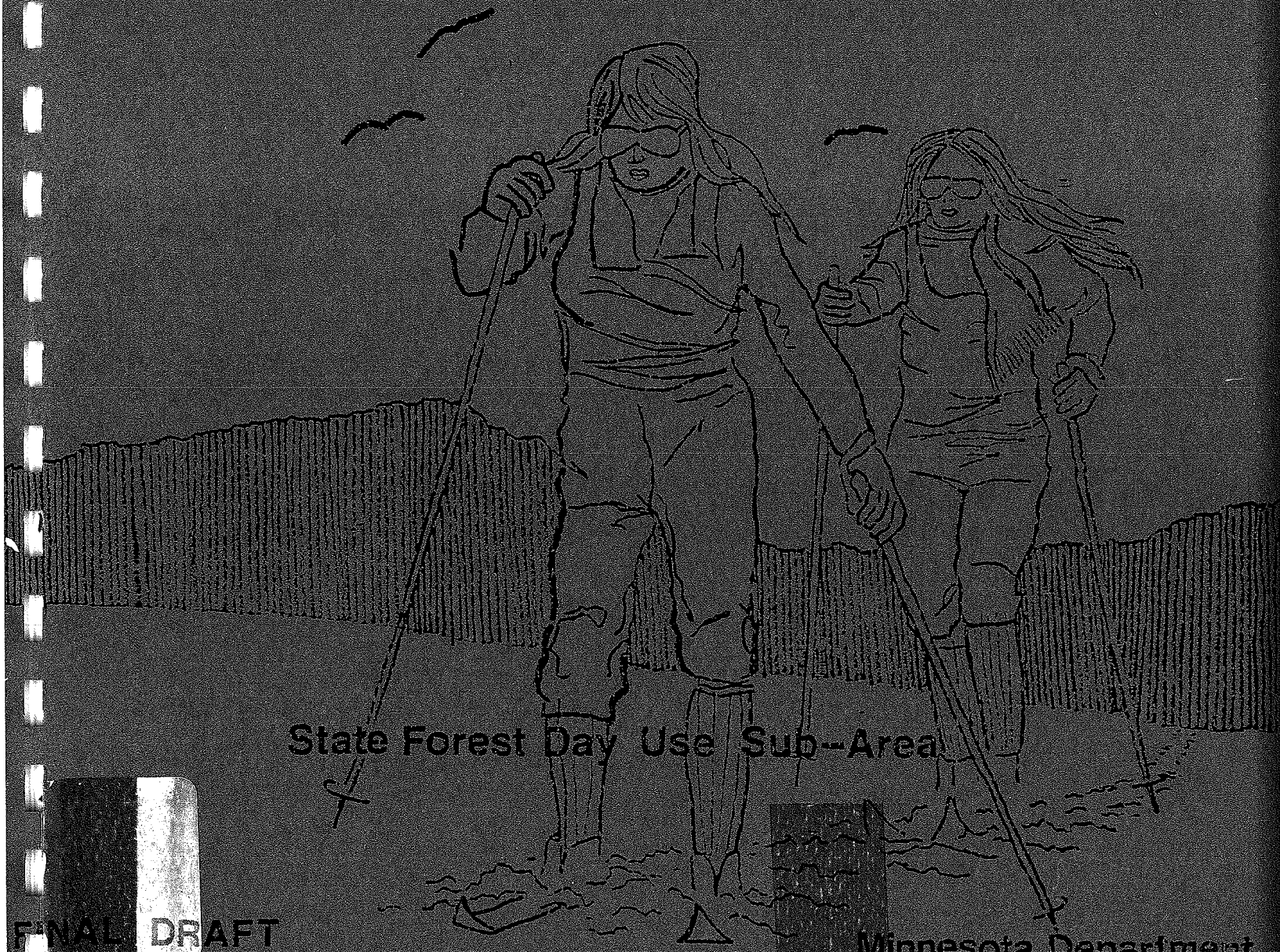
A Management Plan
for the

Rock Lake Solitude Area



State Forest Day Use Sub-Area

FINAL DRAFT
August 1978

Minnesota Department
of Natural Resources

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FOREWORD

It is the purpose of this document to serve as both a management plan for the development and maintenance of the Rock Lake Solitude Area (day use sub-area), and as an environmental assessment of this action. The development and maintenance procedures described in this document will insure that the scenic, historic, scientific and recreational qualities of the trail are properly managed for the use and enjoyment of the citizens of Minnesota. The environmental impacts of this action have also been assessed to measure their effects on the environment. This assessment may be used in the event that the Department of Natural Resources - Division of Forestry decides to seek Land and Water Conservation Funding (LAWCON).

SUMMARY

The major sections of the document are: the Introduction, Description of the Proposed Action, Description of the Environment, and Environmental Impact of the Proposed Project.

The Introduction includes: an overview of pertinent legislation, the authority for state forest sub areas, and the goal and objectives for the state forest ski touring-hiking program. The DNR's overall goal is also revealed.

The Description of the Proposed Action reveals: the location of the project, the unit goal and objectives, existing and proposed development, maintenance, how the plan will be implemented, and whose recreational needs will be served.

The Description of the Environment is an inventory-analysis of the natural and socio-economic resources of the project area. This section attempts to "tie together" the interrelated resource factors that are vital in the planning of this unit.

The final section, the Environmental Impacts of the Proposed Project, deals with the possible affects that the proposed action may incur.

The Rock Lake Solitude Area management plan will be filed with and be available from Documents Section, Room 140, Centennial Building, St. Paul, Minnesota, 55155.

Introduction to the Plan

Multiple Use Concept

It is the policy of the Department of Natural Resources, Division of Forestry, to protect, develop and administer the renewable resources of Minnesota's fifty-six state forests so they are utilized in the combination of uses that will best meet the needs of Minnesota citizens. This requires harmonious and coordinated management of the forest resources to bring about their maximum productivity as well as providing other public benefits.

The primary management objective is to maintain a maximum sustained yield of various forest products while utilizing renewable forest resources to benefit the greatest number of people. Renewable forest resources that require management and protection include timber, wildlife, soil and water. Management practices such as timber production and harvest, watershed protection, wildlife habitat maintenance, and recreational development are carried out on lands best suited for each use.

This multiple use approach to management is intended to provide equal opportunity for all citizens to enjoy and utilize our forest resource. This means that the forest is a shared resource that must be utilized by various user groups in harmony with each other.

With this multiple use concept in mind, the legislature included state forests

in Minnesota's Outdoor Recreation System. This system, created in 1975 by the Outdoor Recreation Act (ORA), incorporated all state recreation lands into eleven different kinds of areas, each with its own classification. The eleven classifications are: Natural State Parks; Recreational State Parks; State Trails; Scientific and Natural Areas; State Wilderness Areas; State Forests; State Wildlife Management Areas; State Water Access Sites; State Wild, Scenic and Recreational Rivers; State Historic Sites; and State Rest Areas. Each member of the system is referred to as a "unit".

By passing the ORA, the legislature revealed its awareness of a growing problem in Minnesota: The increasing number of people using state lands each year for more diverse forms of recreation. While some areas could withstand higher levels of use, other areas experienced overcrowding and conflicts between different recreational users.

To insure that the administration of each unit is managed in a manner that is consistent with the purposes for which the unit was authorized, it is required by the ORA that the managing agency prepare a master plan for each unit. The act states:

> "No construction of new facilities or other development of an authorized unit, other than repairs and maintenance, shall commence until the managing agency has prepared and submitted to the state planning agency and the state planning agency has reviewed, pursuant to this section, a master plan for administration of the unit in conformity with this section. This requirement shall not apply

to an existing unit until August 1, 1977."

The following day use sub-area plan has been prepared by the DNR to fulfill the requirements of this act as it pertains to state forests. This day use sub-area plan will be incorporated into the overall state forest master plan when that plan is prepared.

This day use sub-area plan has been written prior to the state forest master plan so that monies from the Outdoor Recreation Bonding Bill can be utilized this year. (Laws 1977, Chapter 421, Section 13, Subdivision 4)

Under the terms of this bill, the DNR has been allocated $1,105,000:

"For betterment of public land and improvements needed for trails for skiing, hiking and bicycling within state parks and recreation areas as listed and described in sections 85.012 and 85.013 and state forests, as listed and described in section 89.021."

The Authority

The authority for establishment of these ski touring-hiking areas (day use sub-areas) was granted by Minnesota Statutes 86.01 (the Outdoor Recreation Act) subdivision 7 which states:

"Subd. 7. STATE FORESTS AND STATE FOREST SUB-AREAS: PURPOSE; RESOURCE AND SITE QUALIFICATIONS; ADMINISTRATION. (a) A state forest, as established by Minnesota Statutes, Section 89.021, shall be admin-

istered to accomplish the purposes set forth in that section, and a state forest sub-area shall be established to permit development and management of specialized outdoor recreation at locations and in a manner consistent with the primary purpose of the forest.

(b) No unit shall be authorized as a state forest sub-area unless it is located within a state forest and contains suitable natural resources to accommodate any of the following uses:

(1) Day use areas. Areas which permit recreational use of the forest in its natural state, not requiring an overnight stay, including but not limited to picnicking, fishing, swimming, boat launching, hiking, interpretation and nature observation.

(2) Campground. Provide minimum facilities to accommodate overnight camping.

(c) Outdoor recreation sub-areas located within state forests shall be administered by the commissioner of natural resources in a manner which is consistent with the purposes of this subdivision."

Goals and Objectives

The statutes and laws previously cited outline the legislation pertaining to state forest ski touring and hiking trails in regard to funding, planning and establishment. Along with this legislation, it is important to establish a goal for the overall State Forest Ski Touring and Hiking Program.

State Forest Ski Touring and Hiking Program Goal

The goal of the State Forest ski touring and hiking program is to provide

Minnesotans with the highest possible variety of quality ski touring and hiking trails. These ski touring and hiking trails shall be developed so that they may be enjoyed for years to come.

However, since state forest ski touring-hiking trails are only a part of the overall program, it is equally important to recognize the overall DNR ski touring-hiking program goal.

Overall Program Goal

The goal of the overall DNR Ski Touring and Hiking Program (which includes natural and recreational State Parks, Recreation Areas, and State Forests), is to provide Minnesotans with the finest ski touring and hiking trails in the nation.

Objectives for Overall State Forest Ski Touring-Hiking Program

* To provide ski touring-hiking opportunities in state forests which are accessible to all citizens of Minnesota.

* To improve the 64 miles of existing ski touring-hiking trails in state forests throughout Minnesota.

* To develop 150 miles of new or additional ski touring-hiking trails where feasible in state forests throughout Minnesota.

* To provide a variety of ski touring-hiking experiences in state forests

taking advantage of scenic, topographic, historic and recreational areas.

* To involve the governor's appointed ski touring task force and other concerned citizens in the planning and design of state forest ski touring-hiking trails.

* To provide complementary facilities along each state forest ski touring-hiking trail to insure the rest and comfort of the trail user.

* To implement a system of signing design and specifications that is consistent along each state forest ski touring-hiking trail which promotes user enjoyment and safety.

* To disseminate current, accurate literature of each state forest ski touring-hiking trail for public information and use.

* To provide interpretation on the cultural, historic and vegetative features along state forest ski touring-hiking trails.

Description of the Proposed Action

Purpose of the Action

It is the Department of Natural Resources' intention to upgrade the 12.8 miles of existing trail and complementary facilities within the Rock Lake Solitude Area. This action is intended to serve the people of the Brainerd area and the rest of the citizens throughout Minnesota.

Location of the Project

The Rock Lake Solitude Area is located in the Pillsbury State Forest, twenty-three miles west of Brainerd (see location map - figure 1). This unit exists on the northwestern corner of the forest. There are presently 12.8 miles of ski touring trail developed in the area. Part of the area traversed by the trail is lowlands while the north loop is on high ground. The treadway is approximately eight to ten feet wide which allows for two-way traffic.

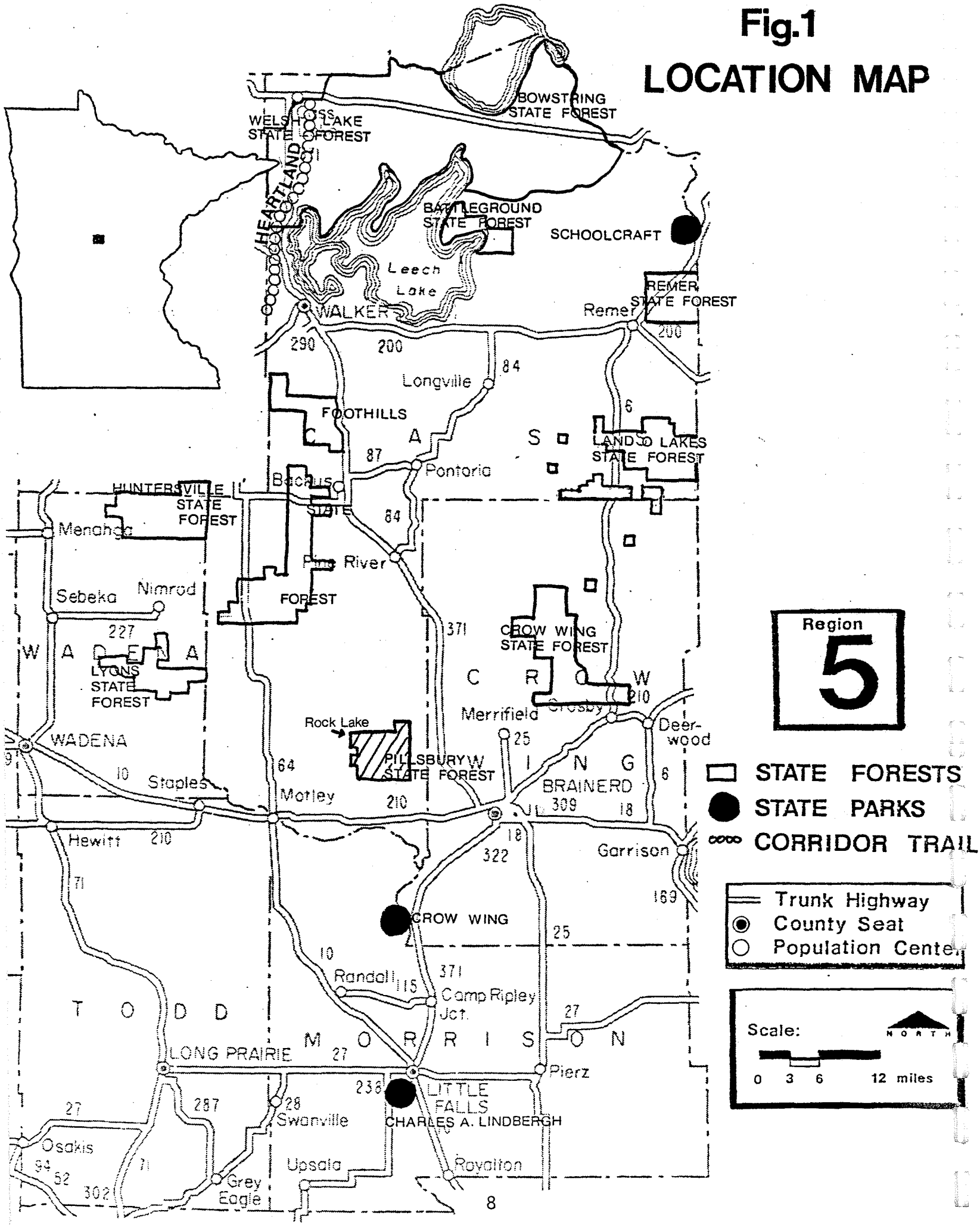
The Rock Lake Solitude Area is located on State and County lands and has been a cooperative effort of DNR - Forestry, Cass County, and Fairview township.

