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OUTDOOR RECREATION IN THE
REGIONAL COPPER-NICKEL STUDY AREA

Minnesota Environmental Quality Board
Regional Copper-Nickel Study
Author: Sara Webb

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ABSTRACT

Geographic patterns of outdoor recreational use in the Regional Copper-Nickel Study Area were investigated as part of a study of potential copper-nickel mining impacts in northeastern Minnesota. With the objective of characterizing recreational use of facilities, water bodies, and public lands, interviews were held with thirteen field land managers and others familiar with the Study Area. Findings from this interview program together with past recreation research provide a data base on existing recreational use necessary to impact analysis.

Numerous public and private recreation facilities are located along Study Area lakes and streams. Outside facilities, public and some private lands are used for diverse land-based activities when afforded road, trail, or surrogate trail access; old logging roads serve this function in the most heavily-used areas, although some activities such as backpacking and winter camping rarely occur in recently-logged zones. Dense settlement and lowland bogs restrict access by most land-oriented recreationists.

Water-based recreation is concentrated on large, deep lakes in the Study Area's northern half. Part of the Boundary Waters Canoe Area (BWCA), a national wilderness area, lies within the Study Area's north boundary. Canoeists and fishermen use BWCA lakes heavily. Dozens of smaller lakes throughout the Study Area serve less diverse but sometimes more intensive recreation functions. Only a few lakes lack any recreational use; most are quite small and lack access or recreation resources. Most Study Area streams have limited recreational use because of low water levels, with the exception of two rivers, the Kawishiwi and the St. Louis.

INTRODUCTION TO THE REGIONAL COPPER-NICKEL STUDY

The Regional Copper-Nickel Environmental Impact Study is a comprehensive examination of the potential cumulative environmental, social, and economic impacts of copper-nickel mineral development in northeastern Minnesota. This study is being conducted for the Minnesota Legislature and state Executive Branch agencies, under the direction of the Minnesota Environmental Quality Board (MEQB) and with the funding, review, and concurrence of the Legislative Commission on Minnesota Resources.

A region along the surface contact of the Duluth Complex in St. Louis and Lake counties in northeastern Minnesota contains a major domestic resource of copper-nickel sulfide mineralization. This region has been explored by several mineral resource development companies for more than twenty years, and recently two firms, AMAX and International Nickel Company, have considered commercial operations. These exploration and mine planning activities indicate the potential establishment of a new mining and processing industry in Minnesota. In addition, these activities indicate the need for a comprehensive environmental, social, and economic analysis by the state in order to consider the cumulative regional implications of this new industry and to provide adequate information for future state policy review and development. In January, 1976, the MEQB organized and initiated the Regional Copper-Nickel Study.

The major objectives of the Regional Copper-Nickel Study are: 1) to characterize the region in its pre-copper-nickel development state; 2) to identify and describe the probable technologies which may be used to exploit the mineral resource and to convert it into salable commodities; 3) to identify and assess the impacts of primary copper-nickel development and secondary regional growth; 4) to conceptualize alternative degrees of regional copper-nickel development; and 5) to assess the cumulative environmental, social, and economic impacts of such hypothetical developments. The Regional Study is a scientific information gathering and analysis effort and will not present subjective social judgements on whether, where, when, or how copper-nickel development should or should not proceed. In addition, the Study will not make or propose state policy pertaining to copper-nickel development.

The Minnesota Environmental Quality Board is a state agency responsible for the implementation of the Minnesota Environmental Policy Act and promotes cooperation between state agencies on environmental matters. The Regional Copper-Nickel Study is an ad hoc effort of the MEQB and future regulatory and site specific environmental impact studies will most likely be the responsibility of the Minnesota Department of Natural Resources and the Minnesota Pollution Control Agency.

Introduction to the Recreation Report

Statement of Purpose--Northeastern Minnesota is known throughout the upper midwest as an area of lake and forest recreation and the importance of tourism to at least one city's local economy has been demonstrated (ref. Lichty report). Copper-nickel mining development could potentially change recreation patterns, but such impacts cannot be assessed until specific areas used for recreation are identified. This report describes the recreational use of the region near the mineralized surface contact. The report serves not only as a characterization of this region but also as a tool to facilitate cumulative and site-specific impact assessment.

Area of Study--The Regional Copper-Nickel Study Area (Study Area) covers _____ hectares in northeastern Minnesota (Figure 1). For discussions of water based recreation, the Study Area was extended to include several lakes just northeast of the Study Area because of public concern about the Boundary Waters Canoe Area (BWCA) which includes these lakes. The BWCA is a component of the National Wilderness Preservation System.

Eighty percent of the Study Area is forested, and 8.4 percent of the total surface area is covered with water. Bogs and marshland comprise ___ percent of the area, while ___ percent is vacant or farmland. The remaining 5.4 percent is divided between mining (3.6 percent), rural residences (___ percent), and urban and transportation land uses (0.8 percent)(total not 100 percent due to rounding. Source: Land Use Map) MEQB Regional Copper-Nickel Study, 1977.

Federal, State, and County Recreation Management--Approximately 55 percent of the Study Area is in public ownership; roughly 30 percent is federally

owned, 12 percent state owned, and 11 percent county owned (U.S. Bureau of Land Management data stored in HLHIS). Much of this public land is managed in part for recreation, especially within special management units which form an overlapping network covering most of the Study Area. Figure 2 illustrates this.

Roughly half of the Study Area is within the Superior National Forest, a portion of that also in the BWCA national wilderness area. In addition, the Study Area includes parts of two St. Louis County memorial forests, five state forests (Burntside, Bear Island, Finland, Sturgeon River, and Kabetogama), two state parks (Bear Head Lake and Tower-Soudan), and one proposed state park (Giants Ridge).

Overview of Study Area Recreation--Three general types of outdoor recreation can be distinguished: facility-based recreation, dispersed land-based recreation, and water-based recreation.

Facility-based activities include picnicking, swimming, camping, golfing, tennis, and downhill skiing. Picnic sites are not essential for picnicking, and camping takes place outside developed campgrounds; however, participation in these activities is generally concentrated at facilities.

Dispersed land-based recreation includes activities not requiring facilities other than roads, trails, or surrogate trails. Examples are hunting, snowmobiling, and berrypicking. In the Study Area these activities are concentrated on public lands and in sparsely settled rural areas.

Water-based recreation is very prominent in the Study Area. Fishing opportunities attract tourists to resorts, summer homes, and campgrounds, and

are important to many local residents as well. The BWCA, used primarily by canoeists and other water-based recreationists, is the most heavily used of all United States wilderness areas (Lime 1977). The region's lakes and streams are also used for other forms of recreation, depending in part on biotic and access characteristics.

More detailed discussion of water-based, dispersed land-based, and facility-oriented recreation patterns follows this brief discussion of project methodology.

Methodology

With the objective of characterizing Study Area recreation, available information on the region was explored and found to provide only a partial picture of recreation use patterns. The Regional Copper-Nickel Study subsequently undertook additional research on use patterns over the entire Study Area to obtain a more complete data base.

Related Research--Geographic patterns of use are readily available for facility-based recreation, but dispersed and water-based recreation areas are more difficult to locate.

The Minnesota Department of Natural Resources maintains a statewide file of recreation facilities and their capacities. This file, the State Comprehensive Outdoor Recreation Plan (SCORP) inventory provided this report's data base on facility-oriented recreation.

Dispersed land- and water-based recreation information was available only from the U.S. Forest Service for lands within the Superior National Forest. Data on the part of the forest within the BWCA is based on entry permit

applications and is detailed and quite complete. Both in and out of the BWCA, the Forest Service also develops annual use estimates in broad categories (lake use, trail use, road use, stream use) for ranger districts, relatively large geographic units ranging from 250,000 to 640,000 acres in size. These use estimates, part of the Forest Service's Recreation Information Management (RIM) System, were used in this analysis but did not provide the level of geographic detail needed to define actual use patterns. Outside the National Forest no studies of dispersed land or water-based recreation were available.

Methods Used--To spare the time and expense of primary field surveys, a program of interviews with land managers such as conservation officers and foresters was designed. It was reasoned that most field land managers already have knowledge about recreation in their areas and can offer valuable insights into recreation patterns not available elsewhere. This concept met with approval during discussions with DNR recreation professionals and at the Regional Copper-Nickel Study's August 1977 Land Use Workshop.

A direct, systematic interview format was chosen over a questionnaire approach for several reasons. It seemed unlikely that a clear, unambiguous questionnaire could be designed to probe such elusive subject matter as dispersed recreational use. Consistent, reliable data might not be forthcoming. Furthermore, written surveys have lag times that could not be worked into Copper-Nickel Study schedules.

The interview strategy chosen was modeled after ethnographic techniques developed by anthropologists J.P. Spradley and D.W. McCurdy of Macalester

College. These methods involve one-on-one interviews designed to first identify the informant's frame of reference and then ask questions within that frame of reference. Distortion and inconsistency due to confusion over terms is thus minimized. Specific techniques used are described in detail in Appendix A.

Thirteen informants were interviewed during the fall of 1977. In addition to nine land managers (conservation officers, U.S. Forest Service rangers, and foresters), and four nonmanagers were interviewed to cover geographic areas and activities not familiar to other informants. The nonmanagers included two canoe outfitters, one former Forest Service ecologist now summerhome owner, and a resident of one area not well covered by other informants.

Informants were selected on the basis of tenure in the area and availability for interview. Dozens of knowledgeable individuals were not contacted due to time constraints. However, at least two informants familiar with each part of the area were interviewed. A complete list of informants is given on page ___ in Appendix A.

Each informant was queried about areas of recreational in the area s/he knew, according to the format described in Appendix A. The perceptions of different informants were found to correspond quite well in most cases. Findings from all interviews were compiled and mapped to form this report's data base for sections on dispersed and water-based recreational use patterns.

Cautions for Use of Findings--Several cautions must be borne in mind when using information in this report:

1) The potential of recreation is not complete. For example, major fishing lakes are mapped, but it is likely that some lightly-used fishing spots were missed. The maps on pages ___ - ___ are general illustrations of more popular and renowned recreation areas.

2) Recreation patterns do change in response to various factors: new activities (e.g. snowmobiling in the 1960s); establishment of new recreational opportunities (e.g. a new state park, a new network of logging roads for access); loss of recreational opportunities to development or change in land ownership. This report characterizes 1977 Study Area recreation, which should be considered changeable over time.

3) No study of land suitability or potential for recreation is included here. Statewide information on suitability will be available from the DNR's SCORP staff in early 1980.

Facility-Based Recreation

Recreational facilities are maintained throughout the Study Area by public agencies and by the private sector. The U.S. Forest Service, the Minnesota DNR, and municipalities all provide facility-based recreation opportunities. Semi-public facilities are offered by private resorts and campgrounds in the form of beaches and picnic areas for guests, and boat rental and access facilities that may also be available to day users.

