosen for two reasons:

1. The questions referred specifically to the trip when respondents were interviewed so they needed to complete the trip before filling out the questionnaire.
2. To cover all the topics of interest, the questionnaire took seven pages, making it too long to be completed on site, especially in winter weather.

The following information was obtained from the questionnaire:

a. Activities undertaken on the trip
b. Group type and size
c. Equipment carried
d. Trails or areas visited
e. Number of trips made to study area and other winter recreation areas
f. Respondent's age, sex and education level

g. Information requests to local agency offices

h. Media checked for weather reports

i. Membership in activity-oriented organizations

j. Attitudes on further programs of facility developments

k. Attitudes toward encountering other users on trails in general, in the park and in backcountry

A wide range of items was covered in the questionnaire with the intent of defining areas of similarity and difference among different groups. In the description section, responses to the variety of items were the basis for comparing groups' backgrounds and behavior. By including a range of statements in the attitudes section, it was possible to determine where the groups agreed and disagreed.

## Sampling Design

Five different places were chosen as interview sites in order to sample as wide a range of users as possible (Fig.1). The survey locations included:

1. Annie Springs Entrance station at the south end of Crater Lake National Park
2. Parking area for Crater Trail, the north entrance to the park
3. Parking area for Thielsen Trail at the southeast corner of Diamond Lake

4. At Howlock Trail parking area, northeast of Diamond Lake
5. Parking lot of the Diamond Lake Resort

These sites are indicated on the map on the next page.

The sites selected vary by type of use allowed. Annie Springs is the only access for cars into the park during the winter. People entering the park here include sightseers, cross-country skiers, snowshoers, snowplayers and hikers.

Crater Trail receives mixed use by motorized and non-motorized recreationists. This trail is the only designated snowmobile route into the park. Any deviation from the marked trail is prohibited. Skiers, snowshoers, hikers and dog-sledders have also been observed on this trail.

At the parking area and for the first 1/2 to 3/4 mile eastward, Thielsen Trail is also designated for mixed use. Snowmobilers and skiers may use the trail to complete a trip around Diamond Lake. Skiers may use this trail to get access to the snowmobile-prohibited area farther up on Mt. Thielsen.

Howlock Trail is designated only for non-motorized use. The bulk of use that this trail receives is from skiers. Tracks of snowshoers and hikers have also been observed on the trail.

All types of users park in the Diamond Lake Resort lot. This site selected against some lodge visitors because people parked by

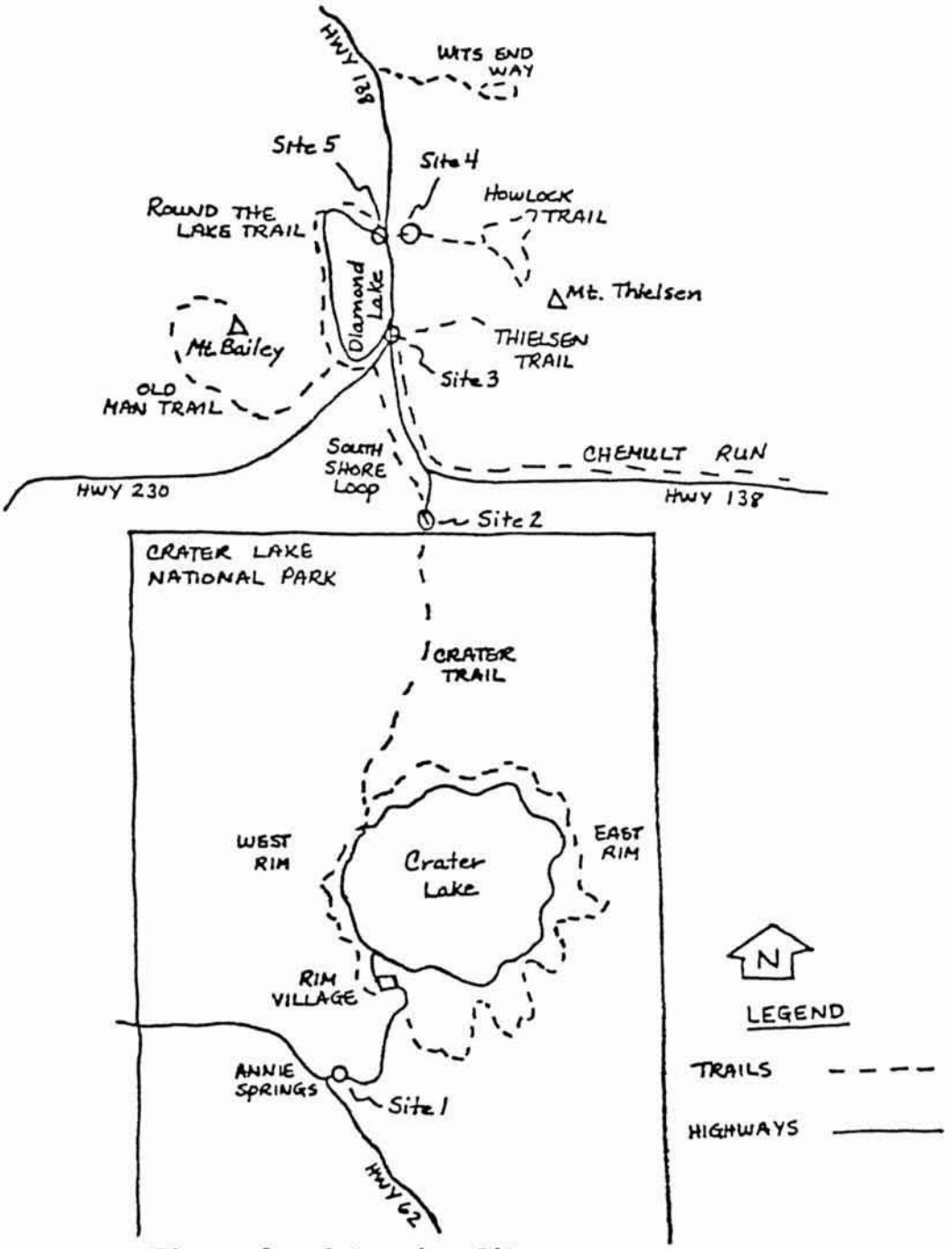



Figure 1. Interview Sites

cabins or motel units who did not check in during the interview perod were not sampled. The whole resort complex was too spread out to be reasonably sampled, so the main parking area was chosen.

The sampling period ran from January 10 through March 21, 1976. From discussions with the area managers, we learned that the bulk of winter use occurs on weekends. In response, interviewing was done every Saturday and Sunday for ten weeks and one day during the week each week, excluding Friday.

Friday was excluded because it is a transition day, partially overlapping the weekend and overlapping the rest of the week. The schedule was chosen in a systematic but not random method. Each location was scheduled for two Saturdays, two Sundays and two weekdays over ten weeks with one of each day occurring in the first five weeks and one in the second five weeks. This schedule is presented in Appendix 2.

## Analysis

The data have been processed and analyzed using programs from the Statistical Package for the Social Sciences (SPSS) system. The interviews and questionnaires were coded and put onto punch cards. The data were presented primarily in simple frequencies and cross-tabulations.

The attitude statements were analyzed by assigning a number value to each of the five responses - from strongly agree to strongly disagree. Means were calculated by user group for each statement on the computer.

A univariate F-test was run by an SPSS program to determine the significance of the differences of means of the user groups. In general, such an F-test is calculated as:

$$F = \frac{s_b^2}{s_w^2} \quad \text{with} \quad \begin{matrix}(K-1)\\ K(n-1)\end{matrix} \text{ degrees of freedom}$$

K = number of means  n = sample size

df = degrees of freedom  ss = corrected sum of squares

$$s_b^2 = n\, s_{\bar{x}}^2$$

$$s_w^2 = (ss_1 + ss_2 + \cdots + ss_k) / (df_1 + df_2 + \cdots + df_k)$$

$$s_{\bar{x}}^2 = \left[\sum_{j=1}^{k} (\bar{x}_j - \bar{\bar{x}})^2\right] \Big/ (k-1) \quad \text{with } k-1 \text{ df}$$

$\bar{x}_j$ = mean of jth example

$\bar{\bar{x}}$ = grand mean of all observations

(Peterson, pp. 170-171)

## Low-Level Flights For Observational Mapping

### Objectives

From the air the study area becomes visible as one unit. Trails and use areas can be viewed in relation to each other and to the whole area.

The objectives of the low-level flights over the study area were:

1. To get a picture of all use occurring over the whole area at approximately the same time.

2. To determine the penetration of users into the area from points of concentration as evidenced by ski or snowmobile tracks.
3. To see how changes over the study period, again shown by the location and concentration of tracks.

In specific terms, the flights were to answer such questions as:

1. Are skiers going all the way around the rim of Crater Lake?
2. Do snowmobilers stay on Crater Trail?
3. Are snowmobilers entering the park at any other locations?
4. Where is the bulk of use occurring around Crater Lake and Diamond Lake?

## Procedure

The study area was flown three times during the interview period to map and photograph users and their tracks visible at the time of the flights. Flights were made February 21, March 6, and March 21 in chartered, small fixed-wing aircraft during the early afternoon, about 2:00, when most of the use occurred. Users and trails were plotted on topographic maps of the area. Slides were taken with a 35mm SLR camera and Kodachrome 64 film. A polarizing filter was used to minimize glare from the snow.

Although the whole area was traversed, several passes were usually made over the known trails and use areas such as:

1. Around Crater Lake National Park headquarters (CLNP-HQ)
2. All around the rim of Crater Lake
3. Around Diamond Lake
4. On Diamond Lake
5. The Diamond Lake Resort area
6. Wit's End Way, northeast of Diamond Lake
7. Along Summit Rock Road and the new bypass road cut

It was difficult to see tracks under the forest canopy unless there were developed and cleared trails. Tracks were fairly easily seen on trails and in open areas. Due to warm, melting weather in January, flights were delayed until February when the snows resumed so the tracks would be as fresh and visible as possible.

## Trail Monitoring By Time-Lapse Photography

### Objectives

Only one interview site was under observation each interviewing day. In order to more accurately estimate daily patterns of use, distribution of use by type of user group, and the proportion of motorized and non-motorized use as well as interactions among users on a mixed-use trail, a battery-powered time-lapse camera was installed to monitor a section of Crater Trail at the north entrance parking lot and road into the park. A second camera monitored the southeast entrance to the park for a short time. The park locations were chosen because the park was the area of main interest and only two time-lapse

cameras were available. The viewing distance of the camera on Crater Trail was about .2 mile.

## Equipment and Operation

The camera used was a Minolta Autopak-8 D4 with an intervalometer and photocell. Normally powered by 15 penlight batteries, the camera was altered to run on a 12-volt motorcycle battery. With this modification, the camera operated for seven weeks without recharging the battery. Also, the penlight batteries would not run the unit in winter conditions.

The camera, placed within a weatherproof box, was mounted on a wooden platform about ten feet up in a tree on the west side of Crater Trail. The power cord ran from the camera in the box down the tree to the battery, buried at the base of the tree. The box was constructed of plywood insulated with styrofoam. The window was made of double panes of glass. A piece of galvanized metal formed a hood that projected about ten inches beyond the box over the window to shield the camera lens from direct sun and help prevent snow from building up on the glass. After heavy snow with wind, snow would adhere to the glass and would have to be cleared away by hand.

Frost developed on the glass on clear, cold nights. Fortunately, however, the camera faced in a southeasterly direction and as the sun rose, it soon melted the frost.

The box and platform were painted brown-gray as camouflage. A sign identifying the box as OSU research equipment was posted on the tree trunk. Elastic cords fastened the box to the platform and the box itself was locked. There was no vandalism of equipment although tracks of snowmobiles and skis were often present at the base of the tree.

The intervalometer was set on the 30 second frame exposure. The actual interval at that setting was 37 seconds. A photocell turned the camera on in the morning and turned it off at darkness. One night the lens apparently froze open because streaks of snowmobile lights passing by the camera have been identified on one frame on one roll of film.

The camera was positioned in the tree and was serviced once weekly, either on Thrusday or Friday, when the film was changed. The film used was Kodak MFX film - a thin-base emulsion film in 100 foot cartridges. One cartridge lasted about five days. Because the length in days of the film was unknown, it was changed just before the weekend to insure coverage of the busiest period during the week. The nature of the film was such that individual machines or persons could not be identified.

## Analysis

Film from the time-lapse camera was developed then copied, giving a stiffer film that could be handled more easily. This film was analyzed with an Ektagraphic super-8 projector with the single-frame remote control.

The film had to be viewed and reviewed frame by frame on the heavy use days. Without such checking, dust particles on the film could easily be confused with users.

In order to estimate the actual number of users on the trail from the number of visitors counted on the film, a calibration formula was calculated. On Saturday, March 13, the number of visitors to the trail was counted by an observer during five one-hour intervals noted on the film. The observer walked out into camera-view to mark each hour.

The resulting two sets of numbers, actual counts and film counts, were entered into a simple linear regression program on the computer. With the equation calculated, estimates of the actual number of users can be derived from the film counts for any time interval, assuming that the ratio of actual use to film counts remains relatively stable.

A regression equation based on only five sets of double-sampling data has a fairly large condidence interval. To decrease the size of the interval, additional double-sampling needs to be included in the calibration.

# III. RESULTS

Results from the three methods employed in the study provided the following three types of data which can be used to describe the nature and extent of winter recreation in the Crater Lake - Diamond Lake area.

1. The recreation visitors: a description of user groups; their behavior in the area and attitudes about use of the area.
2. Aerial photos and observations: a description of the use patterns mapped from tracks visible from the air.
3. Time-lapse film counts: an estimate of daily use patterns at the north entrance to Crater Lake.