Magnitude of the Project

Unit Goal

It is the goal of the DNR to provide the highest quality ski touring-hiking experience possible along the trail within the Rock Lake Solitude Area.

Fig.1
LOCATION MAP



Unit Objectives

* To properly upgrade and maintain the existing trail without inhibiting other management activities.

* To gain approval of this plan for the development and management of this state forest day use area.

* To complete the development as spelled out in this plan by the winter of 1978-79. (i.e. upgrade the 12.8 miles of trail and complementary facilities)

* To further establish this area for non-motorized recreational use through formal designation as a state forest day use area for ski touring-hiking.[1]

* To develop and implement a maintenance program for a quality trail experience.

Existing Development

Existing development consists of 12.8 miles of trail which allows for two-way traffic. A parking lot providing for 20 to 30 cars is located at the start of the trail. Presently, two rest areas exist along the trail. One is located on the interior of the trail system while the other is at the trailhead. A hand pump well and latrines are located near the shelter at the trailhead. The Rock Lake Campground is also located near the parking area. This campground has 18 campsites, 4 picnic sites, a swimming beach, boat access and

[1]Motorized vehicles for administrative purposes and contract services will be allowed.

fishing opportunities.

The Rock Lake Solitude Area has primarily been developed as a ski touring trail within the Pillsbury State Forest. However, the first smaller loop of the ski trail is suitable for hiking in the summer and has been used in the past by users of the Rock Lake Campground (see map in figure 2). Hiking on the remaining segments of the trail is not recommended because of the large amount of tamarack swampland, floating bog area and insect-pest production.

Proposed Development

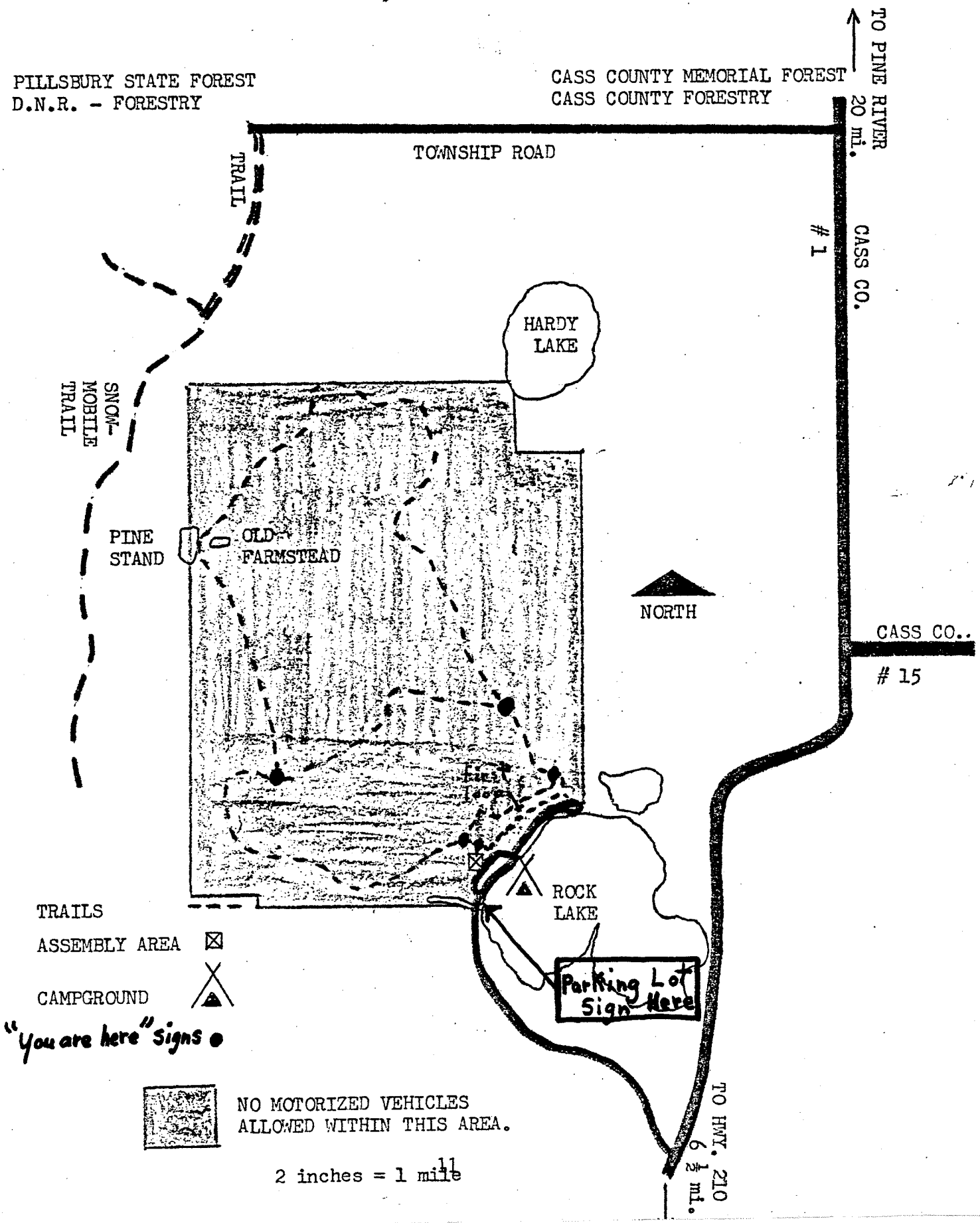
Proposed development will involve the upgrading of existing mileage and complementary facilities. It has been determined at this time that expansion of this system is not feasible. Available state and county lands suitable for quality ski touring trails are in short supply near the existing system. In addition, existing snowmobile trail mileage throughout the entire Pillsbury State Forest would make alignment of additional solitude area mileage difficult (see map in figure 3). Therefore, at this time, it is not recommended to expand the Rock Lake Solitude Area but to improve the current system for the best overall trail experience.

Trail Design

Portions of the solitude trail currently need basic design improvements (see design typical in figure 4, page 13). While the trail may need to be widened in places, the main concern is to level off the hummocky surface throughout

Fig. 2

ROCK LAKE SOLITUDE AREA



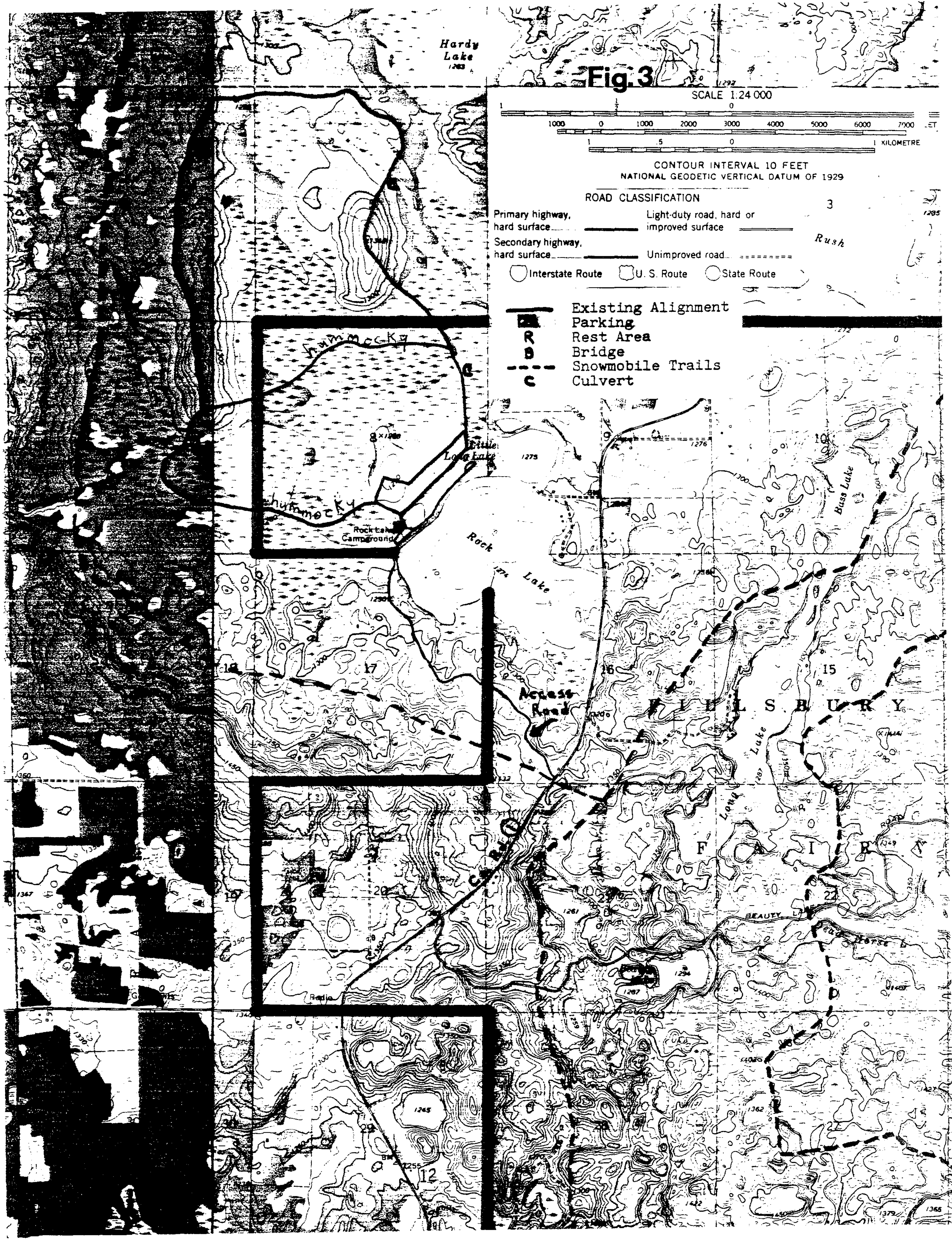
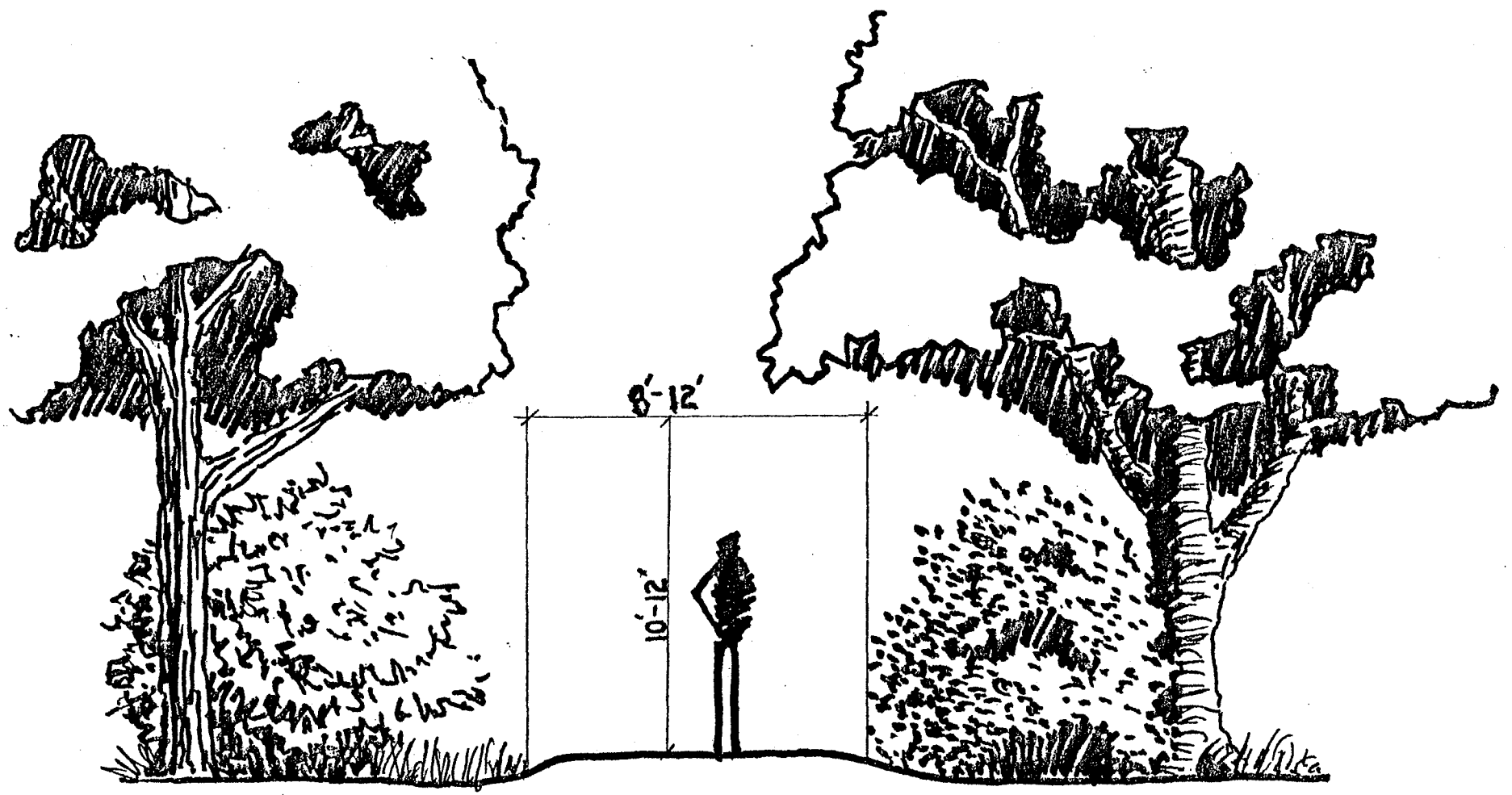

