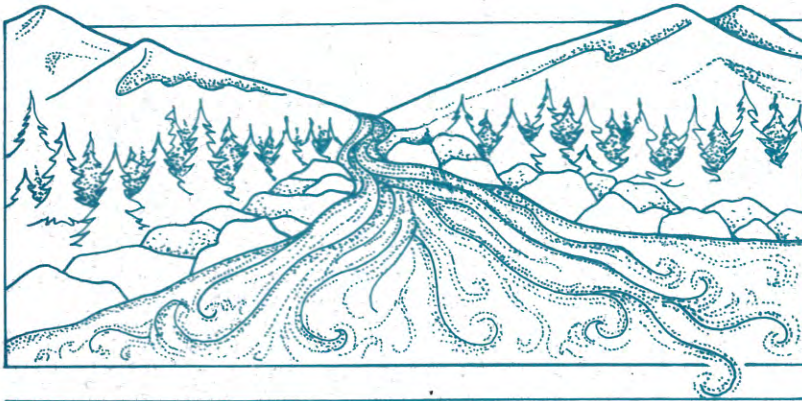


24/201



STATE DEPARTMENT OF
NATURAL RESOURCES

DIVISION OF LAND
LAND & RESOURCES SECTION

SUSITNA BASIN
RECREATION RIVERS
MANAGEMENT PLAN

RESOURCE
ASSESSMENT



AUGUST 1991

SUSITNA BASIN
RECREATION RIVERS
MANAGEMENT PLAN

RESOURCE
ASSESSMENT

AUGUST 1991

PREPARED BY

**ALASKA DEPARTMENT OF NATURAL RESOURCES
DIVISION OF LAND
LAND AND RESOURCES SECTION**

WITH ASSISTANCE FROM

**ALASKA DEPARTMENT OF FISH & GAME
NATIONAL PARK SERVICE**

EXECUTIVE SUMMARY

The following report includes background information on the Recreation Rivers. The purpose of the report is to serve as a resource for implementing the Recreation Rivers Management Plan. *Chapter 1* includes a description of the ownership of lands within the Recreation Rivers, plans and guidelines that applied to the rivers before they were designated, and methods for acquiring additional lands within the corridors. *Chapter 2* provides information on recreation uses and resources including evaluating the physical and social setting, visual resources, types of recreation activities occurring, access, and important public use sites. *Chapter 3* includes estimates of visitor use of the rivers including evaluation of long-term trends, variations in use by day of the week and by season, types of use, and comparison of private and commercial use. This chapter also includes assumptions and methods used in estimating use and how methods can be applied to making future estimates. *Chapter 4* provides information on fish and wildlife resources and use, fish periodicity, and grazing. *Chapter 5* describes the types of improvements that have been constructed in Recreation Rivers including upland structures, water-dependent structures, resource harvest and extraction, roads, and trails. *Chapter 6* summarizes the number and types of commercial businesses operating in the planning area. *Chapter 7* includes some general information on transportation planning in the region and a description of types of legal access.

Chapter 7 includes information on boating including pending legislation, existing safety program, accident rates, existing laws and regulations and the effects of boats on other resources. *Chapter 8* includes information on subsurface resources and uses including mining, oil and gas, and materials. Background information on the oil and gas lease-sale and seismic testing permitting process was also included. *Chapter 9* provides background information on hydrology, floodplains, wetlands, water quality, and waste disposal in the corridor. *Chapter 10* summarizes the volumes and value of forest resources. *Chapter 11* describes the heritage resources in the planning area. The final chapter describes the existing and potential revenues generated in the corridor and the estimated costs of merging the rivers.

AREAWIDE INFORMATION

ACREAGE

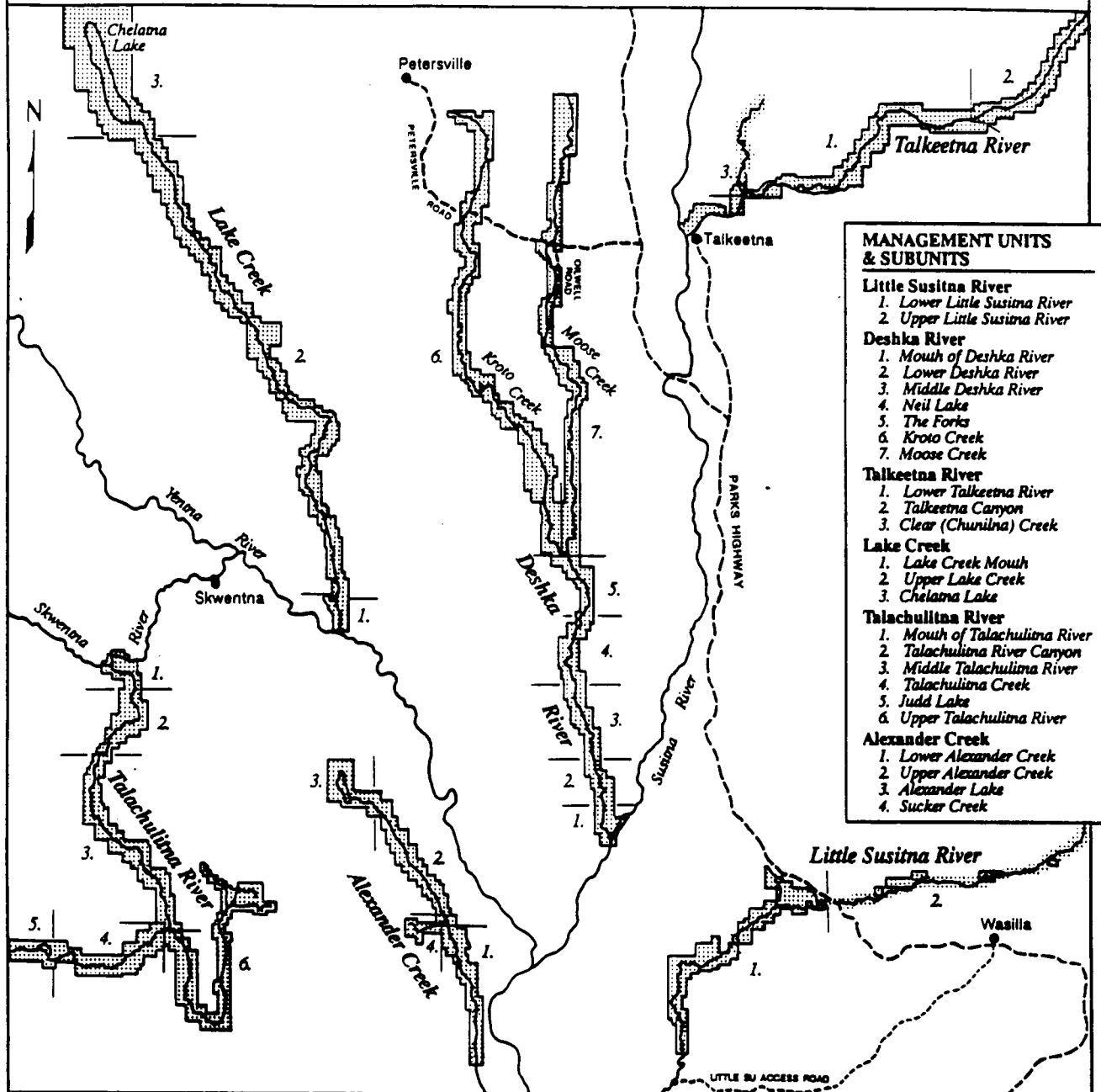
Little Susitna River	17,679
Deshka River	73,694
Talkeetna River	30,295
Lake Creek	64,340
Talachulitna River	51,276
Alexander Creek	<u>22,536</u>
TOTAL	259,820

RECREATION RIVER MILES

Little Susitna River	67
Deshka River	30
Moose Creek	52
Kroto Creek	58
Talkeetna River	45
Clear (Chunilna Creek)	10
Lake Creek	64
Talachulitna River	64
Talachulitna Creek	22
Alexander Creek	<u>44</u>
TOTAL	462

SUSITNA BASIN RECREATION RIVERS MANAGEMENT PLAN

PLAN UNITS & SUBUNITS



ACKNOWLEDGEMENTS

The following staff and volunteers contributed information and assistance to the resource assessment. Their names and the sections of the report they contributed to are listed below. We would also like to thank the many people who assisted with answering questions about each of the resources on the rivers and their uses. Many of these people are acknowledged in the recreation and visitor use chapters in this report.

Bruce Talbot, DNR Division of Land, wetlands, boating, commercial user permits, development aerial photo interpretation, editing, and report coordination.

Leah Wedmore, DNR Division of Land; development, commercial use, waste water, land authorizations, drinking water, solid waste, fees and revenues, and materials.

Jack Mosby, Lynn Anderson, and Doug Whittaker, National Park Service, Technical Assistance Program: recreation, user survey, commercial use, visitor use estimates, boating/instream flow, fishing, river inventories.

Dimitri Bader, and Kim Sundberg, ADF&G Habitat Division: fish and wildlife report coordinators and editors.

Larry Engel, Dave Rutz, Christopher Estes, and Kevin Delaney: ADF&G Sport Fish Division, fisheries, visitor use, and boating.

John Westlund and Steve Albert: wildlife and boating.

Odin Brudie, DNR Division of Land: land ownership and transportation

Lisa Paerels, DNR Division of Land: fees and revenues, user survey, land use authorization summaries, subunits.

Amy Reidell, DNR Division of Land: river inventory data input, aerial photo coordination, mapping information.

Diane Dusek, Mario Ayerdis, Robin Hall, and Kassarina, DNR Division of Land: mapping and report layout.

Pearl Reamer, and Nanci Adeszko, DNR Division of Land: word processing.

Ken Thomas, Holly Stephens, and Don Sherwood: field project volunteers

Hal Brackett, DNR Division of Management: GIS computer mapping

Bill Beebe, DNR Division of Forestry: forestry

Stan Carrick and Bill Long, DNR Division of Water: hydrology, floodplains, boating

ACKNOWLEDGEMENTS (Continued)

Mitch Henning, DNR Division of Mining: mining and mineral assessment

Kris O'Connor, DNR Division of Oil and Gas: oil and gas activities and assessment

Gary Prokosch, DNR Division of Water: instream flow project coordinator and water rights

Ken Rowell, DNR Division of Land: materials

Kevin Kleweno and Henry Friedman, Department of Environmental Conservation: drinking water, waste water, and solid waste

Steve Klinger, Division of Parks and Outdoor Recreation: Heritage Resources

Jon Hall, U.S. Fish and Wildlife Service: wetlands mapping

Tom Jennings, U.S. Fish and Wildlife Service: aerial photography coordination

Sue Fisler, Pete Panerese and Dale Bingham, DNR Division of Parks and Outdoor Recreation: permitting, fees, and revenues

Roger Burnside and Tony Braden, DNR Division of Land: land status

Tim McCarthy, DNR Division of Management: LAS data processing

Yingdi Wang, DNR Division of Land, student intern: fees and revenues

The following lodges, air taxi operators, charter boat services, outfitter-guides, boat launches, and local agencies generously provided information used to develop the recreation visitor use estimates. The assistance provided by the owners, managers, and employees of these businesses is extremely valuable and greatly appreciated.

Action Jackson & Scott's Quality Charters
Alexander Lake Lodge
Bush Pilots Air Service & Silvertip Lodges
Deshka Silver-King Lodge
Houston Public Works Department
Ketchum Air Service
Mahay's Riverboat Service
Mike & Mert's Lodge
NOVA Riverrunners Inc.
Ouzel Expeditions
Riverover Ventures
Riversong Lodge
Skwentna River Lodge
Talaheim Lodge
Talkeetna Boat Launch
Trail Ridge Air
Wilderness Place Lodge

Adventure River Company
Black Fox Lodge
Deshka Landing
Gabbert's Fish Camp
J & S Charters
King Point Lodge
McDougall Lodge
Miller's Landing
Osprey Expeditions
Regal Air
Rivers North
Rust's Flying Service
Susitna Riverboat
Talaview Lodge
Teke Tours Alaska River Camp
Tri-River Charters
Wolverine Guides & Outfitting

TABLE OF CONTENTS

	<u>Page</u>
Executive Summary	i
Acknowledgements	iv
Introduction	ix
 Chapter 1¹ Land Ownership	 1
 Chapter 2 Recreation Resources and Use	 31
 Chapter 3 Visitor Use Estimates	 177
 Chapter 4 Fish and Wildlife	 269
Wildlife Resources	271
Trapping	299
Grazing	299
Sport Fisheries	308
Fish Periodicity	331
 Chapter 5 Development in and Adjacent to the Corridors	 351
 Chapter 6 Commercial Recreation Activities	 381
 Chapter 7 Transportation	 385
 Chapter 8 Boating	 391
 Chapter 9 Subsurface Resources	 417
Mining	417
Materials	423
Oil and Gas	425
 Chapter 10 Water and Solid Waste	 447
Hydrology	447
Wetlands	452
Water Quality	457
 Chapter 11 Forestry	 463
 Chapter 12 Heritage Resources	 485

¹In chapters where resources are described by river, rivers are described in the following order: Little Susitna River, Deshka River, Talkeetna River, Lake Creek, Talachulitna River, and Alexander Creek.

LIST OF FIGURES

	<u>Page</u>
COMPARING USE TRENDS BY RIVER	
Figure S-1. Use Trends on the Little Susitna River, Deshka River, and Alexander Creek	180
Figure S-1. Use Trends on Lake Creek, Talkeetna River, and the Talachulitna River	180
VISITOR USE ESTIMATES	
Little Susitna River	
Figure LISU-1. Seasonal Overview of Little Susitna Recreation Use, 1989.	183
Figure LISU-2. Number of Craft Passing through the ADF&G Weir in 1989.	184
Figure LISU-3. Variation in Weekday/Weekend Use on the Little Susitna River.	185
Deshka River	
Figure DESH-1. Seasonal Overview of Deshka River Recreation Use for 1989.	191
Figure DESH-2. Variation in Weekday/Weekend Visitor Use on the Deshka River.	192
Figure DESH-3. Number of People Beginning Trips from the Mouth of the Deshka River.	195
Figure DESH-4. Number of People Beginning Trips from Neil Lake.	196
Figure DESH-5. Number of People Beginning Trips from Oilwell Road.	197
Figure DESH-6. Number of People Beginning Trips from Amber Lake.	198
Figure DESH-7. Percentage of Float Trips Beginning at Neil Lake, Amber/Whistling Lakes, and Oilwell Road	200
Figure DESH-8. Proportions of Private and Commercial Use.	201
Figure DESH-9. Correlation Between DFG Counts and Reported Recreation Use	205
Talkeetna River	
Figure TALK-1. Seasonal Overview of Talkeetna River Recreation Use, 1989.	215
Figure TALK-2. Variation in weekday/weekend visitor use on Talkeetna River.	216
Figure TALK-3. Number of People Beginning Trips on Lower Talkeetna River.	218
Figure TALK-4. Number of People Beginning Trips above Iron Creek (Float Trip Use).	219
Figure TALK-5. Proportions of Private and Commercial Use.	220
Lake Creek	
Figure LAKE-1. Seasonal overview of Lake Creek recreation use, 1989.	229
Figure LAKE-2. Variation in Weekday/Weekend Visitor Use on Lake Creek.	230
Figure LAKE-3. Number of people beginning trips at Lake Creek mouth.	232
Figure LAKE-4. Number of People Beginning Trips at Chelatna Lake.	233
Figure LAKE-5. Proportions of Private and Commercial Use.	234

LIST OF FIGURES (Continued)

	<u>Page</u>
Talachulitna River	
Figure TALA-1. Seasonal Overview of Talachulitna River Recreation Use, 1989.	243
Figure TALA-2. Variation in Weekday/Weekend Visitor Use on the Talachulitna River.	244
Figure TALA-3. Number of People Beginning Trips at the Mouth of the Talachulitna River	246
Figure TALA-4. Number of People Beginning Trips at Judd Lake.	247
Figure TALA-5. Proportions of Private and Commercial Use.	248
Alexander Creek	
Figure ALEX-1. Seasonal Overview of Alexander Creek Recreation Use, 1989.	255
Figure ALEX-2. Variation in Weekday/Weekend Visitor Use on Alexander Creek.	256
Figure ALEX-3. Number of People Beginning Trips from Lower Alexander Creek.	259
Figure ALEX-4. Number of People Beginning Trips from Alexander Lake.	260
Figure ALEX-5. Proportions of Private and Commercial Recreation Use	261
OIL AND GAS	
Figure 1. Staging Base	433
Figure 2. Fuel Storage Areas	434
FISH AND WILDLIFE	
Figure 1. Marine Run Timing for Susitna River Salmon Stocks	330
----- Species Periodicity for Alexander Creek, reach A (mouth to RM 16) (to Sucker Creek)	331
----- Species Periodicity for Alexander Creek, reach B (RM 16 to RM 29.5)	332
----- Species Periodicity for Alexander Creek, reach C (lake) (29.5 to 31.5)	333
----- Species Periodicity for Alexander Creek, reach D (Sucker Creek)	334
----- Species Periodicity for Deshka River, reach A (0 to RM 22) (mouth to Neil Lake)	335
----- Species Periodicity for Deshka River, reach B (RM 22 to RM 27) (Neil Lake to Forks)	336
----- Species Periodicity for Deshka River, reach C (RM 27 to RM 76 (end) (Kroto Creek)	337
----- Species Periodicity for Deshka River, reach D (RM 0 to RM 43.5) (end) (Moose Creek)	338
----- Species Periodicity for Lake Creek, reach A (RM 0 to RN 32.5) (mouth to Home Creek)	339
----- Species Periodicity for Lake Creek, reach B (RM 32.5 to RM 49)	340
----- Species Periodicity for Little Susitna River, reach A (RM 0 to RM 54)	341
----- Species Periodicity for Little Susitna River, reach B (RM 43 to RM 75)	342
----- Species Periodicity for Talachulitna River, reach A (RM 0 to RM 15.5) (mouth to Friday Creek)	343
----- Species Periodicity for Talachulitna River, reach B (RM 15.5 to RM 52)	344

LIST OF FIGURES (Continued)

	<u>Page</u>
----- Species Periodicity for Talachulitna River, reach C (RM 0 to RM 12.5) (Talachulitna Creek)	345
----- Species Periodicity for Talkeetna River, reach A (RM 0 to RM 13.5) (mouth to Sheep Creek)	346
----- Species Periodicity for Talkeetna River, reach B (RM 13.5 to end)	347
----- Species Periodicity for Talkeetna River, reach C (Clear Creek)	348

FORESTRY

----- Net Volume by Species for all Rivers	471
----- Little Susitna River - Volume and Acres by Stretch	472
----- Little Susitna River - Volume per Acre	473
----- Deshka River - Volume and Acres by Stretch	474
----- Deshka River - Volume per Acre	475
----- Talkeetna River - Volume and Acres by Stretch	476
----- Talkeetna River - Volume per Acre	477
----- Lake Creek - Volume and Acres by Stretch	478
----- Lake Creek - Volume per Acre	479
----- Talachulitna River - Volume and Acres by Stretch	480
----- Talachulitna River - Volume per Acre	481
----- Alexander Creek - Volume and Acres by Stretch	482
----- Alexander Creek - Volume per Acre	483

LIST OF TABLES

	<u>Page</u>
RIVER MILES AND ACREAGE	
----- Miles and Acreage by River	ii
LAND OWNERSHIP	
----- Land Ownership by Acreage and Number of Private Parcels in the Recreation Rivers	4
----- Summary of Susitna Area Plan and Willow Subdivision Plan Surface and Subsurface Designations	7
----- Susitna Area Plan and Willow Subbasin Plan Subunit Guidelines	9
----- Land Ownership by Acreage and Number of Private Parcels within the Little Susitna River Corridor	16
----- Land Ownership by Acreage and Number of Private Parcels within the Deshka River Corridor	21
----- Land Ownership by Acreage and Number of Private Parcels within the Talkeetna River Corridor	23
----- Land Ownership by Acreage and Number of Private Parcels within the Lake Creek Corridor	25
----- Land Ownership by Acreage and Number of Private Parcels within the Talachulitna River Corridor	27
----- Land Ownership by Acreage and Number of Private Parcels within the Alexander Creek Corridor	29
Table I-1. Modified BLM Visual Resource Assessment Criteria/Scenic Quality Evaluation Criteria Scenic Quality Inventory and Evaluation Criteria and Score	35
Table I-2. Recreation Opportunity Class Definitions	37
RECREATION RESOURCES AND USES	
Little Susitna River	
Table LS-1. Powerboat Sizes on the Little Susitna River, 1988	45
Table LS-2. Sport Fishing Harvest on the Little Susitna River, 1988	49
Table LS-3. Little Susitna River: Important Recreation Sites and Facilities on Public Land	53
Deshka River	
Table D-1. Boats on the Deshka River (Moose and Kroto Creeks), 1988	71
Table D-2. Sport Fishing Harvest on the Deshka River, 1987	73
Table D-3. Deshka River: Important Recreation Sites and Facilities on Public Land	77
Talkeetna River	
Table TK-1. Boats Using Talkeetna River from Talkeetna Boat Launch and Talkeetna Airstrip, July through September 1984	97
Table TK-2. Sport Fishing Harvest on Talkeetna River and Tributaries, 1987	99
Table TK-3. Talkeetna State Recreation River: Important Recreation Sites and Facilities on Public Land	102

LIST OF TABLES (Continued)

	<u>Page</u>
Lake Creek	
Table L-1. Boats on Lake Creek, 1987	115
Table L-2. Sport Fishing Harvest on Lake Creek, 1987	117
Table L-3. Lake Creek: Important Recreation Sites and Facilities on Public Land	121
Talachulitna River	
Table TL-1. Sport Fishing Harvest on the Talachulitna River, 1988	139
Table TL-2. Talachulitna River: Important Recreation Sites and Facilities on Public Land . .	143
Alexander Creek	
Table A-1. Boats on Alexander Creek, 1988	159
Table A-2. Boats on Alexander Creek, 1989	160
Table A-3. Sport Fishing Harvest on Alexander Creek, 1988, Compared to 10-Year Averages	162
Table A-4. Alexander Creek: Important Recreation Sites and Facilities on Public Land . . .	165
VISITOR USE ESTIMATES FOR ALL RIVERS	
Table S-1. Percentage of Fishing use by River, Region, and Statewide	179
Table S-2. Percentages Increases in Fishing Use by River, Region, and Statewide	179
VISITOR USE ESTIMATES FOR EACH RIVER	
Deshka	
Table D-4. Reported and Estimated Commercial Recreation Use	202
Table D-5. Reported and Estimated Recreation Use	203
Talkeetna	
Table TK-4. Reported and Estimated Commercial Recreation Use	221
Table TK-5. Reported and Estimated Private Recreation Use	222
Lake Creek	
Table L-4. Reported and Estimated Commercial Recreation Use	235
Table L-5. Reported and Estimated Private Recreation Use	236
Talachulitna River	
Table L-3. Reported and Estimated Commercial Recreation Use	249
Table L-4. Reported and Estimated Private Recreation Use	249
Alexander Creek	
Table A-4. Reported and Estimated Commercial Recreation Use	262
Table A-5. Reported and Estimated Private Recreation Use	262

LIST OF TABLES (Continued)

	<u>Page</u>
Fish and Wildlife	
Table 1. Reported Human Use of moose and bear in Talkeetna River Corridor	295
Table 2. Reported Human Use of moose and bear in Little Susitna River Corridor	295
Table 3. Reported Human Use of moose and bear in Moose/Kroto Creek Corridor	295
Table 4. Reported Human Use of moose and bear in Alexander Creek Corridor	296
Table 5. Reported Human Use of moose and bear in Lake Creek Corridor	296
Table 6. Reported Human Use of moose and bear in Talachulitna River Corridor	296
----- Chronology of Reported Harvest for 1979-1989 Associated with the Little Susitna River	297
Table 1. Sport Fishing Effort for Selected Alaska Fisheries, 1977-1988	324
Table 2. Little Susitna River Harvest and Effort, 1977-1988	325
Table 3. Deshka River Harvest and Effort, 1977-1988	325
Table 4. Alexander Creek Harvest and Effort, 1977-1988	326
Table 5. Lake Creek Harvest and Effort, 1977-1988	326
Table 6. Talkeetna River and Tributaries Harvest and Effort, 1977-1988	327
Table 7. Talachulitna River Harvest and Effort, 1977-1988	328
Table 8. Harvest and Effort for Creek Surveyed Northern Cook Inlet Chinook Salmon Fisheries, 1986-1989	329
	<u>Page</u>
DEVELOPMENT	
----- Existing Development within the Recreation Rivers	357
COMMERCIAL ACTIVITIES	
----- List of Commercial Services Located within the Recreation Rivers, 1989	381
----- Number of Commercial Services Located within the Recreation Rivers, 1989 . . .	384
BOATING	
Little Susitna River	
Table 9. Creel Census Demographic Summary, Little Susitna River, below Burma Landing, 1989	401
Table 10. Creel Census Demographic Data Summary, Little Susitna River, Burma Landing of Weir, 1989	402
Table 11. Creel Census Demographic Data Summary, Little Susitna River, Upstream of Weir, 1989	403
Deshka River	
Table 12. Count Survey Summary, Downstream of ADF&G Cabin	404
Table 13. Aerial Count Survey, Deshka River, ADF&G Cabin to Loebbs, 1989	405
Table 14. Aerial Count Survey, Deshka River, Loebbs to Trapper Creek, 1989	406
Table 15. Aerial Count Survey, Deshka River, Trapper Creek to Neil Lake, 1989	407
Table 16. Aerial Count Survey, Deshka River, Neil Lake to the Forks, 1989	408

LIST OF TABLES (Continued)

	<u>Page</u>
Alexander Creek	
Table 17. Count Survey Summary, Alexander Creek, Mouth to Gabbert's, 1989	409
Table 18. Aerial Count Survey Summary, Alexander Creek, Gabbert's to Weir, 1989	410
Table 19. Aerial Count Survey Summary, Alexander Creek, Weir to Sucker Creek, 1989 . .	411
Table 20. Aerial Count Survey Summary, Alexander Creek, Sucker Creek to Alexander Lake, 1989	412
Lake Creek	
Table 21. Count Summary Survey, Lake Creek, Mouth, 1989	413
Table 22. Count Survey Summary, Lake Creek, Upstream, 1989	414
Talkeetna River	
Table 23. Creel Census Demographic Data Summary, Talkeetna River, 1989	415
OIL AND GAS	
----- Oil and Gas Lease Sale Timeline	428
----- Notification Process for Oil and Gas Lease	430
WATER AND SOLID WASTE	
----- Drinking Water and Wastewater System Approvals for Commercial Facilities, 1989	457
----- Active Landfills within Matanuska-Susitna Borough	459
----- Waste Transfer Facilities and Landfills	460
FORESTRY	
----- Volume and Value - All Species by River	468
----- Volume and Value - Other Species by River	468
----- Volume and Value - White Spruce by River	469
----- Volume and Value - Paper Birch by River	469
----- Biological Annual Allowable Cut by River	370
HERITAGE RESOURCES	
----- Heritage Site Potential by Subunit	488

LIST OF MAPS

	<u>Page</u>
GENERAL MAPS	
----- Planning Area	iii
----- Past State Land Sales	3
----- Adjacent Plans and Specially Designated Areas	13
SUBUNIT MAPS	
----- Little Susitna Index Map and Maps 1-5	56
----- Deshka River Index Map and Maps 1-12	79
----- Talkeetna River Index Map and Maps 1-5	104
----- Lake Creek Index Map and Maps 1-7	123
----- Talachulitna River Index Map and Maps 1-7	145
----- Alexander Creek Index Map and Maps 1-3	168
FISH AND WILDLIFE	
----- Game Harvest Units	298
----- ADF&G, FWP, and CIAA Facilities	349
TRANSPORTATION STUDY MAPS	
----- Six Road Corridors Evaluated in the Susitna Small Scale Transportation Study . .	386
SUBSURFACE RESOURCES	
----- Mining Claims	418
----- Geologic Sketch of Yentna Mining District	420
FORESTRY	
----- Plan Units and Subunits	465

INTRODUCTION

The following report was developed as background information for the Susitna Basin Recreation Rivers planning process. Information from this report is incorporated into the background section for each unit and subunit in Chapter 3 of the final plan. The report is also intended to be used as background information for implementing the plan and adjudicating case files in the Recreation Rivers. Issues were identified at public meetings in December 1988 and January 1989. These comments were summarized in a report.¹ Eight working groups were formed to review this report, identify issues, and developed a data needs assessment.² Different agencies were then requested to provide sections of the report. A draft resource assessment³ was developed. Agencies contributed comments on the draft report. Changes were made and incorporated into this final report.