## The Recreation Visitors

### Survey Results

Interviews were completed with 211 parties in the ten weeks of the study. After two follow-up letters, responses from 176 parties had been returned, for a response rate of 83 percent. A total of 201 questionnaires were returned but in some cases, several questionnaires correspond with one interview. This high rate of return is probably due to several factors:

1. The study was introduced by brief on-site personal contact.
2. The study dealt with a topic of interest to respondents who were actively participating in the activities being studied.
3. All mail-back envelopes were hand-addressed and stamped with several different stamps each, a factor that can influence response rate (Warwick, 1975).

Most respondents were contacted on the weekends, with the splits between Saturday and Sunday varying by user group. All groups except snowmobilers were fairly evenly divided between the two days (Table 1).

TABLE 1. DAY OF INTERVIEW (in percent)

| | All respondents (N=201) | Skiers (N=94) | Snowmobilers (N=41) | Others* (N=66) |
|---|---|---|---|---|
| Sunday | 45 | 45 | 37 | 51 |
| Monday | 0 | 1 | 0 | 0 |
| Tuesday | 2 | 3 | 0 | 1 |
| Wednesday | 2 | 4 | 0 | 0 |
| Thursday | 4 | 2 | 0 | 8 |
| Friday | 0 | 0 | 0 | 0 |
| Saturday | 47 | 45 | 63 | 40 |

*Other users included hikers, dog sledders, sightseers and photographers. Analysis of all activities is shown in Table 10.

The majority of users, excluding snowmobilers, spent one day in the area. Most snowmobilers spent either one or two days (Table 2).

TABLE 2. DAYS HERE (in percent)

| | All respondents (N=201) | Skiers (N=95) | Snowmobilers (N=41) | Others (N=65) |
|---|---|---|---|---|
| 1 | 78 | 84 | 40 | 89 |
| 2 | 20 | 15 | 47 | 9 |
| 3 | 2 | 0 | 7 | 2 |
| 5 | 0 | 0 | 3 | 0 |
| 7 | 0 | 1 | 0 | 0 |
| 10 | 0 | 0 | 3 | 0 |

An estimate of total users contacted was made based on the distribution of party sizes at the interview locations, collapsed here into three general areas - Annie Springs, North Entrance to Crater Lake, and the Diamond Lake area. Users contacted are divided almost equally between Crater Lake National Park and the Diamond Lake area (Table 3).

TABLE 3. ESTIMATE OF USERS CONTACTED IN PARTIES INTERVIEWED BY LOCATION

| | Annie Spr. | N. Entrance | Diamond Lk. area | Total |
|---|---|---|---|---|
| Number of Users Contacted | 314 | 47 | 364 | 725 |

Overall, there was a ten percent overlap of visitors who went to both Crater Lake and Diamond Lake on the trip. Twenty percent of the Diamond Lake visitors also visited the park whereas two percent of park visitors stopped at Diamond Lake.

The interview-questionnaire data for the sample of winter recreationists surveyed are presented in two sections: user characteristics and user attitudes toward management programs and interactions with other visitors.

## User Characteristics

### Age

Respondents were asked for their age in the questionnaire as basic information. This age distribution was collapsed into categories for ease of handling (Table 4).

TABLE 4. AGE DISTRIBUTION OF USER GROUPS (in percent)

| Age (years) | All respondents (N=201) | Skiers (N=95) | Snowmobilers (N=41) | Others (N=65) |
|---|---|---|---|---|
| less than 18 | 3 | 3 | 2 | 3 |
| 18-21 | 8 | 6 | 7 | 12 |
| 22-24 | 16 | 23 | 2 | 12 |
| 25-34 | 33 | 36 | 23 | 34 |
| 35-44 | 16 | 10 | 23 | 22 |
| 45-54 | 16 | 18 | 24 | 9 |
| 55-64 | 7 | 3 | 17 | 6 |
| 65+ | 1 | 1 | 2 | 2 |

The largest age category for the group as a whole includes ages 25-34 years. Nine out of ten respondents are under age 55. Comparing percentages, the snowmobilers interviewed are relatively older than the skiers. The other users are relatively young; most are under 45.

Sex

Over half the respondents were male and males were most prominent in the snowmobile group. This information is summarized in Table 5.

TABLE 5. SEX DISTRIBUTION OF USER GROUPS (in percent)

| | All respondents (N=201) | Skiers (N=95) | Snowmobilers (N=41) | Others (N=65) |
|---|---|---|---|---|
| Male | 70 | 66 | 81 | 69 |
| Female | 30 | 34 | 19 | 31 |

Educational Level

Respondents checked the highest level of education they had completed (Table 6).

TABLE 6. EDUCATION LEVELS OF USER GROUPS (in percent)

| | All respondents (N=201) | Skiers (N=95) | Snowmobilers (N=41) | Others (N=65) |
|---|---|---|---|---|
| High school grad | 20 | 6 | 37 | 29 |
| Some college-technical school | 39 | 36 | 37 | 47 |
| College grad | 19 | 25 | 10 | 14 |
| Post grad | 22 | 33 | 16 | 10 |

More cross-country skiers and showshoers have completed college than have the other users. Three of five snowmobilers have completed at least some college or technical school. More than two-thirds of the others have completed at least one of the three higher levels.

## Repeat Visitors

At least 75 percent of all groups had been to the area before (Table 7).

TABLE 7. PROPORTION OF REPEAT VISITORS (in percent)

| | All respondents (N=201) | Skiers (N=95) | Snowmobilers (N=41) | Others (N=65) |
|---|---|---|---|---|
| First time to area | 17 | 14 | 15 | 25 |
| Have been before | 83 | 86 | 85 | 75 |

## Interview Location

Except for snowmobilers, the largest percent of winter visitors were interviewed at the Annie Springs site, with the second largest number contacted at the Diamond Lake Lodge. Snowmobilers, on the other hand, were interviewed primarily at the Diamond Lake Lodge and secondarily at the North Entrance to the park (Table 8).

TABLE 8. INTERVIEW LOCATION (in percent)

| | All respondents (N=201) | Skiers (N=95) | Snowmobilers (N=41) | Others (N=65) |
|---|---|---|---|---|
| Annie Springs CLNP* | 53 | 52 | 10 | 81 |
| Crater Trail CLNP | 8 | 4 | 24 | 3 |
| Diamond Lake Lodge | 29 | 31 | 51 | 14 |
| Howlock Trail DL** | 7 | 9 | 10 | 2 |
| Thielsen Trail DL | 3 | 4 | 5 | 0 |

* CLNP=Crater Lake National Park
** DL= Diamond Lake

## Areas and Trails Visited

Respondents were asked in the questionnaire to indicate which trails and areas of those listed they visited during the trip when contacted (Table 9).

Considering the whole group of respondents, the highest percent visited the Rim Village of Crater Lake. Next in popularity was the Round the Lake Trail at Diamond Lake.

The highest percent of cross-country skiers and snowshoers also visited the Rim Village. The second most frequently visited trail was Howlock. This trail is prohibited to motorized recreation. The third most visited trail was the Round the Lake Trail. No skiers or snowshoers indicated having visited the Old Man Trail and only one indicated using Wit's End Way.

The bulk of the snowmobilers interviewed used the Round the Lake Trail. The next most popular trails were Crater Trail, Old Man Trail and the South Shore Loop.

Most of the visitors in the other uses group visited the Rim Village. Some reported visiting the west rim of Crater Lake and some visited Howlock and the Round the Lake Trail.

## Participation in Winter Activities

Outdoor winter recreation includes many activities, in addition to snowshoeing, cross-country skiing and snowmobiling. Respondents checked the activities they participated in on the trip from a list provided in the questionnaire. They were also asked to indicate other activities not listed (Table 10).

TABLE 9. AREAS AND TRAILS VISITED* (in percent)

| | All respondents (N=201) | Skiers (N=95) | Snowmobilers (N=41) | Others (N=65) |
|---|---|---|---|---|
| Crater Trail | 10 | 4 | 37 | 2 |
| Rim Village CLNP | 41 | 41 | 7 | 63 |
| West Rim, CLNP | 7 | 10 | 5 | 5 |
| East Rim, CLNP | 4 | 6 | 2 | 2 |
| Round the Lake Trail, DL | 25 | 18 | 76 | 3 |
| Old Man Trail DL | 7 | 0 | 32 | 2 |
| South Shore Loop DL | 10 | 4 | 37 | 0 |
| Chemult Run | 5 | 2 | 17 | 0 |
| Thielsen Trail, DL | 9 | 10 | 22 | 0 |
| Howlock Trail, DL | 13 | 24 | 5 | 3 |
| Wit's End Way | 2 | 1 | 5 | 0 |

*Trails/areas written in by respondents: Summer cabins, DL; Lodge, Rim Village, Cl; Union Creek; Headquarters, CLNP; Crescent Lake; Pacific Crest Trail; on Diamond Lake; Summit Rock Road; Rodley Butte; Windigo Way; Munson Valley; Mt. Bailey; Lemolo Lake; and Diamond Lake Lodge.

Columns do not total 100 percent, as many respondents visited more than one trail or area.

TABLE 10. PARTICIPATION IN WINTER ACTIVITIES (in percent)[a]

| | All respondents (N=201) | Skiers (N=95) | Snowmobilers (N=41) | Others (N=65) |
|---|---|---|---|---|
| Tobogganing | 4 | 0 | 2 | 11 |
| Innertubing | 13 | 6 | 22 | 17 |
| Cross-country skiing | 37 | 67[b] | 22 | 2 |
| Snowshoeing | 6 | 13 | 0 | 0 |
| Snowmobiling | 18 | 0 | 81[b] | 6 |
| Ice skating | 4 | 1 | 10 | 3 |
| Sightseeing | 70 | 59 | 61 | 92 |
| Photography | 49 | 40 | 59 | 57 |

[a]Activities not listed include: hiking, snowplay, picknicking, camping, 4-wheeling, sledding, dog sled racing/watching, and enjoying nature.

[b]These numbers are not 100 percent because people may have responded in the questionnaire as skiers or snowmobilers although they did not participate in the activity on this particular trip.

A number of snowmobilers reported also having cross-country skied but no skiers reported snowmobiling. A large percentage of each user group reported sightseeing and picture-taking. It appears that a higher percent of snowmobilers participated in a wider range of activities than did the skiers, snowshoers and other users, undoubtedly due to the wider range of opportunities around Diamond Lake.

Equipment Used

Respondents were asked to indicate which equipment they used on the trip when they were interviewed (Table 11).

TABLE 11. EQUIPMENT USED (in percent)

| | All respondents | | | Skiers | | | Snowmobilers | | | Others | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (N) | Own | Rent | (N) | Own | Rent | (N) | Own | Rent | (N) | Own | Rent |
| Snowshoes | 15 | 67 | 33 | 13 | 62 | 38 | 2 | 100 | 0 | 0 | 0 | 0 |
| Cross-country skis | 70 | 69 | 31 | 63 | 70 | 30 | 6 | 50 | 50 | 1 | 100 | 0 |
| Ice skates | 5 | 40 | 60 | 1 | 0 | 100 | 2 | 100 | 0 | 2 | 0 | 100 |
| Innertubes | 27 | 70 | 30 | 8 | 75 | 25 | 8 | 50 | 50 | 11 | 82 | 18 |
| Toboggans | 9 | 89 | 11 | 2 | 100 | 0 | 1 | 100 | 0 | 6 | 83 | 17 |
| Downhill skis | 6 | 83 | 17 | 3 | 67 | 33 | 1 | 100 | 0 | 2 | 100 | 0 |
| Snowmobiles | 0 | 0 | 0 | 0 | 0 | 0 | 37 | 78 | 22 | 0 | 0 | 0 |

The majority of those responding to the item owned the equipment they used.

Snowmobiles - Year and Make

The noisiness of some snowmobiles is often mentioned in criticism of the sport. Noise levels produced depend in part on the year and make of the machine. Snowmobiling respondents were asked to indicate the year and make of their machine (Table 12).

TABLE 12. YEAR AND MAKE OF SNOWMOBILES (in percent)

| Year of snowmobile (N=23) | | Make of snowmobile (N=28) | |
|---|---|---|---|
| 1970 | 13 | Rupp | 32 |
| 1971 | 17 | Arctic Cat | 14 |
| 1972 | 4 | Skidoo | 21 |
| 1973 | 26 | Snojet | 4 |
| 1974 | 26 | Merc | 4 |
| 1975 | 0 | Polaris | 10 |
| 1976 | 14 | John Deere | 4 |
| | | Suzuki | 4 |
| | | Others | 7 |

Rupp was the make of snowmobile mentioned most. This may be partially accounted for by the fact that the Diamond Lake Resort rents Rupp machines. About 2/3 of the machines are less than four years old.

## Equipment Carried

The Forest Service recommends that recreationists carry extra rations and equipment in remote snow-covered areas due to the potential for sudden weather changes. Respondents were asked to check items carried on their trip. The list came from a list suggested in

a Forest Service winter activities map. Respondents were also asked to list any other items they carry when they travel over snow (Table 13).

TABLE 13. EQUIPMENT CARRIED (in percent)

| | All respondents (N=201) | Skiers (N=95) | Snowmobilers (N=41) | Others (N=65) |
|---|---|---|---|---|
| Extra clothing | 67 | 80 | 63 | 52 |
| Lunch-Emergency rations | 62 | 81 | 51 | 41 |
| Canned heat - small stove | 11 | 19 | 5 | 3 |
| Candle-waterproof matches | 39 | 50 | 42 | 22 |
| Signaling mirror | 10 | 14 | 7 | 5 |
| Map and compass | 37 | 47 | 46 | 17 |
| Plastic whistle | 10 | 16 | 10 | 0 |
| Tarp for shelter | 24 | 33 | 24 | 11 |
| Flashlight | 41 | 41 | 61 | 30 |
| Collapsible saw | 5 | 4 | 10 | 2 |
| First aid kit | 35 | 36 | 51 | 25 |
| Tools, spare equipment parts | 45 | 44 | 78 | 28 |
| Extra gas* | 11 | 0 | 49 | 3 |
| Snowshoes/skis* | 3 | 0 | 10 | 2 |
| Nylon rope* | 15 | 0 | 71 | 0 |

*Asked for snowmobilers only.