Most Study Area facilities are located adjacent to lakes or rivers, but other generalizations on facility location are not forthcoming. Public and private recreation sites are mapped in Figures 3 and 4, respectively.

Public facilities are listed in Appendix C, along with capacity information and, where available, use estimates.

Camping--Camping takes place in the Study Area at eleven Federal, state, and municipal campgrounds with a total of ___ campsites; dozens of isolated, dispersed campsites, most with water access only, are also found within the Superior National Forest. Additional camping opportunities are provided by the private sector at private campgrounds, group camps, and handful of campsites at resorts. Locations of public camping facilities are mapped on Figure 3, and private facilities on Figure 4. Other unofficial campsites undoubtedly exist.

Camping is often associated with other recreational activities. Apparently most dispersed-site camping occurs in conjunction with fishing, backpacking, or canoe trips. Campers at Superior National Forest campgrounds were surveyed by Lime and Cushwa in 1969, who found that fishing was important to most (62 percent) campground visitors. Other water-based activities were mentioned by 15 percent of the respondents, while 10 percent cited land-based activities (hiking, berrypicking) as important attractions of the region.

Picnicking--Picnicking is concentrated at numerous picnic sites provided by municipal, state, and federal (U.S. Forest Service) agencies throughout the Study Area. These sites are mapped on Figure 3. Some picnic areas receive after-dark use by teenagers and adults as kegger sites.

Swimming--Swimming probably takes place on nearly every lake people access, especially where resorts and summer homes are found. It can be assumed, however, that public beaches are sites of heaviest swimming use (see Figure 4).

Resorts--Resorts are located on many Study Area lakes, nearly all in the northern third of the region; Figure 4 shows their locations. Most of

these resorts cater to fishermen. One survey of resorters just west of the Study Area found every respondent (100 percent of sample) was oriented to fishing (Mills et al. 1975). Waterskiing was also important to 65 percent of the sample. Within the Study Area all resorts are located on lakes or rivers.

Downhill Ski Area, Golf Courses, and Other Facilities--These cities are mapped together on Figure 3. The Study Area's two ski hills are both within the Superior National Forest. Golf courses are maintained by municipalities and private organizations. Tennis courts, athletic fields, and city parks are found in most communities but have not been inventoried here.

Dispersed Land-Based Recreation

Unlike the activities discussed thus far, dispersed land-based recreation is not dependent on developed facilities. However, most dispersed land-based activities do require roads, trails, or surrogate trails, either for access or for the activity itself. For example, hunters, backpackers, berrypickers, and pleasure drivers alike tend to stay on or very near roads and trails in this region.

Formal recreational trails are few in number; most are strictly snowmobile trails too boggy for summer use. However, railroad grades and networks of old logging roads can substitute for established recreation trails in this area. Maps of certain activity patterns--particularly grouse and deer hunting--reflect the area's logging history. This is not true of all dispersed forms of recreation, however; hiking and backpacking are apparently concentrated in zones of more mature vegetation not often found

where logging trails are still passable. The BWCA, where logging and road development is limited, is important to such activities.

Most public lands and some lands in logging and mining company management are open for dispersed land-based recreation. However, a few large tracts of public land have minimal use; most are lowland bogs.

Rural residential areas also have dispersed recreational use where settlement is not too dense; those people living on large lots can hunt and snowmobile, for example, on their own property. However, more heavily settled areas with broken ownership are generally not used as much for dispersed recreation (recreation interview program findings).

Use Magnitudes, Dispersed Land-Based Recreation

As noted previously, the only estimates of dispersed recreational use come from the U.S. Forest Service RIM system. The estimates are aggregated to ranger districts which unfortunately do not coincide with Study Area boundaries; portions of six different ranger districts lie within the Study Area. Therefore, numbers of visitor days occurring within the Study Area cannot be derived from these data. What RIM system estimates do provide is a general picture of relative use frequencies in different portions of the Study Area where it overlaps with the Superior National Forest.

Dispersed land-based recreation falls into two RIM estimate categories: road use and trail use. Total visitor-day estimates in 1976 were converted to gross use-per-acre coefficients for each district as summarized in Table 1. These estimates, used in conjunction with Figure 5, ranger district locations, suggest some general use magnitude patterns.

Amount districts partially in the Study Area road use was heaviest in the Kawishiwi ranger district, which includes the northeast corner of the Study Area, and lowest in the Aurora and Two Harbors districts, the Study Area's south central and southeast portions.

Trail use, a category including recreation on both established and unofficial trails, was greatest outside the BWCA in the Kawishiwi and Isabella districts, the northeast and east central parts of the Study Area. Road use was four to thirty times greater than trail use in every district.

These general indicators of use magnitudes should be used with caution.

They are based on estimates by U.S. Forest Service personnel who rank their own RIM statistics quite low on the reliability scale. Note also that 1976 may not be a representative year because of summer closings of the forest due to forest fire danger. Furthermore, heavy use of some small recreation areas is obscured by the district-wide scale of these estimates. For example, several land managers interviewed agreed that the Skibo Road (F.H. 120) near Hoyt Lakes was a heavy-use area. RIM user estimates for road use in the Aurora district as a whole are quite low, reflecting the presence of fewer roads in this district rather than actual use magnitude on roads that are available. Thus, RIM estimates provide a valuable overview of use levels over the entire Study Area but are not reliable indicators of subarea recreational significance.

Geographic Use Patterns

Following is a discussion of recreational use patterns for individual activities. Figures 6-12 illustrate most of these patterns. However, several forms of dispersed, land-based recreation have continually changing

use patterns or cannot be mapped for some other reason. For these activities the text must be consulted for the most specific information available.

Grouse Hunting--Grouse hunting is widespread throughout the area during a 2 1/2 month fall season. The majority of grouse hunters hunt from their cars along gravel roads where grouse come to ingest bits of gravel for the digestion process. While most gravel roads without dense settlement are hunted for grouse, land managers interviewed noted half a dozen areas especially popular among road hunters, most old logging networks within the Superior National Forest. These and more moderately-hunted roaded areas are indicated on Figure 6. A much smaller number of grouse hunters walk old impassable logging roads and hiking trails. "Walking the trails" for grouse seems to take place in the same areas that are road hunted but also in rural residential districts and a few zones around roads not road hunted because they are paved, such as the Fernberg Trail (Lake County Highway 18).

Deer Hunting--As Figure 7 shows, almost any accessible area has some deer hunting use. According to the game wardens interviewed deer hunting is concentrated along trails and very near roads; few deer hunters stray more than a quarter-mile from roads or trails in this region. It also appears that rural residential areas have relatively light hunting pressure, mostly from immediate residents.

As with grouse hunting, a few areas are particularly popular with deer hunters receiving more use than other parts of the region. These zones, in some cases coinciding with popular grouse hunting areas, are highlighted in Figure 7. Other areas hunted for deer are also shown on that map.

Moose Hunting--The Study Area includes portions of one of Minnesota's two moose ranges, open to moose hunting during alternate years since 1971. Moose hunting licenses are limited in number and allocated through lottery.

The boundaries of permitted moose hunting zones change from year to year but have always included a portion of the Study Area, specifically its eastern edge. Figure 8 shows that portion of the Study Area open for moose hunting during the 1977 fall-winter moose season. Within this overlap between moose hunting zones and the Study Area, a total of 65 hunting parties were allowed to stalk moose in 1977 (most of these hunters also had open to them large acreages outside the Study Area). In 1977 all but one of the 300 parties granted northeastern Minnesota moose permits were successful.

Other Hunting--Neither rabbit hunting nor bear hunting shares the widespread popularity of hunting for grouse and deer. Rabbits, found throughout the Study Area, are hunted by school children and less frequently by adults in some districts. Bear hunting is still less popular. The few bear hunters who register in the area hunt where bears have been causing problems or at spots where game wardens have moved troublesome bears. The only such spot within the Study Area is southeast of Ely near Highway 1, around August and Harris lakes.

Trapping--Although a number of furbearing animals are trapped in the Study Area, beaver account for most of the local pelt market; in 1976, 81 percent of all pelts sold in Ely, Babbitt, Isabella, and Winton were beaver (Regional Copper-Nickel Study, Terrestrial Biology Team findings).

Interviewed land managers claim that beaver are found in nearly all streams and lakes in the area.

Other water-traveling furbearers trapped in this region include muskrat, otter, mink, and fisher. Muskrats are apparently abundant in the southern portion of the Study Area but uncommon further north. Muskrat trapping is popular with school-aged trappers near Iron Range cities. Otter, mink, and fisher are trapped with generally less success, presumably because these animals are less abundant and because their travel habits make them harder to snare.

Land traveling predators that may be trapped include fox, lynx, bobcat, weasel, and coyote. No seasonal restrictions affect the trapping of weasel or coyote. Lynx, bobcat, and fox all have protective seasons, fox for the first time in 1977.

Trapping patterns have not been mapped because areas used are small and their exact locations often well-guarded secrets. However, it was learned that much trapping occurs in roaded areas of the Superior National Forest, particularly in the Tomahawk Trail area (around Forest Highway 424 and 173) and around the Skibo Road (Forest Highway 120). Trapping also takes place on private land where settlement isn't too dense; finely subdivided areas like those south of the Iron Range cities are usually not trapping territory.

Berrypicking---Area berrypickers harvest blueberries, raspberries, pincherries, june berries, hazelnuts, chokecherries, and cranberries. Berrypicking seems to take place wherever berries grow in accessible places. Many local people pick berries north of the Study Area at the site of a large forest fire, the Little Indian Sioux burn. Within the Study Area three most prominent berrypicking zones are shown on Figure 9. However, berrypicking takes place throughout the region, often at isolated

spots whose locations are the secrets of their users. Specific sites also change over the years as succession of vegetation progresses.

Cranberries grow in bogs, unlike other berries, which makes cranberry harvest more challenging. A few small cranberry bogs are found along the Tomahawk Trail (F.H. 424 and 173) in the Stony River watershed; around August Lake in the Isabella watershed; and near Heart Lake in the Keeley Creek watershed. Other cranberry bogs may exist elsewhere in the Study Area.

Gathering Firewood---Wood for fireplaces and for an increasing number of wood burning stoves is cut on both private and public lands. Some firewood gathers have their own woodlots. Others take advantage of firewood permit programs offered by the county, the state, the U.S. Forest Service, and, at times, mining and logging companies. Most public land permits, available free or for a small fee, are for areas recently logged, where "dead and down" debris can be salvaged. However, firewood permits are available for some live timber areas when silvicultural work is needed.

Firewood-gathering areas change markedly from year to year, hence no map of such areas was made.

Picking Pine Cones and Pine Boughs---Each fall the U.S. Forest Service offers permits to pick closed (fresh) pine cones which it subsequently buys back for replanting programs. The state DNR and some seed dealers also buy cones for this purpose, but their campaigns are primarily west of the Study Area.