When the draft resource assessment was developed early in the planning process, the report was based on preliminary river miles and subunits. Since that time the subunit boundaries and river miles have changed and are reflected in the final plan. However, because of the considerable resources required to convert all information in the resource assessment over to the next reference points, **the river miles and subunits in the final plan and resource assessment differ. The subunit boundaries and river miles used in this report are shown on the maps in Chapter 2.** Most of the information in the report is from 1989 and earlier. For this reason, some of the sections in the plan (such as that which describes the numbers and names of commercial businesses in the corridors and sections that describe ongoing programs in 1989) may have changed over the last two years and further research may be needed.

¹ "Comments on Recreation Rivers" Department of Natural Resources, June 1989, 236 pp.

² "Draft List of Issues" Department of Natural Resources, May 1989, 33 pp.

³ "Resource Assessment" Department of Natural Resources, October 1989, 500 pp.

CHAPTER 1

LAND OWNERSHIP

CHAPTER 1 - LAND OWNERSHIP

The land status for the entire planning area and each of the six Recreation Rivers is shown in Table 2.0. The land status is summarized below.

Land Status Summary

The Recreation Rivers planning area includes 259,820 acres. The State of Alaska owns approximately 238,124 acres, or about 91.6% of the planning area, which is managed by the Department of Natural Resources. With the exception of two small parcels at the outlet of Lake Creek, all state land has been patented or Tentatively Approved (TA) for state ownership. Of the remaining land in the six river corridors, there are 14,954 acres of Matanuska-Susitna Borough land (5.7% of the area), 3,757 acres of Mental Health land (1.4%), which is not managed by the Department of Natural Resources, 2,702 acres of private land (1%), and 284 acres (0.1%) of land that is owned by the University of Alaska.

State Title and Conveyances

The state land within the planning area has been selected primarily under the General Purpose Grant provisions of the Statehood Act. The exceptions in the Recreation River corridors are those tracts that were granted to the territory prior to statehood under the University Land Grant and the Mental Health Grant.¹ Within the corridors, there are 284 acres of University grant lands and 3,757 acres of Mental Health lands. The current management of these lands is described later in this chapter.

State conveyances within the planning area include the conveyance of 14,954 acres of land to the Matanuska Susitna Borough, and 2,702 acres which have been conveyed to individuals through preference rights, open to entry, remote parcel, or lottery sales. These conveyance types are explained below.

Federal Land Conveyances

Prior to the state's selection of land in the corridors, several tracts of land were acquired by private groups or individuals from the federal government. The federal land programs included homesteads, homesites, trade and manufacturing sites, and Native Allotments.

Homesites of five acres or less, some homesteads (up to 160 acres) are distributed throughout the river corridors. Concentrations of these private parcels include those at the Lower Deshka River, where 253.65 acres were conveyed in 3 parcels, and Upper Lake Creek at Chelatna Lake, where 88.76 acres have been conveyed in 23 parcels. These programs were eliminated in 1976 by the Federal Land Policy and Management Act, except in Alaska, where the programs were extended until 1986.

¹"Promised Land"; A History of Alaska's Selection of its Congressional Land Grants; Alaska Dept. of Natural Resources; May, 1987.

Under the Native Allotment Act of 1906, the U.S. Department of the Interior may grant up to 160 acres of land to individuals (Native Americans) in areas where continuous use and occupancy can be proven. The only allotment within the planning area is a 160 acre Native Allotment on the southwest shore of Chelatna Lake. Native corporations, established under ANCSA do not own property within the river corridors themselves. There is, however, a considerable holding at the mouth of Alexander Creek, just outside the river corridor which is owned by Cook Inlet Region, Inc. A few small tracts of the surface estate in this area are held by the Alexander Creek Village Corporation.

State Conveyances

Past state disposals in the Recreation River corridors included open-to-entry (OTE) offerings, remote parcels, and preference rights. State-disposed parcels are between one and five acres, with the exception of the Chase remote parcel lots which are up to 40 acres. The planning area is now closed for all of these disposal programs. Following is a brief description of the past programs which lead to private land ownership in the corridors.

Open-to-Entry. A vast majority of the private parcels in the planning area were acquired as open-to-entry land. In 1968, several areas in the Susitna Basin were classified as open-to-entry. Land classified for this purpose were available, in lots of up to five acres, on a lease basis, for a renewable term of five years. Some areas were merely staked, others were pre-designated by aliquot part. During those five years, or during the one-time-only extension period, entrants are required to survey the property. The property could then be appraised and purchased at fair market value. Prior to survey, there is an annual lease payment of "at least 100 dollars per year." These areas remained open-to-entry until 1972, when the OTE program was suspended. In 1978 and 1979, there were limited OTE offerings, but none were located in the planning area.

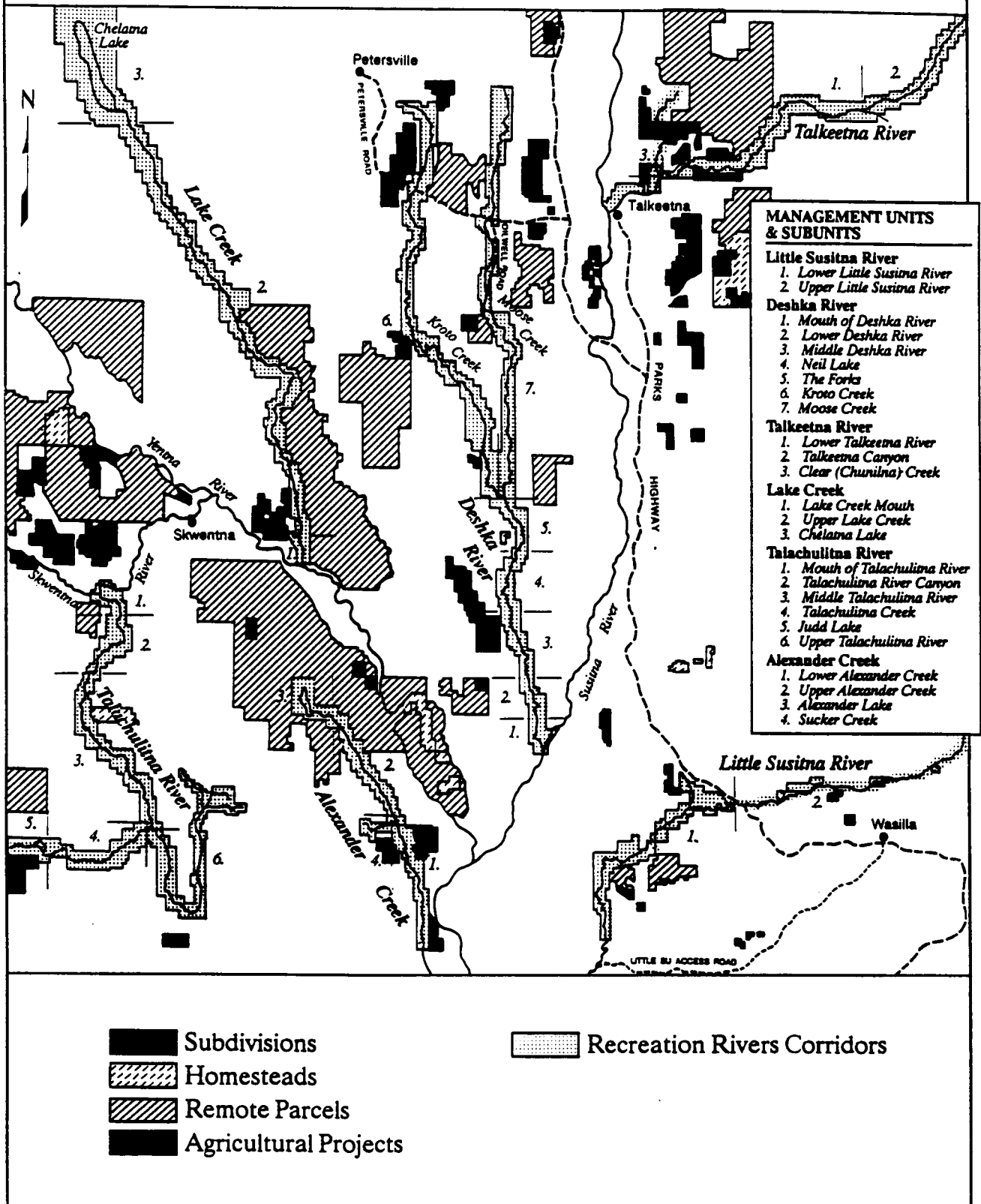
Remote Parcels and Homesteads. Approximately 15 remote parcels were staked in the Talkeetna River corridor. Only three have gone to sales contract or patent. Similar to OTE's, the remote parcel program requires staking, annual lease payments, and a survey. Then, following appraisal, the parcel is purchased at "fair market value at time of staking".

Lottery Parcels. Lottery parcels are surveyed tracts of land, generally in a subdivision, which are sold to "winners" of the annual state land lottery. There are no state subdivisions within the corridor, however there are several subdivisions containing several hundred lottery parcels that are located just outside the Deshka and Alexander Creek corridor boundaries.

Preference Rights. Alaska statutes provide for the sale of real property by the state to individuals who qualify to purchase the property under 12 different sets of criteria. Most preference right sales in the Susitna Basin have been by either AS 38.05.035(b)(2) and 38.050035(b)(5). AS 38.05.035(b)(2) grants a preference right to someone who had valid rights of entry to the property, was diligent in attempting to acquire title, and to whom, for some error or omission, the state or federal government had failed to grant title. AS 38.05.035(b)(5) recognizes individuals who presently use the property and used the property as a primary place of residency prior to

SUSITNA BASIN RECREATION RIVERS MANAGEMENT PLAN

Past State Land Sales



Land Ownership by Acreage and Number of Private Parcels within the Six River Corridors.

<u>River</u>	-----Acres-----					<u>Total Number Private Parcels</u>	<u>Total Acres</u>
	<u>State</u>	<u>Mat-Su Borough</u>	<u>University of Alaska</u>	<u>Mental Health</u>	<u>Private</u>		
Little Susitna	13,239*	1,680	80	2,680	-0-	-0-	17,679
Deshka	62,117	10,110	-0-	-0-	1,467	230	73,694
Talkeetna	28,798	-0-	204	1,077	216	19	30,295
Lake Creek	63,817**	4	-0-	-0-	520	85	64,340
Talachulitna	50,258	900	-0-	-0-	118	23	51,276
Alexander Creek	19,995	2,260	-0-	-0-	381	74	22,536
TOTAL	238,124	14,954	284	3,757	2,702	431	259,820

* includes 640 acres which were selected by the Mat-Su Borough

** includes 20 - 40 acres State-selected land at Chelatna Lake

statehood. Most or all of the individuals who qualify for a preference right in the Susitna basin have already filed their requests. ²

Land Leases. Land leases are considered a disposal of state interest, because a long-term right is granted to lessors to use land for a specific purpose, generally excluding the use thereof by the public. Leases are granted by the Division of Land, for terms of up to 55 years. Land leases are not issued for residential purposes and are limited to commercial developments.

Borough, University and Mental Health Land Management

Borough Land There are 14,954 acres of borough land within the six river corridors. These lands are located at key river access points or public use areas. They include land at Amber Lake, lower Alexander Creek, Judd Lake, Bulchitna Lake, Moose Creek (now the Petersville Rd.), the mouth of the Deshka, and near Little Susitna Landing. The only additional borough selection at this time is a 640 acre selection within the Upper Little Susitna River subunit near Bench Lake. The Matanuska Susitna borough manages their land generally for multiple use. The borough is currently devising policy for lands, including those in the Recreation River corridor, to accommodate a range of uses, including private and public recreation.

University Land Through their territorial land grant, the University of Alaska received 100,000 acres of unreserved public land. All 100,000 acres have been selected and deeded to the University by the Department of Natural Resources. The overall land management intent for university land is, primarily, to generate revenue for the university. There are 284 acres of University grant lands in the corridors. These are located near Talkeetna on the Talkeetna River and along the upper Little Susitna River.

Mental Health Land Prior to statehood, the Alaska Mental Health Enabling Act, U.S. entitled the Territory of Alaska to select, within ten years of the effective date, up to one million acres. This land was granted to meet the necessary expenses of the mental health programs of Alaska. Until recently, there were 3,757 acres of mental health land within the Recreation Rivers. In 1991 the Mental Health Trust Settlement Act became law. This act removed Mental Health Trust lands from all legislatively designated areas including the Recreation Rivers.

Other Plans in the Susitna Basin

Designations and Classifications

Five of the six river corridors in the planning area are located within the boundaries of the Susitna Basin Area Plan (SAP), which was completed by the Department of Natural Resources in 1985. The Little Susitna River corridor, is located within the Willow Subbasin Area Plan completed in 1982. The Recreation Rivers Act and Management Plan supersede the two area plans that cover this area. The following table shows the land use designations from these two area plans for each of the six Recreation Rivers.

²Personal communication, Land Conveyance Section, Alaska Department of Natural Resources.

These plans present primary and secondary surface and use designations. A primary surface use is one that is of major importance in a management unit or subunit. The unit will be managed to encourage this use and its conservation and/or development. A secondary surface use is permitted within a management unit when its occurrence will not adversely affect achieving the objectives for the primary uses. Prohibited surface uses are not permitted anywhere within the unit without a plan amendment. Subsurface resource designations include "minerals," "oil and gas," or "coal" generally are not applied as primary or secondary surface use designations.

The Susitna Area Plan and Willow Subbasin Plan also include areawide guidelines for major activities such as settlement, recreation, and fish and wildlife habitat. The plans also developed specific management interest for each unit and subunit in the plans. Some of the significant guidelines for units which overlap the Recreation River corridors are listed in the following table.

Susitna Area Plan

The Susitna Area Plan for state lands in the Susitna Basin that was adopted in 1985. With the exception of the Little Susitna, the six Recreation River corridors are within the planning area. The plan provides management intent for most public lands in this region. It also classified lands including those that may be available for settlement (classifications are listed in the adjacent table). The plan contains specific policies and guidelines for the short term and more general policies for the long term. It does not control uses of private lands. Since most lands will be managed for multiple use, the plan also established rules which allow various uses to occur without serious conflicts. The plan recommended mineral closures for the five river corridors. The plan also recommended that the five river corridors receive a legislative designation and outlined their boundaries and stated how they should be managed until a management plan is completed. The Recreation Rivers management plan is adopted it will amend and supersede the Susitna Area Plan.

Willow Subbasin Plan (WSBAP)

WSBAP was adopted in 1982 is a land-use plan for state and certain borough lands in the southcentral portion of the Matanuska-Susitna Borough. This plan is organized similarly to the Susitna Area Plan. It includes the entire Little Susitna River Corridor. The designated Little Susitna corridor is in four management units in the WSBAP: Little Susitna, Capital Site, Fishhook, and Wasilla (See the adjacent table). WSBAP closed most of the Little Susitna River which is now legislatively designated to mineral leasing and to locatable mineral entry. The Recreation Rivers Act and Management Plan amends and supersedes the WSBAP.

**Table . Summary of Susitna Area Plan and Willow Subbasin Plan -
Surface and Subsurface Designation in the Recreation Rivers Corridors**

					LAND USE DESIGNATIONS					
REC. RIVERS MGMT. PLAN		AREA PLAN			SURFACE		SUBSURFACE		Prohibited Surface Uses	Guidelines
River Corridor and See Page #	Section of Corridor	Plan	Sub Region	Sub Unit	Primary Use	Secondary Use	Locatable Minerals	Leasable Minerals		
Moose Ck. 150 - 152, 163	Above Minemile Lake	SAP	Petersville Rd.	4 a	Public Recreation Water Resources Wildlife Habitat	Forestry	Closed	Not Available for coal leasing or prospecting	Trapper Cabins and disposals Grazing	A, B, C
Kroto Creek 137 - 139, 163	Above Amber Lake	SAP	Petersville Rd.	1 b	Public Recreation Water Resources Wildlife Habitat	Forestry	Closed	Not Available for coal leasing or prospecting	Land Disposals Grazing	A, B, C, K
Lake Creek 175 - 177, 189, 219 - 220, 247 - 249	Below Camp Creek	SAP	Susitna Lowlands	7 b	Public Recreation Water Resources Wildlife Habitat	Forestry	Closed	Not Available for coal leasing or prospecting	Land Disposals	A, C, D, L
"	Above Camp Creek	SAP	Sunflower Basin	3	Public Recreation Water Resources Wildlife Habitat	Forestry	Closed	Not Available for coal leasing or prospecting	Remote Cabins Land Disposals Trapper Cabins	A, B, C, D
Alexander Creek 213 - 214, \, 250, 262- 265, 284	Mouth - Granite Creek	SAP	Mt. Susitna	3 d	Primarily Private Land	-	-	-	-	B, H
"	Granite Ck.- Pierce Ck.	SAP	Mt. Susitna	3 a	Public Recreation Wildlife Habitat	Forestry	Closed	Not Available for coal leasing or prospecting	Grazing Land Disposals	A, C, D, Q, R
"	Above Pierce Ck.	SAP	Susitna Lowlands	6 d	Public Recreation Water Resources Wildlife Habitat	Forestry	Closed	Not Available for coal leasing or prospecting	Grazing Trapper Cabins Land Disposals	A, B, C, H, K
Telachulitna River 274 - 276, 285, 286	Entire River and Creek	SAP	Mt. Susitna	7	Public Recreation Water Resource Wildlife Habitat	Forestry (Personal Use)	Closed	Not Available for mineral leasing or prospecting	Grazing Land Disposals	A, B, C, M, S
Little Susitna 187 - 197, 231 - 235, 237 - 242, 262 - 263	Game Refuge to Nancy Lake Rec. Area	WSAP	Little Susitna Corridor	11b	Recreation Fish & Wildlife	Forestry	Closed	Not Available for mineral leasing or prospecting	Land Disposals	E, N, O, T

continued

					LAND USE DESIGNATIONS					
REC. RIVERS MGMT. PLAN		AREA PLAN			SURFACE		SUBSURFACE		Prohibited Surface Uses	Guidelines
River Corridor and See Page #	Section of Corridor	Plan	Sub Region	Sub Unit	Primary Use	Secondary Use	Locatable Minerals	Leasable Minerals		
Little Susitna 187 - 197, 231 - 235, 237 - 242, 262 - 263	Nancy Lake Rec. Area to Parks Hwy. including Lake Creek	WSAP	Little Susitna Corridor	11 a	Fish & Wildlife Watershed	-	Closed	Not Available for coal leasing or prospecting	Land Disposals	E, H, O, T
"	Small sections of shorelands above Parks Hwy.	WSAP	Wasilla	18	Recommended land uses: settlement, small farms, commercial agri- culture, recreation	Recommended land uses: forestry (personal use); Parks Highway scenic area		Not Available for coal leasing or prospecting w/i 300' of the Parks Hwy. or Little Su River	-	O, U, V
"	Most of shorelands above Parks Hwy. and two east-most upland parcels	WSAP	Fish Hook Lake	16	Recommended land uses: settlement, watershed, fish and wildlife	Recommended land uses: settlement; forestry		Not Available for coal prospecting within 300' of the Little Su River	-	O
"	Small sections of shorelands above Parks Hwy.	WSAP	Capital Site	22	Reserved Use	-	Closed	Not Available for mineral leasing or prospecting	Land Disposals	
Talkeetna 104 - 108, 129, 388 - 392	Below Sheep Creek (Clear Creek below Mama Bear Creek Junction)	SAP	South Parks Highway	5 b	Public Recreation Wildlife Habitat	Forestry	Closed	Not available for coal leasing or prospecting	Remote Cabins, Grazing, Land Disposals	A, B, C, D, I
"	Sheep Creek to Iron Creek	SAP	South Parks Highway	6 a	Public Recreation Wildlife Habitat	Forestry	Closed	Not available for coal leasing or prospecting	Land Disposals	A, B, C
"	Above Iron Creek	SAP	Talkeetna Mountains	3 b	Public Recreation Wildlife Habitat	Forestry (personal use)	Open	Available for leasing	Trapper Cabins, Grazing, Land Disposals	A, C
Clear Creek 99, 101, 104 - 106, 129	Between Mama Bear Creek Junction and Sec. 27 midpoint	SAP	South Parks Highway	5 a	Settlement (existing sub- division)	Forestry (personal use) Public Recreation Wildlife Habitat	Closed	Not Available for coal leasing or propsecting	Trapper Cabins, Remote Cabins	
"	Between Section 27 midpoint and Big Heart Lake	SAP	South Parks Highway	4 f	Public Recreation Water Resource Wildlife Habitat	Forestry (personal Use)	Closed	Not Available for coal leasing or prospecting	Trapper Cabins, Remote Cabins, Land Disposals, Grazing	P
Deshka River 229 - 233, 249, 250	Mouth up to just below Amber Lake on Kroto Creek, just below Nine Mile Creek jct. on Moose Creek	SAP	Susitna Lowlands	11 b	Public Recreation Water Resources Wildlife Habitat	Forestry	Closed	Not Available for coal leasing or prospecting	Grazing, Land Disposals	A, B, C, D, G, J

Susitna Area Plan and Willow Subbasin Plan Subunit Guidelines

Following are detailed guidelines for each subunit included in the Susitna Area Plan and Willow Subbasin Plan. Guidelines listed include only those that pertain to issues the Recreation Rivers plan can address or to lands within the corridors. Letters listed on the left correspond to the land use designation summary table shown on the previous pages.

Area Plan Guidelines Key

<u>Letter</u>	<u>Guideline</u>
----------------------	-------------------------

- | | |
|----------|---|
| A | <u>Legislative Designation.</u> Recommended by the plan for legislative designation. |
| B | <u>Oil and Gas.</u> Specific mitigation measures necessary to protect the values for which the river corridor was established will be developed as part of the lease sale process. |
| C | <u>Remote Cabins.</u> The [Recreation Rivers] Management Plan will determine whether remote cabins will be a permitted use in this unit. |
| D | <u>Roads.</u> Road crossings of the river should be minimized. |
| E | <u>Roads.</u> Road access to or across the corridor will be minimized, and shall be prohibited between Houston and the Burma Road. |
| F | <u>Talkeetna Roads.</u> Two routes pass through this area, one to Larson Lake and one north across the Talkeetna River to the Chase area. Land use authorizations in these units such as land sales, leases, or other actions should be located so as not to preclude the option to build those roads along a feasible or different route. |
| G | <u>Neil Lake Access.</u> Public access from the lake to Kroto Creek must be maintained. If necessary, access will be maintained through purchase of a public corridor. |
| H | <u>Alexander Creek Access.</u> Encourage cooperative management among Natives, borough, and state to protect public access and opportunities for hunting, fishing, and public recreation. |
| I | <u>Public Recreation Cabins.</u> Public recreation cabins should be developed with a coordinated river and trail access system: No roads will be permitted to these cabins. |
| J | <u>Public Use Cabins.</u> It is recommended that public use cabins be built on state lands in this subunit to support recreational use of Kroto and Moose Creeks. |
| K | <u>Public Use Cabins.</u> Public use cabins are proposed to be built to support recreational use. |
| L | <u>Public Use Cabins.</u> This is a high priority area for construction of public use cabins. |

Area Plan Guidelines Key (continued)

- | <u>Letter</u> | <u>Guideline</u> |
|---------------|---|
| M | <u>Public Use Cabins.</u> This river is a priority for public use cabins. Siting should be in conjunction with conveniently located boat launches and done so as to ensure safety along the river while minimizing visual impacts along the shore. Cabin sites shall be dispensed along the river and creek in a very low density because of limited forest resources. Public use cabins shall not be permitted within 200' of either side of the river and creek. Public use cabins will not be permitted within 100' of any other streams shown on the 1:63, 360 scale USGS topographic maps. |
| N | <u>Public Use Cabins.</u> Should be sited by DOPOR in consultation with ADF&G and on the Mat-Su Borough. |
| O | <u>Land Purchase.</u> Where private lands abut the Little Susitna River the state will consider purchase of land for public access. |
| P | <u>Land Purchase.</u> The plan recommends investigating the possibility of a buy-back program to restore to public ownership some of the private lots along the creek and retaining any relinquished open-to-entry sites along the creek. |
| Q | <u>Recreation and Wildlife.</u> Managed to provide diversity of recreation opportunities including campgrounds, public use cabins, boat launches, and public access, while protecting wildlife habitat. |
| R | <u>Grazing.</u> Lands are closed to grazing because of their importance as moose winter range and brown bear concentration areas. |
| S | <u>Public facilities.</u> Public facilities such as campgrounds and boat launches will be encouraged at Judd Lake, a key access point for float trips. At appropriate locations, boat launches and public use cabins or other facilities should be constructed. |
| T | <u>Comprehensive plan.</u> Management of public lands inside the portion of the unit in the city of Houston should contribute to the City's development plans. Any irreversible management decisions (e.g., disposal) must be consistent with the comprehensive plan for the city of Houston. |
| U | <u>Buffers.</u> Where private land now abuts the river, a publicly owned buffer shall be maintained. |
| V | <u>Scenery.</u> Manage public lands adjacent to the Parks Highway consistent with the recommendation in the report, "Scenic Resources Along the Parks Highway." |

Land Ownership

Coastal Management Area

In 1972, Congress passed the Coastal Zone Management Act, which established a program of coastal planning and coordination among federal, state, and local governments. In 1977, the Alaska legislature enacted the Alaska Coastal Management Act. The Alaska Coastal Management Act established the Alaska Coastal Policy Council, to oversee development and implementation of the Alaska Coastal Management Program, and Coastal Management Districts, to undertake detailed coastal planning in municipalities and the unorganized boroughs. The Coastal Policy Council's responsibilities include the identification of the state's coastal zone, the area in which uses and activities are subject to the requirements of the Alaska Coastal Management program.

The Matanuska-Susitna Borough Coastal management Plan contains specific guidelines to direct development decisions in ways consistent with the plans adopted goals and objectives. They are to be applied to land and water uses and activities subject to the District program. State actions, including permitting, construction, planning and financial assistance within the coastal management boundary are subject to consistency reviews. In addition, actions of state agencies outside of the coastal management boundary, but within the borough boundary, can be reviewed by the coastal management district if "spillover" effects occur that have an effect on the district. Local consistency review of state actions begins when the agency forwards materials to the district for review and comment. There is a list of the types of actions contained in the coastal management plan that must receive consistency review (Matanuska-Susitna Borough, 1983).

The boundary of the Matanuska-Susitna Coastal Management Plan includes parts of all six rivers (Alaska Department of Fish and Game, 1988). Following are the sections of the river columns which are in the river corridors:

- Little Susitna River* - The entire river corridor on the west side of the Parks Highway; within 200' or within the floodplain (whichever is greater) above the Parks Highway.
- Deshka River* - All the Deshka below the forks, within 200' or within the floodplain (whichever is greater) above the forks to the headwaters of both Moose and Kroto Creeks.
- Talkeetna River* - The entire Talkeetna River within 200' or within the floodplain (whichever is greater). Clear Creek is not in the coastal zone.
- Lake Creek* - All the Lake Creek corridor below Quiet Lake; within 200' or within the floodplain (whichever is greater) between Quiet Lake and Shovel Lake. Above Shovel Lake is outside the coastal zone.
- Alexander Creek* - The entire Alexander Creek corridor.
- Talachulitna River* - The entire Talachulitna River corridor.

Other Plans Which Affect The Recreation River Planning Area

For several areas adjacent to the Recreation River corridor, there are plans which have either been completed or are underway. These plans include the Hatcher Pass Management Plan and Fish Creek Management Plan, which are adjacent to the Little Susitna management corridor. These and

Land Ownership

other plans are described in more detail in Chapter III for each of the management units. There are also several areawide plans that encompass more than one or all of the six river corridors. These include the Matanuska-Susitna Borough Forest Management Plan for borough lands, and the Susitna Forest Guidelines for state lands.

Matanuska-Susitna Borough Forest Management Plan This project, now underway, establishes policy and recommends procedures for timber management on borough lands, and redefines the "forest management" classification for the borough. To date there has been a forest land inventory, which sets up classes of forest types and identifies several forest management units (FMU's). The focus of this plan is on forestry and multiple use. There are two FMU's immediately adjacent to the Kroto Creek and Talkeetna River corridors.

Susitna Forest Guidelines The Susitna Forest Guidelines (SFG) establish rules for timber management and timber access on state land, describe the areas that are available for harvesting under the current area and management plans, and describe the covered timber volume on state lands available for harvesting. The SFG covers approximately 2.0 million acres, of which 1.1 million acres are state lands with forestry designations. Of the 1.1 million acres, approximately 400,000 acres (37%) are higher site forests -- mixed forest types (birch, and white spruce), cottonwood, or closed white spruce. About 135,000 acres (12 %) are open white spruce or black spruce types.

Designated state-owned forest lands occur throughout the Susitna basin. They are generally located either east of the Kahiltna and Yentna rivers that are close to road access, and more remote lands west of these rivers. These lands include blocks of several thousand acres. However, private parcels, leases, and permits occur within many blocks. The final plan is expected to be signed in Fall 1991.

Methods of Acquiring Additional Lands

Land Acquisition Under Section 41.23.260 in the Recreation Rivers Act, the state may acquire land in or adjacent to the management corridors by purchase lease, gift, or exchange for inclusion in the Recreation River corridors. Land may not be acquired for inclusion in the corridors by eminent domain or condemnation.