All user groups reported carrying several items on the list, mainly clothing, rations, candle or matches, and map and compass. Some items carried but not on the list include: ski wax; ax, hatchet or knife; camera; ski tip; water; rope or cord; chains; sunglasses; snowmobile belts; gas; tools; parts, plugs; tow bar; snowshoes; and machine manual.

## Membership in Activity-oriented Organizations

Respondents were asked to indicate whether or not they were members of any activity-oriented clubs - snowmobile clubs, Nordic skiing clubs, 4-wheeling clubs, or others. This information may give managers an idea of how many of the area visitors can be reached by contacting such clubs.

When we look at all respondents and respondents by user group, we find that no more than nine percent of any group belongs to any club listed. Nine percent of skiers belong to ski clubs, none reported membership in any other club; eight percent of snowmobilers responding belong to snowmobile clubs; five percent of snowmobilers to 4-wheeling clubs and one person also to a ski club. None of the other uses group reported any kind of club membership. A complete table is presented in appendix 3

## Party Type and Size

Respondents were asked to idnicate their group type on the questionnaire (Table 14).

Most of the user groups were one of three types: a family with children, a couple or an adult group. Cross-country skiers and snowshoers reported the highest percent of respondents in organized groups and the lowest in families with children. Group size information supports this picture. Almost 90 percent of respondents were in parties of one to five persons (Table 15).

TABLE 14. TYPE OF PARTY (in percent)

| | All respondents (N=201) | Skiers (N=95) | Snowmobilers (N=41) | Others (N=65) |
|---|---|---|---|---|
| Alone | 6 | 4 | 5 | 8 |
| Family with children | 24 | 19 | 25 | 32 |
| Families with children | 6 | 1 | 10 | 11 |
| Couple | 27 | 28 | 27 | 28 |
| Teenage group | 5 | 4 | 2 | 6 |
| Adults | 25 | 30 | 31 | 15 |
| Organizations | 7 | 14 | 0 | 0 |

TABLE 15. PARTY SIZE OF USER GROUPS (in percent)

| Number of Persons | All respondents (N=201) | Skiers (N=95) | Snowmobilers (N=41) | Others (N=65) |
|---|---|---|---|---|
| 1 | 5 | 7 | 7 | 1 |
| 2 | 45 | 44 | 46 | 48 |
| 3 | 14 | 17 | 15 | 11 |
| 4 | 17 | 18 | 25 | 12 |
| 5 | 8 | 4 | 5 | 14 |
| 6 | 3 | 1 | 0 | 8 |
| 7 | 2 | 0 | 0 | 5 |
| 8 | 1 | 1 | 0 | 0 |
| 10 | 2 | 4 | 0 | 0 |
| 13 | 1 | 0 | 0 | 1 |
| 15 | 0 | 1 | 0 | 0 |
| 20 | 2 | 3 | 0 | 0 |
| 40 | 0 | 0 | 2 | 0 |

Respondent's Residence

Respondents were asked at the interview for their home location. Sixty-three percent of the respondents live in the adjacent three-county area of Douglas, Klamath and Jackson counties. Forty-six percent come from the cities within these counties - Roseburg, Klamath Falls and Medford. Roseburg alone is home for 21 percent of the respondents (Figure 2).

Twenty-five percent of the respondents are from other areas within Oregon. Grants Pass, Eugene, Coos Bay all claim at least

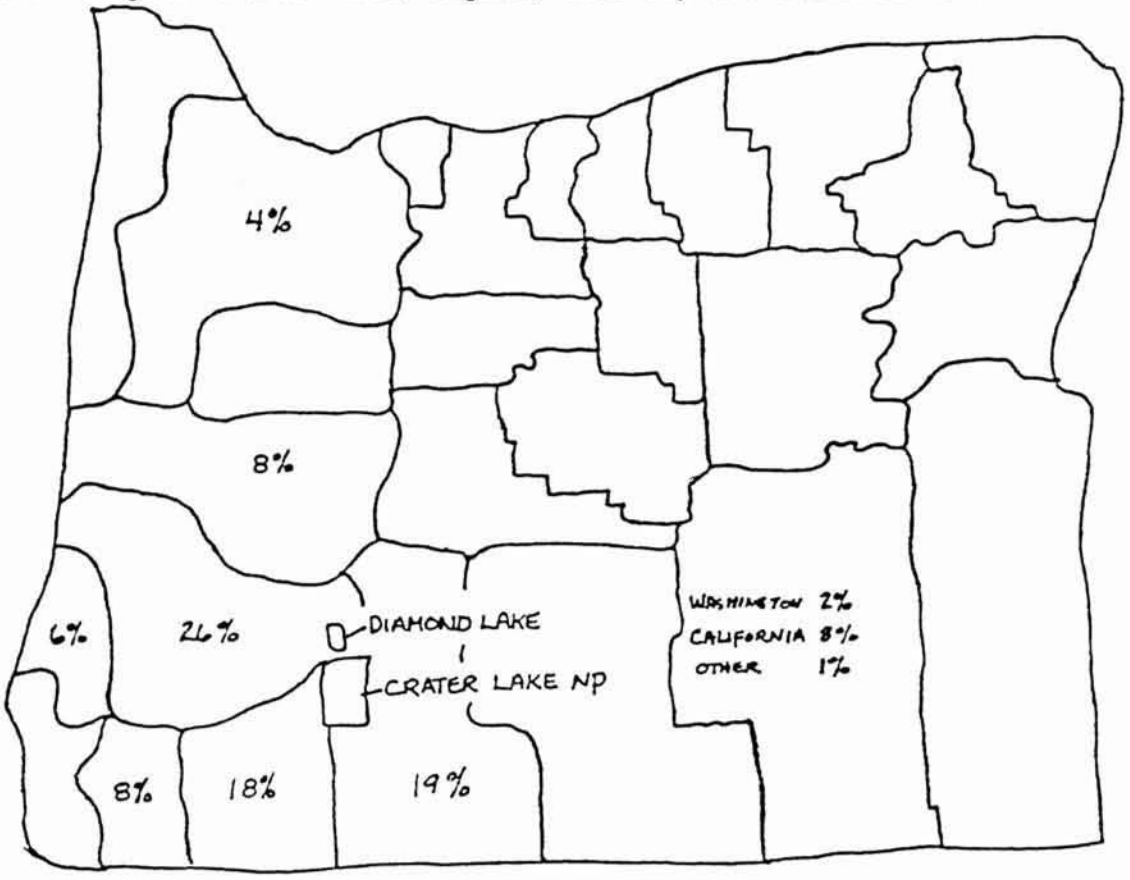



Figure 2. Respondent's Residence by counties (in percent)

five percent each of the users surveyed; 12 percent of the users live out of the state and nine percent are from California. A complete table of the residences is presented in appendix 4.

## Type of Vehicle

In general the sedan was the type of vehicle driven by the largest percent of respondents. However, the largest percent of snowmobilers were in pick-up campers (Table 16).

TABLE 16. TYPE OF VEHICLE (in percent)

| | All respondents (N=201) | Skiers (N=97) | Snowmobilers (N=41) | Others (N=63) |
|---|---|---|---|---|
| Sedan | 44 | 53 | 22 | 51 |
| Station wagon | 14 | 21 | 7 | 8 |
| Van | 5 | 7 | 2 | 5 |
| Pick-up | 13 | 8 | 20 | 16 |
| Camper-pick-up | 10 | 3 | 27 | 6 |
| Motorhome | 1 | 0 | 2 | 0 |
| 4-Wheel drive | 12 | 8 | 15 | 14 |
| Snowmobile | 1 | 0 | 5 | 0 |

Weather and Information Contacts

Respondents were asked if they checked any of the media for weather reports before making a winter trip to the study area. They were also asked if they checked any agencies for information previous to their visit to the area. In addition, the method of contact and the information sought were requested.

Seventy-five percent of respondents said they checked the weather reports before the trip. At least two-thirds of both skiers and snowmobilers responding to the question checked television, radio and newspapers (Table 17).

TABLE 17. MEDIA CHECKED FOR WEATHER REPORTS

| Which media checked | Cross-country skiers | | Snowmobilers | | Others | |
|---|---|---|---|---|---|---|
| | No. Responses | % Yes | No. Responses | % Yes | No. responses | %Y |
| TV | 54 | 74 | 28 | 82 | 41 | 78 |
| Radio | 74 | 85 | 35 | 89 | 42 | 83 |
| Newspapers | 55 | 66 | 28 | 71 | 41 | 76 |
| Weather phone* | 3 | 100 | 0 | 0 | 0 | 0 |

*Weather phone was not listed, these three respondents wrote it in.

All respondents could have responded to this item - either they did or did not check the weather reports. However, quite a few neglected to reply. Non-response could indicate that the respondent did not check for weather or that he/she passed over this question.

About one-fourth of all respondents contacted an agency for information at some time. Almost half of these contacts were made with Crater Lake National Park Headquarters.

Other places contacted include: Toketee Ranger Station (RS); Diamond Lake Lodge; Klamath Falls; Lake of the Woods; Glide RS; Prospect RS; Tiller RS; Portland; Roseburg; Medford; Chiloquin; Grants Pass; Eugene; state police; and sheriff. An information contact summary is presented in Table 18.

TABLE 18. INFORMATION CONTACT (in percent)

| | Cross-country skiers | Snowmobilers | Others |
|---|---|---|---|
| Contacted agency | N=92 responses | N=40 responses | N=65 resp. |
| Yes | 34 | 25 | 20 |
| No | 66 | 75 | 82 |
| How contact made | N=37* | N=13 | N=12 |
| Phone | 68 | 62 | 75 |
| Letter | 5 | 7 | 0 |
| Visit | 27 | 31 | 25 |
| Information sought | N=45* | N=16 | N=13 |
| Weather | 40 | 50 | 8 |
| Snow conditions | 20 | 0 | 8 |
| Road conditions | 22 | 13 | 38 |
| Others | 18 | 37 | 46 |
| Info requested received | N=32 | N=11 | N=10 |
| Yes | 97 | 91 | 80 |
| No | 3 | 9 | 20 |

*In several instances one respondent made several contacts or wanted more than one type of information, so percents were based on total number of responses rather than total number of respondents.

Information requests also covered such topics as maps, snowmobile trails, Christmas trees, cross-country ski trail information, snowshoe tours, activities available and if the Rim Drive was open. Ninety-three percent of respondents requesting information reported receiving the information asked for.

## Characteristics of Users by Location

To this point the respondents have been compared by type of use. Comparisons may also be made by the location of the interview collapsed into three general areas: Annie Springs, the North Entrance into the park and the Diamond Lake area (Table 19).

Distributions in the categories do vary by location except for the first time or repeat visit category, where over 92 percent of users at each location were repeat visitors. A much higher percent of North Entrance respondents were in single-person parties. Twenty-five percent of North Entrance and Diamond Lake users spent two days in the area compared to only eight percent of Annie Springs users.

Most Annie Springs respondents were in the park to sightsee or take pictures. The bulk of North Entrance users snowmobiled while most Diamond Lake users cross-country skied.

About 50 percent of North Entrance and Diamond Lake respondents were from Douglas County. Fifty percent of Annie Springs users were from Klamath or Jackson Counties, only five percent from Douglas County.

TABLE 19. CHARACTERISTICS OF USERS BY LOCATION (in percent)

| Category | All Respondents | Annie Springs | North Entrance | Diamond Lake area |
|---|---|---|---|---|
| First visit | 17 | 23 | 13 | 11 |
| Repeat visit | 83 | 77 | 87 | 89 |
| (N) | (200) | (106) | (16) | (78) |
| Party size no. of persons | | | | |
| 1 | 5 | 5 | 38 | 7 |
| 2 | 45 | 51 | 44 | 39 |
| 3-6 | 42 | 42 | 18 | 40 |
| 7-40 | 8 | 2 | 0 | 14 |
| (N) | (199) | (106) | (16) | (77) |
| Length of stay in days | | | | |
| 1 | 77 | 92 | 62 | 59 |
| 2 | 19 | 8 | 25 | 35 |
| 3-10 | 4 | 0 | 13 | 6 |
| (N) | (199) | (106) | (16) | (77) |
| Group type | | | | |
| Alone | 6 | 6 | 0 | 5 |
| Family with children | 24 | 26 | 19 | 23 |
| Families with children | 6 | 4 | 12 | 8 |
| Couple | 27 | 35 | 19 | 18 |
| Teenagers | 5 | 7 | 0 | 3 |
| Adults | 25 | 20 | 50 | 29 |
| Organizations | 7 | 2 | 0 | 14 |
| (N) | (201) | (106) | (16) | (79) |
| Residence | | | | |
| Roseburg | 21 | 3 | 25 | 45 |
| other Douglas Co. | 5 | 2 | 31 | 5 |
| Klamath Falls | 16 | 25 | 13 | 3 |
| other Klamath Co. | 3 | 5 | 0 | 1 |
| Medford | 9 | 9 | 6 | 9 |
| other Jackson Co. | 9 | 13 | 0 | 4 |
| other Oregon | 25 | 23 | 25 | 29 |
| outside Oregon | 12 | 20 | 0 | 4 |
| (N) | (201) | (106) | (16) | (79) |

TABLE 19. cont.

| Catetory | All Respondents | Annie Springs | North Entrance | Diamond Lake area |
|---|---|---|---|---|
| Winter activities | | | | |
| Tobogganing | 4 | 7 | 0 | 1 |
| Inner-tubing | 13 | 13 | 6 | 15 |
| Cross- country skiing | 37 | 21 | 31 | 60 |
| Snowshoeing | 6 | 9 | 0 | 4 |
| Snowmobiling | 18 | 0 | 75 | 32 |
| Ice skating | 4 | 0 | 0 | 9 |
| Sightseeing | 70 | 88 | 56 | 49 |
| Photography | 49 | 57 | 44 | 40 |
| (N) | (201) | (106) | (16) | (79) |

## User Attitudes

Respondents were asked to indicate their feelings on a series of statements covering: (1) facilities and developments; (2) meeting other users and types of groups; (3) crowding and solitude; (4) use of Crater Lake National Park by snowmobiles. Comparisons were made between skiers and snowmobilers and between skiers interviewed at Diamond Lake and those interviewed at the Annit Springs entrance to Crater Lake National Park.