The Forest Service specifies where pine cones are to be picked; however, a few pickers harvest their cones on the sly at more convenient locations.

Like those cutting firewood, cone pickers directly follow logging operations in most cases; otherwise pine cones are difficult to reach. Cone picking, again like firewood gathering, defies mapping because of annual variability.

Bough picking is of minor importance in this area. On request the U.S. Forest Service sells permits for clipping of pine boughs which pickers then sell to wreath-making firms. During the 1977 taconite workers strike, a few Aurora-area residents picked boughs, but otherwise bough picking is rare.

Pleasure Driving--Maintained roads through unsettled woods and alongside lakes are driven, especially on weekends, by sightseers or "joyriders" viewing natural scenery from their cars. This activity is most prominent during autumn when colorful foliage is the primary attraction.

Pleasure driving roads in the Study Area include roads around Lake Vermilion and most maintained roads in the National Forest, although some are more popular than others. The Echo Trail (county highway 116, north of Ely) is possibly the most heavily used pleasure driving route in the entire Superior National Forest. Another dozen or so routes known to rank among the Study Area's most popular are mapped on Figure 10. These popular routes may stand out because of colorful hardwood vegetation, proximity to population concentrations or fame among resorters and other tourists.

"Four-Wheeling"--Four-wheeling refers to the use of four-wheel drive vehicles to speed up and down old logging trails and stream beds as a form of recreation. Most use of four-wheel drive and Off Road Vehicles (ORV's, also called All Terrain Vehicles or ATV's) is related to other activities;

these vehicles provide access to backcountry hunting areas and fishing lakes by way of otherwise impassable trails. However, some "four-wheeling" for its own sake does take place in the Study Area where logging roads are sufficiently run down to afford a challenge.

Snowmobiling--Snowmobilers use snowmobile trails, unplowed roads (including many National Forest roads), frozen lakes, and open fields or yards in rural residential areas. All game wardens interviewed noted a decline in area snowmobiling during recent years.

Much snowmobiling is associated with winter fishing. Trails and unplowed roads provide sole winter access to some lakes quite popular among ice fishermen. The winter popularity of several BWCA trout lakes accounts for most of the recent protests against a BWCA snowmobile ban.

Trails and lakes aside, snowmobiling is quite common in the Study Area's rural residential districts, whose residents snowmobile through their own woods and fields. School-aged children and teenagers probably account for a large percentage of this kind of snowmobiling.

Snowmobilers also take short trips during the day and at night (sometimes between bars) but rarely camp out.

Figure 11 shows locations of snowmobile trails and unplowed Forest Service roads. Users of this map must bear in mind that much snowmobiling also occurs on frozen lake surfaces, alongside plowed roads and on residential lots.

Sled Dog Racing--Ely hosts one of this country's big annual sled dog races each January, and a number of residents of the Ely-Tower-Babbitt area raise

dogs for racing in this and other events. Races and practice runs take place on unplowed forest roads--most notably the Cloquet Line (F.H. 457), the Spruce Road (F.H. 381), and the Tomhawk Trail (F.H. 424 and 173)--and on winter trails such as the network between White Iron Lake and the South Kawishiwi River, established by a local sled dog racing club. Snowmobile trails and frozen lakes are also used by sled dog racers (see map 11).

Cross-Country Skiing and Winter Camping--Cross-country skiing takes place on the Study Area's limited ski trails, on lakes, and occasionally on snowmobile trails and unplowed roads. Day skiing is popular in the Hoyt Lakes-Aurora area, where ski touring clubs have formed and constructed several trails. Precise locations of these trails have not been mapped. One network of trails, the Lookout Mountain cross-country ski trails, is maintained by the U.S. Forest Service. Skiers in that area also make use of old mine dumps, landforms resembling flat-topped hills.

Gradually-sloping roads spiraling up the sides of these mine dumps provide skiers with vegetation-free paths and a view out over the landscape.

Other parts of the Study Area have no cross-country ski trails per se and apparently less skiing on the whole, except where winter campers are seen.

Winter campers on skis or snowshoes tend to gravitate to the BWCA, possibly because that is the area known to visitors or because snowmobiles won't be encountered there; hiking trails and lake chains in the BWCA are foci of use. Within the Study Area winter camping is seen between Gabbro/Bald Eagle lakes and the South Kawishiwi River. This use is related in part to the presence of Minnesota Outward Bound School on the South Kawishiwi River. Burntside Lake is another site of winter camping.

Day Hiking and Backpacking--Most hiking within the Study Area is associated with hunting or accessing fishing lakes. However, we can distinguish two general types of hiking proper: day hiking and backpacking. Backpacking involves carrying of sleeping gear and an overnight campout at a site accessible only on foot. Day hiking is a more general category used here to cover all hikes not overnight.

Day hiking trails are few in number and short in total mileage. Brief hikes are often taken on residents' own property or along lightly-trafficked roads close to home; such opportunities are especially important for those older people who need daily hikes for health reasons.

Long day hikes by resort guests, campers, day visitors, and local residents are concentrated at a few short trails and portages within the Study Area, and at backpacking trails in the BWCA north of the region of study. Short trails used primarily by day hikers include: 1) sections of some snowmobile trails where not too boggy; 2) the Lookout Mountain cross-country ski trails just north of Virginia; 3) trails in Bear Head State Park; 4) the Bass-Dry lakes trail north of Ely; 5) forest trails adjacent to U.S. Forest Service Campgrounds; and 6) miscellaneous portages, also used by fishermen (see Figure 12). Presently under construction is the Taconite Trail, a multipurpose DNR corridor trail, expected to be used by hikers and backpackers during the summer months.

As implied above, backpackers are drawn to BWCA trails outside the Study Area. Backpacking opportunities are virtually nonexistent within the Study Area at this time. Old logging trails rarely substitute for backpacking trails. Many were originally built for winter use and are boggy in summer; furthermore, backpackers (like other area campers) prefer campsites on and

destinations of lakes or rivers, but few of the many dead-end logging spurs load toward lakeshore where logging is prohibited. Hence, only rarely do logging roads serve the needs of backpackers. When the Taconite Trail is completed, backpacking may be seen more frequently in the Study Area. Figure 12 shows the backpacking trails in and near the area.

Horseback Riding---Not many horses are raised or stabled in the Study Area. However, some horseback riding does take place in old farming districts: the Embarrass River Valley, the Pike-Sandy area, the Palo area, and others. These are rural residential areas mostly outside the Superior National Forest.

Water-Based Recreation

There are approximately 300 lakes in the Study Area and hundreds more in adjacent portions of the BWCA. A few are used heavily for several forms of recreation; others are inaccessible or lack recreation resources. Most fall between the two extremes with use for one or perhaps two recreational activities. Stream use is more limited, apparently because most area streams are too shallow for activities involving boats and canoes.

Each waterbody is unique in recreational use, a function of many variables: public access, the presence of resorts, proximity to the BWCA, lake biota, and so forth. The interplay of such factors is complex and not easily systematized; hence, Appendix B presents recreational use information for individual water bodies. In most cases lakes and streams not included in Appendix B have little or no known recreation use.

Use Magnitudes

As with dispersed land-based recreation, water-based use estimates are available from the Forest Service RIM system for Superior National Forest range districts. More detailed data on use magnitudes are not available at this time, nor have general estimates of use outside the National Forest been made. Some water bodies known to receive heavy use (e.g. Lake Vermilion) are not considered in the following discussion.

Within the Superior National Forest, RIM estimates of water-based recreation are broken down in two categories: lake use and stream use. Table 2 summarizes these estimates for the six ranger districts overlapping the Study Area, and includes general coefficients of use density (visitor days per district acre). These coefficients are not standardized by water acreage; hence, they reflect not only use heaviness but also the abundance or absence of lakes and streams in each district.

In 1976 lake use by district acreage was by far greatest in the BWCA portion of the Kawishiwi ranger district. Next on the lake use magnitude scale were the BWCA portion of the La Croix district and the non-BWCA part of the Kawishiwi district with roughly half as much use in each. These areas comprise the north edge and northeast quarter of the Study Area (see Figure 3 for exact locations of ranger districts).

Lowest lake use estimates were for the Two Harbors and Aurora districts, roughly the Study Area's south central and southeast quarter, which is a region of relatively few lakes. The Isabella and Virginia district estimates suggested moderate levels of lake use.

1976 stream use was an order of magnitude less than lake use in most Superior National Forest districts. As with other recreation types the

Kawishiwi district received the greatest stream use, both within and outside the BWCA. Stream use estimates were uniformly low in other districts.

It must be re-emphasized that these 1976 RIM estimates are of general value only. Again, 1976 may not be a representative year, and the reliability of the estimates is considered to be rather low.

Outside the Superior National Forest but within the Study Area lie many more lakes and streams. Some, like Lake Vermilion, are areas of concentrated water-based use; many others probably have lower use frequencies. Such variable use magnitudes also emerge for waterbodies within the National Forest and can only be inferred from geographic patterns of use identified through the land manager interview program.

Geographic Use Patterns

Recreational use patterns for water-based activities are described below and mapped on Figures 13-19. These use-pattern data, derived from land manager interviews are also arranged by individual waterbody in Appendix B. Note that most major use areas have been identified but little-known or light uses of a given water body may not all be accounted for.

Fishing--Fishing is the most widespread form of water-based recreation in the region, taking place at several streams and nearly every lake not too small or shallow to support a fish population. Fishing is a major drawing card of area resorts and campgrounds and is also popular with local people.

Winter fishing and whitefish netting are discussed separately on the following pages because of unique use patterns. Under consideration here

are all other forms of three-season fishing, including shore fishing, bridge fishing, and boat fishing (by far the most popular).

Most often sought in the Study Area are walleye pike, northern pike, and lake trout, although some fishermen seek other species such as bass, crappies, and rainbow trout. Known fishing lakes and streams are mapped on Figure 13 according to fish species desired by most of their users. Also mapped are state designated trout streams and stream-trout lakes, which may or may not have actual fishing use.

Several lakes are fished much more frequently than others. These include lake trout lakes (Burntside Lake and others just outside the Study Area, e.g. Snowbank, Basswood) and several walleye pike lakes, particularly Lake Vermilion, Shagawa Lake, White Iron Lake, Birch Lake, Gabbro Lake, Bald Eagle Lake, and others (see Figure 13). These very popular lakes are nearly all in the Study Area's northern half. Their heavier fishing use can be due to a combination of factors: presence of resorts and summer homes, proximity to cities, access, tradition, quality of fishing, and fishing reputation, to name a few.

Stream fishing, usually for northern pike or stream trout, is uniformly light as suggested by the RIM estimates of stream use cited previously.