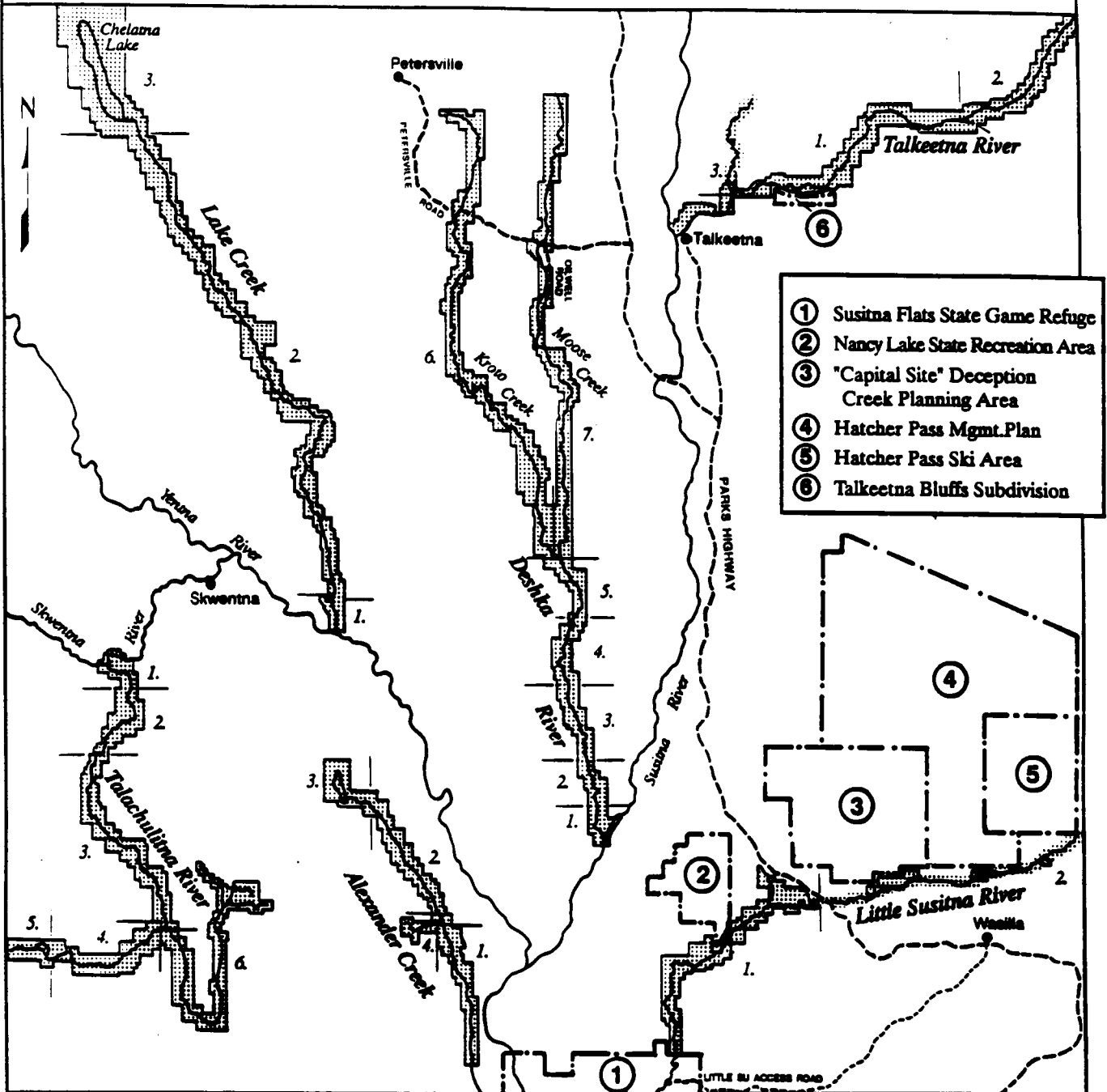
Land Exchanges Land exchanges between the state and other land owners can be executed under the regulations 11 AAC 67.200 to .280. A land exchange can be initiated either by the state or by a landowner.

Land Purchases There is virtually an unlimited number of methods which the state can use for purchasing property. Through administrative or legislative appropriation, a flat-out purchase is possible. This is not normally done, however, as there are federal money-sharing programs available, and there are any number of tax or donation arrangements that can be made in order to acquire property. A few of these programs or methods are listed below:

Land Ownership

SUSITNA BASIN RECREATION RIVERS MANAGEMENT PLAN

Adjacent Plans & Specially Designated Areas



MANAGEMENT UNITS & SUBUNITS

Talachulitna River

1. Mouth of Talachulitna River
2. Talachulitna River Canyon
3. Middle Talachulitna River
4. Talachulitna Creek
5. Judd Lake
6. Upper Talachulitna River

Alexander Creek

1. Lower Alexander Creek
2. Upper Alexander Creek
3. Alexander Lake
4. Sucker Creek

Little Susitna River

1. Lower Little Susitna River
2. Upper Little Susitna River

Deshka River

1. Mouth of Deshka River
2. Lower Deshka River
3. Middle Deshka River
4. Neil Lake
5. The Forks
6. Koto Creek
7. Moose Creek

Talkeetna River

1. Lower Talkeetna River
2. Talkeetna Canyon
3. Clear (Chumina) Creek

Lake Creek

1. Lake Creek Mouth
2. Upper Lake Creek
3. Chelama Lake

1. **Federal Programs.** For most outdoor activity types, the Land and Water Conservation Fund, administered by the National Park Service, provides matching funds for development of the public use site, including the purchase of land. Limited funds are available to Alaska. The Dingell-Johnson Act provided for the development and protection of powerboat access through an excise tax on gas motors, boats, etc.
2. **Other Methods.** By providing tax incentives through borough or federal taxation, reasonable terms for purchase of land may be reached. By making a charitable donation to the state, a land owner may offset his or her capital gains tax burden, or income tax burden. A case in point was a piece of land donated to the municipality of Anchorage. By donating half of the parcel to the city and selling half to the city at fair market value, the municipality was able to get the parcel for one half the cost, and the seller/donor netted roughly the same capital gain as he would have selling the entire lot. A number of combinations are possible.

Non-Possessory Land Acquisition The public use or conservation of private property can often be achieved through conservation easements, or other non-possessory interest in the property. The Alaska State Legislature passed Senate Bill 123, effective May 1, 1989, the Uniform Conservation Easement Act. This act gives more clear and uniform authority for the purchase of conservation easements. This applies primarily to view and watersheds and not necessarily for more access.

Foreclosure The Matanuska-Susitna Borough requires the payment of property taxes within the borough for all private property. If a land owner fails to pay taxes for one year, the borough files for foreclosure non/payments and a lien is placed on the property. One year after this judgement is made, the borough receives a "clerk's deed" and can sell the property or dedicate it for public use.

In the case of state-disposed lands, to which the state holds title, the state is notified of nonpayment of taxes, and it is up to the state to foreclose on this property. According to the borough tax collections office, there are a considerable number of state-disposed parcels which are in default for nonpayment of taxes. The borough does not foreclose on state-owned property.

The borough also forecloses on property which they have sold, and the purchaser defaults on their payments. The Public Lands section at the borough keeps a record, by section, township, and range for the property they have sold. For properties that the state has sold which is under "contract for sale of real property," there is a formal system of foreclosure for default on these payments. Here also, there are several parcels in the Susitna Basin that are potentially in default. If there are specific OTE's, remote parcels, or lottery parcels which are of interest, a list should be presented to the Contract Administration Unit of DNR, and current status of these contracts determined.

Information by River

Little Susitna River

LAND OWNERSHIP

The land status for the Little Susitna River management unit is summarized below. Table 3.0 shows the respective land ownership and land status for each of the two reaches of the unit.

Land Status summary

Of the 17,679 acres within the Little Susitna River planning area, 17,555 are owned by the state and 1680 acres of land are owned by the Matanuska-Susitna Borough. Six hundred forty acres of state land have been selected by the borough. The University of Alaska owns approximately 80 acres within the upper Little Susitna River subunit. There is no privately-owned land within the management corridor. Several land disposals immediately adjacent to the management area have been conducted by the state. Several adjacent areas have been identified for further settlement through the Susitna Area Plan, Willow Subbasin Plan, or Fish Creek Management Plan. (verify)

State Land Conveyances

The boundaries of the management unit were designed to exclude private land. There are no state land leases currently in effect within the management unit. Section 2 of this chapter describes the level of permit activity on the part of the state for the little Susitna River. Within the upper reach an ILMT (interagency land management transfer) for 50 acres was granted to the Department of Transportation and Public Facilities. This parcel is located on Fishhook Road and is used by DOT&PF as a material site. According to DOT&PF, this is one of the three best material sites in the Wasilla area and is used extensively. The near and long term-use for the site is expected to be gravel.³

Other Public Lands

Within the Little Susitna River corridor there are both mental health lands and university lands in addition to land conveyed to and selected by the borough. Chapter II describes the management of these lands in general for the Recreation Rivers.

Mental Health Land. 2,680 acres of mental health land exist within the lower Little Susitna River Subunit.

University Property. The university owns approximately 80 acres on the river within the Upper Little Susitna River Subunit.

³ Chris Kepler; DOT&PF; Palmer Area Office; personal communication 8-14-89

Land Ownership by Acreage and Number of Private Parcels within the Little Susitna River Corridor

-----Acres-----							
<u>Reach</u>	<u>State</u>	<u>Mat-Su Borough</u>	<u>University of Alaska</u>	<u>Mental Health</u>	<u>Private</u>	<u>Total Number Private Parcels</u>	<u>Total Acres</u>
1. Lower Little Susitna	10,945	1,680	-0-	2,680	-0-	-0-	15,305
2. Upper Little Susitna	2,294*	-0-	80	-0-	-0-	-0-	2,374
TOTAL	13,239	1,680	80	2,680	-0-	-0-	17,679

* includes 640 acre selection by the Mat-Su Borough

Matanuska Susitna Borough. 1,680 acres in the lower Little Susitna Subunit are borough owned. An additional 640 acres are borough selected in the upper subunit.

Designations and Classifications

The adjacent table shows the Susitna Area Plan and Willow Subbasin Area Plan (WSAP) land use designations for all six Recreation River corridors. The entire Little Susitna River management unit is within the bounds of the WSAP, primarily in the WSAP "Little Susitna River subunit."

Two other WSAP designations of note are the Little Susitna recreation site, just below the Parks Highway WSAP "Houston subunit", and the (#100) Recreation site in the middle of the upper Little Susitna River subunit WSAP "Fishhook subunit."

Planning Areas Adjacent to the Corridor

Just outside the planning area, land use designations have been established under two area plans, Susitna Basin, and Willow Subbasin, three management plans; Matanuska Valley Moose Range, Hatcher Pass, and Fish Creek; with still another management plan in progress, Deception Creek. In addition to this, two areas have been legislatively designated for particular land uses, specifically the Susitna Flats Game Refuge and the Nancy Lake State Recreation Area. These areas are managed by the Alaska Department of Fish and Game and the Alaska Division of Parks and Outdoor Recreation, respectively.

Matanuska Valley Moose Range Management Plan, Alaska Department of Natural Resources, October, 1986. Although not immediately adjacent to the Little Susitna corridor, this planning area comes close to the corridor in it's upper reach. The management plan outlines timber harvest and enhancement areas within the western portion, less than a mile from the Little Susitna River. The plan also specifies that the Moose Range is open to leasable and locatable mineral development. The Moose Range contains proven coal deposits within the Matanuska Valley coal field and the area has traditionally been mined for coal. The use designations for the western management unit of the Moose Range, which is closest to the Recreation River corridor, are:
primary uses include: wildlife habitat, coal, and forestry;
secondary uses: grazing, public recreation, and heritage resources.

Hatcher Pass Management Plan, Alaska Department of Natural Resources, October 1986. this management plan addresses an area within the Willow Subbasin Area Plan boundary. The regional land use plan designated Hatcher Pass as a management unit with both high resource and public use values.

The major designated uses in Hatcher Pass are public recreation, including tourism and opportunities for the recreation industry, mining, fish and wildlife habitat, and grazing. A variety of management approaches are to be used, emphasizing different resources in different subunits. Exploration for and development of mineral resources will be encouraged throughout most of the area, but will be emphasized in those units with highest mineral potential. Dispersed recreation will be encouraged throughout most of the area, with intensive recreational development foreseen

Land Ownership

in Independence Valley and around Government Peak, specifically, the plan recommends a ski area.

Since the Hatcher Pass Management Plan was completed, Mitsui and Company have completed a conceptual development plan for the construction of an international four-season resort on state land south and east of Government Peak. In July of this year, the Commissioner of the Department of Natural Resources approved an amendment to the Hatcher Pass Management Plan which accommodates Sector B of the conceptual design. The proposal as it stands is for the state to lease to Mitsui two sectors of land. Sector A, the resort site, 3,340 acres; and Sector B, to include slopes on Government Peak and Bald Mountain Ridge, 8,090 acres.

Fish Creek Management Plan Alaska Department of Natural Resources, August, 1984. This plan was prepared by the southcentral regional office of the Division of Land and Water Management along with the Matanuska-Susitna Borough Planning Department in order to examine the potential agricultural development of this area. It includes two management units described earlier in the Willow Subbasin Area Plan: the Fish Creek and Moraine Ridge management units.

Under the plan the Fish Creek subunit should be developed for commercial agriculture and the Moraine Ridge subunit for settlement, with a mix of year-round residences and recreational cabins and a commercial center at the southern end of the ridge.

The Fish Creek planning area is immediately adjacent to the Recreation River management corridor, particularly the Moraine Ridge management unit, which is designated for settlement. Also listed among the planned actions is the development of access to and within the area, and in turn the plan puts forth primary and secondary road proposals in order to access the state and borough agricultural land. The chosen alternative sets out a primary road corridor, north-south in orientation, through the Moraine Ridge management unit. The plan specifies that this potential road corridor be retained in public ownership, with proper easements or rights of way put in place. This corridor is part of a larger proposed corridor running from Point McKenzie to Willow.

Deception Creek Land Use Plan. This plan reclassifies those lands within the "Willow Capital Site" from reserved use to more specific classifications ranging from forestry to public recreation. The overall management intent for the area is to retain the area in state ownership for 10 years, in order to preserve future options for such uses as a capital city, university, new industry, or other uses not foreseeable at present.

Legislatively Designated Areas

Susitna Flats Game Refuge The Susitna Flats Game Refuge was established by the legislature in 1976 in order to protect the fish and wildlife habitat of the Susitna delta area. This area, which is immediately downstream from the Little Susitna Recreation River corridor, has been recognized for its high habitat values including those for waterfowl nesting, feeding, and migration; moose calving areas; spring and fall bear feeding areas; and salmon spawning and rearing habitats. The refuge was also created to protect the public use of these resources. A management plan was completed by the Alaska Department of Fish and Game, who manage the refuge, in March, 1988.

Guidelines are established, which must be followed in all management decisions on the refuge, whether affecting activities undertaken by the Department of Fish and Game, other agencies, or the public.

Land Ownership

Specific Objectives are outlined in the refuge management plan for the maintenance of public use of the refuge, as well as to provide new opportunities for use of the refuge. The plan also sets up several policies for the area, some of which are directed towards recreational use of the refuge. A policy on motorized vehicle use, establish off-road vehicle use corridors, motorboat use restrictions, and seasonal aircraft landing restrictions.

One policy states that

"...the department will, as appropriate, establish motorboat use restrictions on the refuge. The department will monitor boat use on the Little Susitna River and, if necessary, establish motorboat use restrictions consistent with upstream river management policies."

Nancy Lake State Recreation Area The Nancy Lake State Recreation Area (SRA), which was legislatively established in July, 1966, is under the management of the Alaska Division of Parks and Outdoor Recreation. Within this area runs approximately two miles of the Little Susitna River management unit in the Recreation Rivers planning area. The state recreation area provides both access to and upland management for this portion of the Little Susitna corridor. The management of Nancy Lake SRA is for the single purpose of recreation and the area currently receives over 50,000 visitors per year.

A two mile stretch of the Little Susitna River was inadvertently designated as both in the SRA and in the Recreation River corridor.

Deshka River

LAND OWNERSHIP

The land status for the Deshka River management unit is summarized below. Table 3.2 shows the exact land ownership for each of the seven reaches of the Deshka.

Land Status Summary

The management unit boundary for the Deshka encompasses 73,694 acres of land. The State of Alaska owns 62,117 acres, the borough 10,110 acres, and 1,467 acres are in private ownership.

Private Lands

The state has conveyed 224 parcels and a total of 1,041 acres to private ownership. Four hundred and twenty six acres in 6 parcels went into private ownership under the federal government settlement programs.

Other State Land Disposals

There is an open-to-entry lease of 4.79 acres in the Neil Lake subunit, which has not been patented. In the middle Deshka River subunit, in section 22, Township 20 North, Range 6 West, there is a public easement (right-of-way) for an airstrip, containing 7.4 acres. The Alaska

Other Public Lands

The borough owns 10,110 acres of land, which is the only public land not managed by the state in the corridor. This is located near the mouth, Amber Lake, and the Petersville Road (Moose Creek). No mental health land lies within the management unit. Department of Fish and Game manages a small size near the mouth under an Interagency Land Management Agreement.

Designations and Classifications

Under the Susitna Area Plan, there are three primary use designations for the Deshka area. These are public recreation, water resources, and wildlife habitat. A secondary land use designation, forestry, is specified as well. The corridors are closed to mineral entry. These designations and ensuing classifications appear to be consistent with the legislative intent of the Recreation Rivers plan. The adjacent table shows the existing designations for the corridor.

Adjacent Land Management

No other land use plans exist adjacent to the corridor. Section III of this chapter describes two transportation studies and current borough transportation plans that affect the Deshka River corridor.

Land Ownership by acreage and number of Private Parcels within the Deshka River Corridor.

-----Acres-----					
<u>Reach</u>	<u>State</u>	<u>Mat-Su Borough</u>	<u>Private</u>	<u>Number Private Parcels</u>	<u>Total Acres</u>
1. Mouth of DER	1,270	811	9	2	2,090
2. Lower DER	2,084	686	254	3	3,024
3. Middle DER	2,617	1,600	148	32	4,365
4. Neil Lake	5,182	-0-	81	17	5,263
5. The Forks	3,618	-0-	10	2	3,628
6. Kroto Creek	29,159	1,040	257	55	30,456
7. Moose Creek	18,187	5,973	708	119	24,868
TOTAL	62,117	10,110	1,467	230	73,694

Talkeetna River

LAND OWNERSHIP

The land ownership is summarized below for the Talkeetna River management unit. It is shown for each of the 3 reaches of the river in Table 3.3.

Land Status Summary

With a total area of 30,295 acres, the Talkeetna River corridor planning area is comprised of 28,798 acres of state land (including mental health land), and 216 acres of private land, and 204 acres of university land.

Private Property

The state has conveyed 128 acres of land in 15 parcels. Much of this was conveyed through the Chase remote parcel program, the only remote parcel staking area that comes within any of the six river corridors. Four of 271 acres staked under the remote parcel program, within the corridor, have been patented.

Other State Land Disposals

Of the Chase remote parcel leases, only 3 parcels and 4 acres have been patented. 267 acres, or 14 parcels of land have been staked in addition to this and are currently under lease. The Chase remote parcel offering took place in 1980 and 1981.

In the Talkeetna River Canyon subunit there is a permitted Trapping Cabin, which has no associated acreage and expires in 1992.

Other Public Land (not managed by DNR)

University Land. University of Alaska owns 204 acres of land at the mouth of the Talkeetna River in the Lower Talkeetna River subunit.

Mental Health Land. Also in the Lower Talkeetna subunit, there are nearly 1,100 acres of mental health land. Chapter II describes the current management of mental health land.

The Matanuska-Susitna Borough. The borough owns no land within this management corridor.

Designations and Classifications

The Susitna Basin Area Plan, with the exception of Clear Creek, gives the following land use designations to the Talkeetna corridor: public recreation and wildlife habitat for the primary designation; and forestry for the secondary designation. The lower Talkeetna River and the Clear

Land Ownership by Acreage and Number of Private Parcels within the Talkeetna River

Corridor

<u>Reach</u>	-----Acres-----					<u>Total Acres</u>
	<u>State</u>	<u>University of Alaska</u>	<u>Mental Health</u>	<u>Private</u>	<u>Number Private Parcels</u>	
1. Lower TKR	18,785	204	1,077	206	17	20,066
2. Talkeetna Canyon	9,697	-0-	-0-	-0-	-0-	9,697
3. Clear Creek	522	-0-	-0-	10	2	532
TOTAL	28,798	204	1,077	216	19	30,295

Creek subunits are closed to mineral entry. The Talkeetna Canyon subunit is open to mineral entry. For Clear Creek, the Susitna Area Plan's primary designations include settlement, public recreation, water resources, wildlife habitat, and the secondary designations include forestry and personal use. The settlement designation is inconsistent with the Recreation Rivers legislation. The adjacent table shows the existing land use designations for each of the six Recreation River corridors.

Within the Recreation River management corridor in the Talkeetna Bluffs Subdivision and the Talkeetna Bluffs Addition, in the Lower Talkeetna River subunit, there are tracts of land that are reserved for access and public use. The intended use of these reserved tracts is primarily for the owners of land within the subdivisions. The management of these areas is done by the homeowners associations within each subdivision. The homeowners association for the Talkeetna Bluffs subdivision is active; the homeowners association for the addition is not. The second homeowners group may, however, be active at any time, and ultimately have some authority over these tracts.

Lake Creek

LAND OWNERSHIP

The land status for the Lake Creek management unit is summarized below. Table 3.4 describes the land ownership for each of the three reaches of the corridor. Creek.

Land Status Summary

The planning area for Lake Creek covers 64,340 acres. Of this, 63,817 acres are state-owned. The Mat-Su Borough owns only 4 acres in this planning area, although they own a significant amount adjacent to the Lake Creek mouth subunit surrounding Bulchitna Lake. Within the corridor there are 520 acres of private land in 85 different parcels.

State Selections

Two small tracts of land near the outlet of Chelatna Lake are now under state selection. Both parcels were excluded from Tentative Approval by the BLM. The first parcel, an airstrip and surrounding property were excluded from TA due to a withdrawal for the CIRI (Cook Inlet Region, Inc.) land pool in the Cook Inlet land exchange agreement. The runway has been dropped from the pool and CIRI has relinquished their interest. The state selection now goes back into effect. This tract may contain up to 50 acres. A second tract or several tracts, includes parcels of land located between several federally patented properties on Chelatna Lake. The TA, as it was written, excluded these lands as an oversight. These lands make up perhaps 5 to 10 acres. They are now being added to the conveyance priority list for state selections.

Private Lands

Of the 520 acres of private land in the Lake Creek corridor, 252 of them were conveyed by the state, representing 57 parcels of land. 268 acres and 27 parcels were patented from the federal

Land Ownership

Land Ownership by Acreage and Number of Private Parcels within the Lake Creek Corridor.

-----Acres-----					
<u>Reach</u>	<u>State</u>	<u>Mat-Su Borough</u>	<u>Private</u>	<u>No. Private Parcels</u>	<u>Total Acres</u>
1. LAC Mouth	2,402	4	42	11	2,448
2. Upper LAC	36,651	-0-	229	50	36,880
3. Chelatna Lake	24,763*	-0-	249	24	25,012
TOTAL	63,817	4	520	85	64,340

* Includes 20 - 40 acres state-selected land at Chelatna Lake

government. Of the state-conveyed land some is in the Lake Creek mouth subunit but most is in the Upper Lake Creek subunit. Nearly all of the federally patented land is located around Chelatna Lake. Included in this private land around Chelatna Lake is the only valid Native allotment in the entire planning area. A 160 acre allotment is located on the southwest shore of Chelatna Lake. The allotment conveyance has been approved by the BLM and was surveyed.

Other Public Land

The borough owns a small bit of land (4 acres) within the Lake Creek subunit at Bulchitna Lake, and has no further selections within the corridor. There is no mental health land in the management unit.

Designations and Classifications

All land use designations in this corridor come from the Susitna Basin Area Plan. These are summarized in the adjacent table. The primary land use designations for the entire corridor are public recreation, water resources, and wildlife habitat. The secondary use designation is forestry and the area is closed to mineral entry. These designations appear to be compatible with the Recreation River legislation.

Adjacent Land Management

There are some relatively high-value timber lands along Lake Creek that are being assessed in the Susitna Regional Forest Plan, which is discussed in Chapter 2. In addition, the North end of Chelatna Lake is adjacent to Denali National Park and Preserve. This portion of the park receives little public use other than flightseeing and is generally managed as wilderness.

Talachulitna River

LAND OWNERSHIP

The land status for the Talachulitna River is summarized below. The land status and associated acreages for each of the 5 reaches is described in Table 3.5.

Land Status Summary

There are 51,276 acres in this management unit, of which 50,258 acres, or 98% belong to the state. There are approximately 900 surrounding Judd Lake acres that are owned by the borough and 118 acres at the mouth, of Judd Lake, and the middle that are privately owned.

Private Property

Ninety four acres and 18 parcels of land have been conveyed to private hands by the state. twenty four acres in 5 parcels were conveyed through federal programs.

Land Ownership

Land Ownership by Acreage and Number of Private Parcels within the Talachulitna River Corridor

-----Acres-----					
<u>Reach</u>	<u>State</u>	<u>Mat-Su Borough</u>	<u>Private</u>	<u>No. Private Parcels</u>	<u>Total Acres</u>
1. Mouth of Talachulitna	2,242	-0-	65	12	2,307
2. Talachulitna Canyon	5,610	-0-	5	1	5,615
3. Middle Talachulitna	12,959	-0-	24	5	12,983
4. Talachulitna Creek	9,440	-0-	5	1	9,445
5. Judd Lake	2,376	900	19	4	3,295
6. Upper Talachulitna	17,631	-0-	-0-	-0-	17,631
TOTAL	50,258	900	118	23	51,276

Other State Land Disposals

There is one state tract that is under lease for a lodge on the middle Talachulitna River subunit. There is also a lease for a lodge that is pending at Talachulitna Lake.

Other Public Land

There are no mental health lands in the corridor, nor is there any university property. The borough owned land is described above.

Designations and Classifications

Table 2.2 shows the Susitna Basin Area Plan designations for the Talachulitna River corridor. The primary designations are public recreation, water resources, and wildlife habitat; there is also a secondary designation of forestry (personal use). The corridor is closed to mineral entry.

Alexander Creek

LAND OWNERSHIP

The land status for Alexander Creek management unit is summarized below. Figure 3.2 (status map) shows the generalized land status for the unit. Table 3.6 illustrates the land ownership, in acres, for each of the three subunits in the Alexander Creek management unit.

Land Status Summary

There are 22,536 acres within the Alexander Creek management unit. 19,995 acres are in state ownership. 381 acres are private and the Matanuska-Susitna Borough owns approximately 2,260 acres.

Private Property

There are 74 parcels (381 acres) of privately-owned land in the corridor. Seventy one parcels (311 acres) were conveyed by the state. Three parcels totalling 71 acres were acquired through federal programs. The private property is concentrated in the lower Alexander Creek subunit.

State Land Disposals

There are two parcels of land which are being leased from the state at this time within the corridor. These two leases are for lodges and include a total of 3 acres of land.

Land Ownership

Land Ownership by Acreage and Number of Private Parcels within the Alexander Creek Corridor

-----Acres-----					
<u>Reach</u>	<u>State</u>	<u>Mat-Su Borough</u>	<u>Private</u>	<u>No. Private Parcels</u>	<u>Total Acres</u>
1. Lower Alexander Ck.	5,948	2,260	287	63	8,395
2. Upper Alexander Ck.	8,565	-0-	-0-	-0-	8,565
3. Alexander Lake	4,276	-0-	94	11	4,370
4. Sucker Creek	1,206	-0-	-0-	-0-	1,206
TOTAL	19,995	2,260	381	74	22,536

Other Public Land

Within the Alexander Creek planning corridor there are no mental health or university lands. The 2,160 acres of borough land are in the Lower Alexander Creek subunit.

Designations and Classifications

The adjacent table shows the existing Susitna Area Plan designations for the Alexander Creek corridor. The designations are public recreation, forestry, wildlife habitat and water resources. The area is closed to mineral entry. Although the mouth of Alexander Creek (outside the corridor) is mostly private, there are some small tracts of state land that were not designated in the Susitna Area Plan that are classified public recreation and resource management.

Designated Lands Adjacent to the Corridor

This management unit lies entirely within the Susitna Area Plan. The remaining portion of Alexander Creek at the mouth which is not in the corridor abut the Susitna Flats State Game Refuge (see Little Susitna adjacent designations). There are no other specially designated areas adjacent to this management unit.