Facilities and Developments

No group expressed extreme favor or disfavor with any of the facilities or developments presented. The trend, overall, was favorable. The greatest difference between skiers and snowmobilers resulted from the statement about developing more groomed trails--skiers slightly disfavoring while snowmobilers favor. Both groups were in favor of interpretive programs but skiers were more so than snowmobilers (Figure 3).

The two groups of skiers, those from Crater Lake and those from Diamond Lake, have significantly different opinions on the desirability of more trail signs and more trails. The Diamond Lake skiers more strongly favor these developments. Crater Lake skiers tend more toward neutral feelings about these issues.

Respondents were asked to comment on facilities and developments. About 46 comments were made covering a range of topics. Most comments fell into at least one of seven categories: (1) negative about snowmobiles, favor separation of ski and snowmobile developments; (2) development of other activities; (3) concern for parking facilities and plowing; (4) suggestions for ski trails; (5) concern about over-development of area; (6) suggestions for other facilities; and (7) positive about snowmobiles, suggestions for snowmobile trails.

| FACILITIES AND STATEMENTS | STRONGLY FAVOR | FAVOR | NEUTRAL | DISFAVOR | STRONGLY DISFAVOR | SIGNIFICANCE LEVEL BETWEEN SNOW-MOBILERS AND SKIERS | SIGNIFICANCE LEVEL BETWEEN CRATER LAKE AND DIAMOND LAKE SKIERS |
|---|---|---|---|---|---|---|---|
| WARMING SHELTERS | | | | | | N.S. | N.S. |
| MORE TRAIL SIGNS | | | | | | N.S. | 0.05 |
| HAZARDS MARKED | | | | | | N.S. | N.S. |
| MORE TRAILS | | | | | | N.S. | 0.05 |
| MORE GROOMED TRAILS | | | | | | 0.01 | N.S. |
| WINTER SAFETY INTERPRETATION | | | | | | 0.01 | N.S. |
| NATURAL HISTORY INTERPRETATION | | | | | | 0.05 | N.S. |

□ SNOWMOBILERS (N = 30)
○ CROSS-COUNTRY SKIERS (N = 70)
△ CROSS-COUNTRY SKIERS--DIAMOND LAKE LODGE INTERVIEW SITE (N = 25)
▲ CROSS-COUNTRY SKIERS--CRATER LAKE INTERVIEW SITE (N = 45)

Figure 3. Attitudes About Facilities and Developments

Meeting Other Users by Different Locations

Significant polarization between the groups is evident in feelings expressed about meeting other users at various locations. Snowmobilers indicate that they are amenable to encounters with other users (skiers, snowshoers) almost anywhere. They also report beliefs that they can help skiers out by packing trails and providing emergency aid in backcountry (Figure 4).

Overall, skiers disagree. They appear to favor separation of ski and snowmobile trails, without mixed-use crossings or meeting places. Skiers do not perceive snowmobilers as beneficial for trail maintainance or emergency aid.

Of interest is the significant difference between Crater Lake skiers' and Diamond Lake skiers' responses on the items about joint ski-snowmobile areas. While not definitely agreeing that both groups can meet at particular areas or that trails can cross where marked, Diamond Lake skiers do not express disagreement. Rather, their feelings range within the neutral category. Crater Lake skiers express definite disagreement with ideas of joint areas or trail crossings. Towards shared parking areas, Diamond Lake skiers report feeling neutral-agree while Crater Lake skiers report feelings of neutral-disagree.

| LOCATION | STRONGLY FAVOR | FAVOR | NEUTRAL | DISFAVOR | STRONGLY DISFAVOR | SIGNIFICANCE LEVEL BETWEEN SNOW-MOBILERS AND SKIERS | SIGNIFICANCE LEVEL BETWEEN CRATER LAKE AND DIAMOND LAKE SKIERS |
|---|---|---|---|---|---|---|---|
| ALONG TRAILS AND IN BACKCOUNTRY | | | | | | 0.01 | N.S. |
| AT POINTS OF INTEREST | | | | | | 0.01 | 0.01 |
| AT WELL-MARKED TRAIL CROSSINGS | | | | | | 0.01 | 0.05 |
| AT PARKING AREAS | | | | | | 0.01 | 0.05 |

□ SNOWMOBILERS (N = 30)
○ CROSS-COUNTRY SKIERS (N = 70)
△ CROSS-COUNTRY SKIERS--DIAMOND LAKE LODGE INTERVIEW SITE (N = 25)
▲ CROSS-COUNTRY SKIERS--CRATER LAKE INTERVIEW SITE (N = 45)

Figure 4. Attitudes About Meeting Other Users at Different Locations

## Attitudes About Crowding and Solitude

Consistent with opinions expressed about meeting other users, are the opinions of snowmobilers about the statements about solitude and crowding. Snowmobilers apparently do not mind meeting people on trails and solitude is not necessarily a primary goal for the activity. Snowmobilers disagree with limiting backcountry use if crowding becomes evident (Figure 5).

It is not possible to determine, in this study, whether snowmobilers are unconcerned with crowding or if they object to being regulated and restricted.

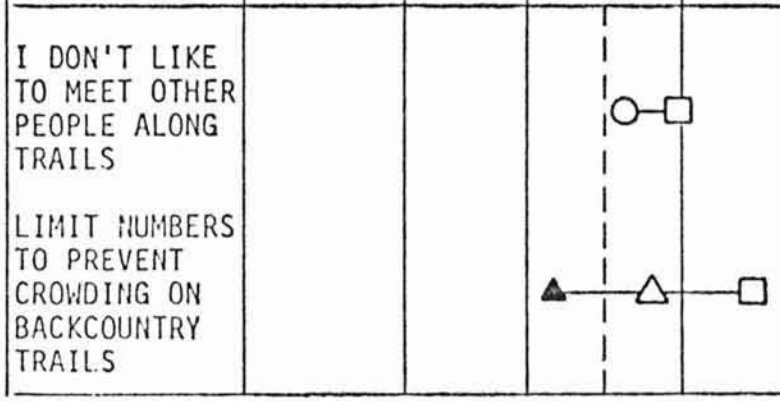
On the other hand, Crater Lake skiers tend to agree with number limits in backcountry. This group differs significantly with the Diamond Lake skiers, who tend toward neutral-disagree on this issue.

Again, the impression created is that Crater Lake skiers do value solitude highly while it is of less concern to Diamond Lake skiers and snowmobilers.

## Attitudes about Use of Crater Lake National Park by Snowmobiles

At present, snowmobilers are only allowed into the park along Crater Trail, along the north entrance road, to the north rim of the caldera. Park managers have had to decide whether or not snowmobiles should be allowed in at all, and if so, where

| ATTITUDE STATEMENTS | STRONGLY AGREE | AGREE | NEUTRAL | DISAGREE | STRONGLY DISAGREE | SIGNIFICANCE LEVEL BETWEEN SNOW-MOBILERS AND SKIERS | SIGNIFICANCE LEVEL BETWEEN CRATER LAKE AND DIAMOND LAKE SKIERS |
|---|---|---|---|---|---|---|---|
| I DON'T LIKE TO MEET OTHER PEOPLE ALONG TRAILS | | | | | | N.S. | N.S. |
| LIMIT NUMBERS TO PREVENT CROWDING ON BACKCOUNTRY TRAILS | | | | | | 0.01 | 0.05 |



□ SNOWMOBILES (N = 30)
○ CROSS-COUNTRY SKIERS (N = 70)
△ CROSS-COUNTRY SKIERS--DIAMOND LAKE LODGE INTERVIEW SITE (N = 25)
▲ CROSS-COUNTRY SKIERS--CRATER LAKE INTERVIEW SITE (N = 45)

Figure 5. Attitudes About Crowding and Solitude

they ought to go. Considerations in such a decision include agency policies and philosophy and the visitors' feelings (Figure 6).

We find significant polarization between snowmobilers and skiers on all statements concerning snowmobiling in the park. Snowmobilers report feeling that snowmobiling is an appropriate use of the park and is no less appropriate than outside the park. They also expressed feelings that noise levels within the park should not differ from those outside.

Three groups emerge on the issue of skiers and snowmobilers meeting at the rim of Crater Lake. Snowmobilers definitely agree that they can meet, Crater Lake skiers feel they cannot meet, and Diamond Lake skiers are in the middle, neutral-agree.

Statements made and not included in the previous four tables are presented in the following table and discussion (Table 20). The point of these statements is to explore each group's perception of the other, given certain situations.

Both snowmobilers and skiers were asked to respond to certain items. Also included were items for each group alone.

In the table, SA= strongly agree; A= agree; N=neutral; D= disagree; and SD= strongly disagree.

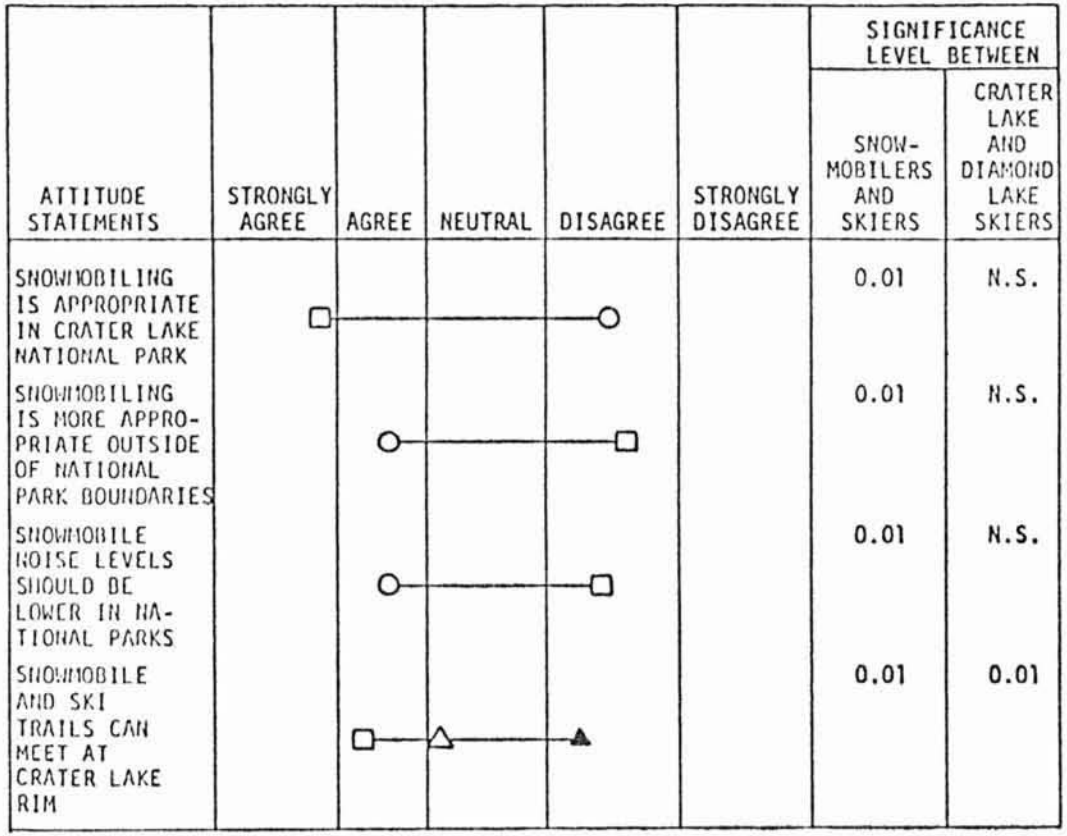



Figure 6. Attitudes About Use of Crater Lake National Park by Snowmobiles

TABLE 20. ADDITIONAL ATTITUDE STATEMENTS (in percent)

| | SA | A | N | D | SD | (N) | Significance |
|---|---|---|---|---|---|---|---|
| Large areas should be set aside where snowmobiles are prohibited. | | | | | | | |
| Skiers | 63 | 26 | 4 | 1 | 6 | 72 | .01 |
| Snowmobilers | 9 | 20 | 12 | 22 | 37 | 35 | |
| It's good to know that snowmobiles are around in case I need help in an emergency. | | | | | | | |
| Skiers | 4 | 19 | 23 | 36 | 18 | 69 | |
| Once I leave parking areas, my day along trails is ruined if I hear the sounds of snowmobiles. | | | | | | | |
| Skiers | 32 | 34 | 17 | 13 | 4 | 71 | |
| When I'm away from parking areas, I don't mind hearing distant sounds of snowmobiles a few times a day. | | | | | | | |
| Skiers | 5 | 42 | 10 | 30 | 13 | 71 | |
| Snowmobiles are a safety hazard when they're on trails used by cross-country skiers. | | | | | | | |
| Skiers | 53 | 36 | 7 | 1 | 3 | 72 | |
| Given the choice, I pick trails to avoid encountering snowmobiles. | | | | | | | |
| Skiers | 63 | 33 | 0 | 3 | 1 | 73 | |
| I don't mind using the trails where I know I may meet snowmobiles. | | | | | | | |
| Skiers | 3 | 12 | 11 | 40 | 34 | 73 | |
| I don't mind encountering cross-country skiers on trails marked for snowmobiles. | | | | | | | |
| Snowmobilers | 32 | 41 | 6 | 15 | 6 | 34 | |

TABLE 20. continued

| | SA | A | N | D | SD | (N) | Significance |
|---|---|---|---|---|---|---|---|
| Cross-country skiers are a safety hazard when they're on trails used by snowmobilers. | | | | | | | |
| Snowmobilers | 15 | 21 | 3 | 49 | 12 | 33 | |
| I enjoy meeting cross-country skiers while snowmobiling. | | | | | | | |
| Snowmobilers | 22 | 41 | 16 | 9 | 12 | 32 | |
| Given the choice, I would choose trails to avoid meeting cross-country skiers. | | | | | | | |
| Snowmobilers | 16 | 25 | 31 | 22 | 6 | 32 | |

Based on the skiers' responses to these statements, the impression emerges that, for the most part, the skiers interviewed prefer to have little or nothing to do with snowmobilers when they are out on trails. Infrequent, distant sounds of snowmobiles are acceptable to about 48 percent of skiers. Other than this, no snowmobiles at all are preferred.