SCALE 1:24 000
CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
ROAD CLASSIFICATION
Primary highway, hard surface
Light-duty road, hard or improved surface
Secondary highway, hard surface
Unimproved road
Interstate Route
U. S. Route
State Route
Existing Alignment
Parking
Rest Area
Bridge
Snowmobile Trails
Culvert
Hardy Lake
Rush
Hummocky
Little Long Lake
Rocklake Campground
Rock Lake
Bass Lake
Access Road
PILLSBURY
Long Lake
F A I R
BEAUTY
Radio

Fig.3

Fig.4

Ski Touring Trail Treadways



minimum clearances needed
for ski touring trails

width varies with terrain
height varies with snow depth

tamarack area (see map in figure 3). This work could be difficult because there are many areas consisting of floating bog and lowlands. In addition, some stumps and rocks may have to be bulldozed along the trail. Cut and fill work on side slopes may have to be done as shown in figure 5. Where there are erosion problems, water bars as shown in figure 5.5 will be constructed. This work will insure a safer, more passible treadway.

A bridge will be installed over a creek with a beaver dam (see map in figure 3). A natural materials bridge, as shown in either figures 6 or 7, would best leave the flow of the creek unrestricted. In other places along the trail, it was found that culverts (approximately 16"), would permit the natural flowage of water from the spring fed lowland. Elevating the treadway and corduroy may be used along these wet areas (see figure 8). Permits will be required from the Division of Waters before corduroy, culverts, bridges and other structures which affect water flow are constructed.

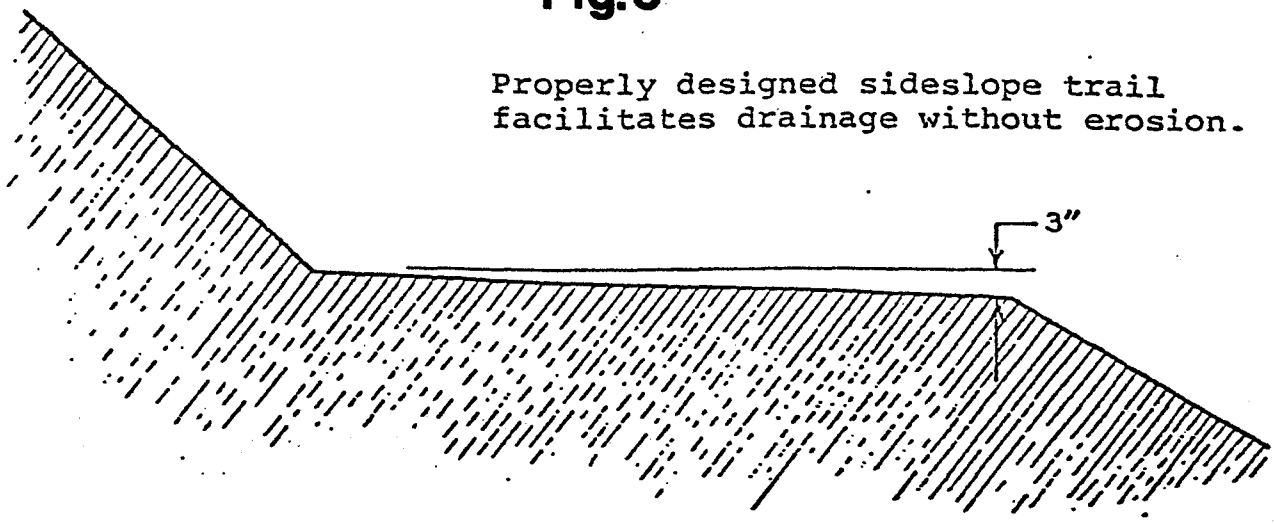
Complementary Facilities

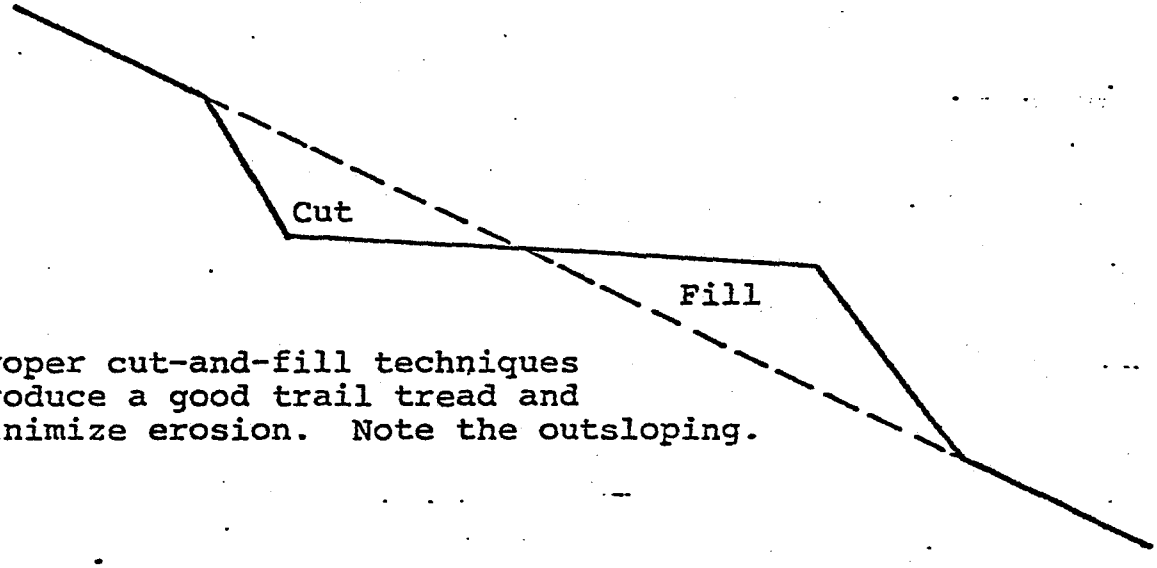
There currently exist complementary facilities which require improvements. The parking lot at the trailhead may need surfacing with class V gravel as use increases (see typical in figure 9). This would make it more durable while aiding the drainage of excess water.

The trail shelter near the parking lot should be moved to the interior of the system. This would better insure the rest and comfort of the trail user and prevent excessive loitering. Moving this shelter, however, may

Fig.5

Properly designed sideslope trail facilitates drainage without erosion.





Proper cut-and-fill techniques produce a good trail tread and minimize erosion. Note the outsloping.

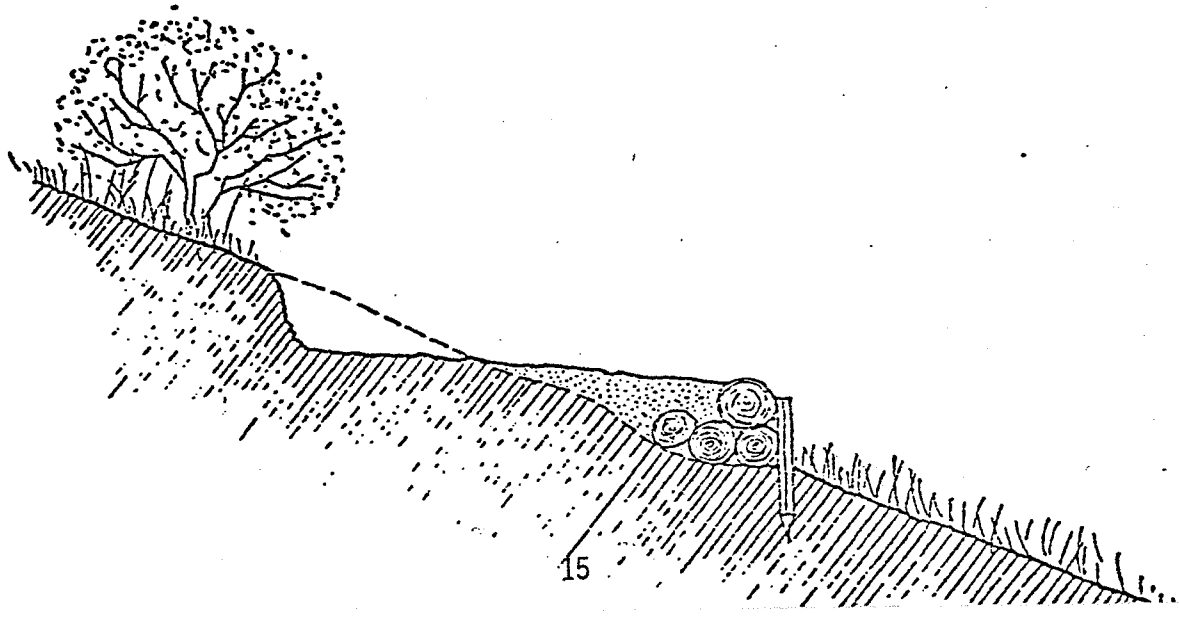
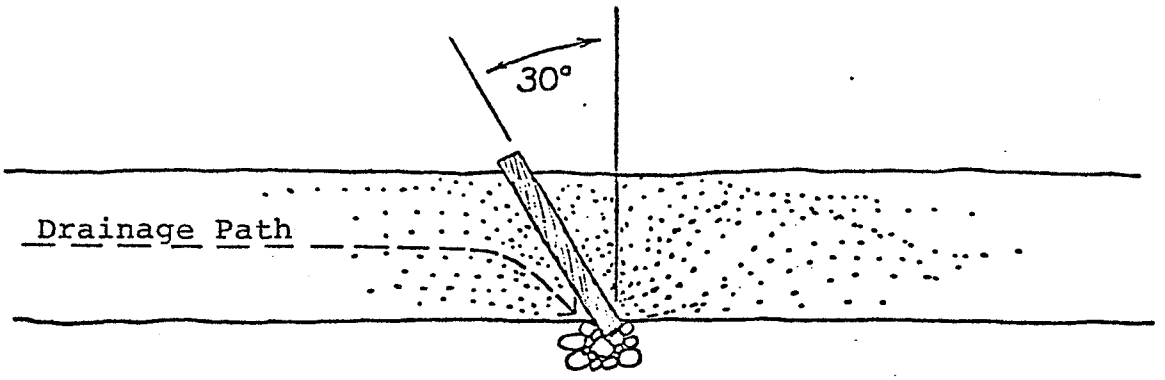
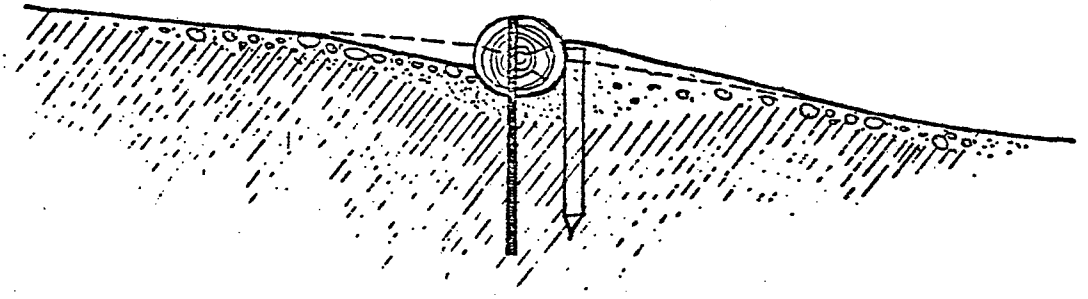


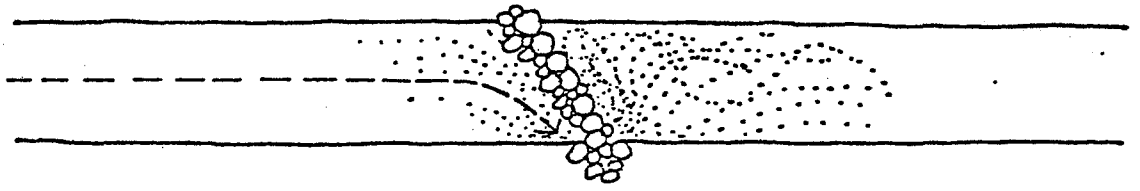
Fig. 5.5



Landscape soil to top of water bar on downhill side.



Water Bars
Note log is held in place by steel pin and/or wooden stake. Below, stones are used as a water bar.