Land Ownership

CHAPTER 2

RECREATION

CHAPTER 2 - RECREATION

INTRODUCTION

Background

The description of the recreation resources and uses along the six rivers that is included in this chapter was prepared by the Alaska Regional Office of the National Park Service (NPS) as part of the Rivers and Trails Conservation Assistance Program. NPS personnel flew over and boated all six rivers during the 1989 season and this chapter represents their findings.

The purpose of this chapter is to provide baseline information about recreation features and opportunities in the Recreation Rivers. Any conclusions presented in this report should be viewed as NPS advice and do not necessarily reflect DNR, advisory board, or planning team positions.

Chapter Organization

This chapter begins with a review of the methods used to collect and analyze recreation information from the rivers. The sections that follow provide the information and analysis for each of the six rivers. For each river, there is a section on access; the physical setting of each river subunit; visual resources; recreation opportunities, activities, facilities, and sites; and use levels and patterns. Maps for each river's subunits have also been prepared, showing the classes of recreation opportunities available and key recreation use sites. River maps follow the narrative description for each of the six rivers.

This chapter contains several kinds of information collected from various sources. In general, information about access, the physical setting, the social setting, and recreation features or sites was determined from aerial photos and on-site reconnaissance during Summer 1989. This information was supported and complemented by interviews and discussions with river users and commercial recreation operators and agency personnel from the Alaska Department of Fish and Game (DFG) and DNR.

METHODS

Inventorying Recreation Features

NPS and DNR staff and volunteers floated each of the recreation rivers during Summer 1989, mapping the locations of recreation sites and other recreation features such as commercial lodges and base camps, private cabins, buoys, docks, signs, and pit toilets. The following is a complete list of the features inventoried:

Campsites	Commercial campground
Fishing holes	Riprap
Day use areas	Steps and ladders
Lodges and associated structures	Airstrips
Cabins and associated structures	Floatplane landing areas
Cabin ruins	Managed public recreation facilities
Dumps	Boat launches
Effluent pipes from structures	Air taxi or boat pick-up/drop-off points
Buoys	Summer ORV trails
Docks	Foot trails
Bridges	Paved roads
Weirs	Unpaved roads
Groins	Portage trails
Jetties	Transmission lines
Bulkheads	Overhead cable or trams
Gabions	Tractor trails
Eagle nests	Active mining sites
Osprey nests	Previous mining sites
Archeological sites	Timber cuts
Geological points of interest	Materials extraction sites
Scenic vista	Pit toilets

The inventory of recreation sites (campsites and day use areas) included descriptive information about the site type (primary, secondary, or marginal), size, cleanliness, and location (on a bar or in the uplands). For primary sites, even more information (about type of use, key attractions, management needs, and importance of site relative to other nearby sites) was recorded. Criteria for describing all sites is summarized below.

Type of Recreation Site

Undeveloped sites were classified as primary, secondary, or marginal. Primary sites include all sites located at major attractions or destinations for recreation visitors. In general, primary sites are those that remain occupied daily during peak use seasons. The most obvious primary sites are located at popular fishing holes, which tend to be at the mouths of major tributaries.

Secondary sites are good quality campsites located away from particular attractions, but which may get substantial use. Secondary sites do not necessarily possess inferior attributes compared to primary

sites, they are simply in less desirable locations relative to attractions, and are therefore used less often.

Marginal sites, in contrast, are of generally lower quality than primary and secondary sites, and are generally only used when no other site is available (in cases of bad weather, the lateness of the day, or emergency). Any one of several characteristics could result in a site being classified as marginal, including low-lying gravel bars that could be easily inundated with rising water levels or boat wakes; large cobbles, muddy areas, or sloping ground which limit space for tents; heavy vegetation (little cleared area); or lack of privacy (too close to primary sites, private cabins, or commercial lodges and base camps).

Cleanliness

The cleanliness of each recreation site was rated on the following three-point scale:

1. No more than the scattered remains from one fire ring and less than a handful of litter.
2. No more than the scattered remains from multiple fire rings and slightly more than a handful of litter in a few places at the site.
3. Widespread litter, unburied human waste and toilet paper, and multiple fire rings.

Size

The size of each recreation site was rated using the following three-point scale:

1. 0 to 500 square feet of usable (relatively unvegetated) area
2. 500 to 1000 square feet of usable area
3. More than 1,000 square feet of usable area

Location

Recreation sites were also classified as being on gravel bars or in uplands and whether the gravel bar sites were primarily vegetated or unvegetated prior to use. The three classes were formally defined as follows:

1. Site is above ordinary high-water mark.
2. Site is below ordinary high-water mark and was primarily unvegetated before use.
3. Site is below ordinary high-water mark and was primarily vegetated before use.

DNR entered the results of the site inventory into a Geographic Information Systems (GIS) database. Each of the inventoried features has been assigned a GIS identification number, many of which are included on the maps at the end of the chapter for each river. Because not every feature inventoried appears on the map, GIS numbers are not necessarily consecutive.

ASSESSING VISUAL RESOURCES

Visual resource assessment necessarily involves some subjective evaluation. However, if one evaluator applies systematically defined criteria, this evaluation process can produce relatively consistent and useful information which defines relative scenic quality.

Scenic attributes were evaluated using a system DNR adapted from the Bureau of Land Management. Landscapes were rated by evaluating and assigning point values for landform, vegetation, water, color, adjacent scenery, uniqueness or scarcity, and cultural modifications, according to the criteria shown on the following page.

Scenic quality rating units were chosen to include areas with similar scenery; they therefore do not correspond exactly to the river subunits discussed above. The scenic quality rating for each subunit is described in the following sections by river. Ratings of scenic quality depend heavily on the viewer's position in the landscape. These evaluations were made from the water or the water's edge, since that is the perspective of the majority of recreation river users. To assure consistency, all of the ratings were completed by NPS employee Lynn Anderson (with assistance from other staff and volunteers).

Scenic Quality Inventory/Evaluation Rating Criteria and Score - During Most of the Peak Season

Landform	Vegetation	Water	Color late May mid August	Adjacent Scenery	Scarcity	Cultural Modifications
High vertical relief such as prominent cliffs, spires, or massive rock outcrops; or severe surface variation or highly eroded formations including major sand or hardrock cliffs or bluffs; or detail features dominant and exceptionally striking and intriguing such as glaciers. 5	A variety of vegetative types in interesting forms, textures, and patterns; e.g., a mix of spruce, birch, and cottonwoods with an understory of ferns, grasses, and shrubs. 5	Clear and clean appearing with either cascading white-water or constant slow-moving flatwater or both or view over large lake. 5	Rich color combination, variety or vivid color or pleasing contrasts in the soil, rock, vegetation, water or snow fields. 5	Adjacent scenery greatly enhances visual quality. Includes striking view of Alaska Range peaks (within 25 miles) or other peaks adjacent to river. 5	One of a kind; or unusually memorable; or very rare within Mat-Su Valley region. Consistent chance for exceptional wildlife (include only bear, sheep, swans, eagle nests - not moose or other types of waterfowl or wildflower viewing. 5	Free from aesthetically undesirable or discordant sights and influences; or modifications add favorably to visual variety. 2
Steep hills, moraines, low cliffs (<50'), drumlins; or interesting erosional patterns or variety in size and shape of landforms; or detail features present and interesting though not dominant or exceptional. 3	Some variety of vegetation, but only one or two types with little understory variety. 3	Mud, tannin or glacially colored with cascading whitewater or consistent slow-moving flatwater. 3	Some intensity or variety in colors and contrast of the soil, rock, and vegetation but not a dominant scenic element. 3	Adjacent scenery moderately enhances overall visual quality. Includes views of Alaska Range (over 25 miles distant) or other adjacent mountains. 3	Distinctive, though somewhat similar to others within the region. 3	Scenic quality is somewhat depreciated by inharmonious intrusions, but not so extensively that they are entirely negated; or modifications add little or no visual variety to the area. 0
Low rolling hills, foothills or flat valley bottoms. Interesting detailed landscape features few or lacking. 1	Little or no variety or contrast in vegetation; all alder or willow, all spruce or all birch or all a spruce/birch mix. 1	Polluted or with severe turbidity from residential, industrial, or commercial sources. 0	Subtle color variations, contrast or interest; generally muted tones. 1	Adjacent scenery has little or no influence on overall visual quality. 0	Interesting within its setting but fairly common within the region. 1	Modifications are so extensive that scenic qualities are mostly nullified or substantially reduced. 4

Spruce Quality

Scenic quality is perhaps best described as the overall impression retained after driving through, walking through, boating through, or flying over an area of land. In the Visual Resources Management (VRM) process, rating Scenic Quality requires a brief description of the existing scenic values in a landscape. This step identifies (1) areas that must be protected, (2) opportunities for enhancement and rehabilitation, and (3) opportunities for improvement by reducing the contrast of cultural modifications.

When inventoried, an area is first divided into sub-units that appear homogeneous, generally in terms of landform and vegetation. Each area is then rated by seven key factors; **landform, vegetation, water color, influence of adjacent scenery, scarcity, and cultural modification**. A standardized point system assigns great, some or little importance to each factor. The values of each category are calculated, and according to total points, Scenic Quality Classes are determined and mapped. As an example, Class A areas contain the most outstanding characteristics of the rating factors (<25 points); Class B areas have a combination of some outstanding features and some that are fairly common to the physiographic region (12-25 points); and Class C areas features are fairly common to the physiographic region (0-11 points).

Assessing Physical and Social Settings

Opportunities for recreation experiences depend on both the physical and social settings. The physical setting refers to the level of development (modifications to the natural environment), as well as natural resources such as vegetation, scenery, and fish and wildlife. The social setting is defined by the level and type of interaction between recreation users, including the number of encounters with other parties on the river, along trails, in camps, or at attraction sites such as fishing holes. The social setting is also affected by signs of previous use such as litter and human waste.

Defining recreation opportunities in this report begins with a discussion of the physical and social settings. The Recreation Opportunity Spectrum (ROS) is a conceptual tool which provides a useful framework for this discussion. In brief, ROS provides a way of classifying land areas by the kind of recreation opportunities they provide. ROS recognizes that people want different kinds of recreation experiences and that different combinations of physical and social settings allow opportunities for those varied experiences.

ROS classes range on a continuum from primitive opportunities in pristine settings to more developed or urban opportunities. There are no firm criteria for the different classes, although both the U.S. Forest Service and Bureau of Land Management have developed relatively standard definitions for six common classes (Clark and Stankey, 1979). In order to account for some significant differences between Alaskan and Lower 48 recreation uses and traditions, we have adapted the Forest Service model to the recreation rivers. The classes and their descriptions are given below. The following list and table includes definitions for each of the opportunity classes based on key variables.

Primitive: A place with a natural environment, where one can find solitude and few traces of previous use.

Semi-Primitive: A place where one meets a few other users, but solitude is still possible, particularly at camps. Development is isolated and small scale.

Semi-Developed: A place where one meets many other users, and solitude is more difficult to find. There are greater traces of previous use. Human development remains subordinate to the natural environment, although facilities may be larger in scale, or clustered near each other.

Developed: A place where users congregate, usually access points, prime fishing areas, or concentrations of lodges, cabins, or camps. Meeting others is part of the experience.

The recreation opportunity classification system has at least two important limitations. First, in mapping the opportunity classes, distinct lines must be drawn to delineate their boundaries. In reality, any area presents a continuum of conditions, with one class gradually grading into the next. Also, recreation opportunities vary seasonally, as the number of visitors fluctuates. Second, any particular area may exhibit characteristics of more than one class. For instance, a river subunit may be totally free of development, and yet a visitor may meet 25 groups in one day. That river subunit meets the development standard for a primitive area; yet the daily encounters are characteristic of a semi-developed area. In this analysis, areas have been assigned to the most developed class indicated by any of the three rating criteria.

Recreation Opportunity Class Definitions.

Class	Encounters	Signs of Use	Development
Primitive	One group per day or less. Except in rare instances, users never camp within sight or sound of each other.	Small amounts of litter or human waste at less than 10 percent of sites.	Only isolated temporary camps, ruins of old structures. No maintained buildings are seen.
Semi-primitive	Five or fewer groups per day. Users camp within sight or sound up to 25 percent of the time.	Small amounts of litter or human waste at 10 to 50 percent of sites.	Isolated and small scale (cabins, small lodges, and base camps).
Semi-developed to 75 percent of	Thirty or fewer groups per day. Users camp within sight or sound percent of sites. the time.	Small amounts of litter or human waste at up to 100 be present, but these Significant amounts at up to 10 percent of sites.	Both individual structures or clusters of camps and lodges may up are interspersed with natural appearing areas.
Developed	More than 30 groups per day. Users camp within sight or sound almost all of the time.	Small amounts of litter or human waste at up to 100 percent of sites. Significant amounts at up to 10 percent of sites.	Cabins and lodges are common. No vistas are free of development.

LITTLE SUSITNA RECREATION RIVER

LOCATION, BOUNDARIES, AND MAJOR USES

The Little Susitna River, referred to locally as the "Little Su," is about 30 air miles north of Anchorage, Alaska. The river passes through or near portions of the communities of Palmer, Wasilla, and Houston. It runs approximately 113 river miles from its source at the Mint Glacier in the Talkeetna Mountains to its mouth on Cook Inlet. The Little Susitna State Recreation River is approximately 66.5 miles long, from river mile (RM) 100 to RM 33.3.

Below the Parks Highway, the legal boundaries of the recreation river include state and borough land adjoining the Little Susitna River for approximately one-half mile on either side. Above the Parks Highway, there are few state or borough holdings; the recreation river is the water column and underlying river bed, plus four scattered parcels adjacent to the river which are still in state ownership. Also included in the Little Susitna State Recreation River is the lower five miles of Lake Creek, which drains Nancy Lake.

The Little Susitna River supports major spawning populations of silver, red, and king salmon, plus rainbow and Dolly Varden trout, which anglers enthusiastically pursue during the established fishing seasons. The Little Susitna River is the most accessible of the six recreation rivers, which enhances its popularity. Besides fishing, other major activities during the ice-free season are float and powerboating, and hunting. Principal winter activities are snowmachining, dog mushing, and cross country skiing on the river and on trails that bisect the area.

ACCESS

Roads and Boat Launches

The Little Susitna River is accessible by several roads. The Parks Highway crosses the river at Houston, RM 69.5. The City of Houston maintains a day-use parking area here, where anglers may fish from the bank and small floatcraft can be launched. Below the crossing, the Parks Highway parallels the river's north (right) bank for about a mile. A privately-operated launch facility for trailered boats is located approximately three-quarters of a mile downstream from the Parks Highway crossing, at Miller's Market. The Little Susitna can be reached by several secondary roads both above and below the highway. Important public access roads above the Parks Highway are a dirt road at RM 81.4, Pittman Road, Schrock Road, Sushana Road, Welch Road, and Wasilla-Fishhook Road. None of these road access points above the highway provide any public facilities to enhance access. Below Parks Highway, secondary roads meet the river at RM 66.0 (Miller's Reach) and 65.7. There is a privately operated boat launch at Miller's Reach; the second site is undeveloped. Burma Landing, the primary access point for boaters on the lower river at RM 28.6, is in the Susitna Flats State Game Refuge. The Little Susitna River is also accessible by water to large powerboats crossing Cook Inlet from Anchorage's Ship Creek boat launch.

Trails

A portage trail at RM 55.1 provides access to the river from the Nancy Lakes State Recreation Area canoe trail system. Additional trails provide ORV access during the ice-free season. In winter these trails, the frozen river bed, and winter trails provide for both motorized and non-motorized access by dog sled, skis, or snowmobile. Additional details about access to and within the area is presented in Chapter 7. Most cleared trails are old seismic exploration lines. ORV trails noted during summer field trips are as follows: a trail that parallels the river about 75 yards back from the left bank, across from the mouth of Lake Creek at RM 61.5; a trail that meets the left bank at RM 47.7 and joins the South Big Lake Road; the Iditarod Trail at RM 34.7; and an ORV trail that meets the river at RM 39.4 from the South Big Lake Road. An ORV trail at RM 30 connects with the Burma Landing access road. These trails, and others mapped by aerial photography, provide fishing and hunting access during the ice-free season.

Crossing the Little Susitna at RM 34.7, the 938-mile-long Iditarod National Historic Trail between Seward and Nome was one of three main trans-Alaska land routes between 1908 and the 1930s (BLM, 1986). A decline in mining and the advent of commercial air travel led to the demise of the Iditarod Trail as a major transportation route (BLM, 1986). Today it is an historical and recreation resource. Every year since 1973 the Iditarod Dog Sled Race has been staged between Anchorage and Nome, and has evolved into an event attracting national and international attention. Besides this major event, the trail serves casual recreation users throughout the winter (See *Winter Recreation Activities* for additional information.).

RECREATION RESOURCES: THE PHYSICAL SETTING

General Characteristics

Between the mouth and the headwaters, the river's character changes from a lazily meandering, muddy river draining marshy lowlands to a clear, rushing mountain stream. Ice-free season is generally May through October. Water temperature measured on June 26, 1989, was 40 degrees at the Parks Highway bridge, RM 69.5.

Lower Little Susitna River – RM 0 to RM 32.8. This subunit stretches from the mouth of the Little Susitna River on Cook Inlet to the weir operated by the Alaska Department of Fish and Game. This subunit is entirely outside the recreation river boundary, but within the Susitna Flats State Game Refuge.

The lower Little Susitna is several hundred feet wide at the mouth, but narrows sharply as one moves upstream. Above RM 9 the Little Susitna is about 50 feet wide. Average gradient is about one foot per mile. The stream bottom is only visible within several feet of the shoreline, in shallow water.

Middle Little Susitna River – RM 32.8 to RM 69.5. This subunit runs from the Alaska Department of Fish and Game weir to the Parks Highway bridge. It encompasses 36.7 river miles. The legal downstream boundary of the recreation river is approximately one-half mile upstream of the weir, which is within the Susitna Flats State Game Refuge.

This subunit is about 50 feet wide. The water is silty and the stream bottom is seldom visible, except close to shore in water depths of less than one foot. The average gradient is 5.4 feet per mile.

Upper Little Susitna River – RM 69.5 to RM 100. This subunit runs from the Parks Highway to the upstream boundary of the recreation river near the Fishhook-Wasilla Road bridge, encompassing 30.5 river miles. The upstream edge of the recreation river borders DNR's Hatcher Pass Management Unit, for which a management plan was completed in 1986. The headwaters of the Little Susitna extend about 10 miles above the boundary of the recreation river, and are within the Hatcher Pass Management Unit. Where available and appropriate, information about the headwaters area is included in discussions of the upper subunit.

The upper Little Susitna is shallow, clear and swift in its uppermost reaches. Coming out of the Talkeetna Mountains, the river drops 200 feet between the recreation river boundary at RM 100 and Parks-Edgerton Road at RM 98.3, or an average gradient of 118 feet per mile. Entering the valley, the gradient drops to 36 feet per mile between Parks-Edgerton and Schrock Roads (RM 84.4). From Schrock Road to the Parks Highway the gradient averages 3.4 feet per mile. The Little Susitna has excellent water clarity down to about RM 81.4. At this point a slight silty discoloration becomes noticeable; the river becomes progressively more silty downstream. The upper Little Susitna River ranges from about 15 to 50 feet wide.

Visual Resources

The extreme upper and lower portions of the river have not been evaluated. The ratings were done in mid to late June 1989, during the height of the summer recreation season. The results of the visual resource assessment are described below; the methodology is more fully described in the introduction to this chapter.

Recreation River Boundary (RM 33.3) to RM 51. This area received an overall scenic quality rating of 13 points. The land form along the river banks is flat, with a few small, rounded hills. The vegetation is a mixture of spruce and birch, with an understory of willow and alder shrubs, grasses, and herbs. The river is consistently slow moving flat water, with a few minor riffles. The water is a silty brown. The stream bottom is visible only where water depths are one foot or less, in shallow riffles and close to the shoreline. Greens and browns are the dominant colors, with scattered wildflowers adding splashes of pink, lavender, white, and blue. There are no views of adjacent scenery; views are generally confined to within one-quarter mile of the river bank. The landscape is common, both in the region and the drainage. Visible cultural modifications are limited to signs denoting canoe portages and campsites that have been improved with pole frames for tents or tarps.

RM 51 to RM 81.4. This area received an overall scenic quality rating of 12 points. The principal difference between this unit and the one downstream is that more cultural modifications are visible here. The terrain along both sides of the river is flat; views beyond the river bank are less frequent than on the upper river. Vegetation is a spruce/birch/cottonwood mixture, with an understory of willow and alder shrubs, grasses, and herbs. The water is a silty, light mud color; the stream bottom is generally not visible, except where the water is one foot deep or less. The river is predominantly slow moving flat water, with a few small riffles. There are no dramatic color contrasts in the landscape, which is dominated by the browns of the water and

gravel bars, and various shades of green vegetation. Scattered wildflowers add occasional color contrast. Cultural modifications have a slight negative impact on scenic quality. The ford at RM 81.4 is a dump, with seven car bodies, discarded furniture, and smaller debris. Houses are frequently seen in this section. The Parks Highway and the Alaska Railroad cross the river at Houston and parallel it for about a mile, where roadside businesses adjoin the river.

RM 81.4 To Schrock Road. (The area above Schrock Road has not been evaluated yet). This three-mile subunit received an overall scenic quality rating of 19 points. The clear water and diverse vegetation contributed most to the score. The immediate surrounding terrain is predominantly flat. The overstory vegetation is a mixture of spruce, birch, and cottonwood; some of the latter are quite large. The understory is a mixture of willow and alder shrubs, grasses, and herbs. The water is clear; mainly flat water but not sluggish, with some riffles, islands, and log jams. The rocky stream bottom is clearly visible, and rocks in a variety of earth tones add color and texture interest. Scattered wildflowers also add occasional splashes of contrasting color to the landscape, which is dominated by greens and browns. Frequent views of the Talkeetna Mountains contribute to the scenic quality; they were still snowcapped when the scenery was evaluated on June 21, 1989. Cultural modifications do not detract from the area's scenic quality. With the exception of Schrock Road, and one seismic exploration line, only temporary modifications were seen. No structures are visible from the river in this section.

RECREATION RESOURCES: THE SOCIAL SETTING

Recreation Opportunities during the Peak Season

The distribution of recreation opportunity classes within the boundaries of the recreation river is shown on maps at the end of this report. The maps depict conditions during the period of peak use, which corresponds to the time during which king and silver salmon returning to spawn are plentiful, in good condition, and can legally be harvested. The peak use period generally corresponds to the months of June through August.

The maps reflect that recreation users rarely leave the river bank. This is because of the difficulty of traveling overland across boggy ground or through thick vegetation, and more importantly, because most users are there to fish. Consequently, the river becomes a ribbon that is largely semi-developed and developed. This is due principally to the number of people on the river at one time, rather than the presence of structural improvements. Away from the river, the river corridor is seldom visited and generally exhibits the characteristics of a primitive area.

Lower Little Susitna River. The portion of this subunit between the weir and Burma Road boat launch at RM 28.6 is classified as developed. Users congregate here, and one can expect to meet well over 30 groups a day during peak season, and see 100 or more cars parked at the boat launch. Besides boat traffic, anglers on foot fish from the left bank, frequently walking several miles upstream and downstream on primitive trails.

The river below Burma Road has not been inventoried.

Middle Little Susitna River. The area within approximately one mile downstream of the Parks Highway bridge is classified as developed. One would encounter well over 30 groups per day

in this subunit, with a popular day-use area/float craft launching site located at the bridge, and Miller's boat launch three-quarters of a mile downstream.

Semi-developed opportunities are provided from RM 68.5 to RM 61.4, just below the mouth of Lake Creek. Although permanent improvements are infrequently visible in this section, it receives considerable boating use. It is common to meet well over five parties per day on the river as boat traffic moves back and forth between Houston and the mouth of Lake Creek, a popular fishing destination. Semi-primitive opportunities are available on Lake Creek, and the rest of the river corridor away from the river and the highway.

From RM 61.4 to Hock Lake, at RM 39.6, semi-primitive opportunities are available on the river. Encounters with other parties decrease, as there is little powerboat use in this section. Traffic is principally float craft moving downstream. The only development visible from the river are signs denoting the Skeetna Lake canoe portage into Nancy Lake State Recreation Area. A portion of the corridor north of the river is seldom visited, and provides primitive recreation opportunities.

The river from RM 39.6 to the subunit boundary at the Alaska Department of Fish and Game weir (RM 32.8) provides semi-developed opportunities. Encounters with other parties increase; powerboaters who put-in at Burma Road launch frequently travel upstream as far as Hock Lake. Development is limited to signs warning of the weir and primitive improvements such as pole tent frames at campsites.

Upper Little Susitna River. The upper portion of this unit, above Schrock Road at mile 84.4, has not been evaluated yet. The immediate area around the Schrock Road bridge has been classified as semi-developed, because of the presence of this improvement, and the likelihood of seeing other groups here. Moving downstream away from the bridge, the river provides semi-primitive opportunities between miles 84.2 and 81.5. Although roads parallel both sides of the riverbank, and are always within a quarter mile of the water, neither the roads nor any other development is visible from the water surface. A visitor can expect to encounter few other parties. Boat traffic is almost exclusively one way and consists of float craft moving downstream.

Between RM 81.5 and RM 78.3 the river is semi-developed. There are five dwellings, a powerline crossing, a primitive road fording the river with car bodies and other debris dumped on both banks, and a trail leading down to the right bank from a road directly above. Contacts with other parties increase around the dwellings and at the two road access points, which serve as day-use fishing areas.

From RM 78.3 to RM 73.7 is another stretch providing semi-primitive opportunities. No houses or other permanent improvements are visible from the water.

From RM 73.7 to just above the Parks Highway bridge, semi-developed opportunities are available. Both a seismic exploration line and a powerline cross the river. Approximately 16 dwellings are visible from the water in this subunit. When floating downstream, highway sounds become audible at about RM 70.7.

Recreation Opportunities During the Off-Peak Season

Generally, depending on the presence of improvements, the entire river below Parks Highway would revert to either a semi-primitive or primitive setting during the off-season. An exception might be during late summer and fall, when debris left by peak-season visitors might result in human waste and litter being found at over 50% of the campsites. Such areas would retain the semi-developed rating, until snow covered the ground and spring runoff removed most of the debris. The portion of the river near the Parks Highway would retain its developed rating year-round. Between the Parks Highway and Schrock Road, ratings would also remain the same year-round, because those areas designated as semi-developed contain houses and other permanent improvements. Areas which provide primitive opportunities during peak season would continue to do so year-round.

RECREATION ACTIVITIES: ICE-FREE SEASON

Powerboating

Propeller and jetboats, and a few airboats, are used on the Little Susitna River, mostly in association with salmon fishing. Powerboats are also used by hunters for moose and bear.

While conducting creel census surveys, Alaska Department of Fish and Game personnel recorded information on boat horsepower. The information was gathered in 1988 during silver salmon season, from July 16 to September. Little Susitna River boaters were interviewed at three separate launch sites: Burma Road, Millers's Landing, and Ship Creek. Results are summarized in Table LS-1.

Lower Little Susitna River. This subunit below the weir is the most heavily used powerboating area on the river, visited by boats crossing Cook Inlet from the Ship Creek launch in Anchorage, and boats originating from Burma Landing on the Little Su at RM 28.6. The most heavily used portion of this subunit is below Burma Landing; there is good, open channel the entire length of the river below the landing, at all water levels (NPS, 1989). Salmon fishing generally remains good below Burma Landing. As noted previously, the availability of productive fishing encourages boaters to congregate in the most accessible and easily navigable stretches.

**TABLE LS-1. Powerboat Sizes on the Little Susitna River, 1988.
(from ADF&G, 1989)**

Launch Site	< 50 HP	50 - 80 HP	> 80 HP
Burma Landing	2,887 71%	774 19%	409 10%
Miller's Landing	33 13%	87 34%	133 53%
Ship Creek	34 12%	0 0%	259 88%
TOTAL	2,954 64%	861 19%	801 17%

Middle Little Susitna River. Most use of this subunit is by powerboaters who launch at Miller's Landing in Houston and travel downstream to fish. The mouth of Lake Creek at RM 61.5 is one of the most popular fishing destinations, although there are numerous holes between Houston and Lake Creek which can be productive. Most powerboaters launching from Houston do not go more than two to three miles below the mouth of Lake Creek, where there is a shallow riffle. Because good fishing holes are plentiful upstream, there is little incentive to risk negotiating these riffles, which require a boater to be both skillful and intimately familiar with this river subunit (NPS, 1989). That is not to say that the channel between Houston and Lake Creek is without obstacles; the most significant is a riffle about five miles below Parks Highway, where the channel may be only three to four inches deep during low water (NPS, 1989). However, experienced boaters with flat-hulled jetboats and engines in the 35 to 50 horsepower range indicate that flow has never been so low during the summer that they could not boat from Houston to about two to three miles below Lake Creek (NPS, 1989). Lake Creek also gets motorized use, typically by day users who motor down the creek in small boats and then back up to the road again. Although two boats with 10 to 15-horsepower motors were observed on the creek July 31, 1989 (Mosby, 1989), the shallow, weed-choked channel is only marginally suitable for motors. Boaters must stop frequently to clean grass from the propeller blades; Mosby (1989) reported having to clean the prop every 100 yards. No sites suitable for camping were seen on a July 31, 1989 field trip on Lake Creek (Mosby, 1989). These factors keep use levels low on Lake Creek.