Snowmobilers, on the other hand, again emerge as a group willing or not minding to encounter skiers-- 62 percent report enjoying meeting skiers. Forty-one percent of snowmobilers do report preferring trails where no skiers are met although 73 percent said they do not mind meeting skiers.

At the end of the questionnaire respondents were again asked for any comments on the study or questionnaire. About 90 respondents did make comments which fell into one or several of six

categories: (1) positive toward snowmobiles and/or snowmobile developments; (2) positive toward all uses, multiple use of the area; (3) negative toward snowmobiles, specifically noise and smell; (4) use should be separated, snowmobiles kept out of certain areas; (5) suggestions for trails and markings; and (6) negative toward cross-country skiing. The comments are listed as written in appendix 5.

## Aerial Photos and Observations

Flights were made over the study area on February 21, March 6 and March 21, 1976. The following maps indicate where snowmobiles or snowmobile tracks and cross-country skiers or ski trails were identified from the air (Figure 7).

The tracks around and on Diamond Lake undoubtedly included cross-country ski tracks but skiers were either not on the trails at the time of the flights or were indistinguishable in the trees.

Tracks completely around the rim of Crater Lake were not clearly present until the third flight on March 21. The bulk of the tracks at the rim were seen in the Rim Village area and along the west rim. Skiers were seen on all three flights in this area along with many sets of tracks.

Skiers were positively identified on the Wit's End Way trail northeast of Diamond Lake. They were not distinguishable in any of the areas not already discussed.

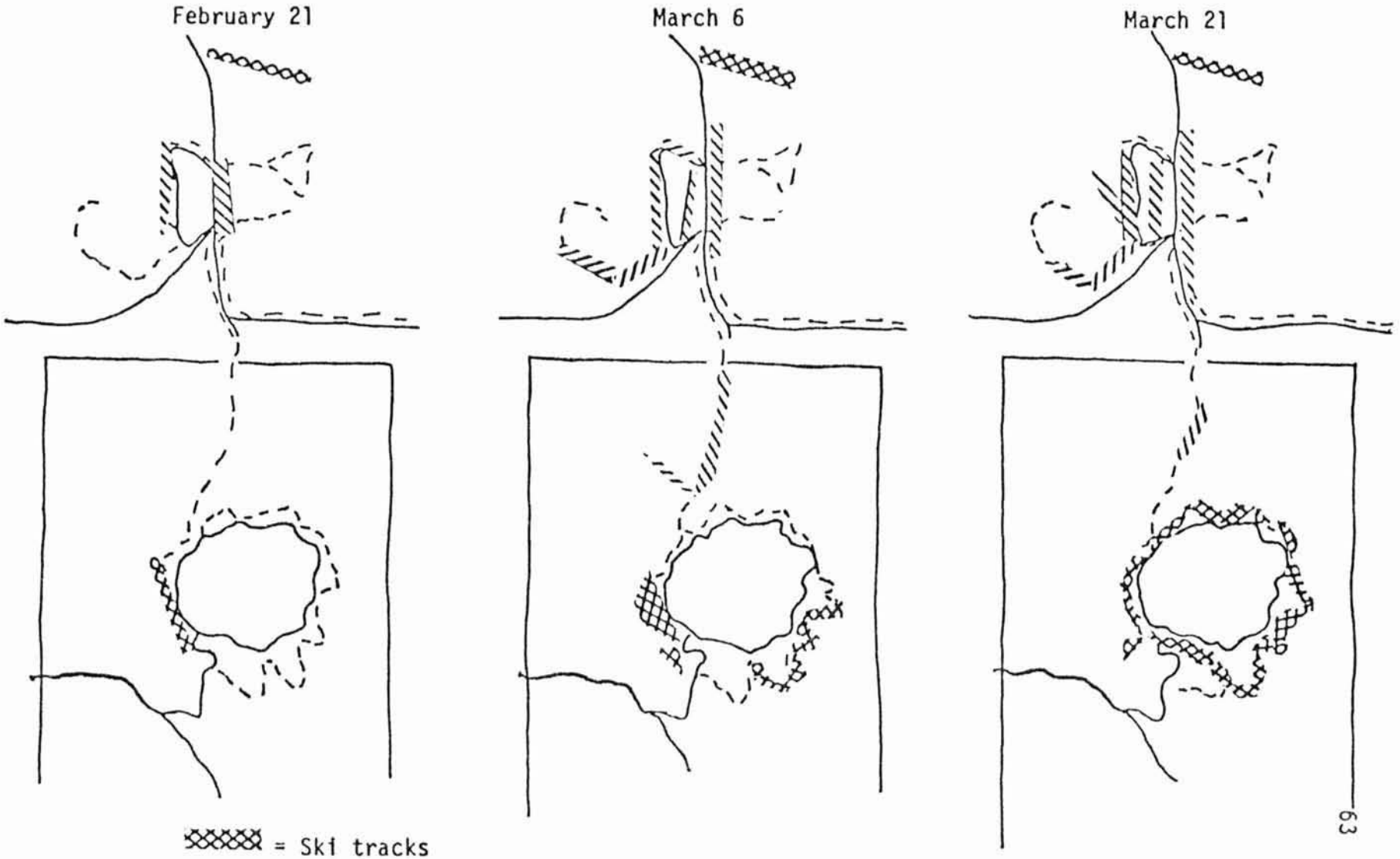



Figure 7. Tracks Mapped on Three Flights

Snowmobiles were more easily identified during the flights than were skiers. An obvious gathering place for snowmobiles was the Forest Service comfort station kept open at the south end of Diamond Lake. Snowmobiles were seen on the Summit Rock Road-new bypass road cut running along the east side of Diamond Lake. In several places on the roadcut, tracks gave evidence to off-trail snowmobile activity, especially where there were exposed slopes.

Snowmobiles were seen only on the March 6 flight within the park. Two machines were seen south of the Pumice Desert where they left the marked trail, circling several times in an open area west of the trail. These were the only off-trail snowmobiles or tracks seen in the park with the exception of tracks broadening the section of trail traversing the Pumice Desert.

The southeast entrance road into the park was also surveyed. No tracks were seen in the park on any of the flights.

It was very difficult to detect any kind of tracks beneath the trees. Howlock Trail and Thielsen Trail both running through the forest were not visible.

## Time Lapse Film Counts

From the camera monitoring the Crater Trail, we ended up with seven rolls of film covering the interval of January 29 through

March 13, including 37 days that can be definitely identified.

The film confirms that the great bulk of use of this area occurs on weekends. Reliability of the film counts is decreased by several possible factors:

1. With a camera interval of 37 seconds, users passed the camera without being recorded. This discrepancy can be somewhat corrected by double sampling *and calibration.*
2. *Any night use was unrecorded, except for one frame* on one roll, because the camera turned itself off at sunset.
3. Frost sometimes built up on the glass of the camera box, obscuring the view until it completely melted off.
4. Snow sometimes covered the glass, also blocking the view until it melted or was wiped off.

## Regression

Based on five sets of actual and film counts of snowmobiles, the equation relating the two is:

Actual count = 5.50 + 1.50(Film count)

$R^2$ = 0.31179775

An estimate of daily and total snowmobile use was calculated from average counts for all days on film, for Crater Trail.

The average film counts were fitted into the regression equation then expanded for the whole study period (Table 21). More calibration measurements will be made this coming winter to help increase the reliability of this estimate procedure.

TABLE 21. ESTIMATE OF SNOWMOBILE USE ON CRATER TRAIL*

| Average Weekday Use | Average Saturday Use | Average Sunday Use | Total Estimate (Jan. 1 - March 31) |
|---|---|---|---|
| 6 | 31 | 19 | 1040 |

*Estimate based on regression equation from rough calibration of double sampling at Crater Trail only. This table should be interpreted with extreme caution.

Estimate made for snowmobiles only. No skiers or snowshoers were present when the double sampling was done.

# IV. SUMMARY AND CONCLUSIONS

The purpose of the study has been to give area managers information about the winter visitors and use patterns in the Crater Lake - Diamond Lake area. This study presents initial data addressing the study objectives stated earlier.

## Describe winter recreation use patterns in the Crater Lake - Diamond Lake area, Oregon

### Interview-Questionnaire

1. At least 75 percent of all visitors interviewed were repeat visitors to the Crater Lake - Diamond Lake area.
2. Over 90 percent of all interviews completed were conducted on the weekend. Including all the weekend days of interviewing at all locations, an average of ten parties were contacted each weekend day.
3. The greatest percent of skiers and other users were interviewed at Annie Springs. Most Snowmobilers were contacted at the Diamond Lake Resort.
4. Over 84 percent of skiers and people in the other user category spent one day in the area. Forty percent of snowmobilers spent one day and 40 percent two days.

5. Only eight and nine percent, respectively, of snowmobilers and skiers contacted belonged to activity-oriented clubs.
6. About 22 percent of all users participated in more than one activity on their trip. Sightseeing and picture-taking were the major secondary activities.
7. The skiers and other users are younger than snowmobilers: 69 percent of skiers are less than 35 years old while only 34 percent of snowmobilers are less than 35.
8. There was a ten percent overlap of respondents visiting both Crater Lake and Diamond Lake. Twenty percent of Diamond Lake visitors also went to Crater Lake. Two percent of Crater Lake visitors also went to Diamond Lake.
9. About 45 percent of users interviewed were in parties of two. The majority of parties, 89 percent, contained from one to five persons.
10. Sixty-three percent of all respondents live in the three-county area: Douglas, Klamath and Jackson counties, surrounding the study area. Forty-six percent are from the major cities within each county: Roseburg, Klamath Falls and Medford.
11. Two out of three respondents are male.

12. More skiers are college educated than the other two groups.
13. The bulk of the skiers came to the area in sedans or station wagons. Most snowmobilers came in sedans pick-ups or pick-up campers. Most of the other users came in sedans or pick-ups.
14. Most groups were either couples, adult groups or a family with children. Most parties contained no children.
15. The trails or areas used vary greatly by user group:
    a. Forty-one percent of skiers visited the Rim Village area in the park.
    b. Seventy-five percent of snowmobilers took Round the Lake Trail or were somewhere in the immediate Diamond Lake area.
    c. Thirty-five percent of snowmobilers visited Crater Trail.
    d. The bulk of the other users went to Rim Village.
16. The majority of snowmobilers own their machines. Fifty percent of machines are 1973 or 1974 models. The most popular brands are Rupp and Ski-doo.
17. Less than one-third of the respondents contacted

an agency for information about the area. Forty percent of those who did, contacted Crater Lake National Park headquarters. Phone contacts were made most often with the bulk concerning weather or road or snow conditions.

18. Three-fourths of the respondents report checking the weather forecast before making a trip to the area. Most check television, radio and newspapers.

Flights and Mapping

1. Ski and snowmobile tracks are visible except under the forest canopy.
2. Ski tracks can be distinguished from snowmobile or mixed-use tracks, as long as ski tracks are not obliterated.
3. Users, when visible, can be distinguished as skiers or snowmobilers.
4. Ski tracks were seen all around the rim of the caldera on one out of three flights, but most were concentrated near the Rim Village and along the west rim.
5. Most of the snowmobiling activity was seen on and around Diamond Lake. Trails, gathering areas and play areas were all evident.

## Time-Lapse Photography

1. Skiers are distinguishable from snowmobilers although individuals of either group are impossible to identify.
2. Most activity occurs on weekends. More skiing was recorded during the week than snowmobiling ( with no data on nighttime use).
3. Visitors to the trail are under-represented due to frost on the glass, time interval too long and lack of nighttime monitoring. In several instances, a snowmobile appears in only one frame, and cross-country skiers may appear in only one or two frames.

## Electric-Eye Trail Counters

1. Trail counters were located on several trails in the Diamond Lake area. However, technical problems greatly reduced the reliability of readings given the conditions of the study.
2. Daily checks and maintainence could greatly increase the usefulness of counters for estimating trail use.

Describe and compare views of winter recreationists concerning area management, experience expectations, and encounters with other users.