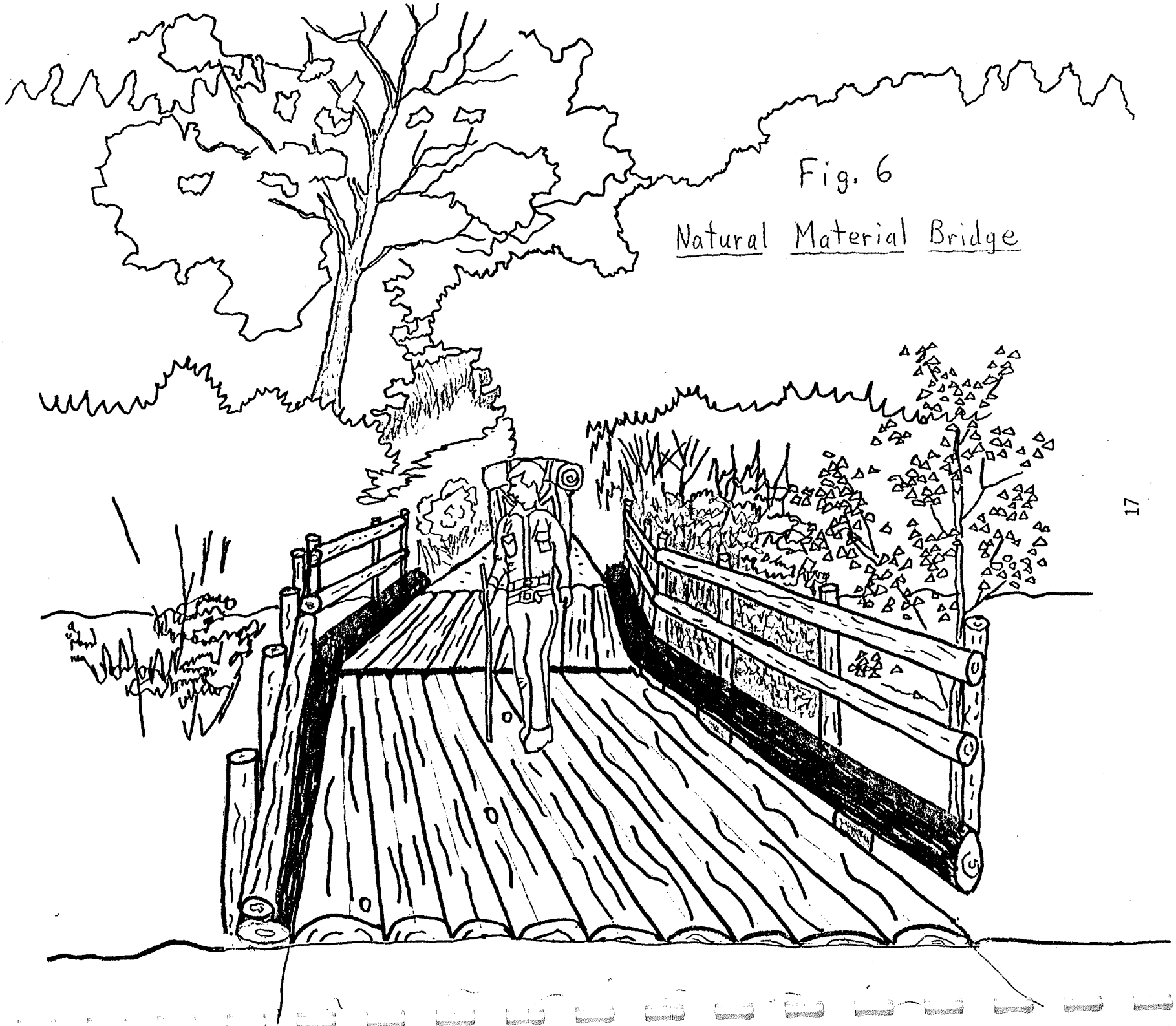
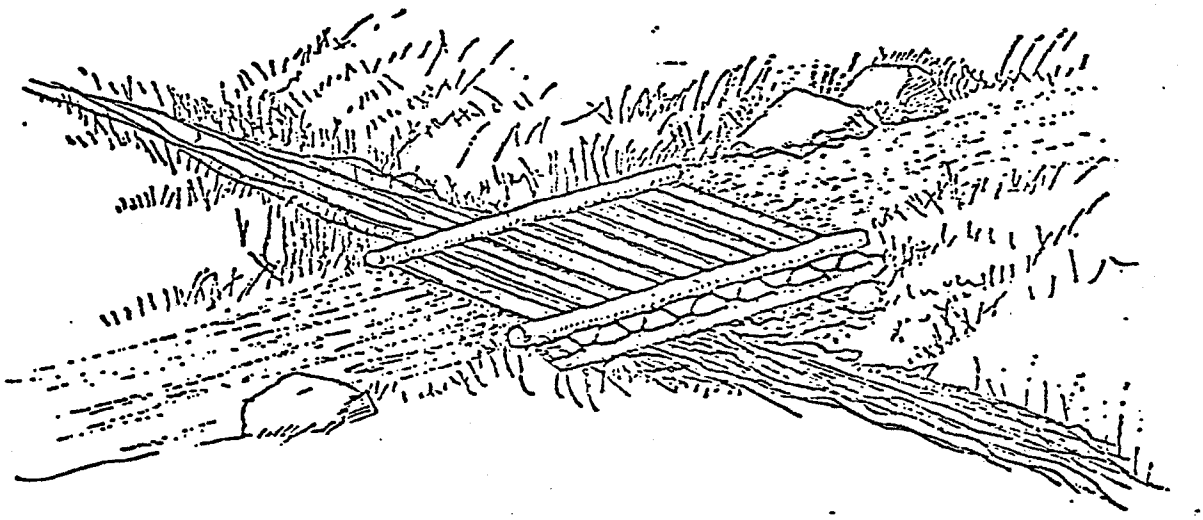


Fig. 6

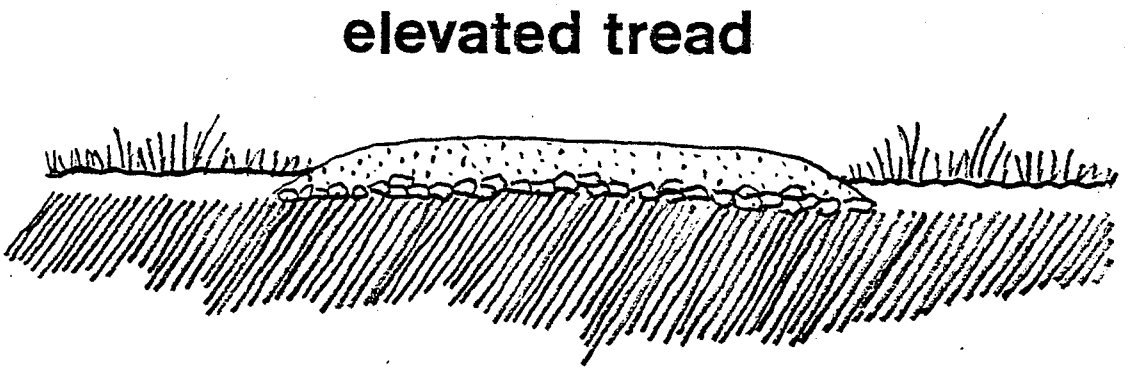
Natural Material Bridge

Fig.7 Small Natural Material Bridge



This is a smaller natural materials bridge. It should be utilized over small stream crossings, drainage ditches and in some cases, over excessive wet lands.

Fig. 8



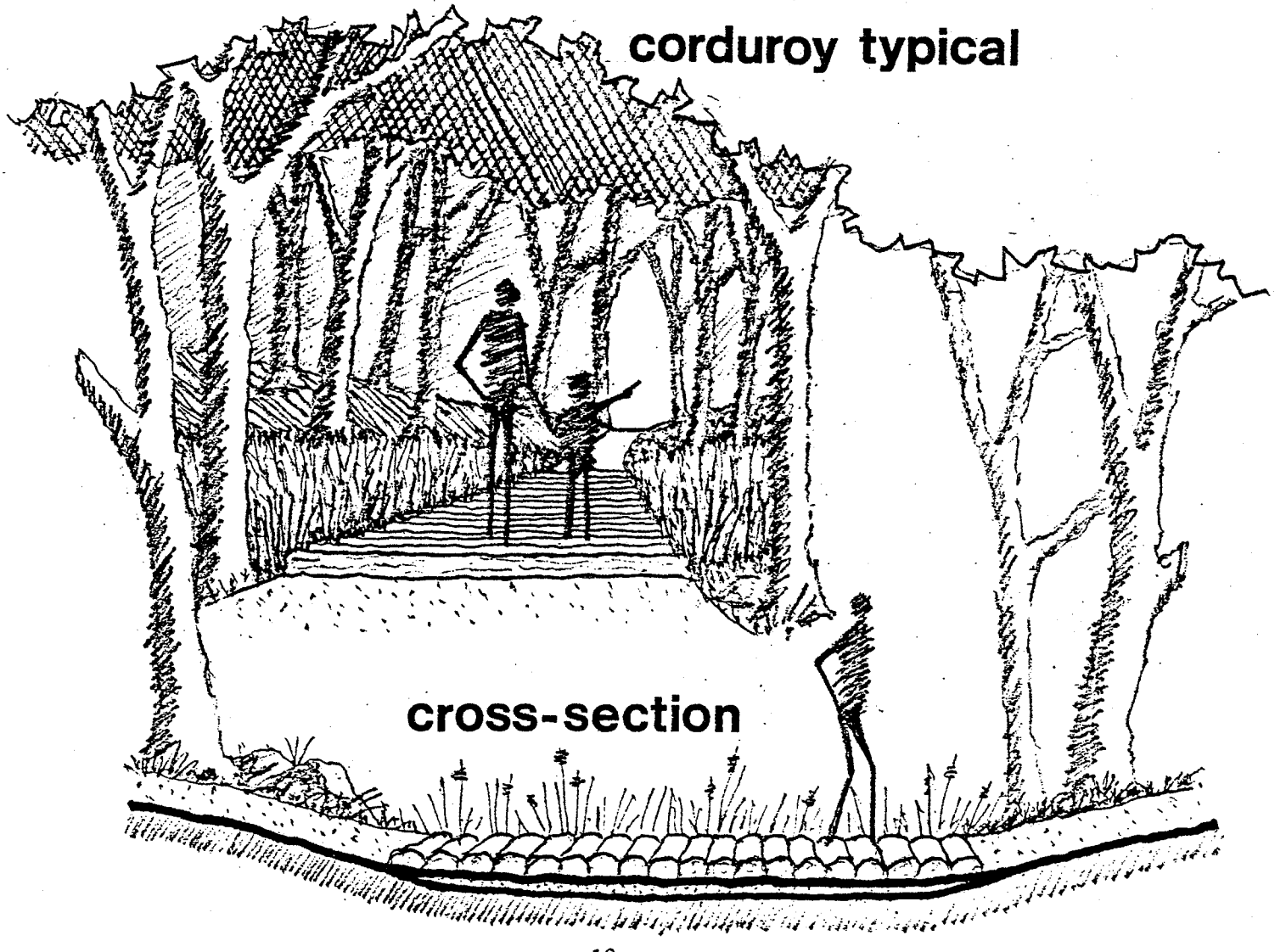
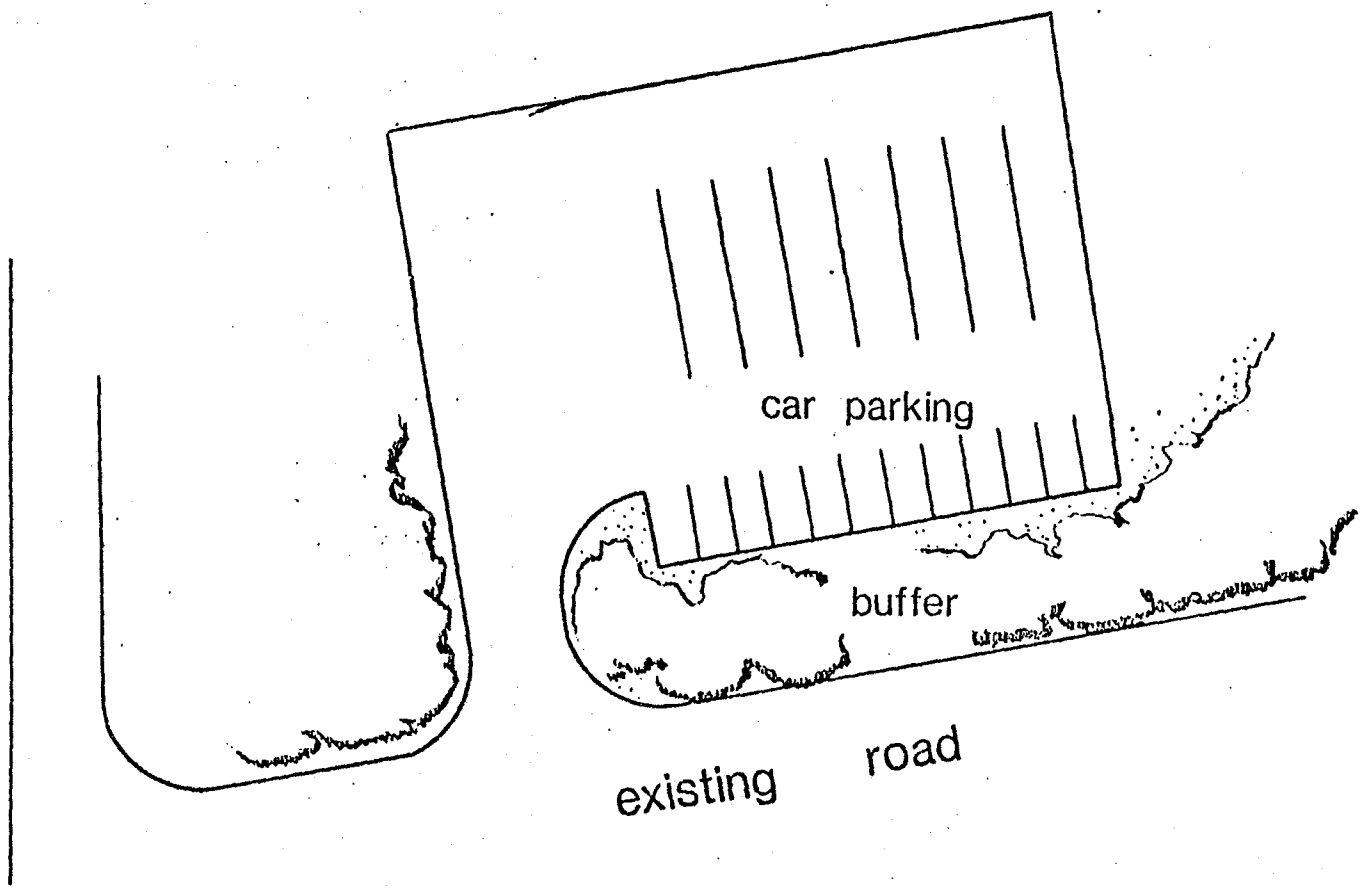


Fig.9

PARKING LOT TYPICAL

PLAN VIEW



not be possible because of an immoveable "permanent-type" fireplace developed with this shelter. One rest area already exists in the interior of the system (see typical in figure 10). It is suggested that a similar fireplace be constructed at this shelter. Simple log benches every two to three miles along the trail will provide users an additional chance to stop and enjoy the surroundings. These benches should be of the primitive type and located a short distance off the trail (see figure 10.5).