Some boaters launching at Burma Landing travel upstream over the weir and into the middle river subunit, but again, use is relatively light because of the difficulty of maneuvering through certain reaches, and because fishing is generally good downstream of the weir in more accessible locations. Just below the weir a few protruding rocks present hazards; above the weir sand bars create several shallow riffles (NPS, 1989). The upstream limit for most jetboats is the riffle at RM 39.4, just downstream of the Hock Lake outlet (NPS, 1989).

As can be seen from the preceding discussion, there are two major powerboating reaches on the middle subunit of the Little Susitna: Houston to Lake Creek or just below, and from points downstream to the Hock Lake area. There is comparatively little powerboat use in the 20 river miles between these two reaches, RM 59 to RM 39.4. During the recreation site inventory trip (June 26-27, 1989), one powerboat was encountered between RM 59 and 39.4, compared with five between Parks Highway and Lake Creek, and five between Hock Lake and the Department of Fish and Game weir. As indicated, river navigability is the principal limiting factor for powerboat use, with fishing success a secondary factor in determining whether boaters are willing to negotiate marginally navigable stretches.

The navigational hazards discussed are barriers to jet and propeller-driven craft; there are no navigational barriers to airboats in this river subunit. However, Department of Fish and Game data shows that airboats are seldom used on the Little Susitna, accounting for only one percent of total boats in 1987 (DFG, 1989c).

Upper Little Susitna River. Most powerboat use of this subunit is by riverfront property owners traveling between their residences and Houston (NPS, 1989), or fishing spots further downstream. Other powerboaters make very light use of the river above Parks Highway, because it is closed to salmon fishing, and because navigational hazards such as log jams and shallow riffles are common.

Boating Safety

The public has mentioned this issue more frequently than any other, although they are divided about the causes of boating safety hazards and possible solutions (DNR, 1989a). Causes of accidents and near misses generally fall into the categories of physical limitations of this small river, limitations of the boat, operator error, or some combination of these causes.

Although the entire river has been the subject of safety concerns, the lower subunit has the most reported safety problems, probably because it is the most crowded. Boaters interviewed for the instream flow needs assessment indicated that large inboards face navigability problems between Burma Road and the weir even at medium water levels, particularly when two boats pass each other, because the boatable channel is very narrow in places (NPS, 1989). A volunteer who worked on the lower river for Department of Fish and Game from July 13 to August 11, 1988 reported witnessing two accidents (Bartleet, 1988). In one, a skiff was sunk by the wake of a large inboard jetboat that passed within three feet; in the other a large inboard jetboat struck an ADF&G boat (Bartleet, 1988). A controversial editorial in an Anchorage newspaper likened canoeing on the Little Susitna to maneuvering through a war zone (Medred, 1989).

Rafting, Canoeing, and Kayaking

All three of these activities take place on portions of the Little Susitna River. Class IV whitewater kayaking occurs at and above the upstream boundary of the recreation river. Rafting and canoeing are most popular on the middle subunit, which offers a gentle gradient and lack of obstacles suitable for novices. The most serious limitation to floating appears to be a scarcity of campsites in the middle river subunit, which limits the number of parties that can be accommodated at one time. Campsite distribution is discussed in more detail later. Also, user

conflicts between powerboaters and floaters are seen as limitations by some floaters; this issue is discussed below.

Because floaters always move downstream with the current, this subsection is organized from upstream to downstream, rather than the usual mouth-to-headwaters organization followed throughout this report.

Upper Little Susitna River: Kayaking. The only section which offers whitewater kayaking opportunities is from Motherlode Lodge to Fishhook Road bridge at RM 99.6. All but the lower one-half mile of this kayak run is above the river corridor, in the Hatcher Pass Management Area. Almost continuous Class IV and V rapids make this one of the premier expert kayak runs in the state, and perhaps the country (NPS, 1989). As could be expected with any activity that requires expert skills, use is low. About 30 Anchorage/Mat-Su Valley area kayakers run it regularly, along with perhaps 20 boaters per year from outside the region (NPS, 1989). The kayakers are mainly day users; the run takes from one to two hours, and few stay to camp along the river.

Kayaking is only done at certain stream flows, which often restricts the sport to a few weeks each summer. Flows of from 4.5 to 7.0 (measured on the Fishhook gauge) are generally considered runnable; a reading of 5.5 is considered ideal (NPS, 1989). During most years, ideal flow occurs for perhaps 8 to 12 days during spring run-off, from late May to early June (NPS, 1989). Depending on rainfall, runnable flows may be available during other periods from May to October. Typically there are 15-25 runnable days in the first half of the season, with perhaps a few days in late summer after a period of heavy rain.

There are essentially no conflicts between kayaking and other uses on this section. If DNR reserves an instream flow adequate for kayaking, no threats to the activity are seen.

Upper Little Susitna River: Rafting and Canoeing. Use is low compared to the middle subunit. The most popular trip is from Schrock Road to Parks Highway, a 15-mile segment which can be done as either a day or overnight trip. Secondary reasons for taking this trip include camping opportunities, enjoying the scenery and the chance to spot wildlife, and trout fishing (the river above Parks Highway is closed to salmon fishing). Canoes are used more often than rafts, because they are more easily maneuverable in the narrow channel, and easier to portage around log jams or over shallow riffles. The extra capacity afforded by a raft is not needed because of the short trip and lack of salmon fishing opportunities.

Other portions of the upper Little Susitna are seldom used for rafting and canoeing, because of a channel obstructed by frequent log jams and sweepers, and above the Fishhook Road crossing, heavy whitewater. Between Fishhook and Sushana bridges, the very few users who have made this float report up to 25 separate log jams that require portaging (NPS, 1989). Between Sushana and Schrock bridges there are currently four log jams that must be portaged (NPS, 1989). From Schrock Road to Parks Highway, only one log jam requiring portaging was encountered on the recreation inventory field trip of June 21, 1989, at RM 83.5. However, jams at RM 79 and RM 77.6 require selection of the proper channel to avoid a portage. Our canoes had to be dragged through shallows in two short stretches about a mile below Schrock Road; no other navigability problems were encountered.

Middle Little Susitna River. The middle subunit has several float trip possibilities for canoes and one for rafts. From the Parks Highway, both types of craft float the Little Su to Burma Landing. Canoeists can take out at the Skeetna Lake portage trail and continue their trip within Nancy Lakes State Recreation Area, on a system of lakes connected by portage trails. Canoeists can also float down Lake Creek, continuing down the Little Su to the Skeetna Lake trail or to Burma Landing.

From the Parks Highway to Burma Road is a leisurely three-day float. Like powerboaters, floaters travel this subunit of the Little Susitna River primarily to fish for salmon. Consequently, use peaks in June and again in mid-August, corresponding with the king and silver runs, respectively. Rafts are used more often than canoes because they have plenty of capacity to handle both the occupants' gear and their catch. However, canoes are more widely used than on the other Susitna Basin recreation rivers, because both the put-in and the take-out are road accessible, eliminating the extra expense of transporting the canoe by plane.

As noted previously, this is a gentle stretch of river suitable for novices. There are no log jams, and only an occasional sweeper to maneuver around. Perhaps the biggest hazard, particularly for canoeists, is the wake of powerboats. Wakes can swamp a canoe, particularly where the channel is not deep enough for the powerboat to slow down. A user conflict between floaters and powerboaters is apparent in the comments made at public meetings (DNR, 1989a).

It is important to note that rafting and canoeing from Parks Highway to Burma Road is not a strictly non-motorized activity. Many people use a small "kicker" motor -- generally an outboard of less than five horsepower.

Besides fishing, some rafters come to hunt moose or bear, while for a few, the float trip itself is the primary activity.

Canoers who make the trip from Parks Highway to the Skeetna Lake portage trail generally are not depending on salmon fishing or hunting as a primary activity. The trip itself is the primary activity, with camping, viewing scenery and wildlife, and fishing being important features. People making this trip do not use kicker motors, since they are prepared for portaging. Peak use corresponds to the warmest summer months, mid-June to mid-August. Canoeists typically take one day to paddle the 14 1/2 miles between Parks Highway and the Skeetna Lake trail. They then continue their trip for two days or more on the Nancy Lakes State Recreation Area canoe trail system.

For canoers taking out of the Little Su at Skeetna Lake, an alternate trip is to put-in on Lake Creek, accessible via the Lynx Lake access road at mile 63.7 of the Parks Highway. They can then float down Lake Creek to its confluence with the Little Susitna at RM 61.5. (The lower five miles of Lake Creek have been included within the recreation river.)

Lower Little Susitna River. Floating on the lower river is limited almost exclusively to people making the previously described trip from Parks Highway to Burma Landing. Although it is possible to float the additional 28.6 miles to the mouth and get picked up by float plane or boat shuttle, this trip is rarely made. Such a trip would be more expensive than taking out at Burma Road, with basically nothing to gain by the added expenditure, except early during a salmon run when the fish are concentrated near the mouth. However, there is little incentive to float this

subunit of the river with its heavy powerboat traffic to go salmon fishing, when for probably the same price as a shuttle back to Burma Landing, one could buy a full day guided fishing trip on the river below Burma Landing.

Fishing

As already mentioned, fishing is the dominant recreation activity on the recreation rivers, including the Little Susitna. Major spawning populations of silver, red, and king salmon, plus rainbow and Dolly Varden trout draw large numbers of anglers to the Little Su throughout the summer. Other salmon and resident species are present, but are less frequently harvested (Mills, 1988). As Table LS-2 shows, silver salmon is by far the most frequently harvested species. Although significantly fewer king salmon are harvested, the possibility of catching one of these fish generates considerable recreation activity. Recreation use of Little Susitna River is as heavy from early June to the close of king salmon season (in 1989, July 13) as it is in August during the height of the silver run.

TABLE LS-2. Sport Fishing Harvest on the Little Susitna River, 1988

Species	Number Harvested	Percent of Total Harvest
Silver salmon	19,009	69
King salmon	2,481	9
Red salmon	2,310	8
Rainbow trout	1,273	5
Pink salmon	1,146	4
Chum salmon	673	2
Dolly Varden char	546	2
Lake trout	91	<1
Burbot	36	<1

Alaska Department of Fish and Game, 1989

Angler distribution is influenced by the probability of success, along with ease of access. Fishing in each of the river subunits is discussed briefly below. More detailed information about fishing is presented in Chapter 4, of this report.

Lower Little Susitna River. This subunit receives the highest fishing use, because it is the most accessible. Powerboaters coming in for the day from Burma Landing, or the Ship Creek launch in Anchorage, mix with floaters on the last leg of their trip, and with bank anglers who park at Burma Landing and walk several miles up or downstream. The lower river provides good salmon fishing earlier than the middle subunit, because fish typically hold at the mouth for a period before moving upriver. That factor also contributes to the high use. Approximately 80% of the silver salmon harvested from the Little Su are taken below Burma Landing (Bartlett, 1989).

Middle Little Susitna River. Fishing use is high in this subunit. Besides the effort expended by powerboaters, rafters, and canoers, many people fish from the bank at Parks Highway and other locations in Houston. The Parks Highway area is close to population centers, making it easy for local residents to fish after work or at other times when they may not have a full day or more to devote to the activity. The most successful red salmon fishing is in this subunit near the mouth of Lake Creek, as these fish return to Nancy Lake to spawn. They are seldom caught elsewhere on the Little Susitna.

Upper Little Susitna River. Fishing effort is relatively light in this subunit, because it is closed to salmon fishing. However, with its many road access points, it provides opportunities for automobile-based trout anglers, both day-users and overnight campers. Trout are also pursued by owners of riverfront dwellings, and floaters making a day or overnight trip between Schrock Road and Parks Highway.

Hunting

The Little Susitna River is in Game Management Unit 14A. Moose is the principal species sought, mainly in the middle and lower river subunits, although black bear is also harvested. Hunters commonly use boats, both powerboats and rafts, to gain access to the area and to transport their game meat after the hunt. Other hunters use off-road vehicles (ORVs) on trails within the river corridor. Some hunters combine jetboat and ORV use; they transport the ORV via jetboat to locations where trails cross or meet the river. They then use the ORV to search for game along the trail.

WINTER RECREATION ACTIVITIES

The Iditarod National Historic Trail crosses Little Susitna River at mile 34.7. After freeze-up the Little Susitna River itself becomes a winter trail. These routes, along with other trails discussed under *Access* are the focus of winter activities such as dog mushing, cross country skiing, snowmachining and ORV use, and ice fishing.

RECREATION SITES AND FACILITIES

Developed Facilities

Lower Little Susitna River. Burma Landing is the only developed site, at RM 28.6. Within the Susitna Flats State Game Refuge, it is managed by the State Division of Parks and Outdoor Recreation under a cooperative agreement with the Department of Fish and Game. Until 1989,

it consisted of a gravel boat ramp, with a dirt parking area and vault toilets. Recent improvements at the landing have increased its value for recreation, and have had an influence on use levels and patterns that has only partially been felt. The access road to landing was improved in 1988, for the first time making it easily negotiable by two wheel drive vehicles hauling boat trailers. Boaters interviewed during 1989 reported an increase not only in number of boats using the landing, but in the size and power of the boats (NPS, 1989). During July and August 1989, the boat ramp itself was improved with concrete and by extending it further out into the water to provide a firm surface for vehicle tires. A campground was also constructed in 1989.

Middle Little Susitna River. Except for the Houston-area sites discussed below, the only developed recreation facility on the middle river subunit is the Skeetna Lake canoe portage trail at RM 55.1. About three-quarters of a mile long, the trail is maintained by the staff of Nancy Lakes State Recreation Area, which is part of DNR, Division of Parks and Outdoor Recreation. The trail was in good condition when observed June 26, 1989. A sturdy boardwalk made of treated 2" by 6" lumber, two boards wide had been laid across all the low, boggy sections. Signs are provided on the river to alert canoeists to the upcoming trail; one at RM 55.6, and another at RM 55.3, before reaching the trailhead at RM 55.1.

Houston Area. There are no developed recreation facilities above Houston, where several public and private facilities are available. The City of Houston maintains both a day-use area and a campground. The day-use area, at the Parks Highway bridge, provides toilets and parking with immediate access to the river. It is used mainly for fishing, and also for launching rafts and canoes. Little Susitna River Campground is a 30-unit city facility that is a destination attraction and also a stop-over for highway travelers passing through. Each site is equipped with a picnic table, parking pad, and firepit. Water and toilets are provided at central locations within the campground.

Miller's Market, at RM 68.8, has a launch ramp for trailered boats and a camping area; fees are charged.

Undeveloped Sites

Undeveloped recreation sites discussed below and shown on maps 1 through 4 were inventoried during June and July 1989. Only the portion of the Little Susitna River between Schrock Road (RM 84.4) and Burma Landing (RM 28.6) has been systematically inventoried. Both the maps and discussion below should be reviewed for a full appraisal of recreation sites.

Lower Little Susitna River (Above Burma Landing). Ten secondary campsites were seen between the weir and Burma Landing, all but one cleared from upland vegetated areas. Three of these sites appeared to be under long-term occupation when they were inventoried on June 27, 1989. The entire area between the weir and the landing showed evidence of heavy use. This entire zone, with its 10 individual sites, could well be considered a primary use area.

Middle Little Susitna River: Primary Sites. Only one area, the mouth of Lake Creek, appears to be a destination for recreation visitors. It is a favored fishing hole visited by day-use powerboaters who launch at Houston, and by floating and powerboating anglers who camp

overnight. The primary site here has been cleared from the upland, and exceeds 1000 square feet. Five boats and 13 people were present when the site was inventoried on July 24, 1989.

Middle Little Susitna River: Secondary and Marginal Sites. Attractive secondary gravel bar campsites are scarce in this subunit compared to the upper river. Between Parks Highway and the Skeetna Lake canoe portage trail (RM 55.1), a reasonable day's journey by float craft, 18 secondary sites were inventoried, 16 gravel bars and 2 upland sites. These sites are unevenly distributed; nine of them are within a 1.2-mile segment between RM 63.6 and RM 62.4. Marginal sites are available in the 14.4 miles between Parks Highway and Skeetna Lake; 21 were inventoried on June 26 that were either too small, low, narrow, or muddy to be considered as anything other than a campsite of last resort at that time.

Moving downriver, campsites become progressively more scarce. Between Skeetna Lake and the boundary of this river subunit at the weir, RM 32.8, 12 good secondary campsites were inventoried June 26-27, 1989. Seven of these were gravel bars and five were upland sites, for an average density of 0.5 per mile. An additional 17 marginal sites were observed.

When water levels drop, some of the marginal sites become larger, less wet, and more useable. Eight of the sites evaluated as marginal on June 26 were considered secondary campsites by an inventory team one month later on July 24. Given prevailing weather patterns, this suggests that a greater number of suitable campsites may be available during the silver salmon run than during the king salmon season, which in 1989 ended July 13.

Upper Little Susitna River (Below Schrock Road): Primary Sites. This river subunit is depicted on maps 3 and 4. Except at Schrock Road bridge, no upland campsites were observed in the upper river subunit; all were gravel bars.

The Schrock Road bridge serves as a put-in site for float trips, and a fishing and camping area. The site is unimproved, except the gravel used to surface the road has been extended, providing a parking and staging area on the downstream side of the bridge, on the left bank. The gravel surface can comfortably accommodate six vehicles, which appears adequate to handle present use by float trip parties, day-use trout anglers, and anglers who camp overnight.

Upper Little Susitna: Secondary and Marginal Sites. Good secondary gravel bar campsites are plentiful in the first 10 miles below Schrock Road. From RM 84 to RM 73.8, 45 secondary gravel bar campsites were inventoried, for an average density of 4.5 per mile. They are numbered as sites 3 through 72 on the maps. The gravel bars range in size from under 500 to over 1000 square feet. In the 4.3-mile stretch between RM 73.8 and the Parks Highway at RM 69.5, good quality campsites become scarce. Only four secondary sites were inventoried, and these all above RM 72. Although eight other gravel bars were seen between RM 73.8 and the Parks Highway, these provide only marginal opportunities for camping, because they are small, low, and muddy.

On the right bank at RM 80.9, there is a primitive trail from an improved road down to the water. This trail was not constructed; rather, it has been worn through repeated use. The area appears to be used mainly as a day-use fishing site; one angler was present during the June 21, 1989, inventory trip.

TABLE LS-3. Little Susitna River: Important Recreation Sites & Facilities on Public Land

Type	River Mile	Description	GIS No.
Boat Launch/campground	28.6	Burma Landing. Bank anglers go 1 mile up, downstream.	189
ORV Trail	30	Seismic line. River access from Big Lake.	209
Primary Camp Area	30-32.8	Between landing & weir. Multiple sites, fishing holes.	180-188
Fishing Area	33.6	"Cabin Hole." 3/4 mile above weir.	217
Iditarod Trail	34.7	ORV use in summer; motorized /non-motorized in winter.	206
Fishing Area	37	Day-use; served by trail below.	203
Foot Trail	37.1	Trail to unnamed lake.	202
Foot Trail	39.5	Trail to Hock Lake; ends on private property.	201
ORV Trail	47.7	Connects to Papoose Lakes.	199
Canoe Portage Trail	55.1	Trail from Skeetna Lake portage to Nancy Lakes State Rec. Area.	147
Primary Campsite/ Fishing Area	61.5	Upland site, mouth of Lake Creek.	194
ORV Trail	61.5	Trail parallels river opposite Lake Creek mouth. Summer use appears low.	138
Parks Highway Crossing	69.4	Day-use fishing, non-motorized boat launching. Maintained by City of Houston.	101
Little Susitna Campground	69.8	30-unit facility; operated by City of Houston.	n/a
Road Access	80.9	Informal trail to riverbank provides fishing access.	26
Road Access	84.4	Schrock Road; fishing, camping, float trip put-in.	1

Site Conditions and Adequacy of Sites Relative to Existing Use

Overall, the combination of existing developed facilities and those under construction, and undeveloped recreation sites appears adequate to handle existing public recreation use on the Little Susitna River. The scarcity of campsites in the middle river subunit sets a definite upper limit on the number of parties that can be accommodated and still provide a quality recreation experience. Although the limited campsites affect all boaters, it particularly limits the number of float trips the river can effectively handle, as powerboaters are more mobile and can use this subunit as a day-use area.

The campground being constructed at Burma Landing will help alleviate the lack of sites in the lower river subunit, made more severe by the long-term occupation of some of the sites. However, it will provide an experience of a different type than camping at an individual undeveloped site at river's edge. The campground will be most useful to non-boaters who drive to the landing to fish from the bank, and who have had few places to camp other than in the parking lot or at the edge of the road.

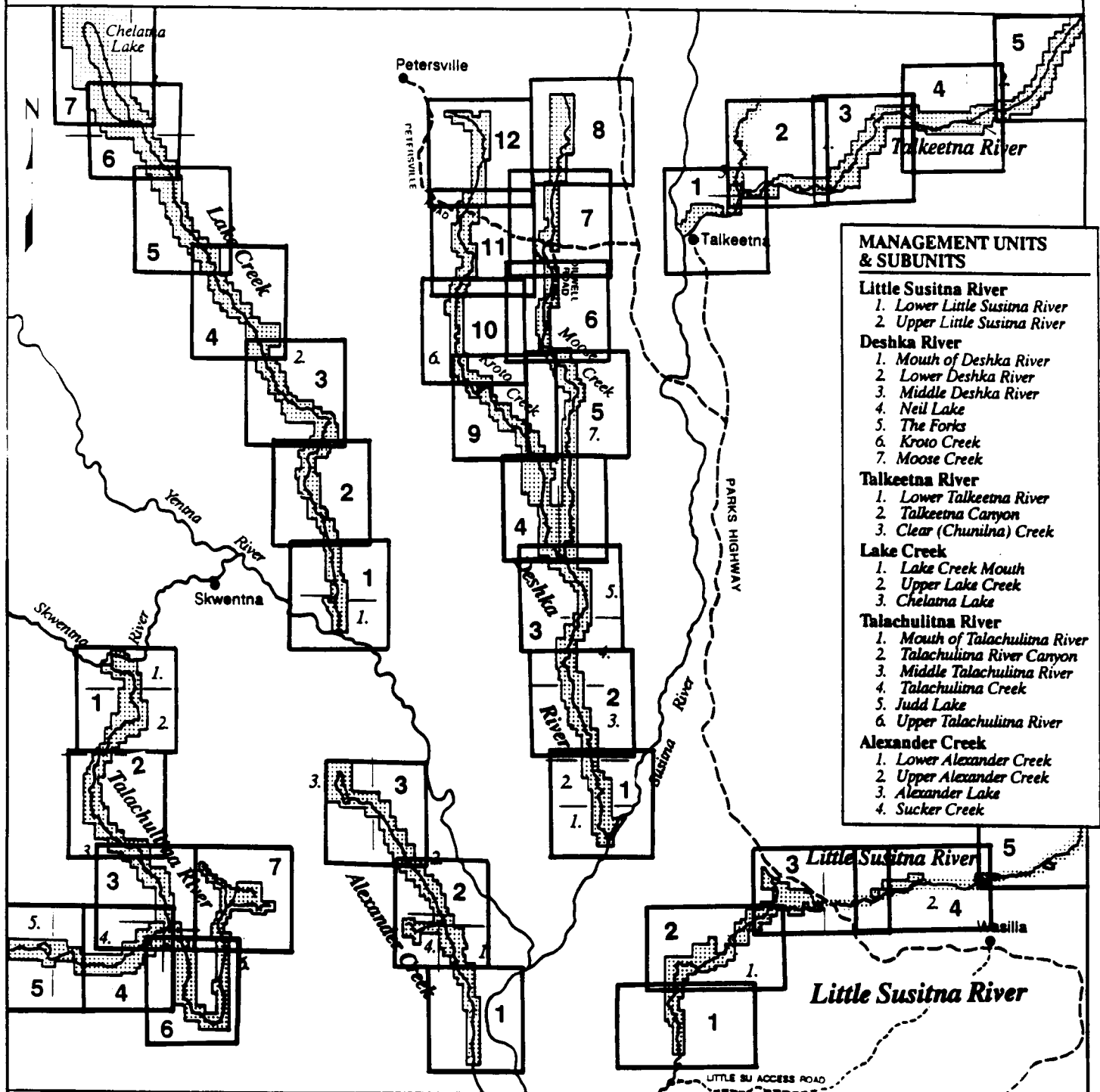
Foot traffic is already high along the river within a couple miles up and downstream of the landing. It will probably increase with completion of the campground. An additional facility worth considering is an improved trail for bank-fishing access. Unimproved foot trails are used now, which divide into parallel trails in several locations. A constructed trail would be more convenient for users, and would help protect against unnecessary soil compaction and vegetation trampling caused by multiple routes. Litter accumulates in the bank fishing zone, and regular removal could supplement the yearly volunteer cleanups performed by the boating association, and others who voluntarily remove other people's litter. However, since Burma Landing and the surrounding area are outside the Little Susitna Recreation River, decisions on developments here cannot be made in the recreation river management plan.

During the recreation site inventory, time constraints did not permit a thorough inspection of each undeveloped site; most were evaluated while floating by on the river. Sites were rated as "clean" if less than a handful of litter was observed. However, of those sites inspected, occasionally, even on gravel bars that contained less than a handful of litter, large amounts of toilet paper and human waste were found in the willow bushes on the edge of the gravel bar. This occurred mainly on the middle river subunit, where camping use is concentrated, and was particularly apparent at the mouth of Lake Creek. To help alleviate this condition, toilets could be provided at popular fishing holes and other high use sites, combined with a public education program on how to properly dispose of waste where toilets are unavailable. Although the presence of litter and human waste was noted on all of the recreation rivers, this problem was much less ubiquitous on the Little Susitna than on Alexander Creek. Whether this is due to lighter use, or a different kind of use, or type of user, has not been determined.