1. All users were neutral to favorable about the facilities and developments listed. Crater Lake skiers were less favorable about providing more trails and more trail signs. Skiers in general were less favorable toward groomed trails. Snowmobilers were less favorable about interpretive programs.
2. Snowmobilers say they think it is all right for snowmobilers and skiers to meet along trails, in backcountry, at trail crossings or at areas of interest. Skiers favor separation of users except for sharing parking areas (neutral responses). Diamond Lake skiers reported neutral feelings about meeting at trail crossings or at areas of interest.
3. Crater Lake skiers favor limiting numbers in backcountry to prevent crowds; Diamond Lake skiers are neutral and snowmobilers oppose such limits. All groups responded neutrally about not liking to meet other people in backcountry.
4. Skiers and snowmobilers are significantly polarized on attitudes about snowmobiling within Crater Lake

National Park. Snowmobilers say snowmobiling is appropriate inside and outside the park and should not have lower noise levels in the park. They also do not mind meeting skiers at the rim of Crater Lake. Skiers feel snowmobiling is more appropriate outside the park and should have lower noise levels in the park if allowed there at all. Skiers ranged from agreement to disagreement concerning meeting snowmobilers at the rim.

5. Snowmobilers and skiers differ significantly in attitudes toward prohibiting snowmobiles from large areas. Skiers strongly agree with such restrictions while snowmobilers disagree but not as strongly.
6. Skiers prefer to avoid contact with snowmobilers on trails but many do not mind hearing snowmobiles in the distance a few times during the day. Snowmobilers say they do not mind meeting skiers; 62 percent report enjoying meetings.

## Limits of the Study

This study was not designed to provide a representative sample of the total visitor population from the area. Activity occurs in many different places within the study area, especially around Diamond Lake. The study focused on five specific areas in order to cover a wide range of visitors.

Generalizations that have been made refer only to visitors who returned the questionnaires; 20 percent did not. This group may be different somewhat from those who did respond.

Biases may exist within completed questionnaires because most interviews were conducted with the driver of the vehicle.

The analysis of attitudes reports what respondents say they believe or feel. This has not been checked against actual behavior.

## Conclusions and Recommendations

This study tentatively confirms the hypothesis that the background, behavior and attitudes of Crater Lake - Diamond Lake winter recreationists vary by type and location of activity.

The cross-country skiers and snowmobilers sampled fit some aspects of their popular images - the skiers like to be separate from snowmobilers in almost all situations while snowmobilers are

not as concerned with solitude and separation.

The skiers interviewed are not homogeneous, however. Diamond Lake skiers are closer in attitudes to snowmobilers on some attitude items than are the Crater Lake skiers. The findings suggest that some mixed trail and facility use could be implemented in the Diamond Lake area without serious conflict. In the Crater Lake area, separation of use seems to be indicated.

## Management Suggestions

A key to mixed-use trails and facilities is letting the users know that an area or trail is for mixed use. This can be done with clear trail markers and signs and appropriate interpretive maps or brochures. Most of the respondents have been to the area before and have some idea of what to expect. Providing information as to opportunities for solitude, isolation or separation from other types of use will help visitors choose the experiences they desire.

The local media - television, radio and newspapers in Douglas, Klamath and Jackson counties may be potentially effective for presenting information about the Crater Lake - Diamond Lake area. With only eight percent of skiers and snowmobilers belonging to ski or snowmobile clubs, contact with these clubs to reach area visitors would miss many users.

Low-level flights over the area after new snow and during heavy use periods can give a fairly accurate point-in-time picture of the distribution of activity in the area.

With some refinements, time-lapse photography can be an effective tool for estimating type and amount of trail use. Further study is needed to specify appropriate intervals between frames and camera operation at night. Additional data is needed for calibrating actual use from film counts.

Winter visitors to Crater Lake National Park and Diamond Lake are now described in some detail. There remain, however, gaps that could be filled by further analysis and research. Additional analysis of snowmobilers is needed to determine whether subgroups exist as with cross-country skiers. More refined counters and comprehensive counter monitoring is necessary for accurate estimates of use.

Managers may want to consider further research and planning concerning better trail signing, maps, brochures, interpretive programs, and users carrying adequate emergency equipment.

# Bibliography

Bloomfield, H.V. "Snowmobiles...Boon or Bane?" American Forests. 75(5):4, 1969.

Chubb, Michael, ed., Proceedings of the 1971 Snowmobile and Off the Road Vehicle Research Symposium held at Michigan State University, 1971.

Holecek, Donald, ed., Proceedings of the 1973 Snowmobile and Off the Road Vehicle Research Symposium held at Michigan State University, 1973.

Horney, Robert L. Snowmobiling. National Recreation and Parks Association Management Aids Bulletin #89, 1970.

International Snowmobile Industry Association (ISIA). Sounds of Snowmobiling in Winter. Washington, D.C.: ISIA, 1976.

_____. Snowmobiling and our Environment:Facts and Fantasies (draft). Washington, D.C.: ISIA, 1976.

Knopp, Timothy B. and Tyger, John D. "A Study of Conflict in Recreational Land Use : snowmobiling vs. ski-touring." Journal of Leisure Research. Vol. 5 No. 3. Summer, 1973.

Line, L. and Perry, J.D. "Snowmobiles: Love'em or Hate'em." National Wildlife. 10(1):21-23, 1972.

Lucking, E.H. "The Snowmobile: Recreation or Ruination?" Ontario Fisheries and Wildlife Review. 8(4):3-6, 1969.

Masyk, William J. The Snowmobile, A Recreational Technology in Banff National Park: Environmental Impact and Decision Making. National Park Series No. 5. London: University of Western Ontario, 1973.

National Park Service. Resources Basic Inventory For Crater Lake National Park, 1974.

_____. Resources Management Plan, Crater Lake National Park, 1970.

_____. Workshop Preliminary Draft, Environmental Assessment for Crater Lake Master Plan, 1975.

Newmann, P.W. and Merriam, H. Gary. "Ecological Effects of Snowmobiles." Canadian Field Naturalist. 86:207-212, 1972.

Nicholes, Garrell E. and Associates, Inc. for the Utah Outdoor Recreation Agency. Utah Snowmobiling and Cross-country Skiing Resource Inventory, 1975.

Petersen, Roger G. Exercises in Statistical Inference. Corvallis: OSU Bookstores, Inc., 1972.

USDA-Forest Service. Snowmobile Noise by Robin Harrison, Mechanical Engineer, Equipment Development and Test Report 7120-5. San Dimas, California, 1974.

USDI-Bureau of Outdoor Recreation. Final Environmental Statement Departmental Implementation of Executive Order 11644 Pertaining to Use of Off-Road Vehicles on the Public Lands, 1974.

USDI-Tast Force Study. Off-Road Recreational Vehicles, 1971.

US President."Federal Occupational Safety and Health Administration" Federal Register. 36 No. 105 29 May, 1971.

Warwick, Donald P. and Lininger, Charles A. The Sample Survey: Theory and Practice. McGraw-Hill, Inc., 1975.

# APPENDICES

Appendix 1. Interview, Questionnaire, Follow-up Letter

OMB#42S-75042
Expires: May, 1976

INTERVIEWER'S FORM

Interviewer _____

Interview Number _____

Weather: Clear _____
Broken Clouds _____
Overcast _____
Raining _____
Snowing _____

Temp. _____
Wind Speed _____

Interview Location _____
Day of Week _____
Date _____

Type of Vehicle:
_____ Sedan
_____ Station Wagon
_____ Van
_____ Pickup
_____ Camper Pickup
_____ Motorhome
_____ 4-Wheel Drive
_____ Other: _____

Hello, my name is _____. The School of Forestry at Oregon State University is conducting a study of winter recreation activities in the area around Crater Lake and Diamond Lake. I would like to ask you a few short questions.

1. How many people are in your party today, including yourself? _____
2. How many children under 16 does that include? _____
3. How many days will you be here? _____
4. Where is your home? _____
5. Is this your first trip to the Crater Lake-Diamond Lake area?

yes _____ no _____

We would like to give you a questionnaire to fill out when you get home. This information will enable park and forest managers to better understand the winter recreation situation in the Crater Lake-Diamond Lake area.

The questionnaire asks about the kinds of recreational activities you will have done this trip so it's important that you fill it out after you get home, not now. Of course, your answers will remain confidential.

---

To be separated from interview form when data collection completed (estimated date: May 1, 1976).

We would also like to send you a summary of the study when we're finished this summer and possibly contact you later in the study.

Could we have your name and address please?

_____

_____

_____ Zip _____

We appreciate your help. Thank you.

| NOTE: Name and address to be destroyed after sending summary report of study to respondent. (No later than August 1, 1976. |
|---|

OMB #42S-75042 81
Expires:May, 1976

Department of
Forest Management

Oregon State University

Corvallis, Oregon 97331

# WINTER SPORTS QUESTIONNAIRE

We are conducting a study of winter recreation activities in the area around Crater Lake and Diamond Lake. The information from this questionnaire will enable park and forest managers to better understand the winter recreation situation in the Crater Lake-Diamond Lake area.

Please complete and return this questionnaire within a day or two after you return from this trip. It asks about the kinds of recreational activities you will have done this trip so it's important that you fill it out after you get home and not now.

It is important to know how everyone feels about winter recreation in this area. We need to know what your views are. Of course, your answers will remain confidential.

We are interested in what you did on your recent trip to the Crater Lake-Diamond Lake area on _____.

1. Which of these activities did your group engage in on this trip? (Check all that apply)

| | |
|---|---|
| _____ tobogganning | ____ snowmobiling |
| _____ innertubing | ____ ice skating |
| _____ cross-country skiing | ____ sightseeing |
| _____ snow shoeing | ____ photography |

2. Did you do other outdoor activities that weren't listed? yes _____ no _____
   What did you do? _____
   _____

3. What type of group were you with?

____ by yourself
____ family with children
____ families with children
____ couple
____ teenage group
____ adult group
____ organized group (name of organization:_____)

4. If you used a snowmobile on this trip, did you or someone in your group:

____ own it?
____ rent it?
____ borrow it?

What year, make and model is it, if you know? _____

_____

5. Do you own or did you rent any of this equipment for this trip?

| | own | rent |
|---|---|---|
| a. snowshoes | ____ | ____ |
| b. cross-country skis | ____ | ____ |
| c. skates | ____ | ____ |
| d. innertubes | ____ | ____ |
| e. toboggans | ____ | ____ |
| f. downhill skis | ____ | ____ |

6. Please place a check beside any of the following equipment that you usually carry as you travel over snow (snowmobiling, cross-country skiing, snowshoeing or hiking).

____ a. extra clothing
____ b. lunch-emergency rations
____ c. canned heat or small stove
____ d. candle & waterproof matches
____ e. signalling mirror
____ f. map & compass
____ g. plastic whistle
____ h. tarp for shelter
____ i. flashlight
____ j. collapsible saw
____ k. first aid kit
____ l. tools, spare equipment parts

Other (please list): _____

_____

For Snowmobilers Only:

____ m. extra gas
____ n. snowshoes or skis for all in party
____ o. length of nylon rope
____ p. other (please list): _____

_____

7. Place a check beside the areas and trails listed below which you visited on the trip.

_____ Crater Trail, from the north entrance of the park to the rim
_____ Rim Village, Crater Lake National Park
_____ trail along West rim, Crater Lake
_____ trail along East rim, Crater Lake
_____ Round-the-Lake Trail, Diamond Lake
_____ Old Man Trail
_____ South Shore Loop
_____ Chemult Run
_____ Thielsen Trail
_____ Howlock Trail
_____ Wits End Way
_____ others, please list: _____
_____
_____

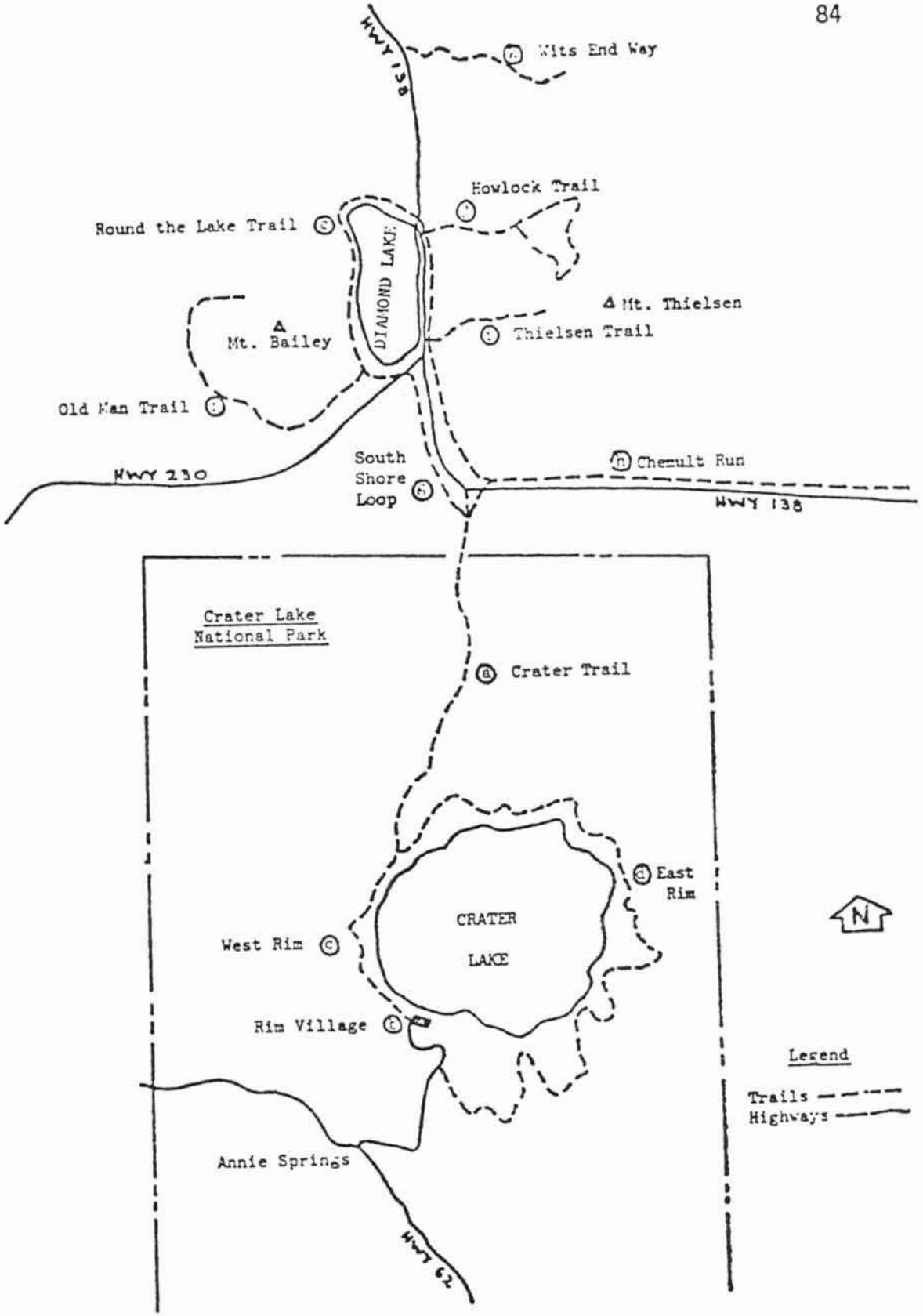
8. How many trips have you made to Diamond Lake so far this winter? _____