All pit toilets have been constructed according to Bureau of Engineering standards (see typical in figure 11, page 24).

Signs and Maps

The trail signing system will conform to the state standard system when that system has been finalized. The purpose of this signing is to provide information and direction for the trail user. Sufficent signs will be provided to transmit information, insure user safety, and facilitate enforcement. Signs are located for maximum visibility and will be kept to the necessary minimum. Examples of signs include: a trailhead sign with registration box, a "You are Here" at every intersection, and trail difficulty markers (see typicals in figures 12 and 13). An additional sign that is needed at the Rock Lake Solitude Area is a "Ski-touring Trail Parking Lot" sign. This sign should be placed just before the campground road intersection to avoid confusion and prevent excessive driving through the campground (see map in figure 2, page11). Interpretive signs identifying tree species, management techniques, and other special features should also be erected in appropriate locations.

Fig. 10

Rest Area Typical

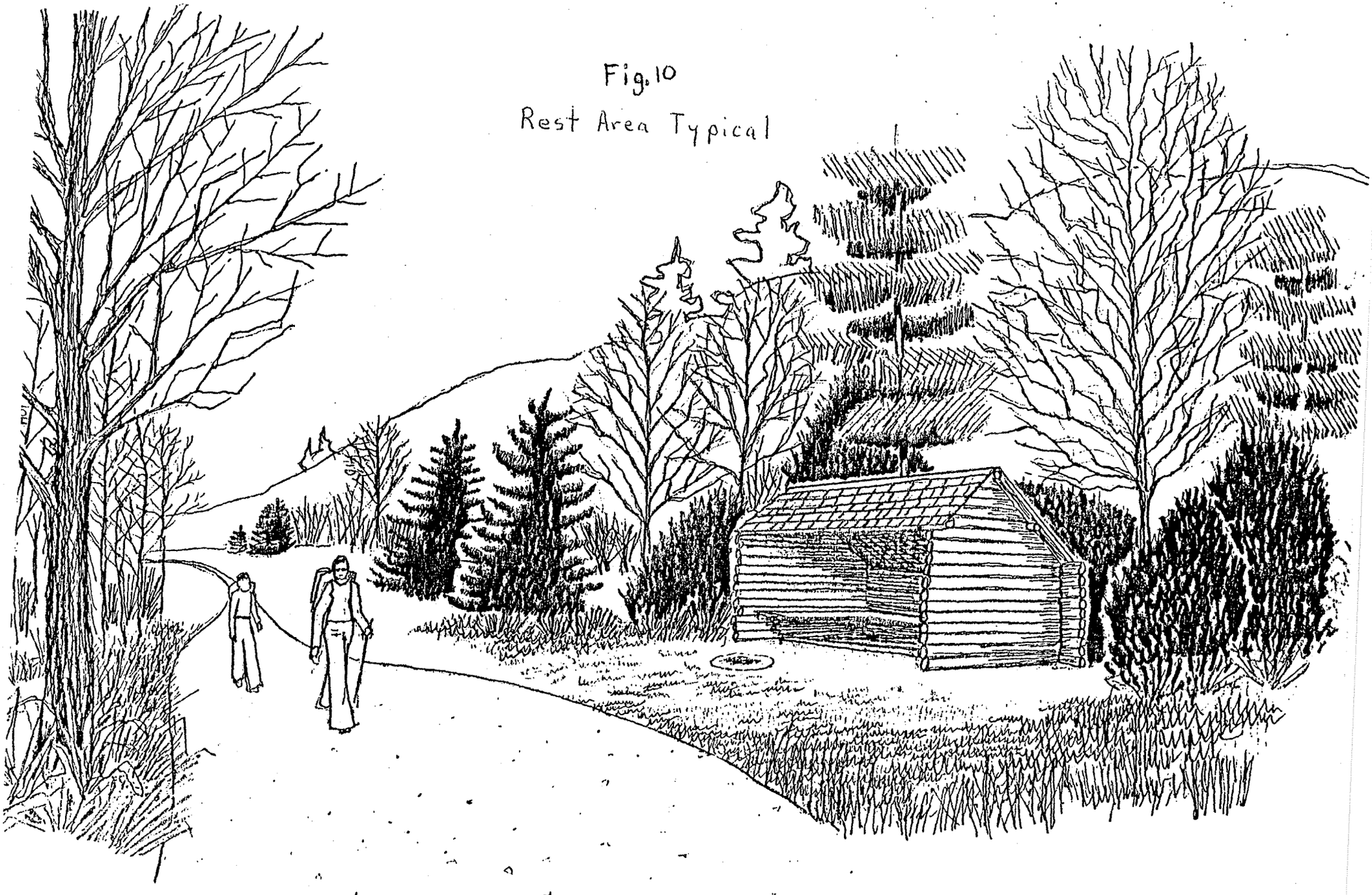
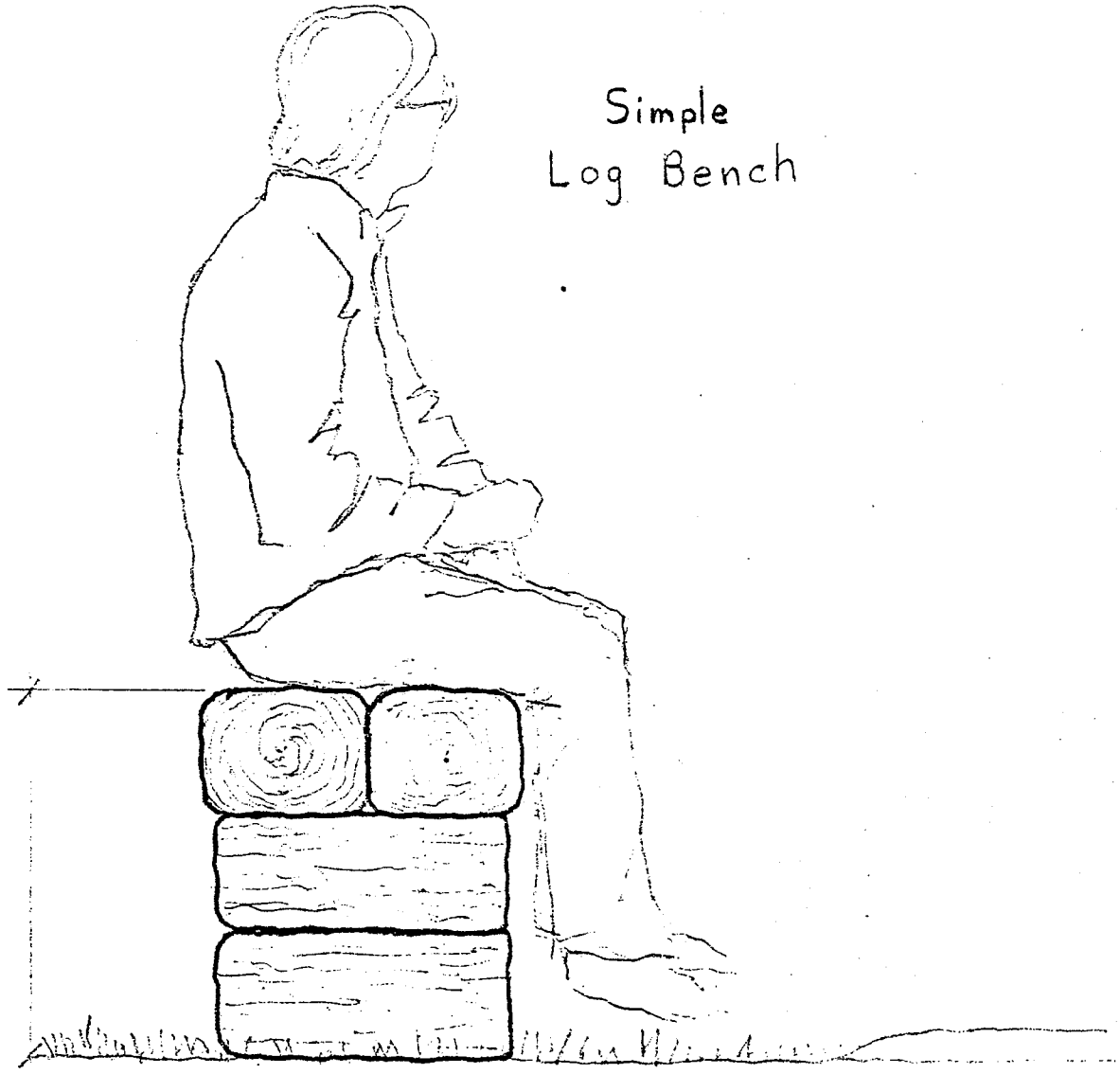
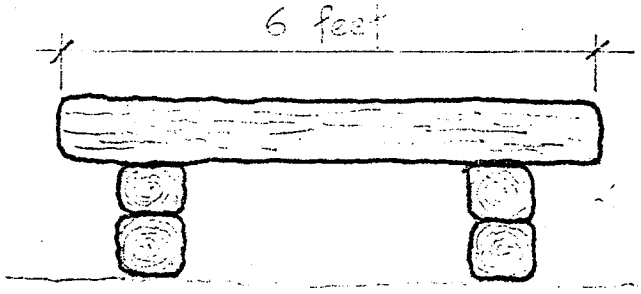


Fig. 10.5





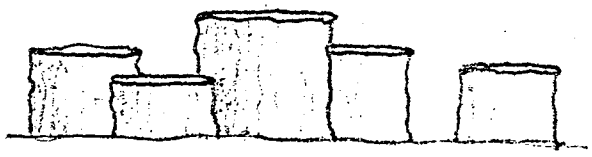
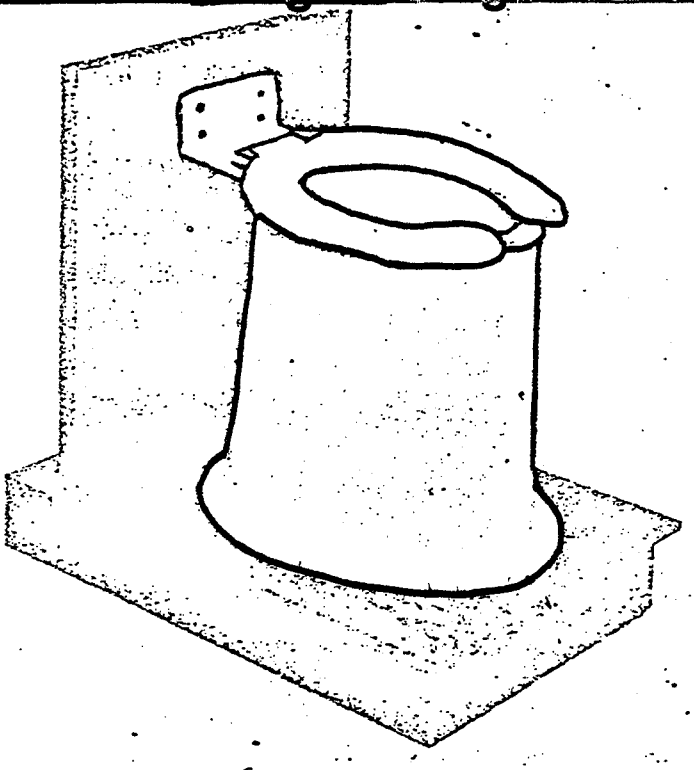
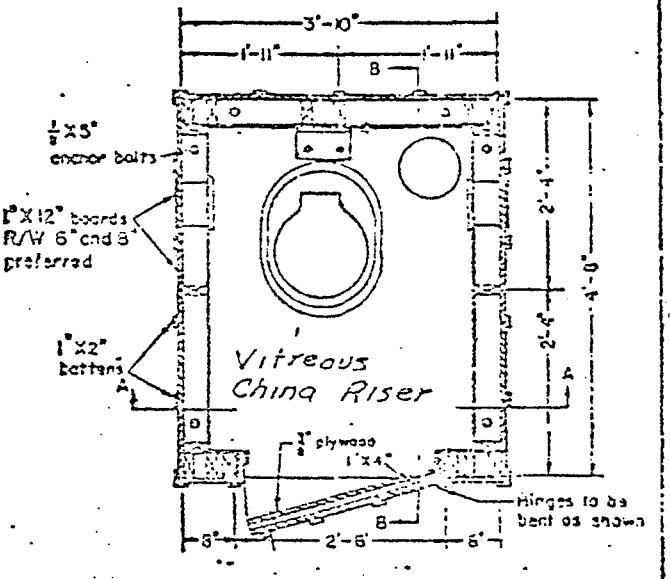
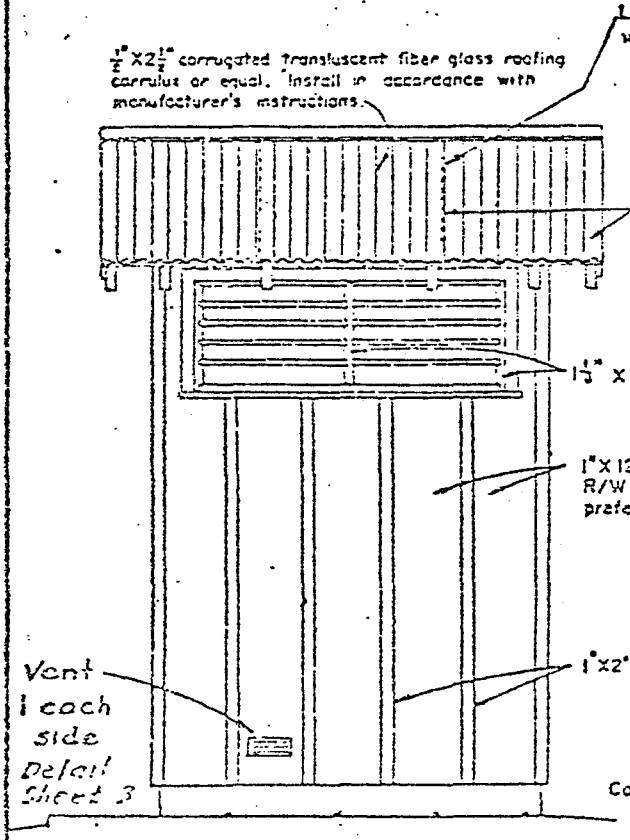