**The maps that follow this page indicate the
Little Susitna River Recreation Opportunity Classes
During Peak Use Period
(June through August)
and
Recreation Sites on Public Land.**

SUSITNA BASIN RECREATION RIVERS MANAGEMENT PLAN

Index Map

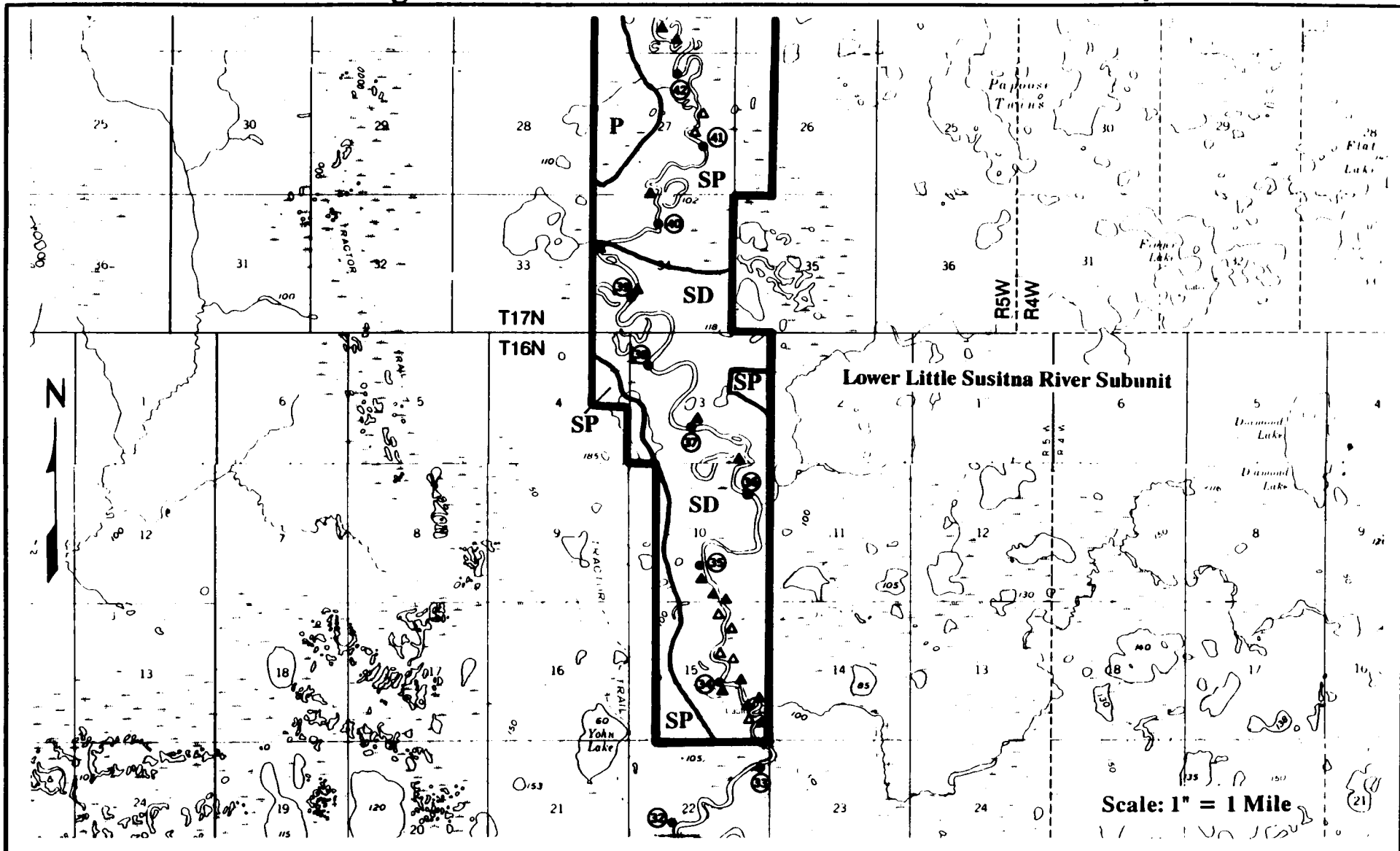


1 Index To Adjoining Maps

Recreation Rivers Corridors

Little Susitna River Management Unit

Map 1 : River Miles 33 - 42



— Management Unit Boundary

--- Subunit Boundary

① River Mile

Recreation Opportunity Classes

P Primitive
 SP Semi-Primitive
 SD Semi-Developed
 D Developed

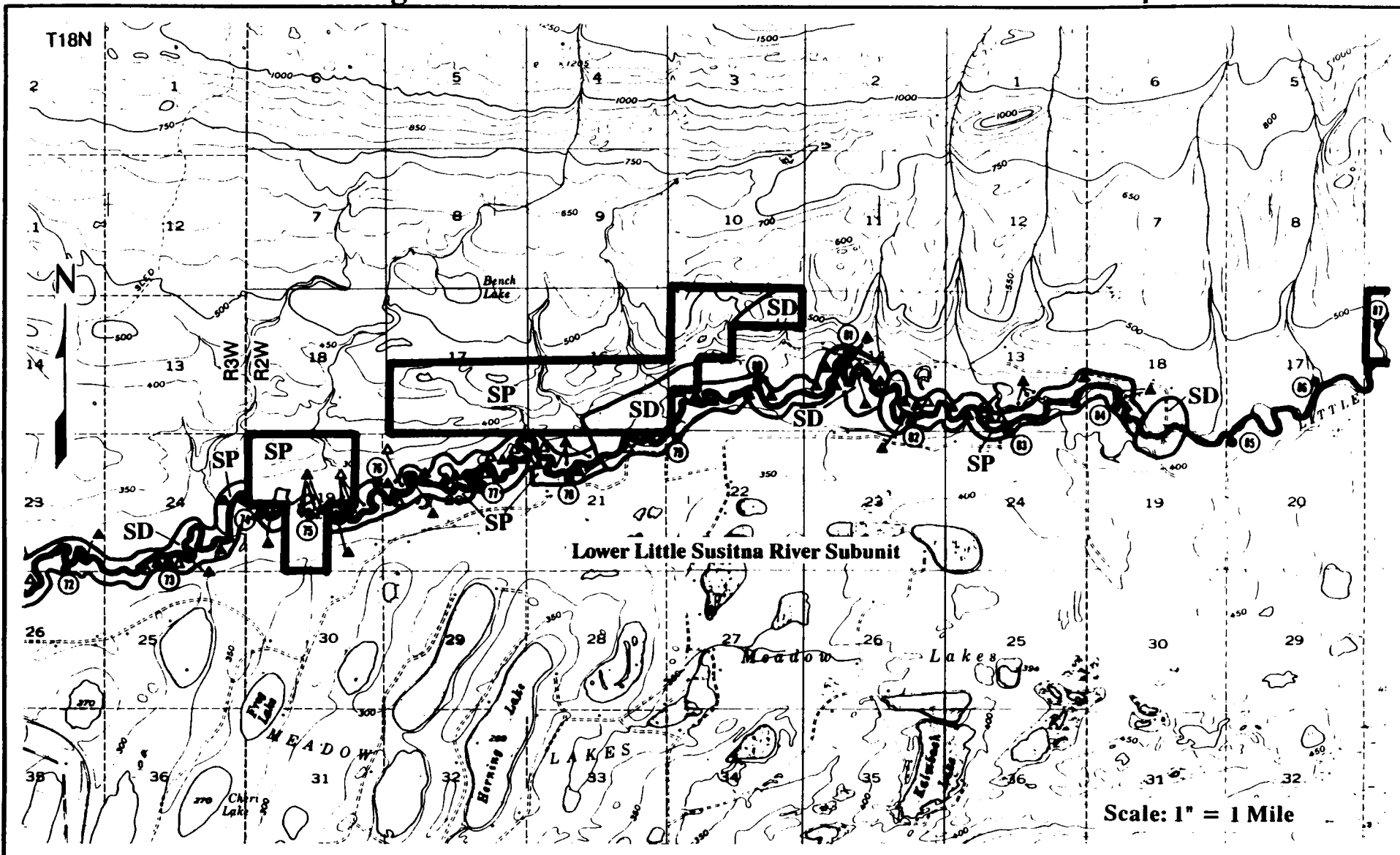
Recreation Use Sites on Public Lands

□ Primary Campsite and ID #
 ▲ Secondary Campsite and ID #
 ◆ Marginal Campsite and ID #

Little Susitna River Management Unit

Map 4 : River Miles 72 - 87

8



— Management Unit Boundary

▬ Subunit Boundary

① River Mile

Recreation Opportunity Classes

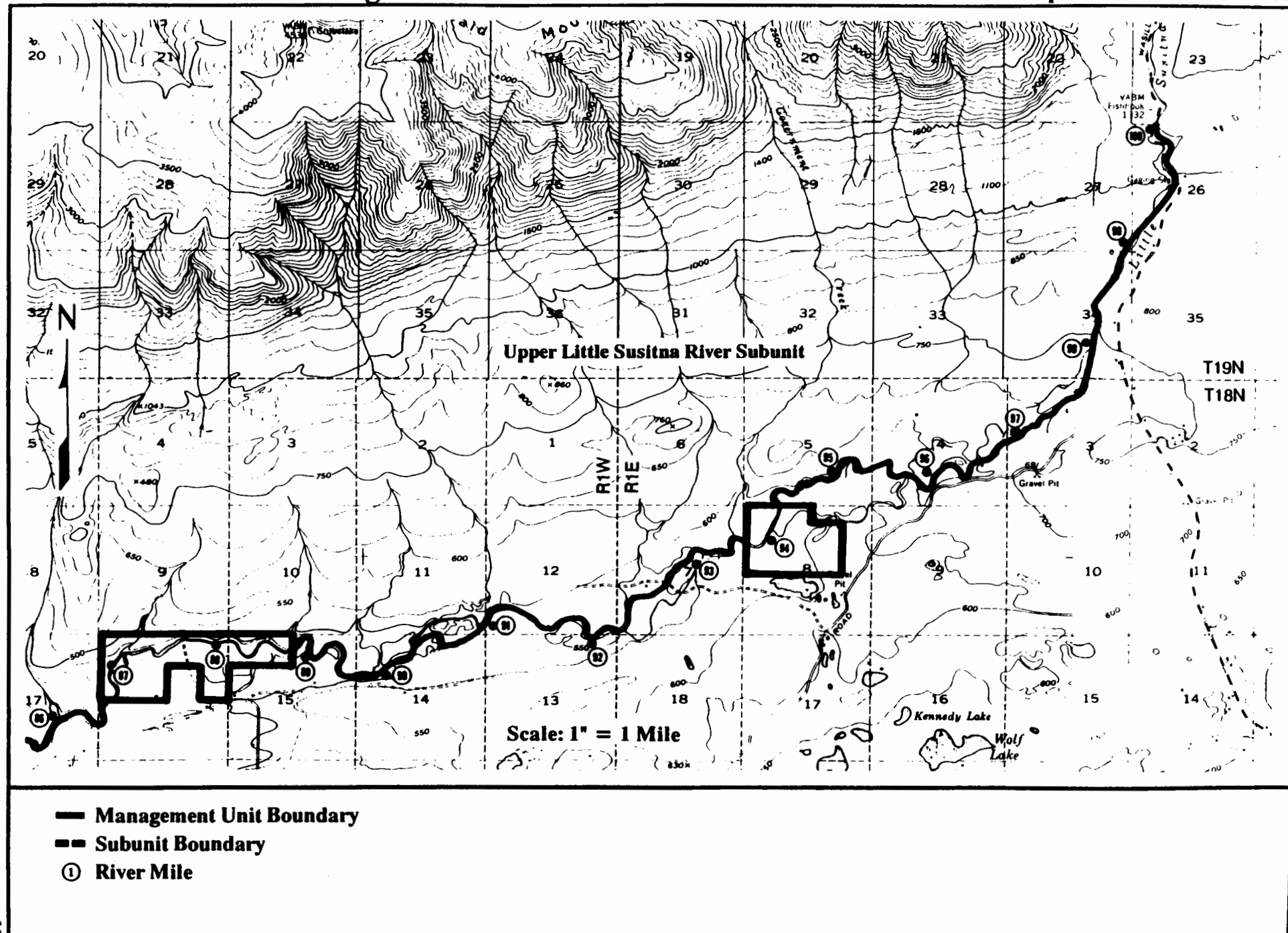
- P Primitive
- SP Semi-Primitive
- SD Semi-Developed
- D Developed

Recreation Use Sites on Public Lands

- Primary Campsite and ID #
- ▲ Secondary Campsite and ID #
- △ Marginal Campsite and ID #

Little Susitna River Management Unit

Map 5: River Miles 86 - 100



DESHKA (Moose Creek & Kroto Creek) RECREATION RIVER

LOCATION, BOUNDARIES, AND MAJOR USES

The Deshka River mouth is about 37 air miles northwest of Anchorage, Alaska. The Deshka is only 29.5 river miles long from where it is formed by the juncture of Moose Creek and Kroto Creek to where it empties into the Susitna River. From their source in the Peters Hills, Moose Creek and Kroto Creek flow southward about 57 river miles before joining to form the Deshka. The two creeks are parallel and are separated by only two to seven miles for their entire course. The legal boundaries of the recreation river include state and borough land adjoining the stream courses for approximately one-half mile on either side.

The most outstanding recreation resource of the Deshka River is its fishery, with major spawning populations of king and silver salmon, and rainbow trout. It is the fishery that, by far, attracts the most recreation users to the river during the ice-free season. The Deshka River's popularity is enhanced not only by its closeness to Anchorage, but to Deshka Landing, a boat launch on the Susitna River approximately five miles upstream from the mouth of the Deshka. Besides fishing, other major activities during the ice-free season are float and motor boating, and hunting. Principal winter activities are ice fishing for burbot, snowmachining, and dog mushing on the river and on trails that bisect the area.

ACCESS

Moose Creek and Kroto Creek are accessible by automobile from Petersville Road; the remainder of the recreation river is accessible only by air or boat. Petersville Road begins at the Parks Highway, just south of the town of Talkeetna, or about 100 road miles north of Anchorage. Petersville Road crosses Moose Creek at river mile (RM) 68.2, and Kroto Creek at RM 47.2. Oilwell Road is a gravel surfaced route that extends about six and one-half miles south of Petersville Road, parallel to the left bank of Moose Creek. The parking lot at the end of Oilwell Road is used for camping, and as a staging area for float trips. Because the bridge across Moose Creek is incomplete, the off-road vehicle (ORV) access trail to Amber Lake that begins on the opposite side of the river is only usable in winter.

Major float plane landing sites for public access to the recreation river are Amber Lake, Whistling Lake, Neil Lake, and near the mouth of the river from RM 1.0 to RM 0.5. Float planes also land on Kroto Lake and other lakes in the upper reaches of Kroto Creek and Moose Creek, but primarily to access private property, rather than general public recreation access. A short, primitive airstrip for wheel planes is on the left bank at the mouth of the Deshka, surrounded by tent camps at the height of the use season.

Boaters can launch at the privately owned Deshka Landing and travel five miles down the Susitna River to the Deshka River mouth. Another launch site is Susitna Landing, at mile 82.5 of the Parks Highway. Susitna Landing is an additional 14 miles upstream on the Susitna River, but

offers lower fees for commercial users such as fishing guides. Susitna Landing is owned by the State of Alaska and operated by a concessionaire. Additional details about access to and within the area are presented in Chapter 7 of this report.

RECREATION RESOURCES: THE PHYSICAL SETTING

General Characteristics of Each River Subunit

The Deshka Recreation River has been divided into the subunits shown in Figure D-11.

Deshka River Mouth (RM 0 to RM 1.7). This is the area between the Susitna River and the Department of Fish and Game cabin. Recreation activity is extremely concentrated, with three lodges, a float plane landing area, and heavy boating, fishing, and camping use.

Lower Deshka River (RM 1.7 to RM 6.4). This subunit runs from the Alaska Department of Fish and Game cabin to the Laub homestead, a distance of 4.7 river miles. This is an area of concentrated boat traffic, as anglers move up and downstream to various fishing holes.

Middle Deshka River (RM 6.4 to RM 14.5). This subunit stretches from the Laub homestead upstream to Trapper Creek, covering about 8.1 river miles. It is similar to the Neil Lake area discussed below, but is considered separately to recognize its different pattern of recreation use.

Neil Lake Area (RM 14.5 to RM 22.7). This subunit runs from Trapper Creek to Neil Lake, encompassing 8.2 river miles. The gradient in this subunit and in the downstream subunits averages only 1.5 feet per mile. As would be expected, the low gradient results in a slow current.

The Forks (RM 22.7 to RM 29.7). This seven-mile subunit covers the upper Deshka River from Neil Lake to the Moose-Kroto Creek confluence. With a water column about 60 to 75 feet wide, the Deshka River meanders through a spruce/birch forest. The average gradient is 9.3 feet per mile.

Moose Creek (RM 29.7 to RM 82.4). This subunit runs from the confluence with Kroto Creek to the upstream boundary of the recreation river. This small stream is about 30 to 50 feet wide and flows through spruce/birch forest. The creek drops from 700 feet to about 375 feet, or at an average rate of 13 feet per mile from the upstream boundary of the river corridor to the end of Oilwell Road. From Oilwell Road to the Moose-Kroto confluence, the gradient averages 6.3 feet per mile.

Kroto Creek. The entire creek within the river corridor boundaries is included in this subunit, from the Moose Creek confluence to Kroto Lake. This is a shallow, boulder-strewn stream. Kroto Creek drops from an elevation of 1,122 feet at Kroto Lake to about 200 feet at its confluence with Moose Creek, for an average gradient of 15.6 feet per mile.

Visual Resources

The visual quality ratings were done in late July, slightly past the summer peak-use period. The results of the visual resource assessment are described below; the methodology is more fully described in the introduction to this chapter.

Deshka River Mouth. This subunit received an overall scenic quality rating of 7 points. The immediate terrain is flat to low rolling hills, with occasional cut banks 50 to 60 feet high. The river is about 375 feet wide, with a steep bluff along the right bank. The vegetation is thick, and is predominantly birch, alder, and young cottonwood. The river is slow moving flat water; canoes can be readily paddled upstream without a motor. There is little color contrast to the landscape; green vegetation and brown water and gravel bars predominate. Birch trunks form vertical white bands, though they are most often screened by leaves and other vegetation. Views are confined to the river banks, except at the mouth, where ridges across the Susitna River can be seen. The overall landscape is common to the region, similar to lower Alexander Creek and many other streams. Scenic quality is substantially reduced by numerous cultural modifications. The left bank is lined with continuous tent and tarp camps, often two to three deep. Although these are all temporary structures, they are commonly left standing throughout the summer season.

Lower Deshka River. This subunit also received an overall scenic quality rating of 7 points. The immediate terrain is flat to low rolling hills, with occasional cut banks 30 to 50 feet high. The river contains numerous side channels and islands. The overstory vegetation is predominantly birch and cottonwood, with a few spruce trees. The understory is willow, alder, ferns, and grass. The river channel is about 100 to 200 feet wide. The water is tannin-stained, slow moving flat water with a few riffles. There is little color contrast to the landscape, except that provided by birch trunks; green vegetation and brown water and gravel bars predominate. Views are confined to the river banks, with no long-range vistas. The overall landscape is common to the region, similar to lower Alexander Creek and many other streams. Scenic quality is reduced by numerous cultural modifications. Cabins, tent frames, and tarp shelters are frequently in view, especially along the lower end of this subunit. Some of these sites are up in the trees and only partially visible, while others are right next to the river bank.

Middle Deshka River. This subunit received an overall scenic quality rating of 12 points. The land form is flat to gently rolling. A few gravel or sand cut banks 30 to 40 feet high, and occasional 4- to 7-foot diameter rocks in the river channel add some variety to the land form. Vegetation is a spruce/birch/cottonwood mixture, with more spruce than found downstream. The water is tannin-stained flat water, with occasional riffles and small islands. Colors are predominantly greens and browns, with white birch trunks, lavender fireweed blossoms, and reddish grass flowers adding some contrast. Views are confined to within one-quarter mile of the river banks, and take in nothing more dramatic than adjoining low ridge tops. The landscape is common within the region and the recreation river system.

Neil Lake Area. This area received an overall scenic quality rating of 13 points. The land form along the river banks is mostly low rolling hills and flat valley bottoms, except for occasional gravel or sand cut banks about 30 feet high. The overstory vegetation is a spruce/cottonwood/birch mixture; the understory is willow and alder shrubs, grasses, herbs, and a few ferns. Fireweed and a few other annual wild flowers were blooming during the evaluation,

which, along with white birch trunks and reddish hues of flowering grasses, added color contrast. The water was stained with tannic acid, similar to the downstream subunits. Views were confined to 300 to 400 yards or less, not extending beyond the immediate river area and adjoining low ridges. The general landscape is common throughout the region and within the recreation rivers system. Three cabins are the only permanent cultural modifications visible from the river in this subunit. Occasional temporary modifications are seen, mostly makeshift campsite "furniture."

The Forks. This area received an overall scenic quality rating of 12 points. The immediate terrain is flat to gently rolling, with a riparian area 150 to 225 feet wide. Overstory vegetation is a spruce/birch/cottonwood mixture. The understory consists of willow and alder shrubs, grasses, ferns, and other herbaceous plants. The water is tannin-stained flat water, with the river bottom visible only in one foot of water or less. The river occasionally branches and then comes back into one channel. Colors are the greens of the plant needles and leaves and the browns of the water, gravel bars, and tree trunks. Fireweed blossoms, reddish hues of flowering grasses, and the white trunks of birch trees added color contrast. Views are confined to the river banks. The scenery is common to the Matanuska-Susitna Valley region, and is similar to Alexander Creek and the Talachulitna River. No structures or other permanent cultural modifications were observed in this subunit.

Moose Creek. This area received an overall scenic quality rating of 17 points. The terrain along both sides of the creek is flat to gently rolling, with a few cut banks. Overstory vegetation is a spruce/birch/cottonwood mixture. The trees tend to be shorter and of lesser diameter than downstream. The understory consists of willow and alder shrubs, grasses, ferns, and other herbaceous plants. The water is tannin stained, with a color resembling a strong cup of tea; the creek bottom is visible only in one foot of water or less. The creek is mainly fast moving flat water, with a few small riffles. Colors are basically shades of green and brown exhibited by the vegetation, water, and gravel bars. Fireweed was blooming during the evaluation; these lavender flowers and the white trunks of birch trees added color contrast to the landscape. Views are confined to the creek banks most of the time, but there are views of Denali and Mount Foraker at RM 57, RM 55, and RM 42. The scenery of Moose Creek is common within the Matanuska-Susitna Valley region, and is similar to upper Alexander Creek and the upper Talachulitna River. The only permanent cultural modifications visible from the creek are two cabins, one of which can barely be seen.

Kroto Creek. This area was not visited by the inventory team; consequently its scenic attributes have not been evaluated.

RECREATION RESOURCES: THE SOCIAL SETTING

Opportunities During Peak Season

The distribution of recreation opportunity classes along the Deshka River (Moose and Kroto Creeks) and within the boundaries of the recreation river is shown on the maps at the end of this chapter. Conditions during the period of peak use are depicted, which corresponds to the time during which king salmon returning to spawn are plentiful, in good condition, and can legally be harvested. The peak use period for 1989 was mid-June to the first week of July.

The maps reflect that recreation users rarely leave the stream banks. This is because of the difficulty of traveling overland across boggy ground or through thick vegetation, and more importantly, because most users are there to fish. Consequently, the river becomes a ribbon that is more developed than the surrounding lands. This is due principally to the number of people on the river at one time, and secondarily to the presence of structural improvements. Away from the river, the river corridor is seldom visited and generally exhibits the characteristics of a primitive area.

Deshka River Mouth. The mouth area is developed. People congregate here throughout the use season. Three cabins and three commercial lodges are within this 1.7-mile subunit, along with an air taxi service drop-off/pick-up site housed in portable buildings. Commercial and private float planes land frequently between RM 1.0 and 0.5. A profusion of tent camps lines the left bank from RM 0.8 to the mouth. The river is clogged with boats, some anchored with the occupants fishing, others moving up or downstream. Guests and personnel of local lodges mix with campers and day-use anglers who boat in for the day from launches on the Susitna River and elsewhere, and with float parties completing their trip.

Lower Deshka River. The lowest portion of this subunit is developed, exhibiting a continuation of the mouth area congestion described above. The river bank environment gradually shifts from developed to semi-developed at approximately RM 2, as fewer parties and tent camps are encountered. Throughout this subunit, boaters move in both directions as they travel between fishing spots. Camps become less frequent above RM 4. Away from the river itself, the river corridor provides primitive and semi-primitive opportunities.

Middle Deshka River. The entire river column is classified as semi-developed. Floaters moving downstream mix with powerboaters traveling in both directions. The mouth of Cabin Creek (a tributary entering on river right about one-half mile downstream from Trapper Creek) is a popular fishing spot. Powerboaters routinely travel to this destination from the river mouth, stopping at other fishing holes along the way. A cluster of structural development is at river's edge between RM 14 and RM 13, where there are seven cabins and associated out buildings. Between RM 11.7 and RM 10.9 is another cluster of development, with four cabins or houses, and one lodge. As elsewhere, human activity and development is confined to the water or water's edge. As one moves out of sight and sound of the river bank, primitive opportunities are available.

Neil Lake Area. The social setting is semi-developed from Trapper Creek to the Northward Bound Deshka River Lodge at RM 15.4. User density is high near the mouth of Trapper Creek,

a popular fishing area visited by powerboaters traveling upstream. During peak use season, the Trapper Creek area is the general upstream limit of powerboat use. Most of the remainder of the river between Trapper Creek and Neil Lake is semi-primitive. Users disperse and little development is visible from the river. The slough to Neil Lake and surrounding uplands are semi-developed, due largely to the frequency of user contacts. Float parties pass in both directions, as some put in at Neil Lake, while others take out. At the head of the slough, several parallel trails connect with the Neil Lake shoreline, which is outside the recreation river area. The head of the slough is also used as a boat storage area. During the July inventory trip, one airboat was parked here, along with fuel drums.

The Forks. From Neil Lake almost to the actual forks, semi-primitive opportunities are available as users remain dispersed. The immediate area around the confluence of Moose Creek and Kroto Creek is classified as semi-developed. Although there are no permanent improvements, the area is one where users congregate, because it is the first spot where floaters can catch and keep salmon. The campsites in this area show signs of heavy use. As elsewhere, the river corridor away from river banks is primitive.

Moose Creek. The creek is classified as semi-primitive from the forks to the first bend below Oilwell Road. The setting is predominantly natural; only two cabins can be seen from the river. During peak use season, other parties are occasionally encountered, almost always rafters or canoers floating to Neil Lake or to the Deshka mouth. Away from the creek, the river corridor, much of it low-lying, boggy ground, provides primitive opportunities.

Moose Creek was not examined above the end of Oilwell Road. Classifications were based on aerial photo review, and must be considered tentative. Adjacent to Petersville Road and Oilwell Road, the setting is semi-developed. These areas contain residences, farm fields, and a gravel pit. Further back from the roads, the river corridor provides semi-primitive opportunities. Above Petersville Road, Moose Creek is seldom visited, and generally provides primitive recreation opportunities. At the upstream boundary of the recreation river, a group of lakes with scattered cabins and off-road vehicle trails are classified as semi-primitive.

Kroto Creek. Since no field inspection of Kroto Creek was made, recreation opportunity classes were assigned by reviewing aerial photos and consulting with staff who have made low altitude flights over the creek. As with upper Moose Creek, the evaluation must be considered tentative until an on-the-ground inspection can be made.

Most of Kroto Creek above Amber Lakes is classified as primitive. It is generally free of structures, and is seldom visited by users because the shallow, rocky channel is only marginally navigable even by float craft. Areas classified as semi-primitive around Kroto Lake and the lake to the south contain scattered cabins. The other semi-primitive areas are adjacent to Petersville Road and a major trail from the Safari Lake area that bisects part of the recreation river area.

From the Amber Lakes area downstream, Kroto Creek is classified as semi-primitive. This section of the creek has fewer navigability problems, and float trips occasionally put in at Amber Lake, bound for either Neil Lake or the mouth of the Deshka. Away from the creek, the river corridor remains a primitive setting, except where ORV trails provide access to the creek.

Recreation Opportunities Before and After Peak Season

Generally, away from the zones containing clusters of permanent structures in the middle river subunit and at the mouth, the entire Deshka River (Moose and Kroto Creeks) would revert to a primitive or semi-primitive setting during the off-season, depending on visitor use levels. An exception might be during late summer and fall, when debris left by peak-season visitors might result in human waste and litter being found at over 50 percent of the campsites. Such areas would retain a semi-developed rating, until snow covered the ground and spring runoff removed most of the debris.

The clusters of dwellings in the middle river subunit would retain their semi-developed rating year-round. The mouth area would revert to semi-developed, when use levels are low enough that less than 30 groups a day are encountered. Areas that provide primitive opportunities during peak season would continue to do so year-round.

Off-season opportunities available on Moose Creek and Kroto Creek would remain similar to peak season. However, most of Moose Creek below Oilwell Road, and most of Kroto Creek below Amber Lake are capable of providing primitive opportunities when use levels drop. As discussed above, primitive opportunities are dependent on peak-season debris either being removed or covered by snow.

RECREATION ACTIVITIES, ICE-FREE SEASON

Powerboating

Jetboats, airboats, and propeller-driven craft are used on the Deshka River (Moose and Kroto Creeks), mostly in association with fishing. Powerboats are also used by hunters for moose and bear.

The Alaska Department of Fish and Game made aerial surveys of boating use from May 28 to July 13, 1988, to estimate the number and distribution of various types of boats. Table D-1 summarizes the survey results.

Deshka River Mouth. This is the most heavily used powerboating area on the river, visited by boats coming into the mouth from the Susitna River, and boats originating from the lodges and other private property in the lower one and one-half miles of the Deshka. Most powerboaters are salmon anglers, and catching fish is their primary purpose for being on the river. The availability of productive fishing encourages boaters to congregate in the most accessible and easily navigable stretch near the mouth. Expert users interviewed for the instream flow needs assessment indicated that all powerboats, including propeller-driven boats, can be used throughout the mouth area for the entire ice-free season (NPS, 1989).

So many boaters and other users crowd into this area that boating becomes a hazardous activity. The most congested area between RM 0.4 and the Susitna confluence has been signed as a "no wake" zone by the Alaska Boating Association. However, many boaters disregard this recommendation. Besides other water craft, boaters must share the lower river channel with float

planes. Traffic is too heavy in this subunit for it to continue to be unregulated; serious accidents will inevitably result. Alaska Department of Natural Resources (DNR) should consider establishing regulations to control both boats and planes in this subunit, and providing enforcement personnel. Such an idea was put forth several times in the public scoping meetings (DNR, 1989a).

Lower Deshka River. This subunit is also heavily used, and can be crowded at the peak of the king salmon run. Although it is generally boatable all summer, a riffle at the Department of Fish and Game cabin, at the downstream subunit boundary, can stop large boats and inexperienced boaters during low flows.

Middle Deshka River. Powerboat use on this river subunit is heavy until low flows restrict upstream travel. Boaters in this subunit typically have smaller boats with smaller motors than are found downstream, and are pursuing uncrowded fishing conditions, or following salmon upriver later in the run (NPS, 1989). Toward the end of the king salmon season, which is also the peak use period, dropping water levels make use of this subunit marginal for large jetboats, but for smaller jets, and airboats, conditions generally remain ideal until about July 15 (NPS, 1989). Between that date and the coming of late summer rains approximately one month later, the middle Deshka is boatable only by expert boaters in relatively small jet units who know the river well (NPS, 1989). Shallow riffles below and one mile above Laub's homestead hamper both the average user, and those in large boats, as does a boulder garden between RM 11.7 and RM 12.5 (NPS, 1989).