9. How many trips did you make to Diamond Lake last winter? _____

10. How many trips have you made to Crater Lake National Park so far this winter? _____

11. How many trips did you make to Crater Lake National Park last winter? ____

12. Do you go to other areas for winter recreation? yes ____ no _____
Where? _____
How many trips have you made to these areas this winter? _____
How many trips did you make to these areas last winter? _____
What do you do at these other areas? _____
_____


HWY 138
Wits End Way
Howlock Trail
Round the Lake Trail
DIAMOND LAKE
Mt. Thielsen
Mt. Bailey
Thielsen Trail
Old Man Trail
HWY 230
South Shore Loop
Chemult Run
HWY 138
Crater Lake National Park
Crater Trail
East Rim
CRATER LAKE
West Rim
Rim Village
N
Legend
Trails
Highways
Annie Springs
HWY 62

13. What is your age? _____

14. Male _____ or Female _____

15. Check the highest level of school completed.

____ High school graduate
____ Some college or technical school
____ College graduate
____ Post graduate

16. Have you ever contacted the National Park Service and/or the U.S. Forest Service before making a winter visit to the Diamond Lake-Crater Lake area? yes ____ no _____

Where did you contact them? _____

Was the contact made by:

____ telephone
____ letter
____ visit to the office

What kinds of information were you seeking? _____

Did you receive the information you wanted? yes _____ no _____

17. Do you make a special effort to catch the weather forecast before leaving on a trip to Crater Lake-Diamond Lake area? yes ____ no _____

Do you check:

| | | |
|---|---|---|
| TV stations: | yes _____ | no _____ |
| radio stations: | yes _____ | no _____ |
| newspapers: | yes _____ | no _____ |

18. Are you a member of any of these types of organizations? (please check all appropriate types

____ a. snowmobile clubs
____ b. ski touring or Nordic clubs
____ c. 4-wheel drive clubs
____ d. not a member of any.

19. Please check the blank that comes closest to your view of the following developments.

| | Strongly Favor | Favor | Neutral - No Opinion | Disfavor | Strongly Disfavor |
|---|---|---|---|---|---|
| a. Constructuion of warming shelters along heavily used trails. | ___ | ___ | ___ | ___ | ___ |
| b. Interpretive programs on winter safety and survival. | ___ | ___ | ___ | ___ | ___ |
| c. More signs marking trails. | ___ | ___ | ___ | ___ | ___ |
| d. Potential hazards marked and mapped. | ___ | ___ | ___ | ___ | ___ |
| e. More trails developed. | ___ | ___ | ___ | ___ | ___ |
| f. More groomed trails. | ___ | ___ | ___ | ___ | ___ |
| g. Interpretive programs on the animals, vegetation, and geology of the area. | ___ | ___ | ___ | ___ | ___ |

Other suggestions for development:

_____

_____

_____

20. Based on your winter recreation experiences, please check the blank that comes closest to your views of the following statements.

| | Strongly Agree | Agree | Neutral - No Opinion | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| a. I don't like to meet other people along trails. | ___ | ___ | ___ | ___ | ___ |
| b. Snowmobiles make the backcountry safer for skiers because they can provide emergency aid. | ___ | ___ | ___ | ___ | ___ |
| c. It is better to have snowmobiling on forest land <u>outside</u> National Parks than <u>inside</u> Park boundaries. | ___ | ___ | ___ | ___ | ___ |

20. (continued)

| | Strongly Agree | Agree | Neutral - No Opinion | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| d. It's okay for cross-country ski trails and snowmobile trails to meet at areas of general interest -- such as at the rim of Crater Lake. | ___ | ___ | ___ | ___ | ___ |
| e. It's okay for cross-country ski trails and snowmobile trails to cross if trail crossings are well marked. | ___ | ___ | ___ | ___ | ___ |
| f. To prevent crowding, the number of people on backcountry trails should be limited. | ___ | ___ | ___ | ___ | ___ |
| g. Snowmobiles pack the snow and make cross-country ski trails easier to travel. | ___ | ___ | ___ | ___ | ___ |
| h. Snowmobiling is an appropriate use of Crater Lake National Park. | ___ | ___ | ___ | ___ | ___ |
| i. Large areas should be set aside where snowmobiles are prohibited. | ___ | ___ | ___ | ___ | ___ |
| j. Snowmobilers and cross-country skiers can share parking and unloading areas without problems. | ___ | ___ | ___ | ___ | ___ |
| k. Legal noise levels from snowmobiles should be lower inside Crater Lake National Park than outside the park. | ___ | ___ | ___ | ___ | ___ |

21. Please give your views on these statements only if you use cross-country skis or snow shoes.

Cross-country skiers - Snowshoers only

| | | | | | |
|---|---|---|---|---|---|
| a. It's good to know that snowmobiles are around in case I needed help in an emergency. | ___ | ___ | ___ | ___ | ___ |
| b. Once I leave parking areas, my day along trails is ruined if I hear the sounds of snowmobiles. | ___ | ___ | ___ | ___ | ___ |
| c. When I'm away from parking areas, I don't mind hearing distant sounds of snowmobiles a few times a day. | ___ | ___ | ___ | ___ | ___ |
| d. Snowmobiles are a safety hazard when they're on trails used by cross-country skiers. | ___ | ___ | ___ | ___ | ___ |

| 21. (continued) | Strongly Agree | Agree | Neutral - No Opinion | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| e. Given the choice, I pick trails to avoid encountering snowmobiles. | ___ | ___ | ___ | ___ | ___ |
| f. I don't mind using the trails where I know I may meet snowmobiles. | ___ | ___ | ___ | ___ | ___ |

22. Please give your views on these statements only if you use a snowmobile.

Snowmobilers Only

| | | | | | |
|---|---|---|---|---|---|
| a. I don't mind encountering cross-country skiers on trails marked for snowmobiles. | ___ | ___ | ___ | ___ | ___ |
| b. Cross-country skiers are a safety hazard when they're on trails used by snowmobiles. | ___ | ___ | ___ | ___ | ___ |
| c. I enjoy meeting cross-country skiers while snowmobiling. | ___ | ___ | ___ | ___ | ___ |
| d. Given the choice, I would choose trails to avoid meeting cross-country skiers. | ___ | ___ | ___ | ___ | ___ |

Please add any comments or observations you have on winter recreation or this questionnaire. _____

_____

Thank you very much for your time and patience.

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/__/ Please check if you would like a copy of the study summary sent to you.

Department of
Forest Management

Oregon State University

Corvallis, Oregon 97331

Dear Winter Recreationist:

While visiting the Crater Lake-Diamond Lake area recently, you were interviewed for a winter recreation study being done by Oregon State University. At that time you were given a questionnaire concerning your activities to fill out and mail back. If you have already returned the questionnaire, please consider this a special "thank you" for your promptness. If, as we often do ourselves, you have put the questionnaire aside to finish later, please fill it out and return it right away. There will probably never be a better time than now.

In case you've lost or misplaced the questionnaire, we're including another copy with return envelope. Thank you for your help.

Sincerely,

Terry Jo Thompson
Research Assistant
Department of Forest Management

Dr. Kent B. Downing
Assistant Professor
Department of Forest Management

cr
Enclosures

Appendix 2. Interview Schedule

| Date | Day | Location | Weather | Camera-Notes |
|---|---|---|---|---|
| 1-10 | Sat. | N. Entrance | Overcast | ----- |
| 1-11 | Sun. | Howlock | Snow | ----- |
| 1-14 | Wed. | N. Entrance | ----- | ----- |
| 1-17 | Sat. | Thielsen | Broken Clouds | ----- |
| 1-18 | Sun. | Annie Spr. | Clear | ----- |
| 1-19 | Mon. | Howlock | ----- | ----- |
| 1-24 | Sat. | Annie Spr. | Clear | ----- |
| 1-25 | Sun. | N. Entrance | Broken Clouds | ----- |
| 1-29 | Thurs. | ----- | ----- | Began 1st Roll |
| 1-31 | Sat. | Dia. Lk. Lodge | Clear | Night picture |
| 2-1 | Sun. | Dia. Lk. Lodge | Clear | ----- |
| 2-3 | Tues. | Dia. Lk. Lodge | Overcast | ----- |
| 2-6 | Fri. | ----- | ----- | Begin 2nd Roll |
| 2-7 | Sat. | Howlock | Clear | ----- |
| 2-8 | Sun. | Thielsen | Overcast | ----- |
| 2-12 | Thurs | Annie Spr. | Broken Clouds | ----- |
| 2-13 | Fri. | ----- | ----- | Begin 3rd Roll |
| 2-14 | Sat. | Annie Spr. | Snow | ----- |
| 2-15 | Sun. | Dia. Lk. Lodge | Snow | ---------- |
| 2-19 | Thurs. | ----- | ----- | Begin 4th Roll |
| 2-21 | Sat. | N. Entrance | Clear | First Flight |
| 2-22 | Sun. | Annie Spr. | Broken Clouds | ----- |
| 2-26 | Thurs. | Thielsen | ----- | ----- |
| 2-27 | Fri. | ----- | ----- | Begin 5th Roll |
| 2-28 | Sat. | Howlock | Snow | ----- |
| 3-5 | Fri. | ----- | ----- | Begin 6th Roll |
| 3-6 | Sat. | Dia. Lk. Lodge | Clear | Second Flight |
| 3-7 | Sun. | Howlock | Snow | ----- |
| 3-8 | Mon. | Annie Spr. | ----- | ----- |
| 3-12 | Fri. | ----- | ----- | Begin 7th Roll |
| 3-13 | Sat. | N. Entrance | ----- | Double Sample |
| 3-14 | Sun. | N. Entrance | Broken Clouds | Double Sample |
| 3-17 | Wed. | Dia. Lk. Lodge | Overcast | ----- |
| 3-19 | Fri. | ----- | ----- | Camera Down |
| 3-21 | Sun. | ----- | ----- | Third Flight |

Appendix 3. Organizational Membership (in percent)

| | All respondents (N=201) | Skiers (N=94) | Snowmobilers (N=39) | Others (N=68) |
|---|---|---|---|---|
| Snowmobile Club | 2 | 0 | 8 | 0 |
| Cross-country ski/ Nordic Club | 4 | 9 | 3 | 0 |
| 4-Wheel Drive Club | 1 | 0 | 5 | 0 |
| Not a Member | 93 | 91 | 84 | 100 |

Appendix 4. Residence of User Groups (in percent)

| Location | All respondents (N=201) | Skiers (N=95) | Snowmobilers (N=41) | Others (N=65) |
|---|---|---|---|---|
| Roseburg | 21 | 25 | 32 | 8 |
| Other Douglas Co. | 6 | 3 | 12 | 5 |
| Klamath Falls | 16 | 13 | 2 | 29 |
| Other Klamath Co. | 3 | 2 | 2 | 8 |
| Medford | 9 | 12 | 8 | 6 |
| Other Jackson Co. | 9 | 10 | 2 | 9 |
| Grants Pass | 7 | 5 | 8 | 9 |
| Other Josephine Co. | 0 | 0 | 0 | 1 |
| Eugene | 7 | 8 | 5 | 5 |
| Other Lane Co. | 2 | 0 | 5 | 1 |
| Coos Bay | 5 | 2 | 15 | 3 |
| Other Coos Co. | 0 | 0 | 2 | 0 |
| Corvallis | 0 | 0 | 0 | 1 |
| Salem | 1 | 2 | 0 | 0 |
| Other Polk/Marion Co. | 0 | 1 | 0 | 0 |
| Portland Area | 3 | 3 | 2 | 1 |
| Seattle | 0 | 1 | 0 | 0 |
| Other Washington | 1 | 2 | 0 | 1 |
| Northern California | 1 | 2 | 0 | 1 |
| Central California | 4 | 3 | 5 | 5 |
| Southern California | 3 | 2 | 0 | 6 |
| Other States | 2 | 2 | 0 | 1 |

# Appendix 5. Survey Comments

## Other Users

"I'm sorry we could not give much information as we were just at the Lake for the weekend and were snowing the whole time."

"Leave snowmobiles out of State Parks!"

"I saw so many people having such a good time, it's a pleasure to know that they have a place such as Crater Lake (and Diamond) to go. Think your questionnaire should gain much information for you."