Winter Fishing---In 1967 the Minnesota Outdoor Recreation Resources Commission (MORRC) estimated that 29 percent of all Minnesota fishing trips took place during winter; this percentage may be even higher since the advent of the snowmobile. Ice fishing is popular on Study Area lakes near residential areas or with snowmobile access. Most lakes with trout and other large water bodies in the Study Area's north half receive

concentrated use pressure from winter anglers. In the southern portion of the Study Area winter fishing is more dispersed over a number of small and medium-sized lakes. However, Big Lake and Seven Beaver Lake are fished frequently during winter, accessed only by a snowmobile trail; several observers maintain that these two lakes are fished more in winter than spring and summer. Other lakes throughout the region accessible only by snowmobile are fished during winter.

Lakes near cities are generally visited by many local winter fishermen, e.g. Shagawa Lake near Ely, Whitewater Lake near the city of Hoyt Lakes, Birch Lake near Babbitt. Also important for winter fishing is Lake Vermilion which is popular for dark house spearing, a form of ice fishing requiring a shelter house to block out light as northern pike are speared through a hole in the ice. Vermilion is not the only dark house spearing lake, but certainly the most prominent.

Figure 14 shows known winter fishing lakes in the Study Area.

Netting for Whitefish, Tullibeas, and Ciscos--Netting refers to the fishing of whitefish, tullibeas, or ciscos (inland herring) with gillnets. Special licenses allow netting only on certain lakes during a late fall to early winter season. Each netter sets up one or two nets in shallow waters where fish are moving to spawn, and checks these nets daily thereafter.

Whitefish and tullibeas are closely related and often found together; they are netted for eating. Ciscos, much smaller fish, are used as bait in winter trout fishing. Figure 15 shows lakes open for netting of the different species.

Wild Rice Harvesting--Wild rice grows in several Study Area lakes and is harvested by canoe during late August and early September. People harvest

wild rice wherever dense stands are accessible by canoe. Big Rice Lake north of Virginia probably produces more wild rice for local harvest than any other water body in the region. Other lakes and rivers where wild rice is harvested are indicated on Figure 16. However, many "ricers" are secretive about where they go, hence this map does not account for all ricing sites.

Duck Hunting--Waterfowl densities are rather low throughout the Study Area (Huempfner and Pfannmueller 1978). Nevertheless, a few ducks do visit the area and more than a few local residents stalk them during hunting season, which runs from October first through mid-November.

The map of duck hunting lakes and streams on Figure 17 differs slightly from the Regional Copper-Nickel Study's waterfowl distribution findings. The key to these differences is accessibility. Several lakes with sparse waterfowl visitation are hunted heavily because they are accessible to many people (e.g. Whitewater Lake near Hoyt Lakes), while other water bodies noted in aerial surveys to have many ducks are virtually inaccessible (e.g. unnamed lakes northwest of Greenwood Lake). As with other activities, the map of duck hunting sites is not complete but shows primary areas of use.

Swimming--Swimming is discussed on page ___ as facility-based recreation because public beaches apparently serve as use focal points.

Boating and Waterskiing--Most boat use in the Study Area is associated with fishing and discussed in that section. However, waterskiing and pleasure boating occur on large lakes such as Vermilion, Birch, and Burntside. Waterskiers also use medium-sized lakes with resort and summerhome development. Water bodies with known waterskiing or pleasure boating use other than fishing are mapped on Figure 18.

Canoeing--The BWCA is a national focal point for canoeing, the primary use of this million-acre roadless area. In 1977 an estimated 23,249 groups canoed in the BWCA for a total of 674,348 visitor days (not including motor canoe use; U.S. Forest Service, 1978).

Outside the BWCA, occasional day canoeing takes place on many accessible lakes and on just a few streams when and where water levels permit. Much of this day canoeing is associated with fishing or duckhunting.

In general, however, areas of concentrated and extended canoe use are the interconnected lake chains in the north and northeast part of the Study Area. These canoe routes, most within the BWCA, are mapped on Figure 19.

The U.S. Forest Service annually compiles BWCA use statistics on the basis of applications for required BWCA entry permits. Thus, actual amounts of use as well as use patterns can be determined for zones within the BWCA. 1977 canoe use of routes in and adjacent to the Study Area is listed in Table 3.

These statistics indicate that fully one quarter of all BWCA paddle canoeists begin their trips at one of two Study Area entry points, Fall Lake and Moose Lake. Moose Lake is actually just outside the Regional Copper-Nickel Study Area but within the region under consideration for water-based recreation analysis. Other nearby canoe routes are also popular: the Lake One area, the Gabbro-Bald Eagle route, Crab Lake-Cummings Lake, the North and South Kawishiwi River.

Several variables affect the use of different canoe routes, according to Jon Waters and Bill Rom, canoe outfitters in the Ely area. The popularity

of the Moose and Fall Lake entry points has to do with relatively easy access to Canadian customs stations and hence to Quetico Provincial Park. Factors cited as discouraging some back country canoeing include resort and residential development, the necessity of making many or long portages, and recent logging which may have a temporary esthetic impact on a route. Allowed capacities of the routes vary also, usually according to numbers of available campsites.

Partially in the Study Area is at least one natural canoe route not within the BWCA: the Bass-Low lakes route. Because it is outside the BWCA, the Bass-Low Lake route (shown on Figure 19) is not as well known as some others but nonetheless has canoeing use.

Analysis of Recreational Use Patterns

Taken together the activity patterns outlined here comprise a mosaic of multiple-use and no-use areas, of well-known recreation lakes and inaccessible water bodies. Access is one principle key to all forms of recreation; those areas and lakes inaccessible due to private ownership or lack of roads and trails have minimal use.

Other factors affecting use patterns vary from one activity to the next, but certain land areas and water bodies stand out as important for several different forms of recreation.

Dispersed Land Based Recreation---The most concentrated zones of dispersed land-based recreation are upland forest areas with road access. Seven areas that emerge as multiple use zones are indicated on Figure ___ (page ___). They are: 1) the Tomahawk Road area; 2) the Spruce Road area; 3) the Fernberg Road area; 4) the Cloquet Line area; 5) the Echo Trail area; 6)

the Pfeiffer Lake Trail area; 7) the Skibo Road area; and 8) the Moose Line area. All of these lie within the boundary of the Superior National Forest and were timber harvesting districts at one time; old logging roads remain for use as trails. Many have gravel roads for grouse hunting and unplowed roadways for snowmobiling and sled dog racing. These areas are also used by trappers, firewood haulers, deer hunters, berrypickers, pine cone and bough harvesters.

Other roaded areas in the region of study have similar recreational use but not of the magnitude and diversity these seven zones exhibit. Some of these secondary areas have sparse residential settlement which generates additional use from within, but also apparently discourages use by tourists. Areas with rather dense rural development have still less dispersed recreational use. Heavy settlement often blocks access to public lands away from roads, and development may also detract from habitat quality or other factors important to recreationists.

Some dispersed land-based activities occur in areas altogether different from those used by hunters, trappers, and firewood gatherers. Hiking, backpacking, cross-country skiing, and winter camping are oriented toward recreational trails for which old logging roads rarely substitute in this area. These activities take place where trail opportunities are available, primarily in the BWCA outside the Study Area, and, in the case of ski touring, on frozen lakes.

Lowland bogs and marsh areas have very limited recreational use; several in the Study Area are accessible only via snowmobile trail in winter, if at all.

Water-Based Recreation--As with land-based recreation, a handful of areas have diverse water-based recreational uses. Virtually all are in the Study Area's northern third, the area where large and deep lakes are found.

Lakes used for several forms of recreation include:*

This is already corrected

Lake Vermilion (7 activities)	Shagawa Lake (6 activities)	White
Iron Lake (6 activities)	Birch Lake (6 activities)	Burntside Lake
(5 activities)	Fall Lake (5 activities)	Whitewater Lake (5
activities)	Big Rice Lake (4 activities)	

*8 possible activities: fishing, netting, ricing, duck hunting, waterskiing/ boating, winter fishing, canoeing.

Two of the area's rivers and streams have notable multiple use:

(Kawishiwi River (4 activities) St. Louis River (3 activities)

Note that dozens of other waterbodies have recreational use, most for fishing and some for one or two other activities as well. Diversity of use does not necessarily equate with recreational significance; some single-use lakes could actually have more users than multiple-use lakes. A few waterbodies indeed appear to fall into this category: Bear Head Lake, in the state park of the same name, and Gabbro and Bald Eagle lakes, very popular fishing lakes with substantial BWCA canoeing but few other uses. However, heavy use does seem to characterize water bodies that serve diverse recreational functions.

Several water bodies fall into a residential--summer home category. Mostly in the Study Area's southwest quarter these lakes are characterized by shoreline development and some local fishing, swimming, and waterskiing.

A final group of lakes comprise the Seven Beaver area, a zone with trail access only located in the south central part of the study region. This area, managed by the Superior National Forest for dispersed recreation, hunters and hikers as well as water-based recreationists such as duck hunters, wild rice harvesters, and fishermen. These shallow lakes are partially edged by bog and more readily accessed in winter for ice fishing than during warmer months, although user-developed trails and a private railroad grade are used regularly in spring, summer, and fall. Big Lake, somewhat deeper than the others, is locally known as a good walleye pike fishing lake.

A few Study Area lakes lack recreational use. Most are too small or shallow to support fish populations, and nearly all lack drive-up access. Wetlands surrounding many of these waterbodies can preclude walk-in access as well.

Most streams and rivers in this area are headwater streams very near the Laurentian Divide. As a result, flow volumes are usually too low for recreational use except in early spring. The two exceptions are the Kawishiwi River, already a fifth-order stream when it enters the Study Area, and the St. Louis River, which is canoed, fished, and hunted for ducks but rarely upstream of the Hoyt Lakes area.

Facility-Based Recreation—Public-sector recreation facilities are scattered wherever sites were deemed suitable throughout public management units, and in or near municipalities. Private sector facilities, including resorts and private campgrounds, are more concentrated on large, deep lakes: Vermilion, Burntside, Shagawa, White Iron, Farm, Fall. Almost half are located on Lake Vermilion, the one large Study Area lake not located within the Superior National Forest. Nearly all private facilities lie in

the northern half of the region. Both public and private recreation facilities are located adjacent to lakes or permanent streams with only a few exceptions.

Conclusions

1) Outdoor recreation of all forms is dependent on access: roads, trails, public lands. In this region, most land areas with minimal use lack roads or trails, are lowland bogs, or have residential development at a density that severs access to any adjacent public lands. Any water bodies without recreational use lack road, trail or water access, although some accessible lakes have little use if too small or shallow to at least support a fish population. Lakes with heavy shoreline development are used only by immediate residents for lack of public access.

2) The region is covered with an extensive network of public management units: the Superior National Forest, state and county forests, the BWCA, state parks. Each responsible agency owns land within a given unit and manages that land in part for recreation purposes. With public ownership around 55 percent of the entire Study Area, a substantial acreage is available, even considering that not all of these lands are accessible or desirable for recreation. Public access to lakes and rivers is also provided by government agencies within management units.