Neil Lake Area. Powerboat use is light, except at the downstream end near Trapper Creek, a popular fishing destination. Boating use in the upper reaches of this subunit is similar to the forks, with similar natural restrictions.

The Forks. This subunit receives light use by jetboats and airboats. Although airboats are not restricted by low flows, dropping water levels prevent jetboats from reaching the forks (NPS, 1989). This river subunit is navigable by jetboat for only a very short period, typically from June 15 until July 1, and again in late August after seasonal rains (NPS, 1989). Even during these periods of relatively high water, jetboaters must travel through several hazardous stretches to get to this area, and there is little incentive to do so when fishing is typically good downstream.

TABLE D-1. Boats on the Deshka River (Moose and Kroto Creeks), 1988

	2-49 HP	50-80 HP	> 80 HP	Inboards	Airboats	Rafts
The Forks (RM 29.7 - 22.7)	19 (6%)	5 (.5%)	4 (1%)	2 (0.5%)	26 (8%)	278 (83%)
Neil Lake Area (RM 22.7 - 14.5)	32 (11%)	28 (10%)	31 (11%)	13 (5%)	62 (22%)	115 (41%)
Middle River (RM 14.5 - 6.4)	31 (9%)	43 (13%)	40 (12%)	35 (11%)	126 (38%)	53 (16%)
Lower River (RM 6.4 - 1.7)	72 (15%)	109 (23%)	119 (25%)	118 (25%)	22 (5%)	35 (7%)
Mouth Area (RM 1.7 - 0)	260 (29%)	167 (19%)	228 (26%)	197 (22%)	7 (1%)	26 (3%)

Source: Alaska Department of Fish and Game, 1989b

Moose Creek. Moose Creek is essentially without powerboat use, because it is a small stream with occasional shallow riffles. However, floaters putting in on Moose Creek frequently have a kicker with them, for use downstream on the Deshka where the current becomes sluggish.

Kroto Creek. There is no powerboat use here. With half the flow of Moose Creek, Kroto is shallow, and choked with large boulders.

Rafting, Canoeing, and Kayaking.

Rafting is the dominant form of floatboating on the Deshka River (Moose Creek and Kroto Creek). The absence of whitewater discourages kayaking; kayaking and canoeing are also limited by the expense of transporting the boats into the area on the exterior of small float planes, although trips are available that do not require air access.

There are several float trip possibilities on Moose Creek and Kroto Creek, and continuing down the Deshka. Floaters can drive to the end of Oilwell Road on Moose Creek, and float either to Neil Lake or to the Deshka mouth. Taking out at Neil Lake requires float plane pick up, but is preferred by users who want a predominantly semi-primitive experience and wish to avoid crowded conditions at the mouth. Floaters who continue on to the mouth of the Deshka must also fly out, or leave a vehicle at either Deshka Landing or Susitna Landing, and arrange for a powerboat shuttle back to the landing. Floaters who take this longer trip are attracted by the additional salmon fishing opportunities, since on Moose Creek salmon must be released. Both trips involve similar costs; basically, users choose their trip depending on whether salmon fishing or semi-primitive opportunities are their first priority. Other considerations are desired trip

length, and river character. Continuing beyond Neil Lake to the mouth affords an additional two days of floating. On the other hand, the river current becomes very sluggish in the lower reaches, and a kicker is commonly used. During peak use season, both trips are popular. Oilwell Road to the Deshka mouth seems to attract slightly more use when the king salmon run peaks in the second half of June. Another Moose Creek trip is to fly in to the lake one and one-half miles northwest of Amber Lake (labeled as "Whistling Lake" on U.S. Geological Survey maps, but not popularly known by that name). The lake's outlet stream is floatable; upon reaching Moose Creek floaters can continue to Neil Lake or to the Deshka mouth.

In addition to serving as a take-out, Neil Lake is also a put-in for floaters who continue to the mouth. This trip is primarily done by avid anglers during the king or silver salmon runs.

On Kroto Creek, floaters can fly in to Amber Lake and float to Neil Lake or the mouth. While it is possible to put in on Kroto Creek at the Petersville Road crossing, this trip is rarely done. Upper Kroto Creek is very shallow, narrow, and boulder strewn, and floaters must frequently get out and pull their boats over or around rocks, gravel bars, and sweepers. Kroto Creek above Amber Lake is reportedly floatable only at very high flow, usually in the second half of June (NPS, 1989).

From Oilwell Road to the mouth of the Deshka is a leisurely five- or six-day float, although it can be done in four days with a kicker. Oilwell Road to Neil Lake is a two- to three-day trip. Amber Lake to Neil Lake is about two days. Each trip can be extended an additional one to two days to allow more time for other activities, such as fishing, hunting, or exploring away from the water column.

Like powerboaters, peak-season floaters come to the Deshka River (Moose and Kroto Creeks) primarily to fish for salmon, and also resident species. Its proximity to Anchorage and gentle gradient suitable for novices are other qualities that influence floaters to choose the Deshka over other streams (DNR, 1989a).

Kickers -- small outboard motors of about 5 horsepower or less -- are commonly used by floaters who put in on Moose Creek or Neil Lake and travel to the mouth. They are rarely used by floaters who take out at Neil Lake. The current is generally swift enough that they are not needed, and there are relatively few sections where they can be safely used.

User conflicts between powerboaters and floaters are apparent in the forks area (RM 29.7 to 22.7). Evidently, floaters expect to see powerboats lower on the river, but many wish to see motors prohibited either above Neil Lake or above the Moose Creek-Kroto Creek confluence (DNR, 1989a). To some it's a safety issue, others appear simply to want to maintain a non-motorized experience, free of motor noise.

Fishing

As already mentioned, fishing is the dominant recreation activity that draws people to the area. More anglers are present during the height of the king salmon run than at any other time, which for 1989 was mid June to early July. A second, somewhat lower peak in fishing activity corresponds to the silver salmon run, which generally peaks in late July to early August. During

the nine fishing seasons from 1979 through 1987, considerably more king salmon were harvested from the Deshka than from any of the other five recreation rivers. It is also evident, that at least during the years 1986 through 1989, anglers expended considerably more effort on the Deshka than on the other recreation rivers during the king salmon season (Ibid). The Deshka has developed a reputation for king salmon fishing that influences anglers to crowd into the area when the kings are running. Although salmon fishing is the most popular, significant numbers of rainbow trout are caught each year, along with other species, as Table D-2 shows.

More detailed information about fishing is presented in Chapter 4 of this report.

TABLE D-2. Sport Fishing Harvest on the Deshka River, 1987

Species	Number Harvested	Percent of Total Harvest
King salmon	4,622	31
Rainbow trout	3,006	20
Silver salmon	2,789	19
Burbot	1,123	8
King salmon under 16"	1,010	7
Grayling	942	6
Pink salmon	652	4
Red salmon	272	2
White fish	163	1
Dolly Varden/arctic char	72	< 1
Chum salmon	54	< 1
Lake trout	36	< 1

Source: Mills, 1988

Hunting

Moose, black bear, and brown bear are the principal species sought. The Deshka River/Moose Creek drainage is one of the most important moose harvest areas in the Susitna Basin (Wildlife Fed. of Alaska 1987). More detailed information about hunting is presented in Chapter 4 of this report.

WINTER RECREATION ACTIVITIES

After freeze-up the Deshka River becomes a winter trail which, along with other trails discussed under *Access*, is the focus of winter activities such as dog mushing, cross country skiing, snowmachining and ORV use, and ice fishing.

Deshka River outfitted dog sled trips are offered by the Deshka Silver-King Lodge (RM 0) from January to April each year (Dick, 1989). These trips begin at Crystal Lake, which is reached from Nancy Lake Parkway, off the Parks Highway at mile 67.2.

RECREATION SITES

Undeveloped Sites

There are no developed recreation facilities within the Deshka River corridor. Undeveloped recreation sites discussed below and shown on maps 1 through 12 were inventoried during July 1989. Kroto Creek and upper Moose Creek above Oilwell Road have not been inventoried yet. Both the maps and discussion below should be reviewed for a full appraisal of recreation sites; the maps contain information on additional sites not specifically mentioned in the text.

Deshka River Mouth. This area is shown on map 1. Between the Susitna River and RM 1.5, individual sites were not inventoried; the proliferation of tent camps would have made this a futile task. Below RM 0.8, the left bank is lined with continuous tent camps, sometimes two or three deep. In effect, the entire area is a primary campsite. Many of the camps were unoccupied during the inventory, which occurred after king salmon fishing closed, and before silver salmon had entered the river in large numbers. Anglers customarily leave their tents and tarps behind to "reserve" their sites for the silver salmon run.

In the one-quarter mile between RM 1.5 and 1.7, six sites were inventoried, five upland sites and one gravel bar. Three of the sites were under long-term use, one by a commercial boat charter and another by an air taxi service, as evidenced by business signs.

Lower Deshka River (Map 1).

Primary Sites — A campsite alongside a productive fishing hole is considered a primary site. It appeared to be under long-term occupation when observed on July 26, 1989.

Secondary Sites — Fifteen campsites were seen between Laub's homestead and the Department of Fish and Game cabin, or an average of 3.2 sites per mile. Six sites were on the uplands, nine were gravel bars. Eight of the sites were occupied when they were observed on July 26 and 27, 1989. Some camps appeared long-term, and at least four of them looked unused for several weeks. As described above, these camps were presumably left to reserve the sites.

Middle Deshka River (Maps 1 and 2). Good campsites are scarce in this subunit. Only three secondary campsites were observed on July 26, 1989 -- one gravel bar and two upland sites, for an average site density of 0.4 per mile. An additional four marginal sites are available, but these are either too muddy, uneven, or with gravel too large to be considered as anything other than a campsite of last resort.

Neil Lake Area (Maps 2 and 3). Between the Neil Lake slough and the mouth of Trapper Creek, 29 secondary sites were inventoried on July 26, 1989. All of these sites were gravel bars, at an average density of 3.5 sites per mile. No primary sites were identified. Although the mouths of Trapper Creek and Cabin Creek are important fishing spots, there were no sites that showed evidence of heavy use at or near these confluences. Presumably, most anglers who fish these creek mouths are day users, or campers based downstream.

The Forks (Map 3)

Twenty-one primary and secondary campsites were inventoried in this subunit, 19 gravel bars and 2 upland sites. The average density is three sites per mile. None of these bars were submerged after the heavy rains. Although some were smaller, all were large enough for camping.

Primary Sites -- The primary sites all show evidence of heavy use. One site just upstream from the slough to Neil Lake (number 127) has a primitive latrine.

Moose Creek (Maps 3 through 8).

Primary Sites -- The end of Oilwell Road (RM 57.5, see Map 6) widens into a gravel fill parking area approximately 60 by 150 feet. A bridge provides access to an ORV trail to the Amber Lakes area, where there is private property. Although there are no other improvements at this important public use site, it serves as both a camping and day-use fishing area, and as a launch site for float trips.

A gravel bar about one-tenth mile above the Kroto Creek confluence is the only other primary site identified on Moose Creek.

Secondary Sites -- Between Oilwell Road and the Moose Creek-Kroto Creek confluence, 86 secondary campsites were inventoried during relatively low water levels on June 30 and July 1, 1989 -- three upland sites and 84 gravel bars, for an average density of 3.1 sites per mile. Three and one-half weeks later, approximately half of these sites were submerged or nearly so, after six days of steady rain.

Kroto Creek. This stream has not been inventoried.

Site Conditions and Adequacy of Sites Relative to Existing Use

From the camps left standing, it is obvious there are not enough sites to satisfy public demand on the lower river, particularly near the mouth. A large campground (or more than one) is clearly needed in this area. The Mat-Su Borough has established such a facility. The borough also requires a permit for camping on the uplands on the lower river which it owns.

Other primary sites exhibit a need for management attention. On Moose Creek, toilets and trash collection should be provided at the end of Oilwell Road, to protect public health and safety. Use is high enough that a campground should be considered for this location. The desire for a campground/boat ramp at Oilwell Road was frequently heard at the public scoping meetings for the recreation rivers plan (DNR, 1989a).

River campsites near the slough to Neil Lake (particularly primary site #127 on a gravel bar at RM 23) have relatively heavy accumulations of trash and human waste. From the debris left by peak-season visitors, use appears heavy enough to justify providing a toilet, and periodic litter removal (not trash collection). Although Neil Lake itself is outside the recreation river area, it gets heavy use as a float trip put in and take out, and for fly-in day use fishing. A cabin and outhouse on the southeast shore are identified by a sign as a "public access site." However, the site is not managed by any governmental agency, and is without regular cleaning and maintenance. Users come and go on a daily basis throughout peak use season, and a large mound of bagged and loose trash has accumulated at this site.

Human waste and trash are also prolific at the Moose Creek-Kroto Creek confluence. This area would benefit greatly from toilets and seasonal litter removal. Elsewhere on the river, undeveloped sites generally appear adequate to handle existing use.

TABLE D-3. Deshka River: Important Recreation Sites & Facilities on Public Land

Type	River Mile	Description	GIS No.
Primary Camping, Fishing Area	0-0.8	Left bank; continuous camps, Deshka River Lodge to mouth.	221
Fishing Area	6.1	Fishing hole with associated campsite, left bank.	190, 189
Fishing Area	14.1	Cabin Creek mouth.	none
Fishing Area	14.5	Trapper Creek mouth.	none
Staging Area	Neil L.	Float trip put-in/take-out; Day & overnight fishing use. Cabin on-site.	132
Primary Campsite	23	Gravel bar just above Neil Lake entrance.	127
Primary Campsites (3)	29.6-29.8	"The Forks." First spot that floaters can catch & keep salmon.	106-109
Float Trip Put-In	Whistling L.	Air taxi drop-off for Moose Creek/ Deshka float.	16
ORV Trail	57.5	Connects Oilwell Rd. terminus with Amber Lakes area.	2
Staging/Camping Area	57.5	Oilwell Rd. terminus. Float trip put-in, also camping, fishing area.	2

**The maps that follow this page indicate the
Deshka River (Moose and Kroto Creeks) Recreation Opportunity Classes**

**During Peak Use Period
(mid-June to early July)**

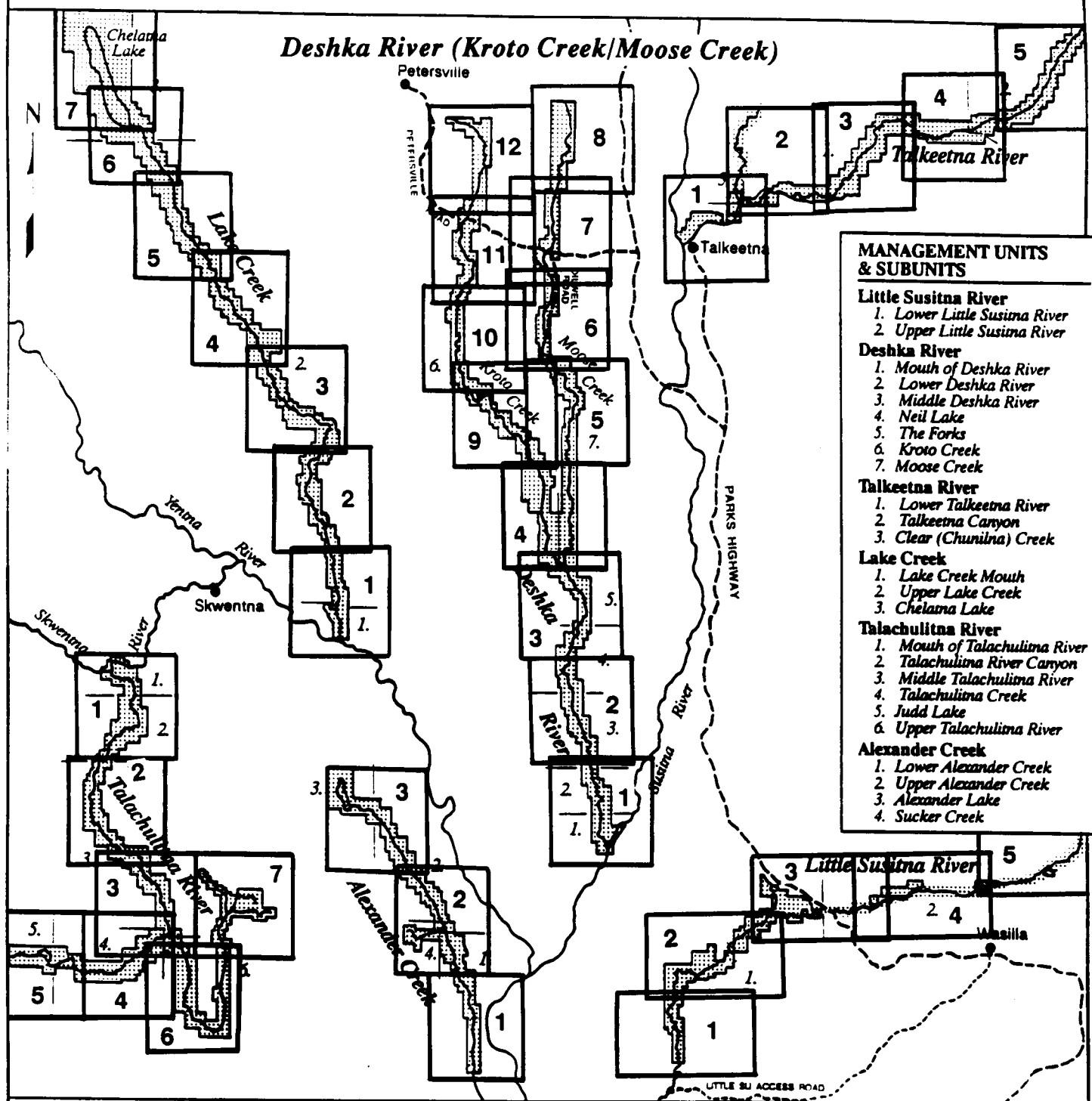
and

Recreation Sites on Public Land.

Deshka River Recreation Resources and Use

SUSITNA BASIN RECREATION RIVERS MANAGEMENT PLAN

Index Map

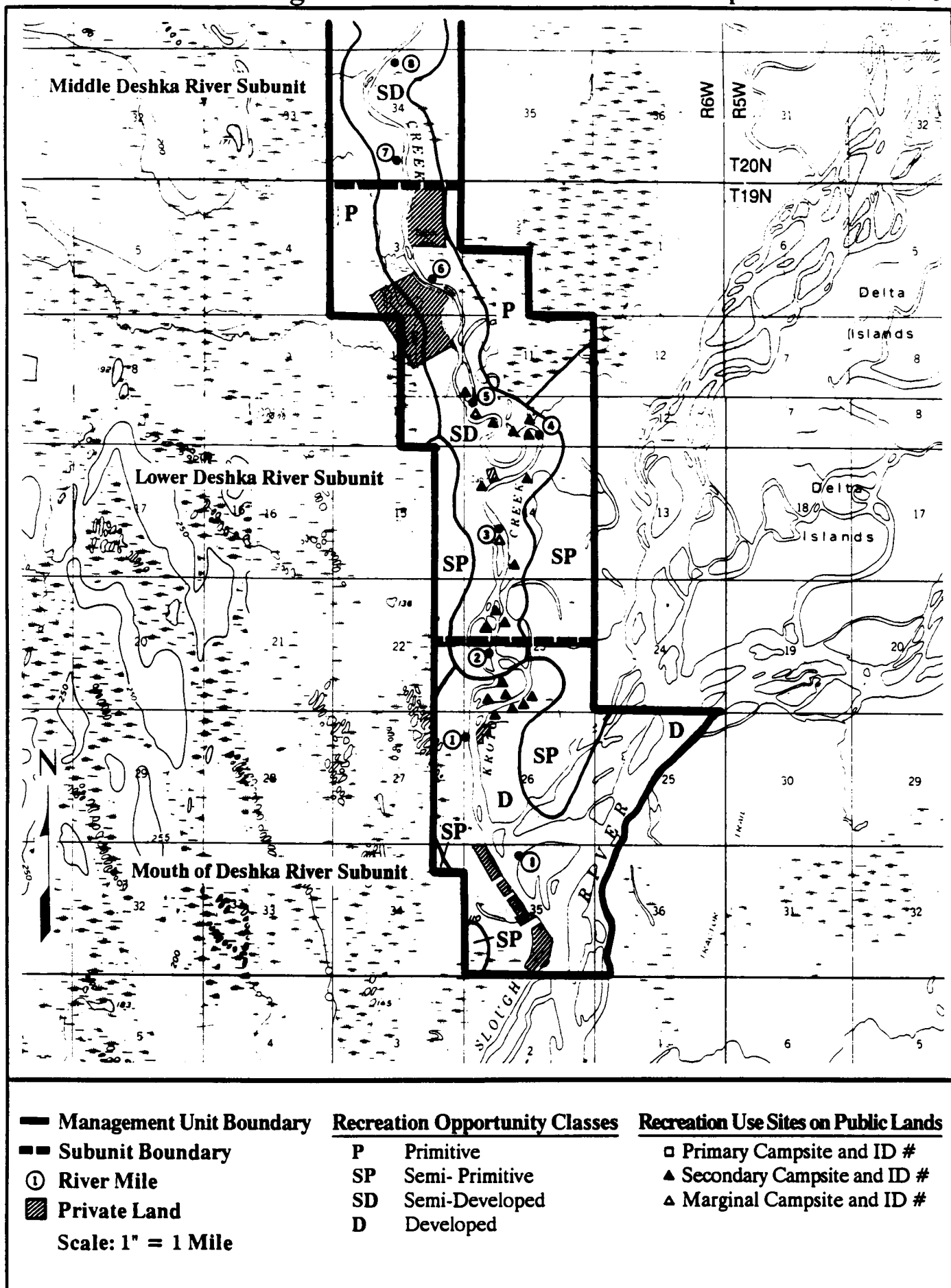


1 Index To Adjoining Maps

Recreation Rivers Corridors

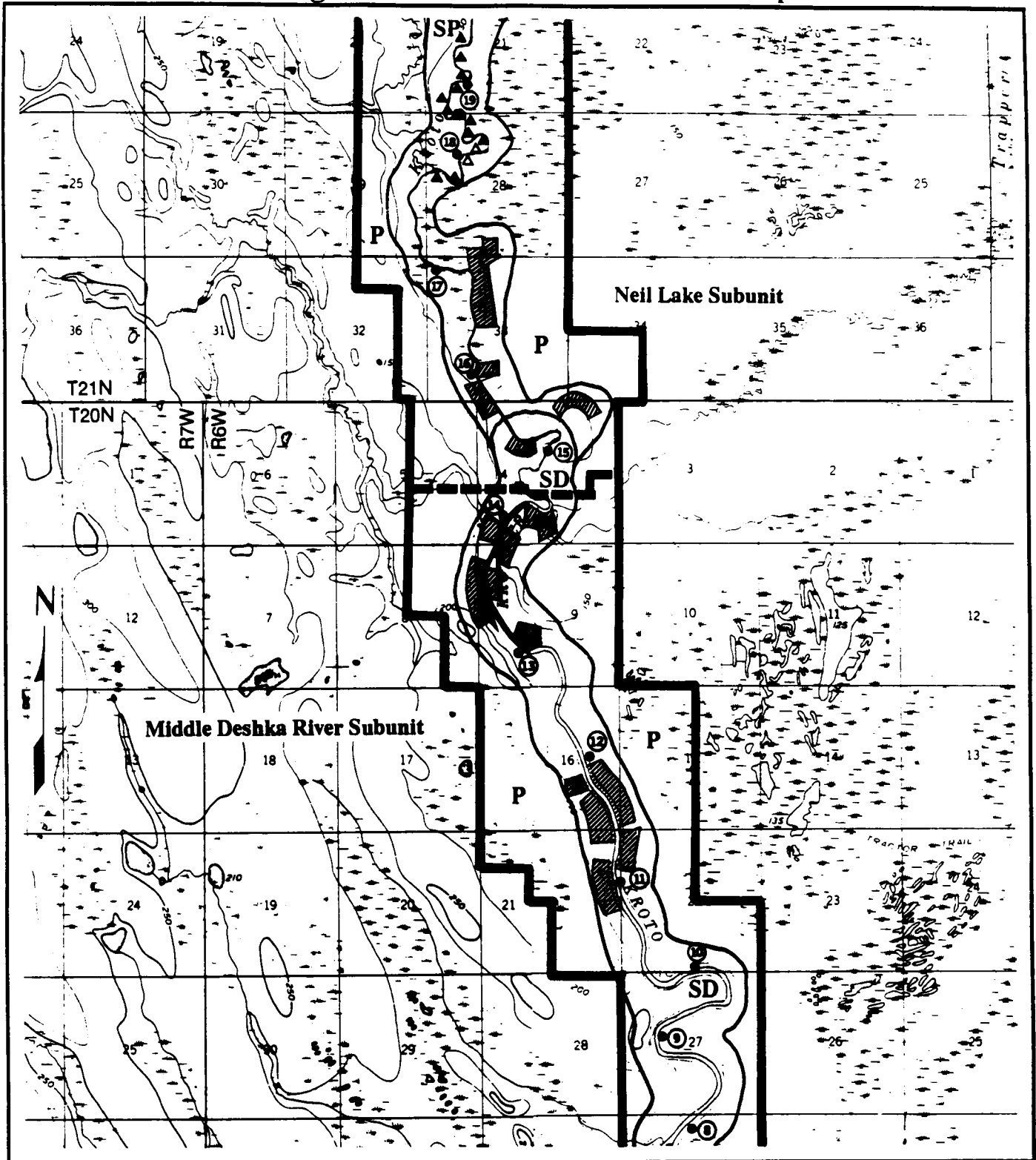
Deshka River Management Unit

Map 1: River Miles 1 - 8



Deshka River Management Unit

Map 2: River Miles 9 - 19



Management Unit Boundary

Subunit Boundary

① River Mile

Private Land

Scale: 1" = 1 Mile

Recreation Opportunity Classes

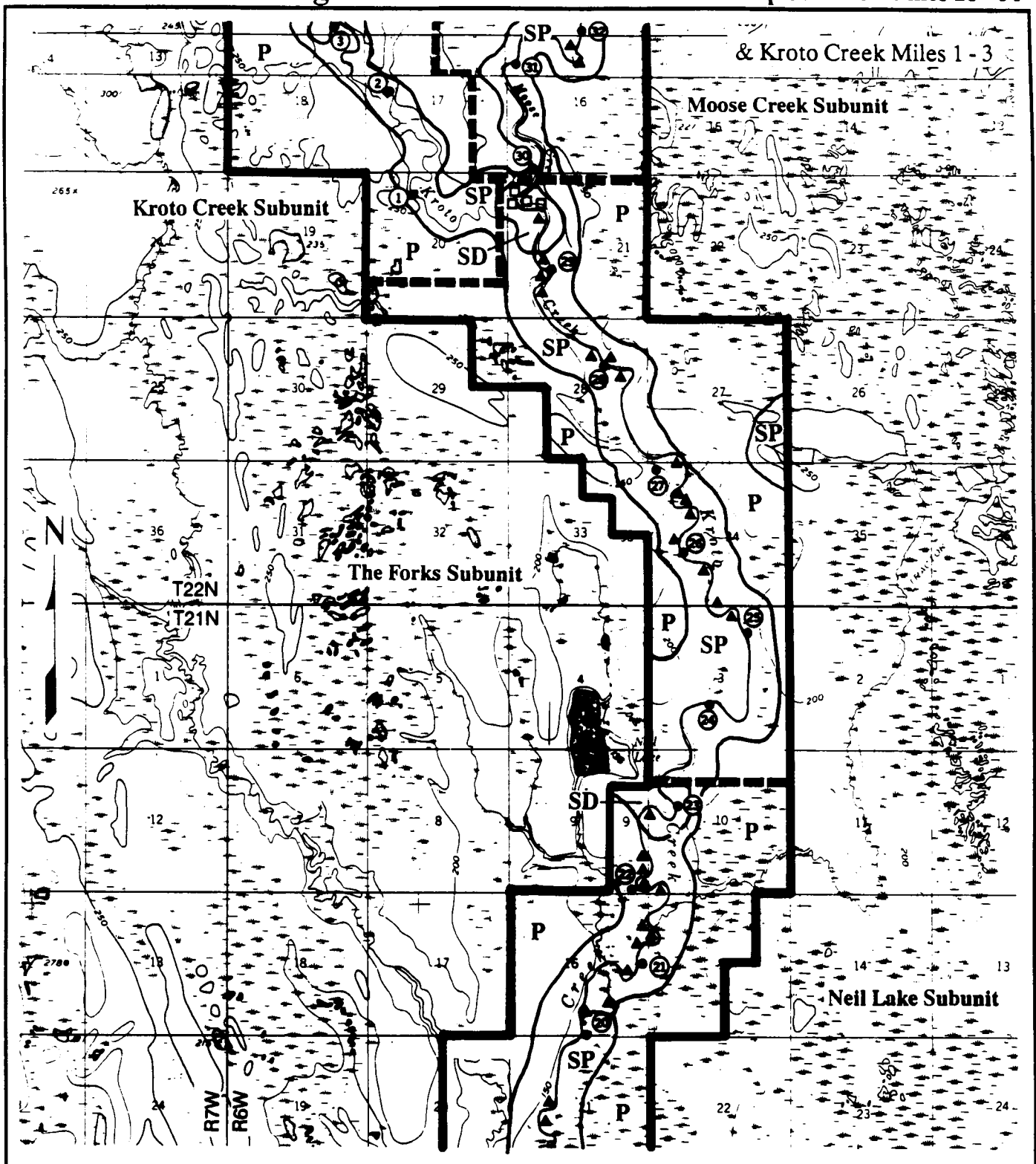
- P Primitive
- SP Semi- Primitive
- SD Semi-Developed
- D Developed