"I think it is a good questionnaire. As far as winter goes - I use the Park more in the summer."

"Would like very much to see a good ice skating area developed at Diamond Lake."

"Snowmobiles should be kept separate from non-motorized activities but they can be mixed as long as caution is used!"

"I know that a study has been made for a ski development on the west slope of Mt. Bailey. I wonder if anyone ever thought about the north slope of Cinnimon Peak--an ideal place and close to a paved all winter road."

"Glad to assist."

"I was visiting in Oregon only a few days. I'm very glad I took the time to go to Crater Lake. I would like to come back some day."

"Separate space alloted to snow mobiles. They disturb natural settings and wildlife for snowshoers and cross-country skiers."

"Its a nice place to go. I only wish it wasn't so far or I'd visit more often."

"Snowmobilers should be restricted in where they can go in Crater Lake National Park. But at least ½ of the Park should be open to them."

"Snowmobiling should be strictly restricted to certain areas, as small as possible, because they are loud, sources of pollution, and damage tree seedlings."

"It did not seem to me that there was any recreational activities unless you skied, snowmobiled. All we could do is walk on the frozen lake."

"I have used the area so little I don't feel qualified to answer most questions."

"Overnight winter facilities. Gab session after a day of skiing around a lodge, fire, etc."

"The crowded conditions made it very hard to load and unload dogs and to train them."

"We noticed that the snowmobiles on the lake ran at a fast speed and some were too close to the hills for safe sliding down the hills."

"Opening of a few more roads for 4-wheel drive."

Cross-country Skiers and Snowmobilers

"I feel there is a very real need for winter recreation. Cross-country skiing is wonderful but not everyone has the physical stamina to participate, therefore, snowmobiling is a good winter sport for whole families.

"There has been much talk that the Sierra Club is working hard to stop much of our recreation and even logging in Oregon. I'm sure many feel as I do "Sierra Club go home."

"Here in Oregon we are having to share our wonderful recreation areas more and more with people from California. Why do Oregonians sit by and let the Sierra Club try to do to our beautiful state what they have done to California? Where will we have to go to enjoy the out of doors?

"One report said our snowmobiling was ruining the flora and fauna on the desert going in to Crater Lake. Are they serious? Have they been there in the summer? There is nothing to ruin. In our years of snowmobiling (we are just beginning to cross-country ski) we have never seen litter on the trails--we have always enjoyed meeting with people and found snowmobilers ready and anxious to help anyone in trouble on the trail.

"We need our families doing and enjoying things together. Keep Diamond Lake and Crater Lake open--we need these facilities."

"I snowmobile and cross-country ski."

"I own 2 large snowmobiles and have used them in rescuing downed fliers and others in Mountain Rescue work."

"There are 2 of us--we know its unusual to like both skiing and snowmobiling, but we do do both at Diamond. Our main desire is that the number of both be kept from increasing. At the present time there's room for all of use. Won't be if any more of either kind come here."

"From my own experience I see no real problems and some advantage to the joint use of trails by snowmobile and skis. However there are some trails which should definitely be one or the other."

Snowmobilers

"This was first time to use snowmobile - do not ski - unable to comment on many questions."

"I commend this study and recommend more of them. Public opinion should formulate policy."

"Have cabin at Dia. Lk--Have snowmobiled for past 6 yrs--and 6 yrs ago cross-country skiers were practically non-existent. Now they clutter up our trails and complain about the noise! They are supposed to be purists, so why don't they travel on unused snow, instead of in our tracks, and then bitch if we happen to come by// It was sno-mobiling that originally made it profitable to keep some resorts open in the winter. Cross-country skieing means traveling over un-groomed trails or no trails at all. Let them do that!"

"Very nice at your area. I feel snowmobiling should be restricted in some parts so area isn't harmed. Such as young trees. Would like to see area set aside for steep hills and jumps. Thank you for asking."

"I feel everyone should be able to enjoy their sport. I feel a good effort has been made to get information."

"We feel all winter recreation could share the areas--the snowmobiles pay a license--skiers don't--No one should be left out from enjoying this beautiful winter wonderland!"

"We would like to see the trail from Diamond Lake to Crater Lake Lodge opened for snowmobiles."

" There is room for all in this area and I feel it is the best area in the world for winter sports."

" I feel we all should be able to enjoy our particular sport in the Parks--as well as the Nat'. Forests, etc."

" I have spent many hours snowmobiling with my family and snowshoeing in these areas, and I cannot see where the noise of snowmobiles bothers the animals to any extent. I have caught many martins within 30' to 50' of well used snowmobile trails. And I have also seen cougar tracks walking in the snowmobile trails."

"Snowmobiling is the only way we can go as husband is an amputee. We enjoy traveling the trails leisurely and visiting with cross-country skiers we meet along the way."

" More activity set up in areas other than cross-country skiing and snowmobiling. Lower food prices at lodges."

"There are already too many rules and regulations restricting and dividing the different forms of recreation, which have no positive effects that I can see. I believe some trails can and should be integrated for everyone's use, not just selected groups. I believe in the free right for everyone enjoying the outdoors to prepare himself mentally and physically for the excursion, as long as he does no harm to anyone else. Agencies and organizations should butt out. I am also hoping for the ski resort on Mt. Bailey!"

"Properly quieted and sensibly used, snowmobiles can be compatible with other recreational uses. Crater/Diamond Lake area is a beautiful recreational area. Not yet over-developed and over-regulated."

"There is room for both parties involved, lets cut out the hate, greed and discontent, and have fun in the snow country! Have a nice day."

"I have been snowmobile since 1969, and can see no real conflicts between cross-country- and snowmobile in this area---except on some of the people who rent machines and are not aware - respectful of other on the trails. I have been to a meeting at the Douglas County court house on the Diamond/Crater Recreational use. All types of recreation's were present! Did not see or hear much opposition between snowmobiling and cross-country sking at all!"

"We are new to snowmobiling and winter sports, so our opinion is not quite true to context of this questionnaire."

" I didn't see any rangers (to ask questions), their should be a place to rent equipment for day use only."

" The trails and National Park and Forest belong to all of us. So why don't we all use them together."

"We are just starting to snowmobile so really don't know too much about this."

"I think that multiple use of our recreation areas are best, but the safety factor of motor vehicles and skiers and snowshoe people has to be considered. Heavy use by skiers in snowmobile trails could be dangerous but courteous consideration by all can solve any problems."

Cross-country Skiers

"It was great that the road was plowed up to the lake. Makes it a beautiful day trip. Hope the forest service will continue this practice."

"Not much to see at Crater Lake in the winter."

" I have never cross-country skiied in this area."

"Taped comments of visitors exiting the park would be a more reliable source of info than a questionnaire. These queries are too general and often vague."

"Snowmobiles are extremely noisey and DIRTY. They have the noise and stink of a LA freeway. I ski to enjoy peace and quiet, not to be run over by a snowmobile goint 50 mph. In my opinion, they can only be tolerated if the trail is wide and the snowmobiles are few and far between."

" We feel cross-country skiing, snowshoeing and snowmobiles are compatible. All the snowmobilers have been courteous to us. We feel there should be more overnight lodging facilities for the winter sports enthusiasts. There shouldn't be a 2-3 month waiting list to get lodging. The earliest cabin we could get was the 1st weekend of April. That's 2½ months in advance. That's too long!"

"I would much rather see snowmobiling confined to areas (even in Nat'l. Park Rec. areas) if areas are marked and designated accordingly, rather than allowing snowmobiling at random outside of designated areas."

"My wife and I really enjoy getting out in the woods in this area, we would rather not have snowmobiles around."

"Snowmobiles should be allowed only in designated areas such as the Mojave Desert."

"Strongly limit snowmobiles, especially in National Parks. The Parks and forests should be for wildlife and plants first, people second, and machines last."

"Snowmobiles should be limited to rescue operations. They are too noisy, potentially dangerous, and are obviously used by people too lazy to use their legs!"

" Good questions! Snowmobile use at Crater Lake would be appropriate and is so at the North Entrance where X-C skiers are few and far between. When snowmobiles were allowed on the rim road into the lodge area, we had some bad encounters."

"Crater Lake is a beautiful and semiwild place. I'd hate to see it developed any more than it already is."

"As with any ORV, the impact of a snowmobile is determined by the operator."

"Snowmobilers are very inconsiderate of other people and the environment. It is very difficult to ski in snowmobile trails, your skiis will not grip the snow, will follow any little groove."

"My opinions on snowmobiles are not based on observations in Crater Lake park, however I do feel that they (snowmobiles) destroy the serenity of the country."

"This paper seemed OK - I wonder if anything will come of it, though?"

"Maximum noise levels on all snowmobiles should be set quite low when on federal lands. Their operation should be condoned only on public roads, and not on all of them. It's nice to see the greater emphasis the NPS and USFS has been placing on winter recreation in the recent seasons."

"I liked the quiet of the wood which is getting harder to find."

"I believe it ot be important to have areas which are free of snowmobiles in winter and motorbikes in summer."

"We need more recreation dept. graduates working in parks and forests - fewer forestry grads!"

'*I go up to the woods to get away from people, cars, and noise* - hence I strongly dislike noisy, smelly snowmobiles."

"Good--why not save paper and make it smaller - what about user characteristics--the rich and educated or do all segments of the population make it here."

"In light of the parks directing policy of preserving the areas in a natural state, I think snowmobiles should be prohibited - the same as motorbikes and offroad vehicles. Roads should be the only permanent disturbance to the park ecosystem. Other disturbances should be temporary, by people when they walk through."

"I like the outdoors kept free from all litter and vehicles, they hinder and ruin nature."

"Both snowmobiles, motorcycles, and 4-wheelers destroy or impair wilderness values. Persons enjoying their use should have a separate place where they can join in a community effort toward creating the most dust, fumes and noise possible for their mutual enjoyment. I'd suggest a race track."

"Mileage on trails to vistas,pt. of interest or intersection with another trail."

"I think snowmobiles should be muffled more. Their noise is ridiculous."

"It is probalby evident after reading the questionnaire that our group (and nearly all of the people that we are acquainted with) are strongly against the unrestricted use of snowmobiles in wilderness areas. This attitude should not be difficult for anyone to understand who is concerned about the purity of our environment. I realize that snowmobilers are also just trying to escape the pressures of the city, but what many of them don't realize is that they are making a city out of many of our previously untouched wildernesses. In an Alpine area, several parties of ski-tourers and snowshoers may co-exist without ever being aware of one-another, and if they do know of each others presence, they will still not feel crowded. Thus, many people can get away from the pressures of the city, while producing little or no effect on the country or its permanent inhabitants. One snowmobile driven through the same area makes an inescapable insistence on its own presence. Anyone else in that area is stuck with an awareness of that presence, whether the driver passes right on by or shouts out a greeting over the roar of their engine. It merely increases the feeling of crowding that one is trying to avoid by heading for the hills in the first place.

"Still another reason for my prejudice against motor vehicles in the back-country stems from the excessive ease with which the operator reaches his destination, or at least tries to. I think that one's attitude toward one's environment is always related to the effort and speed and personal involvement one has in traveling through it. Sticky snow to a skitourer is likely to be challenging in the way of a friend with difficult idiosyncrocies, while to the snowmobile it is more often a nuisance for which he has no affection.

"I don't want to give the reader the impression that I am down on all motor-vehicles in all non-metropolitan areas. I merely trying to convey the concern that we have about our wilderness areas. I would like to see more large areas restricted to only non-motorized recreation, and a careful eye kept on the growing snowmobile population."

"Snowmobiles noise limit, because when you are sking you like to see the animal life around you and when you have a lot of noise you don't get the chance."

"The noise from snowmobiles is objectionable. I like nightskiing on lake, but find it dangerous to share the lake with the snowmobiles. Am working on a system of reflectors and lights on poles and clothing."

"Snowmobiles can be of value when packing on trail however their function and use has become a source of irritation because of their noise and pollution factors not to mention some exhibitionist type drivers. Disappointed no mention made of the sport of sled dog racing; it is currently under consideration for future winter olympics."

"Although a snowmobile has it's purpose and it's uses, I object heartily to its misuse and its obnoxious noise in the wilderness."

"How do you plan on using the results?"

"I do not disagree with the use of snowmobiles in special areas but I do feel the special use permit for snowmobile concession at Diamond Lake should be revoked and use restricted to trail and only non shoreling areas of lake."

"We prefer mid week trips to avoid the snowmobile traffic."

"I firmly believe snowmobilers should be kept out of the immediate area of the Diamond Lake Lodge; they are a hazard to pedestrians and on several occasions, I have seen small children driving them completely out of control. Their noise on the Lake at night (after 10:00 pm) has been a nuisance. There should be <u>much more</u> enforcement of snowmobilers where signs are posted that they are prohibited. They <u>completely</u> ignore these signs."

"I believe some areas should be set aside for cross country skiing <u>only</u>--also for snowmobiles--also on x-country trails - dogs should not be allowed--they ruin the trails and are a hazard encountering one as you ski - (and I'm a dog lover - just not the place for them!)."

"No dogs on X country trails. No snowmobiles around lodge after 11 oclock at ngiht."

"Snowmobiles and cross country skiing should be allowed on some trails only if there are other trails limited to either ie.--- snowmobile trails only and cc skiing trails only."

" FS and NPS and Douglas County should be encouraged to create additional parking area on hwy 138 to disperse people and avoid traffic hazards. Additional trails for X country skiers will be needed as the sport becomes more popular."

"I hope the D-Lake and C-Lake area can be something other than a race track for snowmobiles."

"I like snowmobiles but not when I'm cross-country skiing. Both are great fun."

"Recently moved to Oregon from Pennsylvania and we love it here!"