3) Land-based recreation patterns relate closely to the Study Area's logging history. Old logging roads provide foot and vehicle access to otherwise remote areas, and certain activities such as firewood gathering and berrypicking occur primarily on recently-logged sites. The half-dozen most popular areas for several forms of dispersed land-based recreation are

all veined with remnants of logging roads. Most are in the eastern half of the Study Area.

4) On the other hand, certain land- and water-based activities are concentrated in the Boundary Waters Canoe Area (BWCA), a roadless, lake-oriented national wilderness area. The majority of BWCA users are canoeists; trout and walleye fishermen comprise another large user group.

Land-based recreationists such as hikers, cross-country skiers, and winter campers account for a smaller but growing percentage of BWCA visitors. Unlike many other forms of land-based recreation, these activities are oriented away from roaded, recently logged areas.

5) Except for a very few cranberry bogs, virtually all lowland bog areas are without recreational use.

6) Large and deep lakes in the Study Area's northern half are foci of water-based recreation. In addition to several heavy-use BWCA lakes, numerous large waterbodies outside the BWCA are popular for diverse recreational activities, such as fishing, whitefish netting, wild rice harvesting, boating, swimming. Many have both public and private recreation facilities which generate additional use.

7) Smaller lakes throughout the Study Area have fewer recreational uses, as a rule. However, some are quite important for one or two individual activities. Many other small and medium-sized lakes, especially in the Study Area's southwestern quarter, have residential and seasonal development along their shores, and are used primarily by immediate residents as noted above. In contrast, lakes in the Seven Beaver area (tpw. 58N., range 12W.) have neither immediate residents nor road access,

but recreationists frequently hike and snowmobile into these lakes.

Another category of small lakes includes those water bodies with little or no recreational use; most lack access and/or recreation resources.

8) Few streams in the Study Area have more than minimal use. Most have low flow volumes which prevent even canoeing except in early spring. Some streams are fished for northern pike; a number of designated trout streams have been designated by the DNR but not all are continually stocked, and only a few are fished. Most stream use occurs on the Kawishiwi and St. Louis rivers.

9) Practically all public and private recreation facilities are located on water bodies, excluding certain municipal facilities such as golf courses and athletic fields. Private campgrounds and resorts are concentrated in the northern half of the Study Area where more lakes are found.

The Future Recreation Picture

It cannot be assumed that the recreation patterns described in this report will remain static over time. Even with a constant recreation resource base and no changes in the area population structure, preferences and tastes continually shift. In 1962 the U.S. Outdoor Recreation Resources Review Commission (ORRRC) published national recreation projections for 1975. Driving for pleasure was forecast as the number one American outdoor pastime; not foreseen were the "back-to-nature" trends of the mid-1970s and the rising cost of gasoline which was on everyone's mind in 1975.

Furthermore, the ORRRC projections do not include relatively new activities such as cross-country skiing and snowmobiling which did figure heavily in the sum of U.S. recreation by 1975.

The interplay of numerous factors will determine the Study Area's future recreation picture. These include:

a) Additions to the recreation resource base--For example, a new state park (Giant's Ridge) is proposed in the Study Area. Besides new facilities management changes can create new recreation opportunities; in the BWCA the ban on snowmobiles meant new opportunities for winter campers on skis who avoid snowmobile zones (of course this management change meant a simultaneous loss in opportunities for snowmobilers, see below).

b) Loss of recreation opportunities--This can happen in many ways: through management changes (as with snowmobiling above); closed access to lakes or hunting areas due to residential development; tarring over gravel grouse hunting roads.

c) Changes in population structure--Size of population obviously affects use, heaviness, causing crowding if increases in population aren't compensated for with new recreational opportunities. Age structure also affects recreation: the very young and very old are generally less mobile, and teenagers may engage in activities different from those of their parents. Some recreation research suggests relationships between recreation participation and occupation or income.

d) Trends--Styles of recreation change and new activities are established (e.g. snowmobiles in the 1960s). Old forms of recreation often enjoy sudden return to popularity while others fade in importance over time.

e) Publicity--This often generates use. For example, national publicity about the Boundary Waters Canoe Area and the motor controversy there is partially responsible for increasingly heavy use of the area.

These and other variables make recreation forecasting a complex business which is not attempted here. Suffice it to say that the 1977 recreation picture presented in this report is dynamic in temporal dimensions. For some recreational activities spatial distribution also changes continually; for example, firewood cutting and berrypicking follow logging activities and, in the latter case, fire. This variability emphasizes the need for careful assessment of local recreation impacts that might result from specific mining proposals. Lake, stream, road, and facility use must be carefully evaluated before siting decisions are finalized. The data base developed in this report is the first step in that process.

Table 1. 1976 visitor day estimates for U.S. Forest Service Ranger Districts dispersed land-based recreation.

DISTRICT	DISTRICT ACREAGE	ANNUAL ROAD USE		ANNUAL TRAIL USE	
		Visitor Days	Per Acre	Visitor Days	Per Acre
Aurora Dst.	283,771	17,800	0.06	1,100	0.00*
Isabella Dst.	369,988				
BWCA	75,371	(no roads in BWCA)		200	0.00*
non-BWCA	294,617	45,600	0.15	12,200	0.04
Kawishiwi Dst.	636,226				
BWCA	355,009	(no roads in CA)		8,100	0.02
non-BWCA	281,217	60,100	21	15,700	0.05
LaCroix Dst.	557,099				
BWCA	257,834	(no roads in BWCA)		4,000	0.01
non-BWCA	299,265	31,500	0.10	1,000	0.00*
Two Harbors Dst.	260,999	7,1	0.03	---	
Virginia Dst.	254,260	2600	0.10	3,900	0.01

SOURCE: U.S. Forest Service, Recreation Information Management (RIM) Use Estimates, 1976.

Table 2. 1976 visitor days estimates water-based recreation.

DISTRICT	DISTRICT ACREAGE	LAKE USE		STREAM USE	
		Visitor Days	Per Acre Avg.	Visitor Days	Per Acre Avg.
Aurora Dst.	283,771	12,100 ^{(1/2} on Whiteface Reservoir)	0.04	2,000	0.01
Isabella Dst. . .	369,988				
BWCA	75,371	5,700	0.08	600	0.01
non-BWCA	294,617	19,300	0.07	3,000	0.01
Kawishiwi Dst.	636,226				
BWCA	355,009	183,800	0.52	22,100	0.06
non-BWCA	281,217	58,500	0.21	11,000	0.04
LaCroix Dst.	557,099				
BWCA	257,834	57,700	0.22	6,700	0.03
non-BWCA	299,265	15,400	0.05	6,500	0.02
Two Harbors Dst.	260,999	4,600	0.02	700	0.00*
Virginia Dst.	254,260	19,100	0.08	4,100	0.02

Table 3. Use estimates: Boundary Waters Canoe Area (for eleven travel zones in or near the Regional Copper-Nickel Study Area, out of a total of 49 zones in the entire BWCA).

TRAVEL ZONE	YEAR	PADDLE CANOE	MOTOR CANOE	MOTORBOAT	SNOW-- MOBILE	HIKING	OTHER**	TOTAL
8. Trout Lake	1977	2,734	1,718	16,310	---*	724	267	21,753
	1976	2,478	1,699	18,145	3,192	559	39	26,112
9. Cummings Lake	1977	6,280	25	185	---	691	152	7,333
	1976	6,060	0	0	0	247	88	6,395
10. Schlamm Lake	1977	2,061	48	18	---	250	49	2,426
	1976	2,319	0	0	0	448	44	2,811
17. Jackfish Bay (Basswood Lake)	1977	29,710	7,443	19,775	---	88	826	57,842
	1976	30,534	6,805	18,037	268	114	302	56,060
18. Basswood Lake	1977	17,073	2,799	17,832	---	228	580	38,512
	1976	15,728	3,081	16,865	471	40	963	37,148
19. Moose Lake	1977	42,399	5,853	23,183	---	205	520	72,160
	1976	40,982	7,235	18,371	1,648	23	231	68,490
21. Snowbank Lake	1977	18,883	2,139	2,355	---	2,313	335	26,035
	1976	16,344	1,971	2,634	400	1,899	281	23,529
22. Lake One	1977	30,884	7,301	5,707	---	59	154	44,105
	1976	24,973	7,124	5,072	6	11	399	37,585
23. Clearwater- Pietro	1977	3,011	250	16	---	5	33	3,315
	1976	3,611	0	0	0	3	425	4,039
24. Southfarm Lake	1977	6,920	720	1,803	---	14	146	9,603
	1976	7,332	497	1,698	8	53	250	9,838
25. Gabbro Lake	1977	11,827	1,966	1,205	---	154	373	15,525
	1976	12,082	1,226	1,037	4	43	1,052	15,444

SOURCE: U.S. Forest Service, Superior National Forest, 1977 and 1978.
BWCA Visitor Estimates Office Reports.

*Snowmobiles were banned from the BWCA in 1977.

**Other includes cross-country skiing, snowshoeing, horseback riding, rowboating, rafting, sailboating.

Also note: travel zone boundaries changed between 1975 and 1976. If visitor estimates from previous years are to be analyzed, travel zones must first be standardized.

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Appendix B. Interview Program Methodology

Information on waterbased and dispersed land-based recreation was acquired through the interview program described in this appendix.

Informants---As noted on pages ___ of this report, thirteen people familiar with all or part of the Study Area were interviewed. These informants were selected mainly on the basis of availability for interview and tenure in the area and with the objective of having at least two informants familiar with each portion of the region under study. Time constraints precluded interviewed with other knowledgeable individuals. In response to concern that conservation officers (who on the job are chiefly concerned with hunting, trapping, and fishing) were over represented, three nonmanager informants knowledgeable of so-called wilderness recreation were also interviewed. The informants were:

Frank Baltich, DNR Conservation Officer: Field Officer in Babbitt for 12 years (previously did similar work in area)

Jim Charles, DNR Conservation Officer: Field Officer in Tower for 17 years

Don Church, U.S. Forest Service: Resources Assistant, Kawishiwi Ranger District (in Ely) for 5 years

Jim Gawboy, DNR Conservation Officer: Field Officer in Aurora for 11 years

Miron Heinselman, retired U.S. Forest Service ecologist, now area summer home owner

Bob Jacobsen, DNR Conservation Officer: Field Officer in Ely for 29 years

Jerry McHugh, DNR Conservation Officer: Field Officer in Virginia for 9 years

Bill Rem former owner, Canoe Country Outfitters in Ely for 30 years

Lee Sutton, U.S. Forest Service: Kawishiwi District Ranger in Ely for 5 years

Tom Sweet, U.S. Forest Service, Aurora District Ranger for 3 years

Fred Thompson, Brimson Area resident for 8 years

Jon Waters, owner, Canadian Waters Canoe Outfitters in Ely for 13 years

Howard Wagoner, DNR District Forester in Tower for 26 years

Program Design--All interviews were conducted during the fall of 1977 by one interviewer; a cassette tape recorder was used during each interview; tapes were later reviewed and roughly transcribed. Approximately 65 tape hours of tape were produced.