Fig.11 Single Seat Pit Toilet

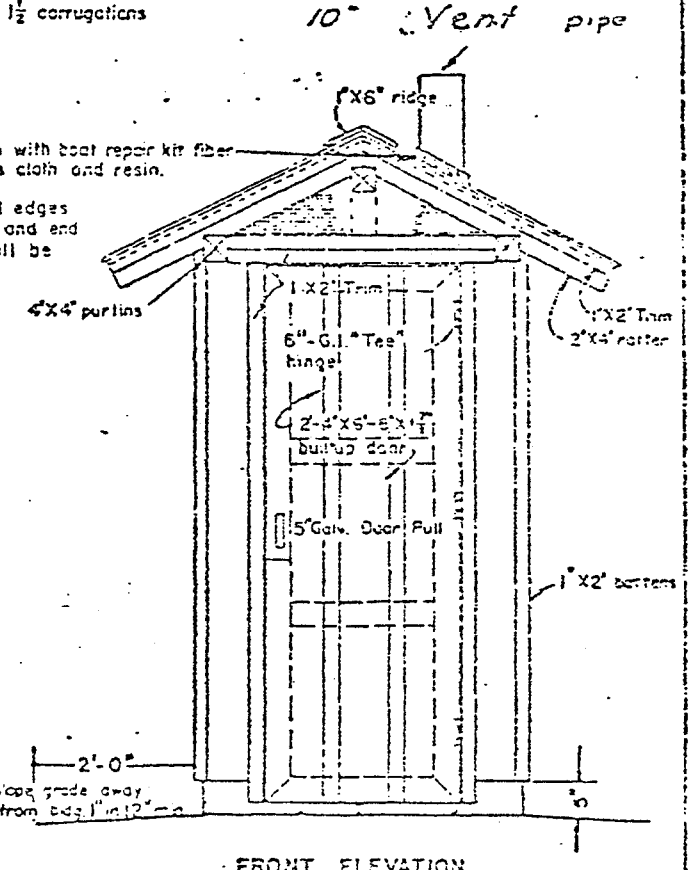




PLAN



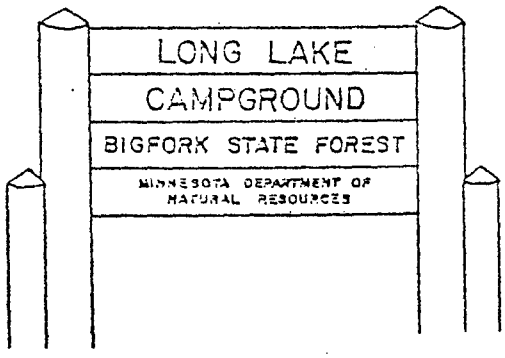
SIDE ELEVATION
(OPPOSITE SIDE SIMILAR)



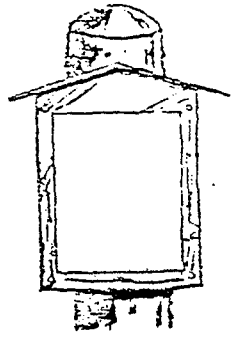
FRONT ELEVATION

Scale

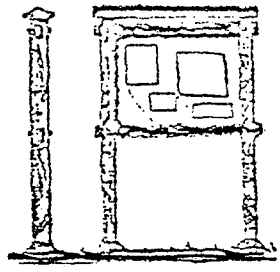
Fig.12 Sign Typicals



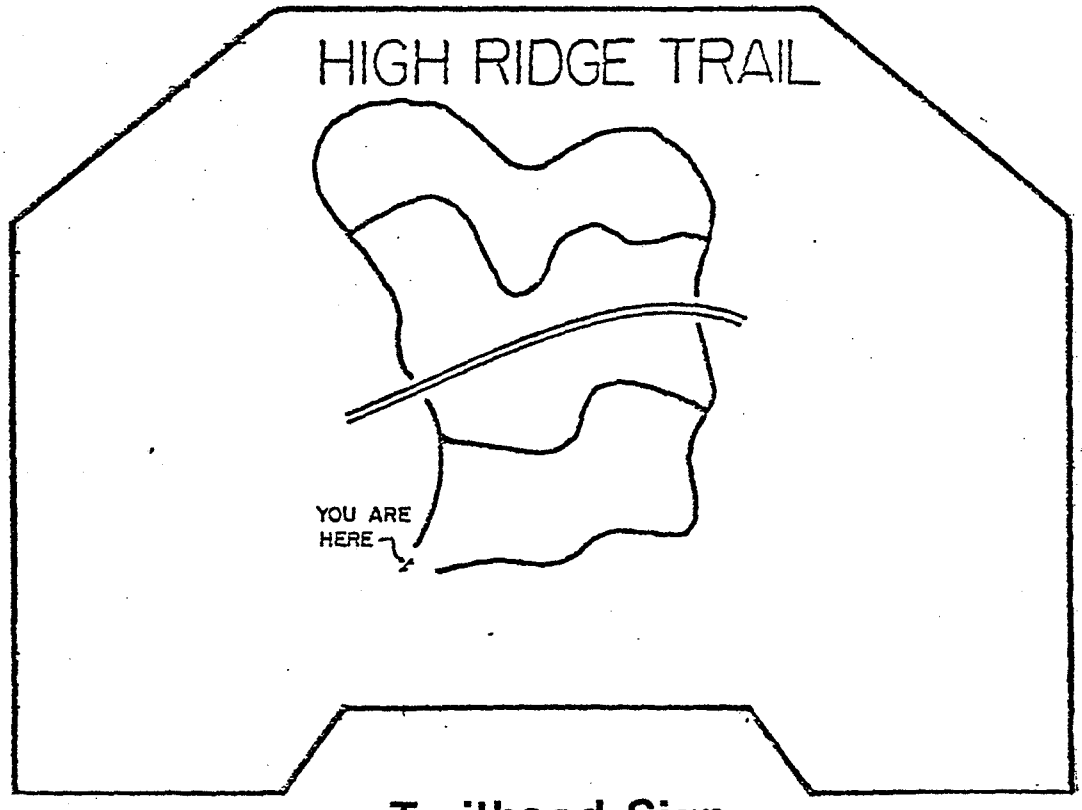
Entrance Sign



"You are Here" Sign



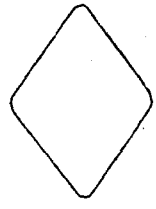
Information Bulletin Board



Trailhead Sign

Ski

Hiker

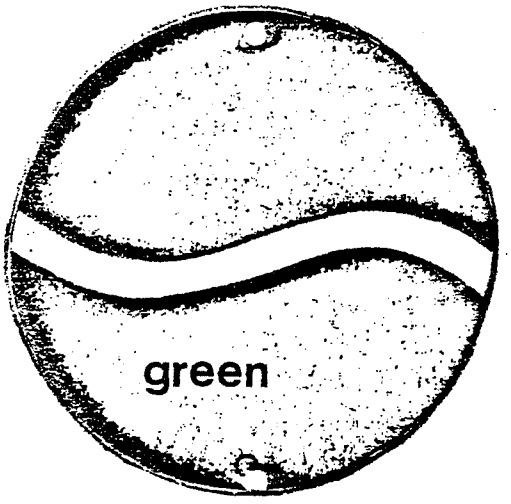


Blazer

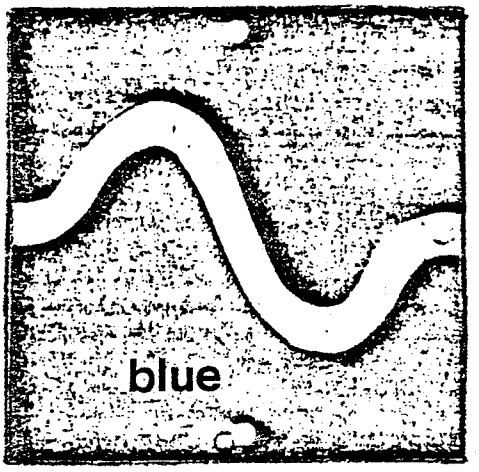
Fig. 13

Trail Difficulty Symbols

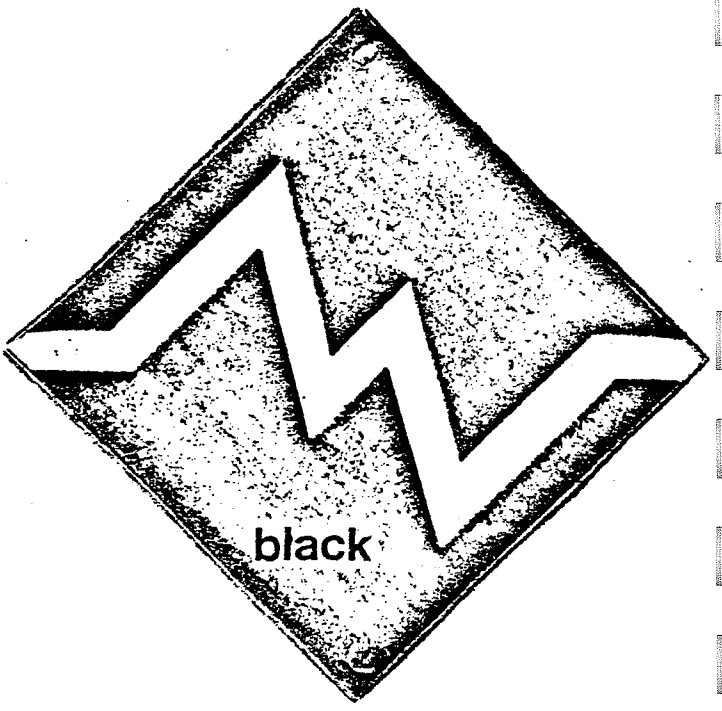
easy



more difficult



most difficult



A user map is extremely important and will be available from a box attached to the registration box at the trailhead. They will also be available from the DNR Foresters, Regional trail staff and in St. Paul. The present Rock Lake Solitude Area map should be upgraded for accuracy and information. The new map should show the location of the Pillsbury Forest within the State, an accurate route of access, trail mileage, and complementary facilities such as campgrounds, shelters, and parking lots. Also included should be interpretive information about history, development, and management of the forest. The cooperative effort between DNR Forestry and Cass County should also be made clear to the user. Maps will be the responsibility of the Division of Parks and Recreation to develop and print. The Trail Project Planning Staff and the Division of Forestry will have input as to their content and design.

Maintenance

Maintenance of the Rock Lake Solitude Area after development is the most important tool for sustaining its quality. Therefore, maintenance monies are essential if the area is to become a quality ski touring and hiking area.

At present, there are no funds earmarked for maintenance of ski touring and hiking areas developed through the bonding bill program. Therefore, it is a recommendation of this plan that maintenance money be made available through legislation to insure the quality of this unit.

Maintenance of the Rock Lake Solitude Area will require a year-around program. Routine maintenance will indluce litter pick-up, cleaning shelters, and toilets, stacking firewood, sign replacing, and clearing surface vegetation.

Major maintenance will involve removal of windfalls, painting and repairing of structures, and controlling erosion where necessary.

Winter grooming of ski treadway will be done on a contract basis or by state employees using DNR equipment. No equipment is available for state use at this time, therefore, if a contractor cannot be found to groom the treadway, suitable equipment will have to be purchased. Winter grooming will be set up on a flexible schedule to allow for periods of high and low use.

Periodic inspections will be made throughout the year to evaluate maintenance problems and actions needed. Inspections may be made by the District Forester or his designate (i.e. maintenance foreman or by the person in charge of trail grooming). The regional trail coordinator and St. Paul staff may also inspect the trail if necessary.

Steps Involved in the Planning Process

1. Project proposal is initiated by district forester and is submitted through the area and regional foresters (At this time, the proposal is evaluated for worthiness and the potential for public support).

2. After proven feasible and consistent with the state forest multi-use concept, the proposal is sent to St. Paul.

3. Proposal is then investigated by the Bureau of Planning and Research with the input of the regional trail coordinator, area and district

foresters, and other involved divisions.