The program began with a series of intensive interview sessions with one informant, Frank Baltich, whose recent transfer to St. Paul allowed interview contact without overnight travel costs. These sessions were used to draw out this informant's tacit knowledge of recreational use patterns and to define the forms of recreation taking place in the area. These definitions also proved useful in sessions with other informants when time was more limited. After these background interviews, two trips to the Study Area were scheduled and interviews held with a total of ten more people. Two other interviews were held in the Copper-Nickel Study's Minneapolis office at later times.

Interview Procedures---As mentioned previously, the interview techniques used are rooted in the ethnographic methods of anthropology as refined by J.P. Spradley and D.W. McCurdy (197). Dr. Spradley generously provided a great deal of methodological assistance which is gratefully acknowledged; however, any problems with the program interview format are strictly the responsibility of the author.

Actual interview techniques were quite straightforward, all adapted to the objective of developing a valid, functional data base on dispersed recreational use patterns.

First, informants filled out biography forms, listing present and past occupations, job duties, tenure at relevant jobs, and personal recreation interests. The next task was to determine with what area the informant was familiar and how that area was tacitly subdivided. The interviewer produced a blank map covering an area three to four times the extent of the Study Area and asked, "first, could you mark herer the area you are familiar with?" If the boundary drawn coincided with the informant's district or patrol area, s/he was asked if s/he also knew other areas outside that district, perhaps to a lesser degree of familiarity. Focus was then narrowed to parts of the familiar area falling within the Copper-Nickel Study Area or nearby portions of the BWCA.

The informant's personal geographic breakdown of the area was then explored. Rather than discuss dispersed recreation in arbitrary units such as townships, the units of discussion were those each informant perceived as distinct areas. These subareas were mapped by each informant in response to a question such as, "what are the different areas here?"

The rationale for this approach was two-fold. First, if subareas are clearly marked and labeled on a map in plain view, there will be minimal misunderstanding of place names used. Without this precaution, an informant's comment that Embarrass is a deer hunting area could be inaccurately interpreted; as it happens, the Embarrass area as locally perceived extends well beyond the boundaries of Embarrass Township.

The second rationale for defining individually-perceived subareas is based on the tentative assumption that a geographic unit used in general discussion is probably the same unit of reference used in coding variables like recreational use. If asked about recreation in a given township other unit, an informant may have to divide up what s/he sees as recreation units. This translation process could result in inaccurate data.

After subareas were defined there were basically four kinds of questions asked in varying combinations depending on the answers to previous questions. The process of ethnographic inquiry requires maximum flexibility in the interview structure.

1) "Grand tour" questions are very general and designed to discover some of the terms and concepts in use. For example, this grand tour question might be asked: "Over a year's time what do people come into the area to do?" The response to this particular question yields the start of a list of activities, in the informant's own words, which can then be expanded and refined through other kinds of questions. The answer to a grand tour question reveals a great deal about the operative frame of reference, giving clues which help in formulating good, unambiguous questions. Grand tour questions move from the general to the specific but are always carefully phrased so as not to introduce an analytic framework which might be confusing.

2) Taxonomy questions are designed to complete lists started from answers to grand tour questions: lists of activities, lists of fishing lakes, lists of snowmobiling areas. Like all others, taxonomy questions must be simple and neutral, but they do pick up on terms the informant uses: "You said people go to Lake Vermilion to 'fish walleyes.' Do people do other things on Lake Vermilion?" Or, for another purpose, a question like this might be asked: "You mentioned that people fish walleyes. Are there other kinds of fishing?"

Lists, or taxonomies look like this:

Things people do on area streams	Trout fishing	
	Canoeing	Local canoeing Wilderness canoeing
	Ricing	
	Fishing for northerns	
	Camping	
	Snowmobiling	
	Duck Hunting	

Lists or taxonomies were developed for recreation subareas and recreation activities as perceived by each informant. Taxonomies of recreational activities were not developed anew at each interview after these lists were found to correspond closely between informants.

3) Componential analysis takes information already generated and probes deeper into areas of relevance to the project. It was not enough to know the recreational uses of area streams; we also needed geographic breakdowns. For example, designated state trout streams do not all have

trout, which are actually fished? Which streams are and are not canoed? Furthermore, an attempt was made to identify participant origin: are the trout fishermen locals or tourists? Data on this subject of user origin is incomplete, however, and not included here.

Two techniques fall into this category of componential analysis. First, we are comparing the elements of a single list to one another: "Of areas P, Z, and Q, which two are most alike? Most different? Why?" This kind of question, often done with names of each area or activity on individual note cards, is called triadic sorting. The differentiating characteristics mentioned by an informant help us describe different areas or activities and understand their relative importance.

Besides triadic sorting to identify attributes of an activity or area, componential analysis also involves cross-tabulating one taxonomy with another (binary componential analysis) to generate matrixes like this one:

Activities AREA	Canoeing	Hunting	Motorboating	Fishing
Gabbro-Bald Eagle	+	+	+	+
Tomahawk Area		+		
Basswood Area	+	+	+	+
Seven Beaver Area		+		+

4) Rank-ordering is the next step in an interview program like this one. Elements of any column or row from any taxonomy or matrix may be ranked by the informant in order of frequency, size, importance, accessibility, or other variables. Unfortunately, rank-ordering is very time consuming. To get a complete picture of use frequency one must investigate the personal

frequency coding systems each informant employs, this investigation alone took four hours with the one informant queried at length about use heaviness. Given three-hour interview slots with out-of-town informants, that process had to be streamlined as discussed below.

The Short Interview Format

During the fifteen-odd hours spent with initial informant Baltich, the rules ethnography were carefully followed. His frame of reference was probed with grand tour questions and details of his knowledge elicited through the other processes described above. However, to take full advantage of other informants' knowledge, during brief three-hour sessions necessitated by travel timetables, short cuts had to be made. These shorter sessions soon took on a relatively prescribed pattern. Short interviews began like other first contact sessions, with completion of biography forms and definition of familiar areas on blank maps. A grand tour question about geographic subdivision was often asked. Next, lists of activities generated in previous interviews were used. For each activity, for example grouse hunting, the informant was asked first, "Where do people hunt grouse in this area?" and then, "who hunts grouse in the _____ area?", referring to subareas that informant had mentioned. Each informant was also asked to name any activities not on the pre-existing list.

Another focus during short interviews was the spatial frame of reference, particularly the perceived spatial units of recreational use. When a grouse hunting area was pointed out on the map, the informant was asked, "what would you call that area?" This rather simple question revealed a great deal about the role accessibility plays in all area recreation. For example, it became clear that many unsettled land areas used for dispersed

recreation were named after roads and included only those areas accessed from those roads. Several large areas had no noted recreational use and no local names; most were boggy lowlands but some simply lacked any roads, trails, or canoeable streams for access. Lands around lakes were clearly and consistently defined as part of those lakes' areas, (e.g. August Lake Country, Burntside Lake area) and local areas with residential settlement often took their names from communities or townships nearby.

Maps perceived subareas reflected individuals' own job duties, areas of jurisdiction, and place of residence, hence correlation of various informants' maps was not perfect. More importantly, comments on which geographic places were used for what were in very close agreement across the board.

<u>WATERSHED/LAKE OR STREAM</u>	<u>IN BWCA</u>	<u>TYPE OF ACCESS (Lakes only)</u>	<u>RECREATIONAL USE</u>
<u>Isabella Watershed</u>			
<u>Lakes:</u>			
August Lake		public access	fishing (walleye, pike)
Bald Eagle Lake	X	indirect over water	fishing (walleye)* canoeing, duck hunting
Gabbro Lake	X	portage or over water	fishing (walleye)* canoeing
Gull Lake	X	portage	canoeing, fishing (walleye)
Pietro Lake	X	portage	canoeing, fishing (northern pike)
Quadka Lake	X	over water	fishing (walleye)
Turtle Lake	X	portage	fishing (walleye), canoeing
<u>Streams:</u>			
Isabella River	X	-----	canoeing, wild rice harvesting, fishing
Little Isabella River			designated trout stream
Snake River			designated trout stream

Filson Creek Watershed --- No known water-based recreation

Keeley Creek Watershed

Heart Lake		informal public access	fishing
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Keeley Creek: flows through Superior National Forest's Keeley Creek Natural Area

Stony River Watershed

Lakes:

Bonga Lake		no access except winter snowmobile trail	no known use, despite waterfowl visitation (see Reg. Copper-Nickel Study Waterfowl report)
Greenwood Lake		public access and residences	fishing (walleye pike) duckhunting, swimming, canoeing to Rocky Shores campground
Harris Lake		public access	fishing (walleye pike)
Lobo Lake		no access except winter snowmobile trail	no known use despite waterfowl visitation (see Reg. Copper-Nickel Study Waterfowl report)

<u>WATERSHED/LAKE OR STREAM</u>	<u>IN BWCA</u>	<u>TYPE OF ACCESS (lakes only)</u>	<u>RECREATIONAL USE</u>
<u>Stony River Watershed</u>			
<u>Lakes:</u>			
McDougal Lakes		public access, campground, summer homes	fishing (walleye), camping at campground, swimming, waterskiing
Sand Lake		summer homes & informal public access	wild rice harvesting, fishing, swimming associated with summer homes
Slate Lake		public access	fishing (walleye)
Stony Lake		public access	wild rice harvesting
Unnamed Lakes and unspecified small lakes in Twp. 60N., R. 10W		public access	fishing (walleye, some stream trout)

Streams:

Harris Lake Creek	-----		designated trout stream
Nip Creek	-----		designated trout stream
Mike Kelly Creek	-----		designated trout stream
Nira Creek	-----		known to be fished
Stony River	-----		fishing (walleye pike), wild rice harvesting in isolated patches, day canoeing (when water level is very high), camping at dispersed sites along forest road 178

Unnamed Creek Watershed --- No known water-based recreation

Dunka Watershed

Dunka River	-----		fishing (trout) in segment designated as a trout stream and possibly elsewhere
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Bear Island Watershed

Lakes:

Bear Island Lake		public accesses, residences, resorts, summer homes	fishing (walleye and northern pike), swimming (at beach), netting for Ciscos permitted
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<u>WATERSHED/LAKE OR STREAM</u>	<u>IN BWCA</u>	<u>TYPE OF ACCESS (Lakes only)</u>	<u>RECREATIONAL USE</u>
<u>Bear Island Watershed</u>			
<u>Lakes:</u>			
Johnson Lake		public access, summer homes	fishing
One Pine Lake		public access, summer homes, new housing develop.	fishing (walleye and northern pike)
Purvis Lake: Part of Purvis Lake-Ober Scientific and Natural Area			
<u>Shagawa Watershed</u>			
<u>Lakes:</u>			
Burntside Lake		multiple public accesses, resi- dences, seasonal homes, camps, resorts.	fishing (lake trout)*, winter fishing (angling for trout primarily), boating and water- skiing, swimming at beach on east shore and from resorts, etc., canoeing en route to Crab Lake
Crab Lake	X	portage access	canoeing
Mitchell Lake		resort, no formal public access	fishing, swimming, etc. asso- ciated with resort
Shagawa Lake		public accesses, resorts, resi- dences, seasonal	fishing (walleye pike)*, winter fishing, netting for whitefish*, duck hunting*, also: snowmobiling and cross country skiing on frozen surface
Twin Lakes (near Mitchell Lake)		portage from Mitchell Lake, snowmobile trail	fishing
Wolf Lake		one resort	
<u>Streams:</u>			
Longstorff Creek		-----	designated trout stream

<u>WATERSHED/LAKE OR STREAM</u>	<u>IN BWCA</u>	<u>TYPE OF ACCESS (Lakes only)</u>	<u>RECREATIONAL USE</u>
<u>Kawishiwi Watershed Lakes:</u>			
Birch Lake		public access and residential access on west end by Babbitt; residential development around North Bay; campground and public access on northwest shore; seasonal homes in several spots; several resorts	fishing, winter fishing, duck hunting, waterskiing, boating, camping at campground and at dispersed island and shoreline campsites, canoeing, swimming at beaches, at cabins and resorts, ricing (at the mouth of Birch River)
Browns Lake		summer homes, no official public access	fishing (walleye pike) duck hunting
Cedar Lake		residences, summer homes	fishing (northern Pike) possible waterskiing
Clearwater Lake	X	portage	canoeing, fishing (northern pike and possibly walleye pike)
Fall Lake		public access at campground; resorts along south shore	canoeing*, fishing (walleye and northern pike), waterskiing and boating, swimming at campground beach and at resorts, duck hunting, netting for whitefish, wild rice harvesting (in bay where Stub Lake Creek flows into Fall Lake), camping at campground and campsites (canoeists)
Farm Lake		resorts, summer homes, private campgrounds, & public access	fishing (walleye and northern pike), winter fishing, waterskiing, netting for whitefish, wild rice harvesting, BWCA canoe entry lake, swimming, camping at private campgrounds
Garden Lake		summer homes, resort(s), public access	fishing, waterskiing and boating winter fishing, swimming
Lakes One, Two, Three, and Four	X	over water access from Kawishiwi River	canoeing*, fishing (walleye pike) especially heavy further up this lake chain (Lake Insula, Alice Lake)
South Farm Lake	X	public access on farm lakes serves South Farm as well	canoeing, fishing

<u>WATERSHED/LAKE OR STREAM</u>	<u>IN BWCA</u>	<u>TYPE OF ACCESS (lakes only)</u>	<u>RECREATIONAL USE</u>
<u>Kawishiwi Watershed Lakes</u>			
<u>Lakes:</u>			
White Iron Lake		residences, resorts & summer homes, public accesses	fishing (walleye pike and northern pike)*, winter fishing, waterskiing, duck hunting, netting whitefish, canoeing
<u>Streams:</u>			
Kawishiwi River- North Branch	X	portage or over water	canoeing, fishing (walleyes, northern crappies), winter fishing
Kawishiwi River-	Partially X	public access at campground	canoeing, fishing, winter fishing, boating, camping
<u>Basswood, Moose Lake, Snowbank, and Range River Watersheds</u>			
<u>Lakes:</u>			
Bass Lake		portage	canoeing, fishing (bass, northern pike), winter fishing, (hiking), part of nominated national natural landmark and proposed state scientific and natural area
Basswood Lake	X	portage, over water access, one resort	fishing (walleyes, trout, northern etc.), netting for whitefish, winter fishing, wild rice harvesting, canoeing*, boating
Dry Lake		portage	fishing (stream trout), part of nominated national natural landmark and proposed state scientific and natural area
High Lake		portage	fishing (stream trout)
Jasper Lake		resort(s), cabins	fishing
Low Lake		informal public access and over water access from Bass Lake, summer homes	canoeing, ACM (Associated Colleges of the Midwest) has field ecology station on Low Lake
Moose Lake	Partially X	public access, canoe outfitters' bases, resorts	canoeing*, boating and waterskiing, fishing (walleye pike), netting of whitefish
Ojibway Lake (Twin Lakes- old name)		summer homes (including 16 on federal lease sites),(?)resorts, public access	fishing (trout), winter fishing

<u>WATERSHED/LAKE OR STREAM</u>	<u>IN</u> <u>BWCA</u>	<u>TYPE OF ACCESS</u> <u>(lakes only)</u>	<u>RECREATIONAL USE</u>
<u>Basswood, Moose, Snowbank, and Range River Watershed</u>			
<u>Lakes:</u>			
Snowbank Lake	Partially X	summer homes, public access, (?) resorts	fishing (lake trout)*, winter fishing, waterskiing
Tofte Lake		public access	stocked with rainbow trout
Triangle Lake		summer homes	fishing, winter fishing
Twin Lake (renamed Ojibway Lake, see above)			
Wood Lake		public access	fishing (northern pike) duck hunting
<u>Streams:</u>			
Range River	X	-----	canoeing
<u>Vermilion Lake Drainage</u>			
<u>East & West Two Rivers Watersheds</u>			
<u>Lakes:</u>			
Bear Head Lake		public access, in Bear Head State Park	fishing (walleye pike), camping boating, picnicking, swimming, hiking and other trail-based activities in State Park sur- rounding Bear Head Lake
Blueberry Lake (near Bear Head Lake)		unofficial trails	reputedly a trout lake with occasional fishing use
Eagle Nest Lakes		residences, summer homes, resorts, & public access (on one of the four lakes)	fishing (walleyes), waterskiing, duck hunting
<u>Streams:</u>			
East Two River		-----	designated trout stream with some fishing use
West Two River		-----	designated trout stream with some fishing use
<u>Pike River Watershed</u>			
<u>Lakes:</u>			
Hay Lake		water access from Pike River	wild rice harvesting
Pfeiffer Lake		public access at U.S. Forest Serv. Campground	fishing (bass, northern pike), camping, swimming, picknicking, hiking

<u>WATERSHED/LAKE OR STREAM</u>	<u>IN BWCA</u>	<u>TYPE OF ACCESS (Lakes only)</u>	<u>RECREATIONAL USE</u>
<u>Vermilion Lake Drainage</u>			
<u>Pike River Watershed</u>			
<u>Streams:</u>			
Pike River			wild rice harvesting, day canoeing, fishing (northern pike)
<u>Other Tributary Waterbodies</u>			
Armstrong Lake		residences, (?)resort	fishing
Clear Lake		residences, (?)resort	fishing
Lost Lake		public access (informal?)	fishing (walleyes), duck hunting
Mud Lake		portage	fishing (bass, northern pike)
Robinson Lake		residences, (?)resort	fishing
Tamarack Lake		summer homes	fishing
Lake Vermilion		several public accesses, numerous resorts, summer homes, & residences	boating and waterskiing*, fishing (walleye pike)*, winter fishing-including dark house spearing for northern pike*, netting for whitefish*, camping at campgrounds and dispersed island campsites, swimming, duck hunting, wild rice harvesting
<u>Little Fork Watershed</u>			
Big Rice Lake (near Britt)		public access, one residence	wild rice harvesting*, fishing (northern pike)
Little Rice Lake		public access	wild rice harvesting
Little Fork River		no access	no known recreational use
<u>Embarrass Watershed</u>			
<u>Lakes:</u>			
Cedar Island Lake		residential, summer homes, camps(?)	fishing, swimming, waterskiing
Embarrass Lake		public access plus? (south side closed off by dynamite factory)	swimming, fishing

<u>WATERSHED/LAKE OR STREAM</u>	<u>IN BWCA</u>	<u>TYPE OF ACCESS (lakes only)</u>	<u>RECREATIONAL USE</u>
<u>Embarrass Watershed</u>			
<u>Lakes:</u>			
Esquagama Lake		residential, summer homes, camps	fishing, swimming, waterskiing
The Fishing Lakes		unofficial trails	limited fishing
Heikilla Lake		possibly one cabin	no known use of great significance
Sabin Lake and Wynne Lake		public access, a few summer homes	fishing (northern pike), canoeing
Other small lakes in Embarrass Watershed		residences, unof- ficial public accesses	waterfowl hunting
<u>Streams:</u>			
Embarrass River		-----	fishing (northern pike), day canoeing when water levels allow
<u>Partridge Watershed</u>			
<u>Lakes:</u>			
Big Lake		accessed along railroad grade & snowmobile trail	fishing (walleye pike), winter fishing
Colby Lake		public access	fishing, swimming, boating, waterskiing, duck hunting
Whitewater Lake		public access	fishing, swimming, boating, waterskiing, duck hunting, camping at two municipal campgrounds
<u>Streams:</u>			
Partridge River		-----	fishing (northern pike) near Hoyt Lakes
Wyman Creek		-----	designated trout stream with known fishing use
First Creek		-----	designated trout stream
Second Creek		-----	designated trout stream
unnamed tributary to Cranberry Lake		-----	designated trout stream
<u>St. Louis Watershed</u>			
<u>Lakes:</u>			
Bass Lake		residences	

<u>WATERSHED/LAKE OR STREAM</u>	<u>IN BWCA</u>	<u>TYPE OF ACCESS (Lakes only)</u>	<u>RECREATIONAL USE</u>
<u>St. Louis Watershed</u>			
<u>Lakes:</u>			
Bird Lake		public access at picnic site	picnicking, canoeing
Cedar Lake		public access	designated trout lake
Ely Lake		residences and public access	swimming, fishing, waterskiing, netting for Ciscos
Long Lake		snowmobile trail	duck hunting
Pine Lake		railroad grade to unofficial public access, cabins	
Round Lake		snowmobile trail, and railroad grade	fishing (walleye pike), winter fishing
St. Marys Lake		residences, public access, and one resort	swimming, fishing, waterskiing, netting of Ciscos and whitefish
Silver Lake		public access lake	designated trout lake
Seven Beaver Lake		snowmobile trail & railroad grade	fishing (walleye pike), winter fishing
Twin Lakes (T.57,R.15W.)		public access	swimming, waterskiing
Other lakes, e.g. Lost, Frying Pan, Loon Lakes, in St. Louis Watershed		residences, public access in some cases	fishing, winter fishing, swimming
<u>Streams:</u>			
St. Louis River			canoeing where and when water levels allow, rarely upstream from Norway Point, fishing (northern pike), duck hunting
<u>Cloquet Watershed</u>			
<u>Lakes:</u>			
Bassett Lake		summer homes, residences, public access	fishing, swimming
Sullivan Lake		public access	fishing (a designated trout lake), winter fishing, camping at campground, picnicking

<u>WATERSHED/LAKE OR STREAM</u>	<u>IN BWCA</u>	<u>TYPE OF ACCESS (Lakes only)</u>	<u>RECREATIONAL USE</u>
<u>Cloquet Watershed</u>			
<u>Streams:</u>			
Cloquet River		-----	canoeing
Murphy Creek		-----	designated trout stream
Sullivan Creek		-----	designated trout stream
<u>Whiteface Watershed</u>			
Cadotte Lake		summer homes, residences, public access	fishing, camping at campground, swimming
Whiteface Reservoir (outside Study Area but included because of heavy use by Study Area residents)		public access, summer homes	boating, waterskiing, swimming, picnicking, camping at 2 camp- grounds, fishing

*Lake or stream one of most heavily used in Study Area for this activity.

Appendix C. Public outdoor recreation facilities.
(Public facilities only-no resorts or private campgrounds)

SITE NAME	MANAGING AGENCY	LOCATION	ACTIVITY	CAPACITY*	1976 USE, % OF ANNUAL CAPACITY
Camp II	U.S. Forest Service, Superior National Forest (USFS)	61,10W.Sec.29	picnicking	1	---
Birch Lake	U.S.F.S.	61,11W.Sec.19	camping boat access	38 ---	19 ---
McDougal Lake	U.S.F.S.	60,10W.Sec.36	camping picnicking swimming boat access	21 2 100'X50' ---	46 29 3 ---
White Pine	U.S.F.S.	57,10W.Sec.18	picnicking	3	---
Tofte Lake	U.S.F.S.	63,10W.Sec.10	boat access	---	---
Fall Lake	U.S.F.S.	63,11W.Sec.10	picnicking swimming boat access camping	20 200'X25' -- 69	2 13 -- 26
Farm Lake	U.S.F.S.	63,11W.Sec.33	boat access	---	---
S. Kawishiwi River	U.S.F.S.	62,11W.Sec.33	boat access picnicking camping swimming	-- 5 31 400'X75'	--- 63 40 38
Pfeiffer Lake	U.S.F.S.	61,17W.Sec.23	picnicking camping swimming boat access	7 21 100'X40' ---	17 17 32 ---
Big Rice Lake	U.S.F.S.	60,17W.Sec.9	picnicking boat access	1 ---	--- ---
Laurentian Divide	U.S.F.S.	59,17W.Sec.29	picnicking	7	83
Bird Lake	U.S.F.S.	58,14W.Sec.25	picnicking boat access	3 ---	10 ---
Norway Point	U.S.F.S.	57,14W.Sec.8	picnicking boat access	6 ---	19 ---
Cadotte Lake	U.S.F.S.	57,12W.Sec.31	camping swimming boat access	27 1000+ ⁴ X3' ---	27 7 ---

SITE NAME	MANAGING AGENCY	LOCATION	ACTIVITY	CAPACITY*	1976 USE, % OF ANNUAL CAPACITY
Johnson La ¹	U.S.F.S.	62,12W.Sec.32	boat access	---	--
One Pine Lake	U.S.F.S.	62,12W.Sec.32	picnicking boat access	2 ---	-- ---
Burntside Lake, East Arm	U.S.F.S.	63,12W.Sec.8	swimming	---	--
Bassett Lake	U.S.F.S.	57,12W.Sec.32	swimming	---	---
Rocky Shores	MDNR (Minn. Dept. Natural Resources)	58,10W.Sec.17	camping boat access	3 ---	--- ---
Greenwood Lake	MDNR	58,10W.Sec.18	picnicking boat access	4 ---	-- ---
Sullivan Lake	MDNR	57,11W.Sec.36	camping picnicking boat access	10 2 ---	--- --- ---
Bear Island Lake	MDNR	61,13W.Sec.9	boat access	---	---
Bear Island Lake	MDNR	61,13W.Sec.16	picnicking swimming boat access	2 --- ---	--- --- ---
Birch Lake	MDNR	61,13W.Sec.36	picnicking boat access	2 ---	-- ---
Hilsdale Island	MDNR	63,17W.Sec.36	camping	11	---
Chub Lake	MDNR	60,10W.Sec.16	boat access	---	---
McDougal Lake	MDNR	60,10W.Sec.36	boat access	---	---
Horseshoe Lake	MDNR	58,17W.Sec.36	boat access	---	---
Silver Lake	MDNR	58,16W.Sec.36	boat access	---	---
St. Louis River	MDNR	58,14W.Sec.36	boat access	---	---
Lost Lake	MDNR	57,16W.Sec.9	boat access	---	---
Coe Lake	MDNR	57,16W.Sec.36	boat access	---	---

SITE NAME	MANAGING AGENCY	LOCATION	ACTIVITY	CAPACITY*	1976 USE, % OF ANNUAL CAPACITY
Bear Head Lake State Park	MDNR	61,14W.Sec.2	picnicking swimming	30 300'X35	--- ---
Bear Head Lake	MDNR	61,14W.Sec.2	boat access	---	---
Bear Head Lake	MDNR	61,14W.Sec.2	camping	74	---
Tower-Soudan State Park	MDNR	62,15W.Sec.27	picnicking	13	---
Ely Rest Area	MNDOT (Minn. Dept. of Transportation)	62,11W.Sec.31	picnicking	1	---
S. Kawishiwi River	MNDOT	62,11W.Sec.31	picnicking boat access	1 -	
St. Mary's Lake	MNDOT	57,17W.Sec.17	picnicking	1	
Pike River Rest Area	MNDOT	61,16W.Sec.4	picnicking boat access	1 -	
Embarrass Lake	MNDOT	58,16W.Sec.1	picnicking boat access	2 -	
Tower Rest Area	MNDOT	62,15W.Sec.32	picnicking	1	
Jasper Park	MNDOT	62,15W.Sec.35	picnicking	3	
Ely Rest Area	MNDOT	62,14W.Sec.14	picnicking	1	
Bear Island River Rest Area	MNDOT	62,12W.Sec.34	picnicking	1	
Bear Island Lake	Co.Hwy.Engr.	61,13W.Sec.12	boat access	-	
Birch Lake	Co.Hwy.Engr.	61,13W.Sec.24	boat access	-	
Birch Lake	Co.Hwy.Engr.	61,13W.Sec.25	boat access	-	
Wynne Lake	Co.Hwy.Engr.	59,15W.Sec.18	boat access	-	
Vermilion Lake-9	Co.Hwy.Engr.	63,17W.Sec.11	boat access	-	

SITE NAME	MANAGING AGENCY	LOCATION	ACTIVITY	CAPACITY*	1976 USE, % OF ANNUAL CAPACITY
Vermilion Lake-11	Co. Hwy. Engr.	63, 17W. Sec. 8	boat access	--	
Vermilion Lake-8	Co. Hwy. Engr.	63, 17W. Sec. 26	boat access	--	
Vermilion Lake-12	Co. Hwy. Engr.	63, 17W. Sec. 11	boat access	--	
Vermilion Lake-1	Co. Hwy. Engr.	63, 16W. Sec. 33	boat access	--	
Burntside Lake-2	Co. Hwy. Engr.	63, 13W. Sec. 4	boat access	--	
Burntside Lake	Co. Hwy. Engr.	63, 13W. Sec. 12	boat access	--	
Burntside Lake-1	Co. Hwy. Engr.	63, 13W. Sec. 23	boat access	--	
Shagawa Lake-2	Co. Hwy. Engr.	63, 12W. Sec. 19	boat access	--	
Vermilion Lake-5	Co. Hwy. Engr.	63, 16W. Sec. 33	boat access	--	
Vermilion Lake-6	Co. Hwy. Engr.	62, 16W. Sec. 5	boat access	--	
Vermilion Lake-7	Co. Hwy. Engr.	62, 16W. Sec. 6	boat access	--	
Vermilion Lake-4	Co. Hwy. Engr.	62, 16W. Sec. 16	boat access	--	
Vermilion Lake-3	Co. Hwy. Engr.	62, 16W. Sec. 23	boat access	--	
Lost Lake	Co. Hwy. Engr.	62, 16W. Sec. 29	boat access	--	
Eagles Nest Lake	Co. Hwy. Engr.	62, 14W. Sec. 33	boat access	--	
White Iron Lake	Co. Hwy. Engr.	62, 12W. Sec. 13	boat access	--	
Hopkins Municipal Park	Eveleth	58, 17W. Sec. 26	picnicking swimming	6 250' X 0'	

SITE NAME	MANAGING AGENCY	LOCATION	ACTIVITY	CAPACITY*	1976 USE, % OF ANNUAL CAPACITY
Ely Lake Municipal Access	Eveleth	58,17W.Sec.35	picnicking swimming boat access	6 150'X50' -	
Embarass Lake-2	Biwabik	58,16W.Sec.11	picnicking swimming boat access	1 600'X0' -	
Biwabik Municipal Swimming Beach	Biwabik	58,16W.Sec.14	picnicking swimming boat access	8 300'X0' -	
Loon Lake Municipal Access	Biwabik	57,15W.Sec.28	boat access	-	
McKinley Park	McKinley	62,15W.Sec.29 & Sec.20	camping picnicking swimming	40 4 500'X0'	
Birch Lake Beach Municipal Park	Babbitt	60,12W.Sec.5	picnicking swimming	15 100+'X300'	
Hidden Valley Ski Area	Ely	63,12W.Sec.36	skiing	---	
Adams Municipal Park	Eveleth	58,17W.Sec.32	picnicking	2	
Eveleth Municipal Golf Course	Eveleth	57,17W.Sec.8	golf course	---	
Colby Lake Municipal Access-2	Hoyt Lakes	58,14W.Sec.7	picnicking swimming boat access	10 150'X300'	
Fisherman's Point	Hoyt Lakes	58,15W.Sec.13	camping picnicking boat access	42 5 ---	
Hoyt Lakes Municipal Golf Course	Hoyt Lakes	58,14W.Sec.13	golf course	---	
Fisherman's Point City Campground	Hoyt Lakes	58,14W.Sec.18	camping boat access	54 ---	

SITE NAME	MANAGING AGENCY	LOCATION	ACTIVITY	CAPACITY*	1976 USE, % OF ANNUAL CAPACITY
Hoodoo Point Campground	Tower	62,15W.Sec.30	camping picnicking swimming boat access	54 15 400'X50' --	
Virginia Municipal Golf Course	Virginia	58,17W.Sec.6	golf course	--	
Olcott Municipal Park	Virginia	58,17W.Sec.7	picnicking	6	
Southside Municipal Park	Virginia	58,17W.Sec.17	picnicking	4	

*Capacity: Picnicking=#picnic sites; camping=#campsites; swimming=dimensions of beach (length of shoreline by width of beach area).