4. Area of study is defined and a preliminary plan is prepared based on this study. Regional trail coordinator, and the area and district foresters perform necessary "groundwork" and report information to the Trail Project Planning Staff. Also, input is received from various levels of government, special interest groups and others.

5. Preliminary plan is sent out to DNR divisions involved for review.

6. Plan is revised subject to this input and printed for public hearing.

7. A public hearing is held in the local area of the unit.

8. Plan is revised again taking into account public, departmental, and other agency review.

9. Plan is submitted to State Planning Agency for review for consistency with the Outdoor Recreation Act of 1975.

10. Possible revision subject to State Planning review.

11. Final Review by State Planning Agency.

12. Implementation of the plan by the Division of Forestry and regional trail coordinator.

Note: Planning is an on-going process which does not stop after final State

Planning Agency review. The management plan's built-in flexibility allows for site specific decisions at the time of development. After development is completed, periodic re-evaluation of the management program is required for response to changing conditions.

Implementation

The structure of the Department of Natural Resources is such that the Bureau of Planning - Trail Project Planning is responsible for coordinating the planning process and general implementation monitoring. After the plan is reviewed for consistency with the Outdoor Recreation Act, development can begin.

The Division of Parks and Recreation has the responsibility for funding the project. The Division of Parks and Recreation is also responsible for monitoring development and maintenance to insure that funds are spent in compliance with the bonding bill and master plan.

The Division of Forestry implements the plan, by assigning appropriate regional personnel to carryout the development and maintenance of the trail. This development and maintenance must be done in compliance with the bonding bill and master plan. The regional trail coordinator will coordinate other manager's activities within the region. He will also coordinate the design of the trail and facilities, with the area and district forester. Actual construction and maintenance of the trails will be the primary responsibility of the area and district forester, with input from the regional trail coordinator.

Schedules and contracts will be worked out by these three people.

Changes to the management plan must be cleared through the Bureau of Planning and Research - Trail Project Planning.

Estimated Cost of Development

Maps	-	$ 1,000
Shelters	-	$ 500
Toilets	-	$ 1,000
Signing	-	$ 500
Bulldozing	-	$ 500
Supplies, Labor and Equipment	-	$ 5,000
Bridge Materials	-	$ 2,500
Total	-	$11,000

Maintenance Costs

Maintenance costs will be determined by the district forester, area forester and regional trail coordinator. A rough estimate of maintenance cost is $2,000/year.

Timing of Project

Sixteen state forest ski touring-hiking areas have been given high priority for development and/or improvement during 1978. The Rock Lake Solitude Area is one of these projects.

The proposed developments are scheduled to be constructed during the summer and fall of 1978 so that they will be ready for use in the winter of 1978-79.

The area will be monitored continually by the district forester and regional trails coordinator to assess any problems that have occurred and to determine any additional developments which may be necessary.

Future Potential Expansion

Areas for future expansion of the Rock Lake Solitude Area were investigated while the management plan was formulated. Currently, no areas within the Pillsbury State Forest are immediately feasible for expansion of this system. It is recommended that this area be studied further for the possibility of re-routing snowmobile trails or the restriction of their use in some areas.

Any future recreational development will be coordinated with this plan and the overall forest management plan when it is formulated.

Recreational Needs to be Served by the Project

The Rock Lake Solitude Area within the Pillsbury State Forest is located almost in the exact center of Economic Development Region 5. The majority of the people in Economic Region 5 are within an hour's drive and are potential "day users" of the unit. Region 5 includes residents of the Brainerd, Crosby-Ironton, Pillager, Little Falls, Wadena, Walker, Motley, Pine River, Staples, Nisswa, and other areas. The map in figure 14 shows the hypothetical

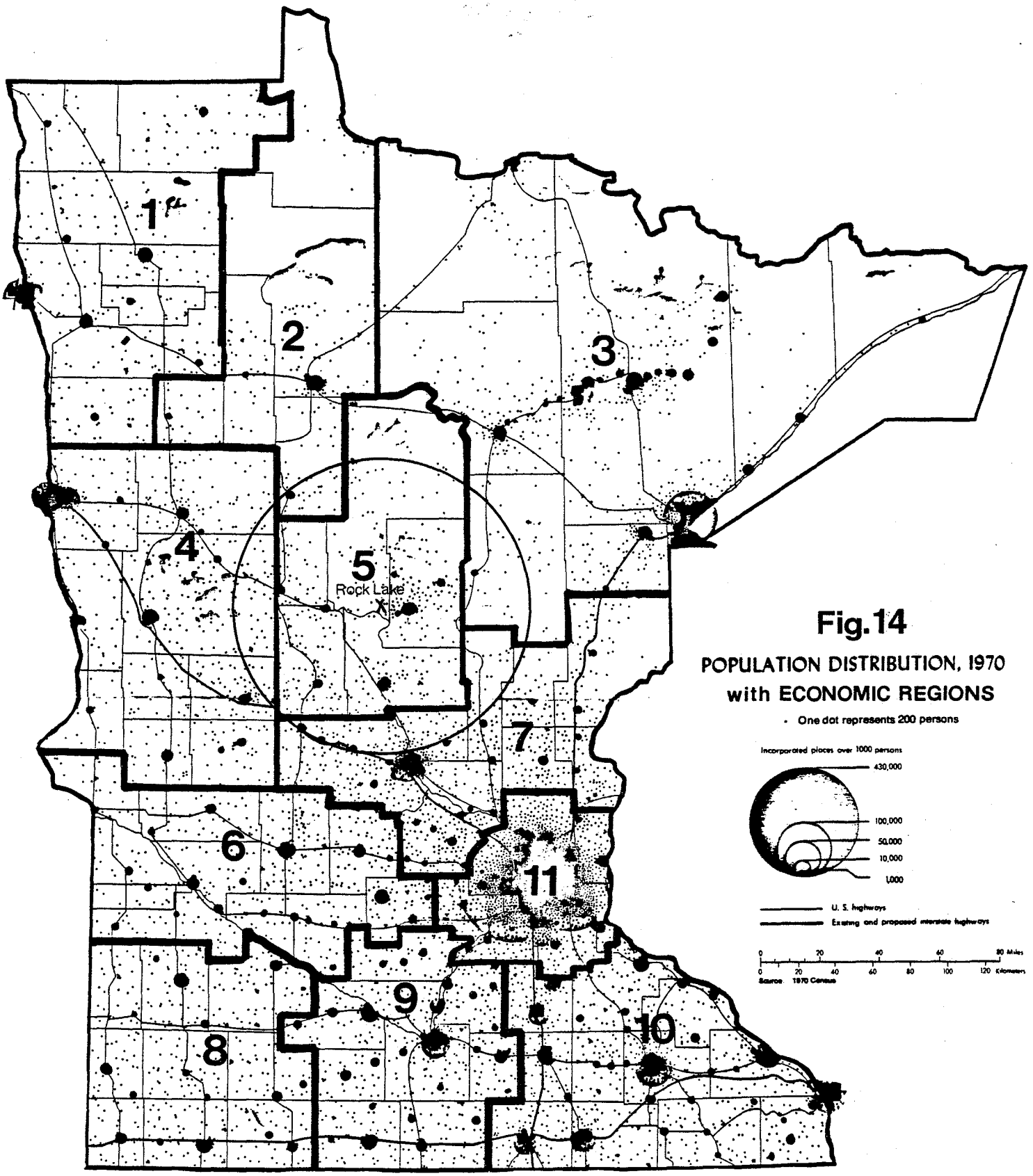


Fig.14

POPULATION DISTRIBUTION, 1970
with ECONOMIC REGIONS

- One dot represents 200 persons

Incorporated places over 1000 persons
430,000
100,000
50,000
10,000
1,000

U. S. highways
Existing and proposed interstate highways

0 20 40 60 80 Miles
0 20 40 60 80 100 120 Kilometers

Source: 1970 Census

day use area. This area is defined as the average distance people would travel to use this area without requiring overnight facilities. It should be mentioned that the Brainerd Area is the third largest urban-residential area in Minnesota.[1] Scattered throughout this area's lakes and forest is a large population that is increasing.

Portions of economic regions located radially around Region 5 are also within an hour's drive. These areas include: the southwestern portion of region 3, the southeastern portion of region 2, the western portion of region 4 and the northwestern portion of region 7.

Potential weekend users or users requiring overnight facilities can generally be expected from outside this area. Areas in particular are the Twin Cities, St. Cloud and Duluth. Many people can be expected from the Twin Cities because Brainerd is a major vacation-resort area for many of these people. St. Cloud, with its young college population, also is a potential area that many users could be attracted from.

Current users of the unit have consisted mainly of local people with occasional use from Twin Citians. Prepared literature and more publicity is expected to further increase the clientele of this day-use area. It should be mentioned that no user survey data is presently available for the Rock Lake Solitude Area. Therefore, it is difficult to predict future numbers of users for this unit. Nevertheless, it is expected that use will be great because of

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[1]MLMIS

location, growing population, good accessibility and popularity of the area for tourism.

Description of the Environment

Topography

The Rock Lake Solitude Area consists mainly of flat lowlands in the south loop with islands of high ground in the north loop. The elevation ranges from 1,280 feet in the lowlands to 1,342 feet in the high grounds. These variations in topography along with the assortment of vegetation add to the total trail experience. The south lowland loop exists in some areas as a large floating bog. This wetland is spring recharged, and water movement is visible at the surface in places.

Soils

The Rock Lake Solitude Area lies within an area called the St. Croix moraine. This moraine was formed primarily by ice advancing from the east-northeast. The materials carried from this source by the advancing glacier were usually noncalcareous till which it overrode. Because of the coarse soil materials and the topography of the St. Croix Moraine Complex, there is very little agricultural development.

A detailed soil survey is not presently available for the Rock Lake Solitude Area. A broader soil survey report reveals that the soil landscape unit is classified as XLWL with the major soil series as Flak, Brainerd, Chetek, and Emmert.

X = mixed sandy and loamy texture of the soil material below five feet

L = loamy or silty texture of the soil material above five feet

W = well to excessively drained

L = light color

The broad soil survey report fails to reveal the vast amount of swampland traversed by the trail. This soil landscape unit has been found to be LLPL with the major soil series as Nokay and Barrows.

L = loamy or silty texture of the soil material below five feet

L = loamy or silty texture of the soil material above five feet

P = poorly to very poorly drained

L = light color

The major management problems of these soil series are stone removal, erosion control, and drainage. These soil aspects will become more pertinent to trail construction in the development section.

Climate

The Rock Lake Solitude Area has suitable climate not only for ski touring but year-around outdoor recreational activities. Climate summary is given below:

Climate Data

Temperature (^{o}F)

January	-	mean maximum	-	18^{o}
		mean minimum	-	-3^{o}
July	-	mean maximum	-	82^{o}
		mean minimum	-	58^{o}

Precipitation

annual normal precipitation	-	26"
annual normal snowfall	-	45"

Average annual number of days with snowcover of:

1" or more	-	110 days
3" or more	-	100 days
6" or more	-	60 to 80 days

Water Resources

Surface water resources near the Solitude Area consist of three small to medium sized lakes and vast acreages of marsh and swamp.

These natural lake basins are a very important resource in the area. As can be seen from the map in figure 3, page 10, the trail is located close to these lakes. This adds to the overall experience of the trail user.

Mineral Resources

No economic concentrations of mineral resources are known to occur within the area of the trail.

Vegetative Cover

The upland islands of the Rock Lake Solitude Area consist mostly of jack pine, aspen, birch and oaks. The lowland areas consist of willows, black ash and swamp grasses. Other site specific vegetation noted were: ash swales, tag alder and tamarack. (a covertype map is shown in figure 15).

Wildlife

A relative abundance of deer, grouse, mink and beaver exist near the Rock Lake Solitude Area. Frequent sightings of wildlife should be possible. A beaver dam exists on a larger creek along the western side of the south loop. Other animals and birds which may be sighted include squirrels, rabbits, raccoon, woodcock, waterfowl, and songbirds.

Winter Deer Concentration Area:

A major winter deer concentration area exists in and along the west and southwest edges of the Rock Lake Solitude Area (Sections 7, 17, and 18 of Township 134N., Range 30W.). This area is a winter concentration point for a majority of the deer that summer in the Pillsbury State Forest and the farmland areas to the south and west. Winter deer populations in this area may average 20-40 deer/sq. mile during an average winter and increase to 40-80 deer/sq. mile during severe winters.

Land and Timber Resource

The Pillsbury State Forest, located entirely within Cass County, contains 8,105 acres under state ownership. Of this total, 7,805 acres are under

Fig.15 COVER TYPE MAP

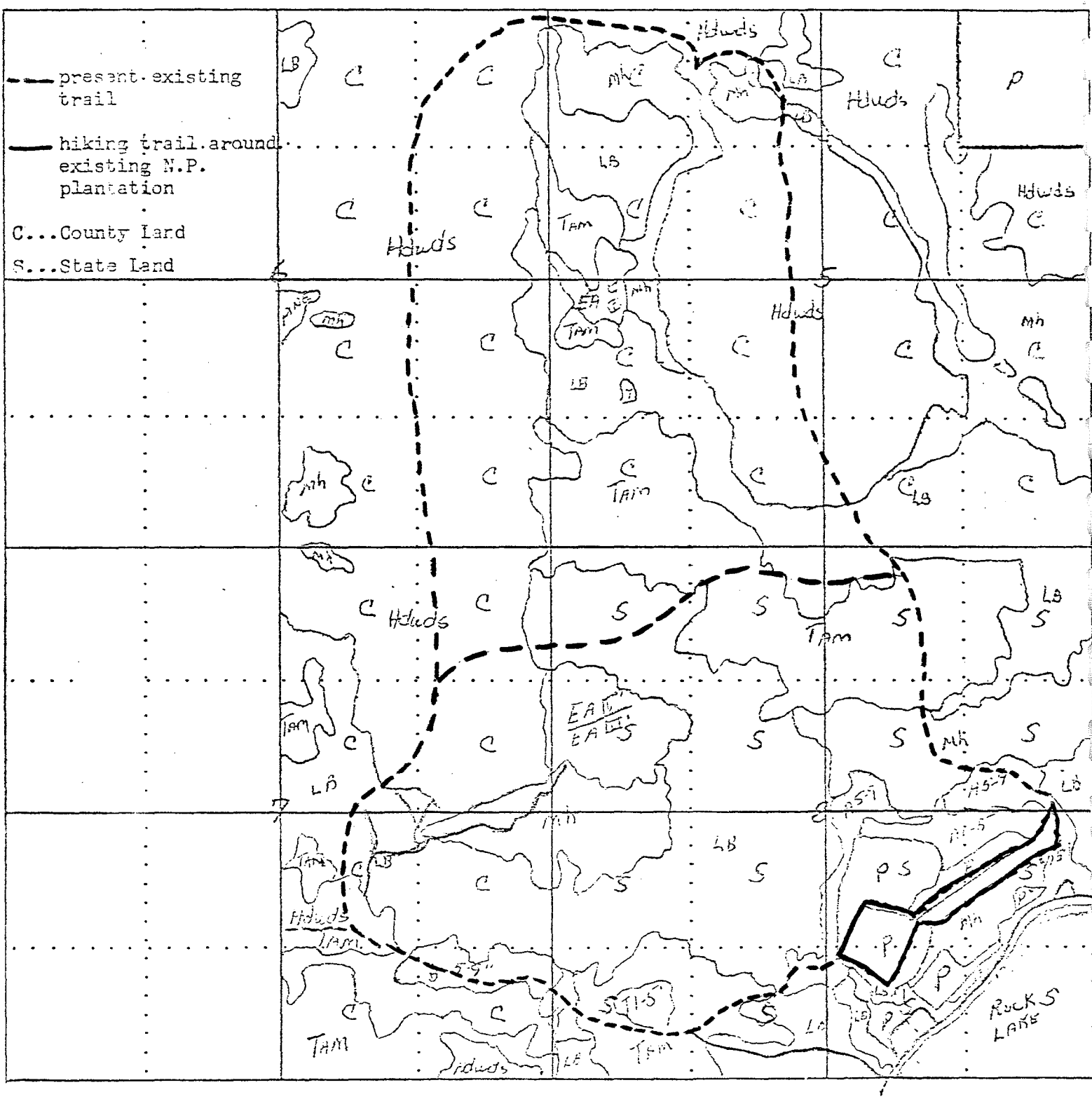
134-30

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

WORK UNIT Solitude Area

DATE 3/16/75

SEC. 5,6,7,8 TWP. 134 R 30



Forestry control while 300 acres are under the Division of Wildlife jurisdiction. This ownership is located entirely within the Pillager forestry district. The Pillsbury forest of which the Rock Lake Solitude Area is a part, consists of the following covertypes: 20% Aspen-Birch, 48% Bottomland and Northern Hardwoods, 7% Jack Pine, 6% Norway and White Pine, 2% Tamarack, .4% Spruce-Balsam, 6% deforested, while 11% is nonforest.

Of these covertypes, 19% is in the reproduction classification, 70% is in the pole timber classification and 11% is in the saw timber classification. Annual acreage recommended cut is 75 acres Aspen-Birch, 60 acres Bottomland and Northern Hardwoods, 25 acres Jack Pine, 10 acres Norway and White Pine, one acre Spruce-Balsam and 5 acres Tamarack.

Air and Water Quality

The Pillsbury State Forest is located near Brainerd which is one of the larger population centers in the area. Although there are sources of local industrial air pollution which exist, it does not appear to be a problem near Rock Lake. Auto emissions are also a minor source of local air pollution.

Surface water quality is reasonably good and water pollution is not considered a problem in the area. At present, one hand pump well is located at the trailhead. Groundwater quality from this source is considered to be excellent .

Historical and Archaeological Resources

The Pillsbury State Forest was named after John S. Pillsbury, who served as

Governor of Minnesota from 1876 to 1887. In 1890, Governor Pillsbury tendered 990 acres of cutover pine lands in southern Cass County to the Minnesota State Forestry Board, thus enabling the area to become the first forest reserve. This land formed the nucleus of the Pillsbury State Forest when it was established by the Legislature in 1935.

Millions of board feet of virgin pine were cut from one of the many logging camps which logged nearly all of Pillsbury State Forest by the turn of the century. Most of the logs were transported by sleigh or railroad to Gull Lake, rafted to Gull River, then floated downstream to a sawmill just south of State Highway 210 on the west shore of the river. Traces of the old mill are still visible.

In the fall of 1903, land clearing was begun for the state's first forest tree nursery. Tree seeds were planted the following spring. Seedlings planted in parts of the forest have since grown into towering trees and some have been harvested.

In 1911 the first fire lookout tower in the region was erected. Built of wood, "Martin Hope Tower" was later abandoned after the construction of the Gull Lake Lookout Tower, a modern steel structure in 1939.

No archaeological sites have been identified within the Rock Lake Solitude Area to date. The Minnesota Historical Society will review the management plan prior to development to determine if an archaeological investigation is

necessary.

Transportation and Utilities

The Rock Lake Solitude Area, because of its location in the state and the existing roads to the vicinity, is considered highly accessible for the major population centers in Minnesota. U.S. Highway 10, state highway 210 and state highway 371 provide access to the Brainerd area from: the Twin Cities, Duluth, St. Cloud and Fargo-Moorhead.

Access to the Solitude area is best gained by using state highway 210 to Cass County Road 1. Six and a half miles north on Cass County Road 1 will take the user to the access road leading to the Rock Lake Solitude Area and campground. (see map in figure 2, page 11) Signs will be placed along roads so the traveler can clearly see where to go.

No utilities (telephone or electricity) are presently available within the Solitude area and are not necessary at this time. Utilities are available, however, to residences and facilities near Pillsbury State Forest.

Socio-Economic Factors

The Minnesota State Planning Agency (SPA) population projections for Cass County and Economic Development Region 5 are revealed below:

Population Projections

Year	Cass County	Region 5
1980	19,400	122,500
1985	20,300	127,600

Year	Cass County	Region 5
1990	21,200	131,800
1995	22,500	136,200
2000	24,100	139,500

Four areas of major employment for Cass County are: 1) agriculture, forestry, and fisheries - 12.1% of employed labor force; 2) construction - 7.5%; 3) elementary, secondary schools and colleges; and 4) furniture, lumber and wood products.

Tourist travel expenditures during 1974 totaled $33,504,423 in Cass County. These expenditures accounted for 56.5% of gross sales.

Land Use and Development Trends

Cass County General Land Use
(Forty Acre Parcels)

Forested	- 25,399		Marsh	-	1,334
Cultivated	- 1,017		Urban	-	838
Pasture and Open	- 4,247		Extractive	-	0
Water	- 5,993		Transportation	-	4
	Total - 38,832				

State Planning Agency - Pocket Data Book 1975

Agriculture

Current agriculture land use within Cass County is not intensive or extensive. Major crops are small grains, wild rice, and feed crops.

Residential

Current residential land use does not affect the Rock Lake Solitude Area because of state and county lands which surround it. Residential use, however, is increasing around lakes in the county.

Commercial/Industrial

No commercial or industrial developments are located near the solitude area. Timber harvesting is permitted. This activity, however, will not have an adverse effect on the solitude area.

Facilities in Region 5

Economic Development Region 5 encompasses an area located in the approximate middle of the northern half of the state. This region is presently an area of population growth with a great number of outdoor recreation facilities. Existing facilities include: 1 national forest; 2 state parks; 1 state trail; 14 historic sites; 6 state forests; 150 miles of ski trails and 692 miles of snowmobile trails.

Numerous resorts, motels, hotels and campgrounds can also be found throughout Region 5. Many of these facilities are open year-around to accommodate the needs of outdoor enthusiasts. Gas stations, repair shops and ski shops can also be found in many places of this region.

Facilities in the Forest

The Pillsbury State Forest has many facilities to offer the public. Besides

the Rock Lake Solitude Area, there are trails for hiking, horseback riding and snowmobiling. The Rock Lake Campground offers 18 campsites, 4 picnic sites, a swimming beach, boat access, and fishing.

Management Programs within the Forest

Management of the Pillsbury State Forest is based on recommendations outlined in the Pillager District Forest Management Plan. This plan is formulated for each forestry district throughout the state and is based on a ten year period, while necessary adjustments are made to fit local conditions.

The management program includes timber, wildlife, soils, water and recreation. Management of these resources requires a coordinated program which brings about maximum productivity and protection as well as providing other public benefits such as recreation.

Development of the Rock Lake Solitude Area has and will be an integral part of this management program and will not inhibit other forest management practices.

Necessary adjustments will be made in the area to avoid conflicts between other management activities and the trail. Development of the ski touring and hiking trail, however, will not exclude use of administrative vehicles and/or contractors who have been assigned to do work in the area. It will also not exclude automobiles from roads which are normally plowed during the winter.

When timber harvest is recommended in the area, cutting and hauling will try to be scheduled between May 1 and November 1 to avoid conflicts between skiers and contractors. In some instances, such as when swamp conifer types are recommended for harvest, logging operations will have to be performed in the winter to take advantage of frozen ground conditions. In these instances, portions of the trail treadway may have to be closed or rerouted temporarily to permit timber harvest operations to be run efficiently.

Timber sale contracts will be adjusted to insure that trees are not felled blocking the treadway. Provisions will be written so that the trail treadway, if damaged, will be returned to its original condition. Provisions will also be written to insure that slash and other debris are scattered away from the trail.

It should be emphasized at this point that some forest trails will not always be permanent. As forests change in age, timber harvest will preclude established trail use in some areas. To adjust for these changing conditions, the trail will be rerouted into other areas in the forest. Thus, while trail use will be an established use in state forests, the trail location may not.

All management decisions concerning the area will be made in a manner that insures that the needs of other management activities and recreation are met with the least possible conflict.

Potential Concerns and Considerations

The Rock Lake Solitude Unit as presently developed has been relatively free of conflicts from motorized recreationists. This is primarily because of adequate existing snowmobile trail milage in the Pillsbury State Forest, signing, and site factors that have passively constrained unwanted activities.

No future conflicts are expected since expansion in this area is seen as limited. In addition, literature and more sophisticated signing in keeping with the solitude experience will establish non-motorized use more firmly and consequently minimize problems.

Environmental Impact of the Proposed Project

Impact on the Physical and Biological

Since the soils in the area are a mixed sandy, silty and loamy texture, some problems may occur in high use areas. Soil compaction may become a problem on the hiking portion of the trail and overuse may cause denudation of vegetation from this area. Reseeding of the trail after upgrading, however, should help to minimize these problems.

Soils on the remaining portion of the trail should not be adversely affected because ski-touring will be the primary activity on this portion. Ski touring has been shown to have little or no impact on soils within trail treadways. Soils in this area will be temporarily disturbed to level the treadway.

The proposed action will not have a significant impact on surface or ground water resources. Upgrading of the trail treadway will be undertaken in a manner which will allow natural drainage. Bridge construction will be undertaken in a manner which will not adversely inhibit streamflow.

No impacts on a mineral resources will occur.

Adverse impacts of the proposed action on vegetation will be the loss of ground cover from the areas to be leveled. This impact, however, will be offset by reseeding of the trail treadway.

Wildlife will be disturbed during construction, maintenance and use of the trail. Trail construction may also result in more wildlife being harvested adjacent to the trail by hunters using the trail for access. These effects however, will be minimal and only result in concentrated disturbance rather than dispersed disturbance. Particularly sensitive areas such as deer yards will be avoided during alignment.

Wildlife may benefit from seeding of the trail treadway.

Increased use will cause some deterioration in air quality as a result of increased auto emmissions. Use of heavy equipment in development will have a temporary adverse impact on air quality.

Water quality should not be significantly affected because most of the water areas close to the trail will only be used during the winter, at that time all areas are frozen which will minimize any impact.

Impact on the Historical and Archaeological Resources

No impact on these resources has been identified at this time. Further study by the Historical Society may reveal sites which must be avoided during development.

Impact on Transportation and Utilities

Expected increases in use of the area will have an insignificant impact on traffic volumes on the highway access routes to the area. Access to the area via County Road 1 should not be adversely affected.

No impact on utilities will occur.

Impact on Socio Economic Factors

Since all of the land has already been acquired, no loss from local tax revenue will occur. Beneficial impacts on the local economy will be realized. This will result from increased tourist travel expenditures in the area.

Impact on Land Use

Upgrading of the trail will not change the land use of the area.

Impact on Management of the Forest

Normal forest management activities will only be slightly affected by the development and maintenance of this Solitude Area. The Area and District Foresters, and the Regional Trails Coordinator will be impacted by development, maintenance, and enforcement made necessary by the non-motorized status of the trail. Trail shelters and other improvements that are subject to deterioration and vandalism will also add to this impact.

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Draft Plan Review: Public Meeting

A public meeting was held on June 6, 1978 in Pillager Minnesota concerning the Rock Lake Solitude area. Two citizens attended the meeting. One a town board member, the other a resort owner. Neither had read the plan prior to the meeting.

For the most part, the meeting turned out to be a general information meeting concerning overall management of the Pillsbury State Forest.

The main questions raised about the Rock Lake area concerned; future development and expansion, funding and signing. These areas had already been addressed in the plan.

Additional ski touring mileage will be discussed further in the overall Pillsbury State Forest Management Plan.

Cooperation between skiers and snowmobilers was discussed and both citizens including the district forester felt that snowmobilers respected the rights of skiers using the solitude area.

Other areas discussed were the increasing demands on the forest by special interest groups. Horseback riders, snowmobilers, ski tourers, hikers, campers, four wheelers, motorbikers and other groups were discussed. These special interests will all have to be addressed in the overall Forest Plan.

Overall we felt that the meeting was very useful to the DNR and those citizens who attended.