Recreation Use Sites on Public Lands

- Primary Campsite and ID #
- ▲ Secondary Campsite and ID #
- △ Marginal Campsite and ID #

Deshka River Management Unit

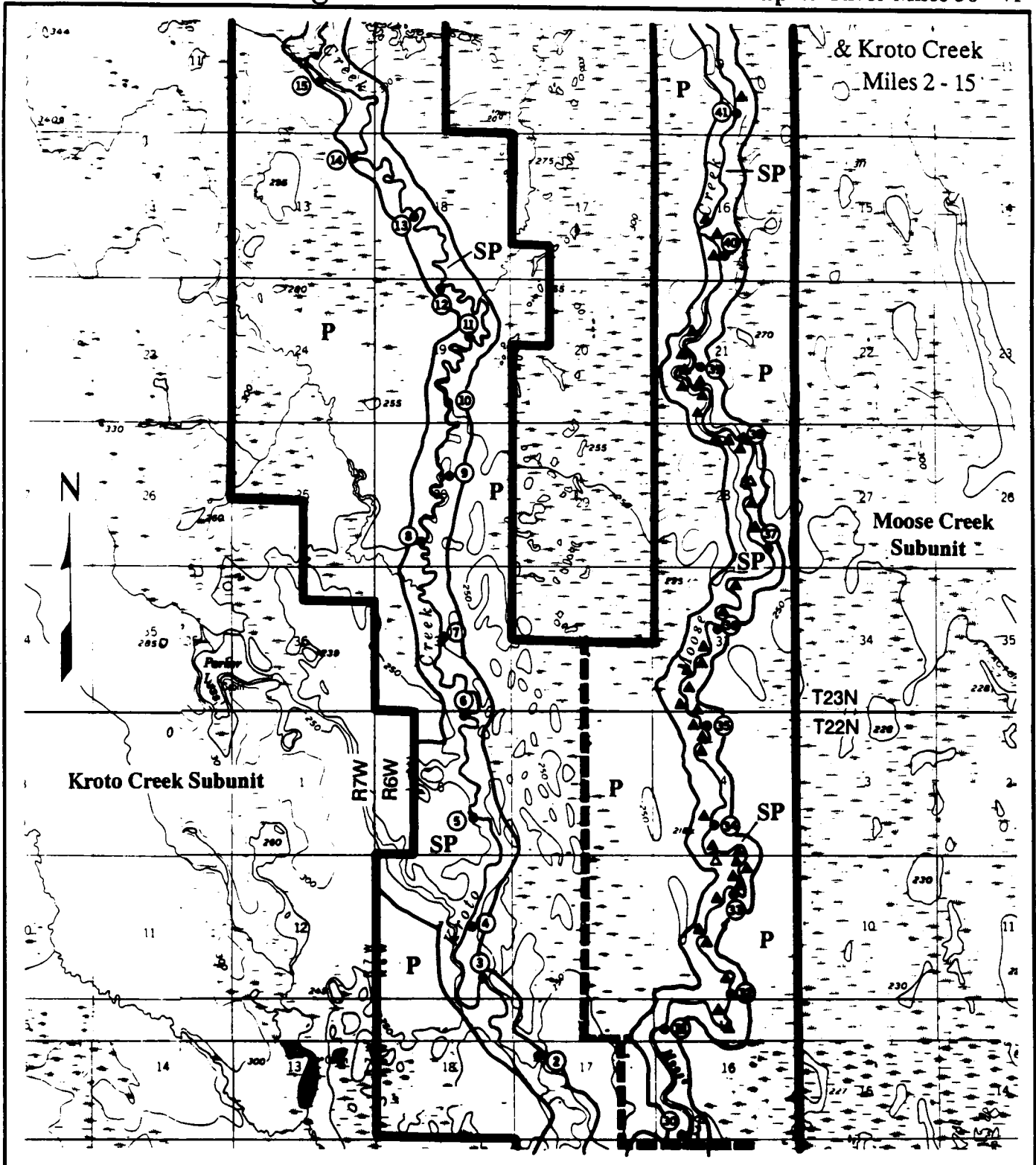
Map 3: River Miles 20 - 31



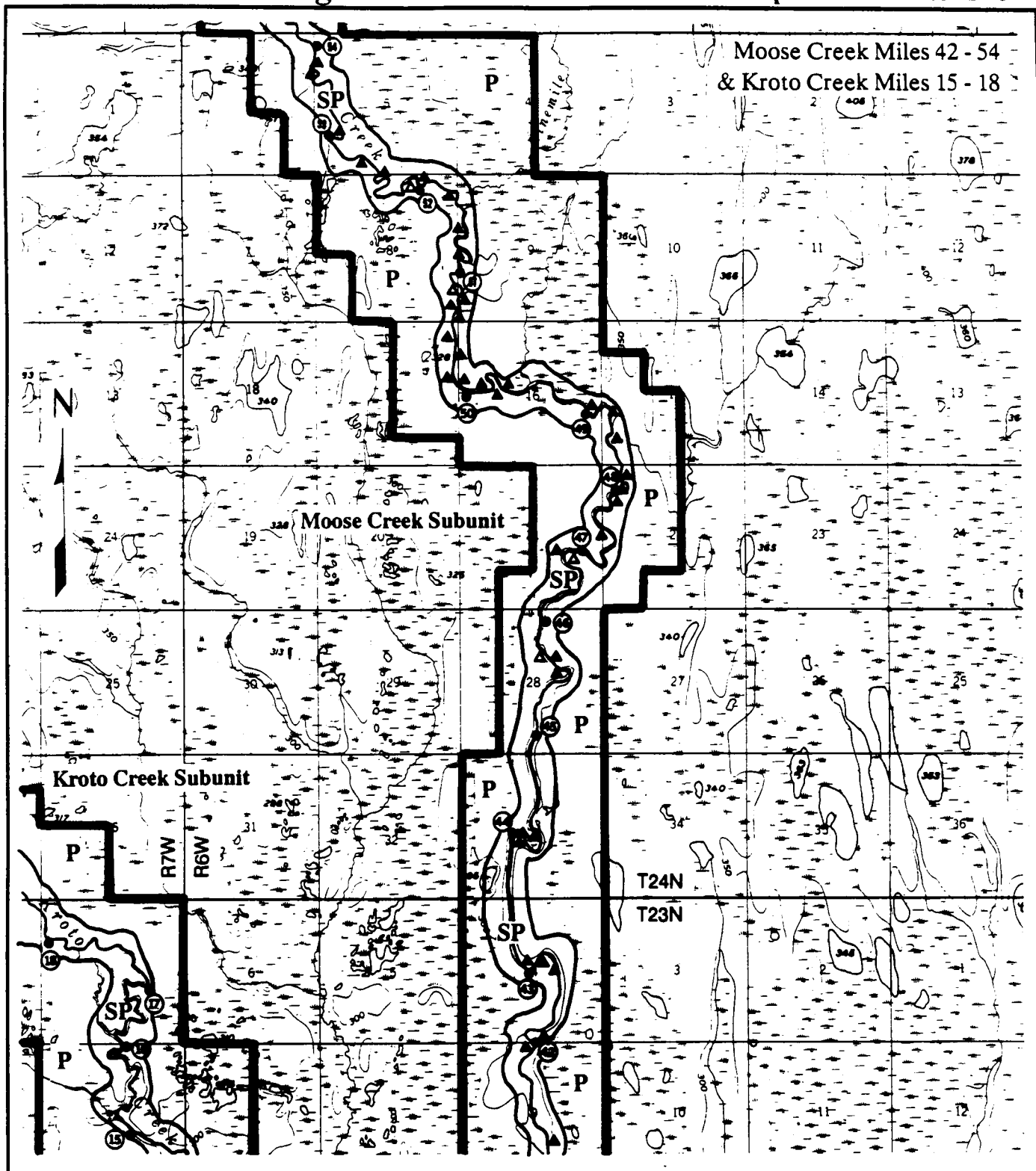
Management Unit Boundary	Recreation Opportunity Classes	Recreation Use Sites on Public Lands
— Subunit Boundary	P Primitive	□ Primary Campsite and ID #
① River Mile	SP Semi-Primitive	▲ Secondary Campsite and ID #
▨ Private Land	SD Semi-Developed	△ Marginal Campsite and ID #
Scale: 1" = 1 Mile	D Developed	

Deshka River Management Unit

Map 4: River Miles 30 - 41



Management Unit Boundary	Recreation Opportunity Classes	Recreation Use Sites on Public Lands
Subunit Boundary	P Primitive	□ Primary Campsite and ID #
① River Mile	SP Semi-Primitive	▲ Secondary Campsite and ID #
▨ Private Land	SD Semi-Developed	◈ Marginal Campsite and ID #
Scale: 1" = 1 Mile	D Developed	



— Management Unit Boundary

— Subunit Boundary

① River Mile

▨ Private Land

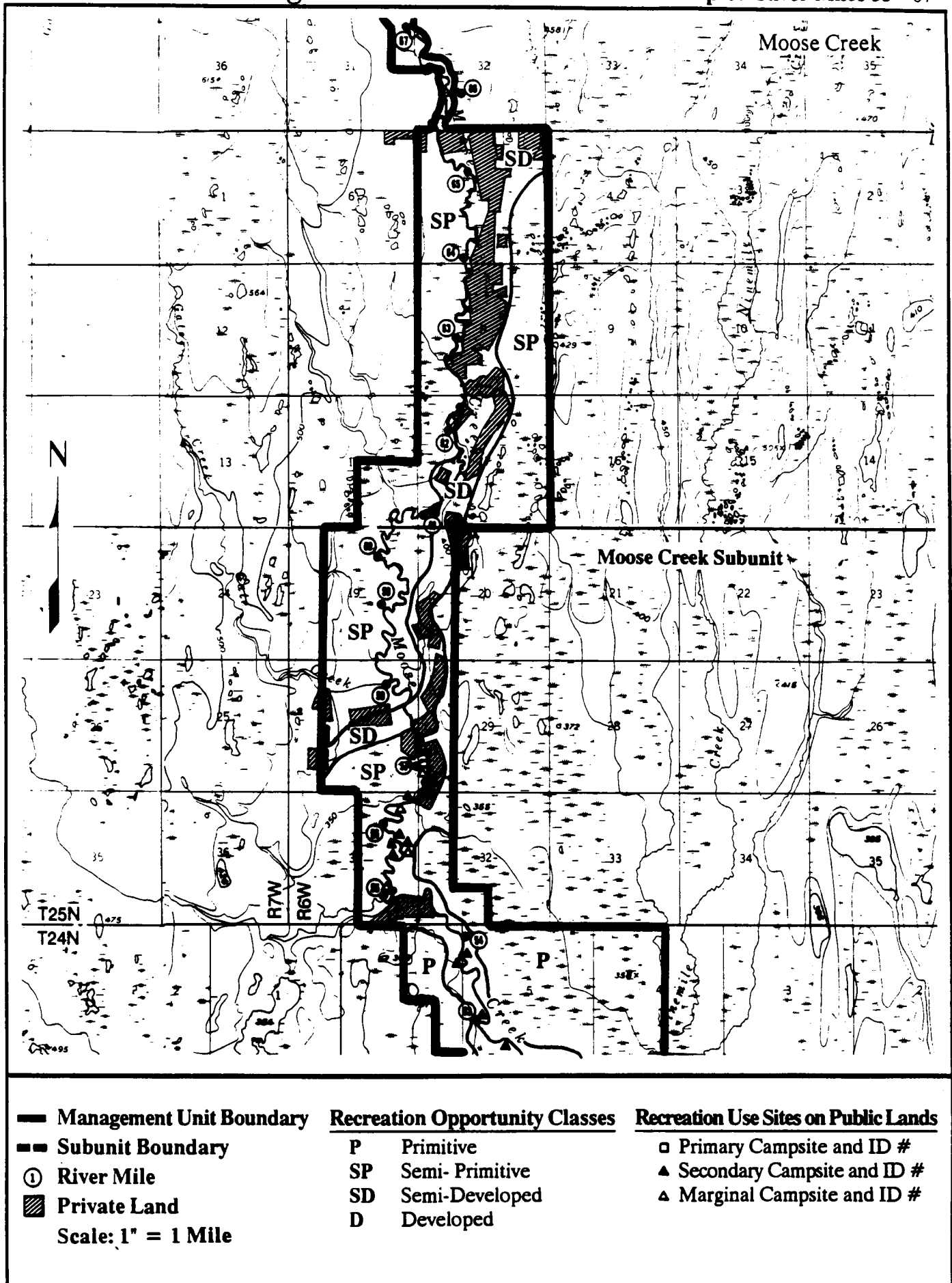
Scale: 1" = 1 Mile

Recreation Opportunity Classes

P Primitive
SP Semi-Primitive
SD Semi-Developed
D Developed

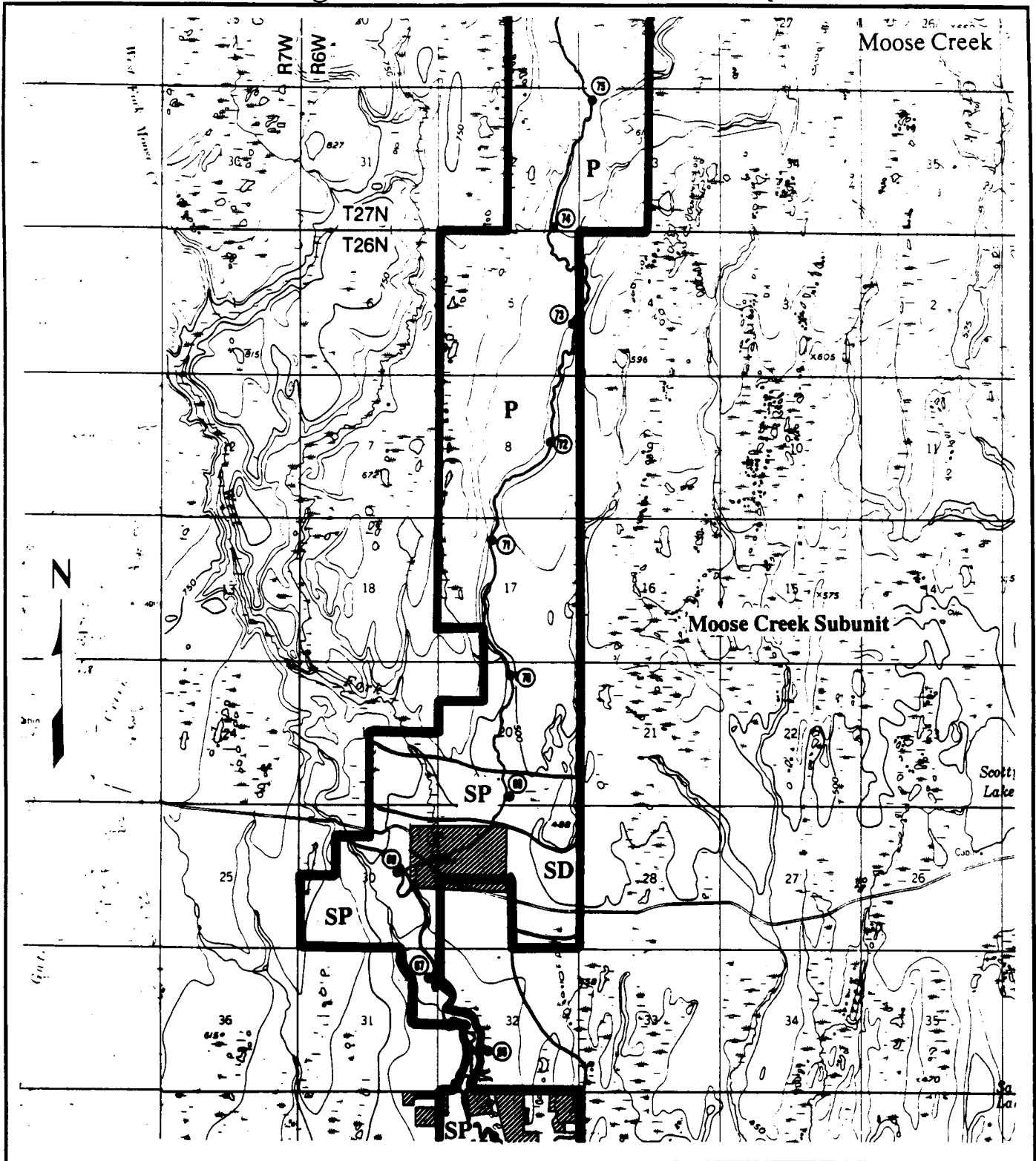
Recreation Use Sites on Public Lands

□ Primary Campsite and ID #
▲ Secondary Campsite and ID #
▲ Marginal Campsite and ID #

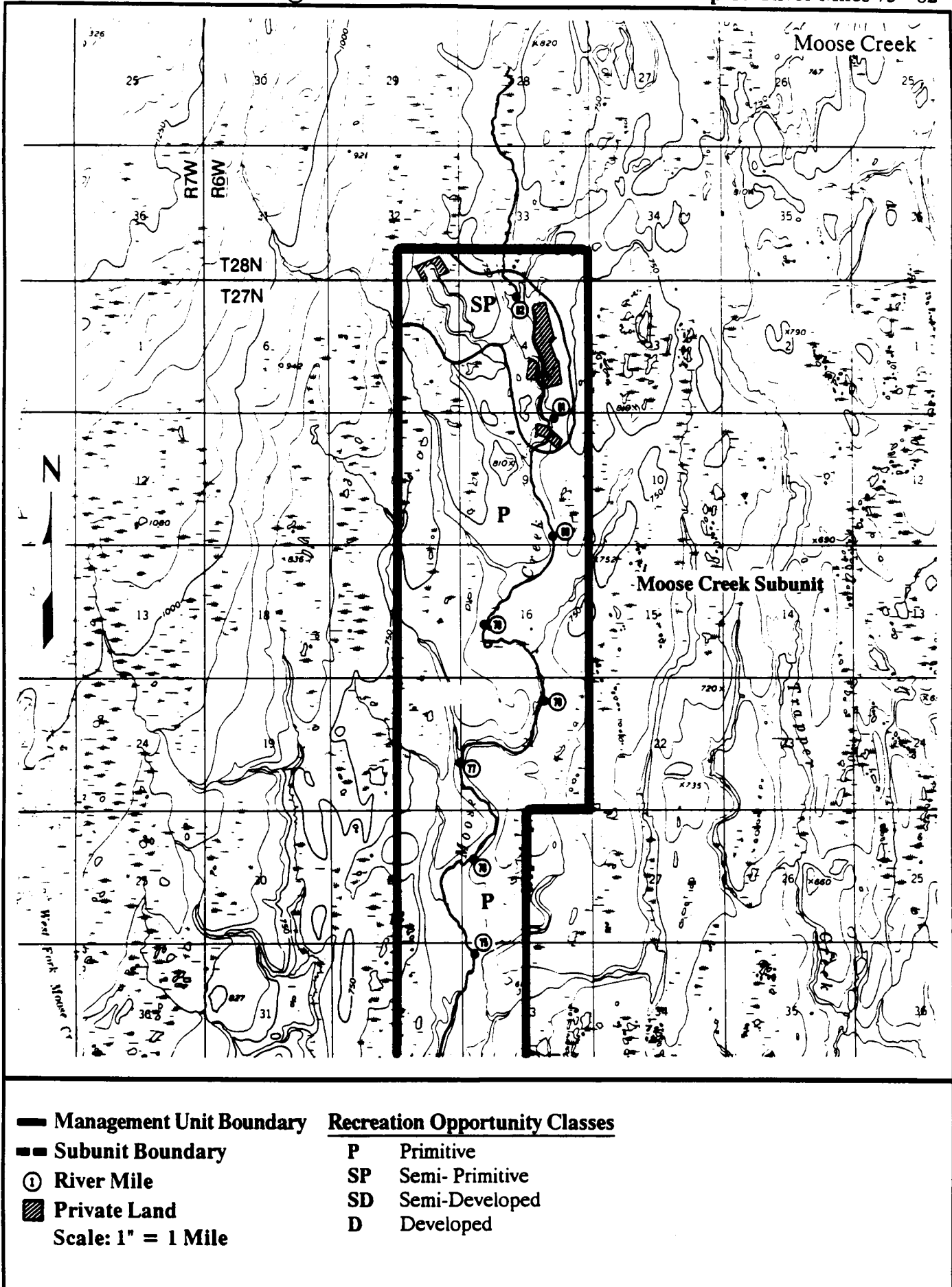


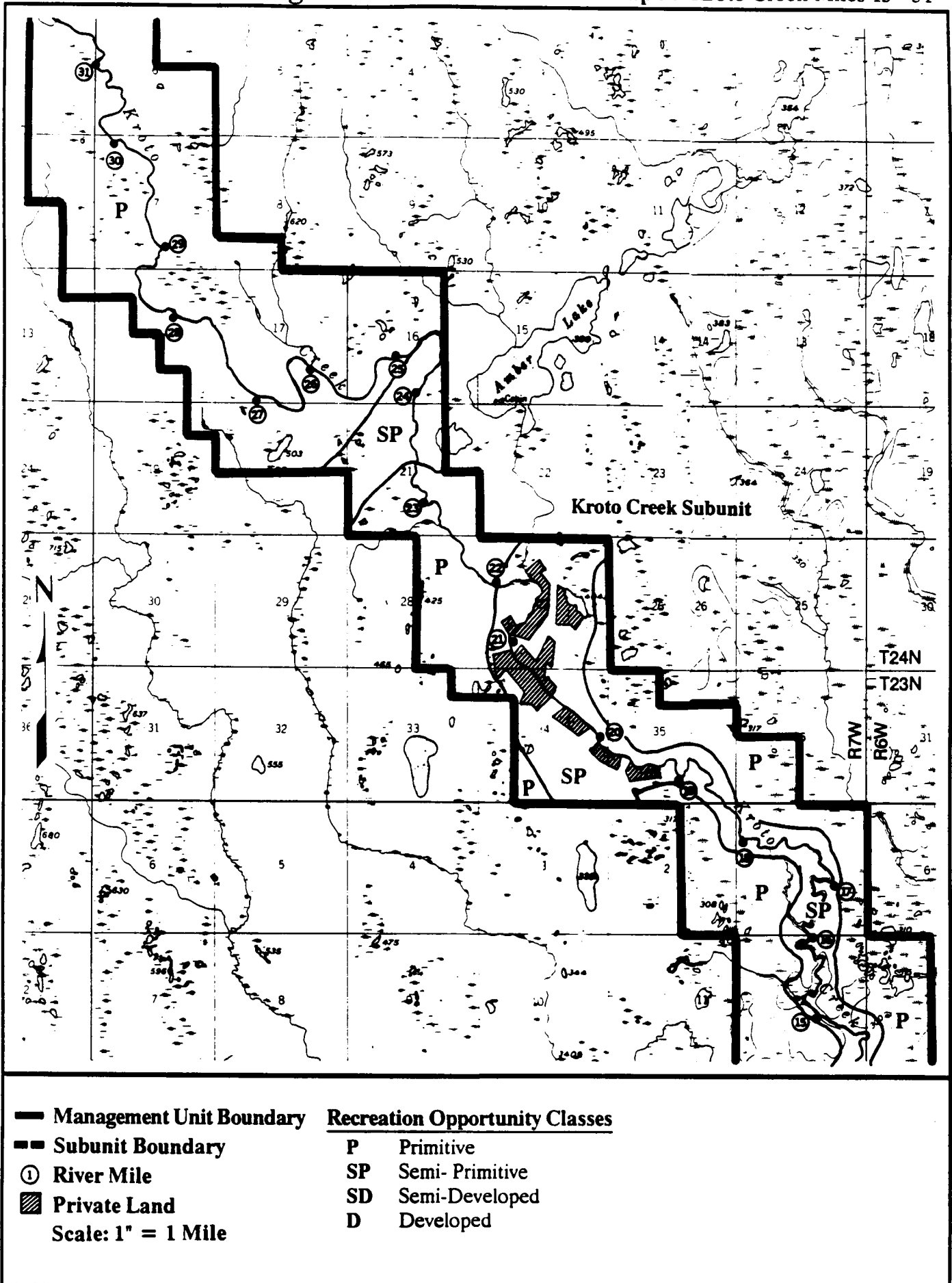
Deshka River Management Unit

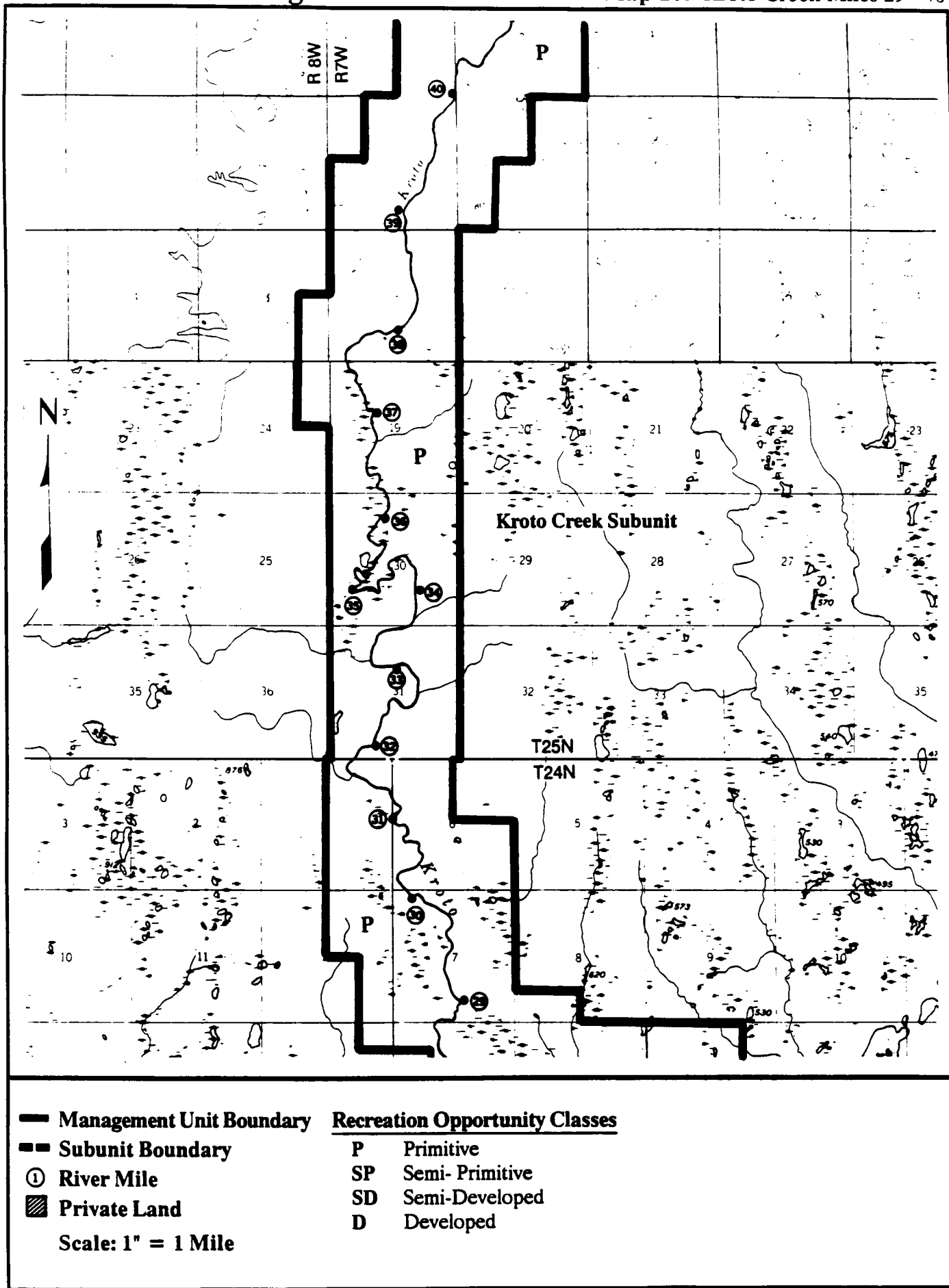
Map 7: River Miles 66 - 75

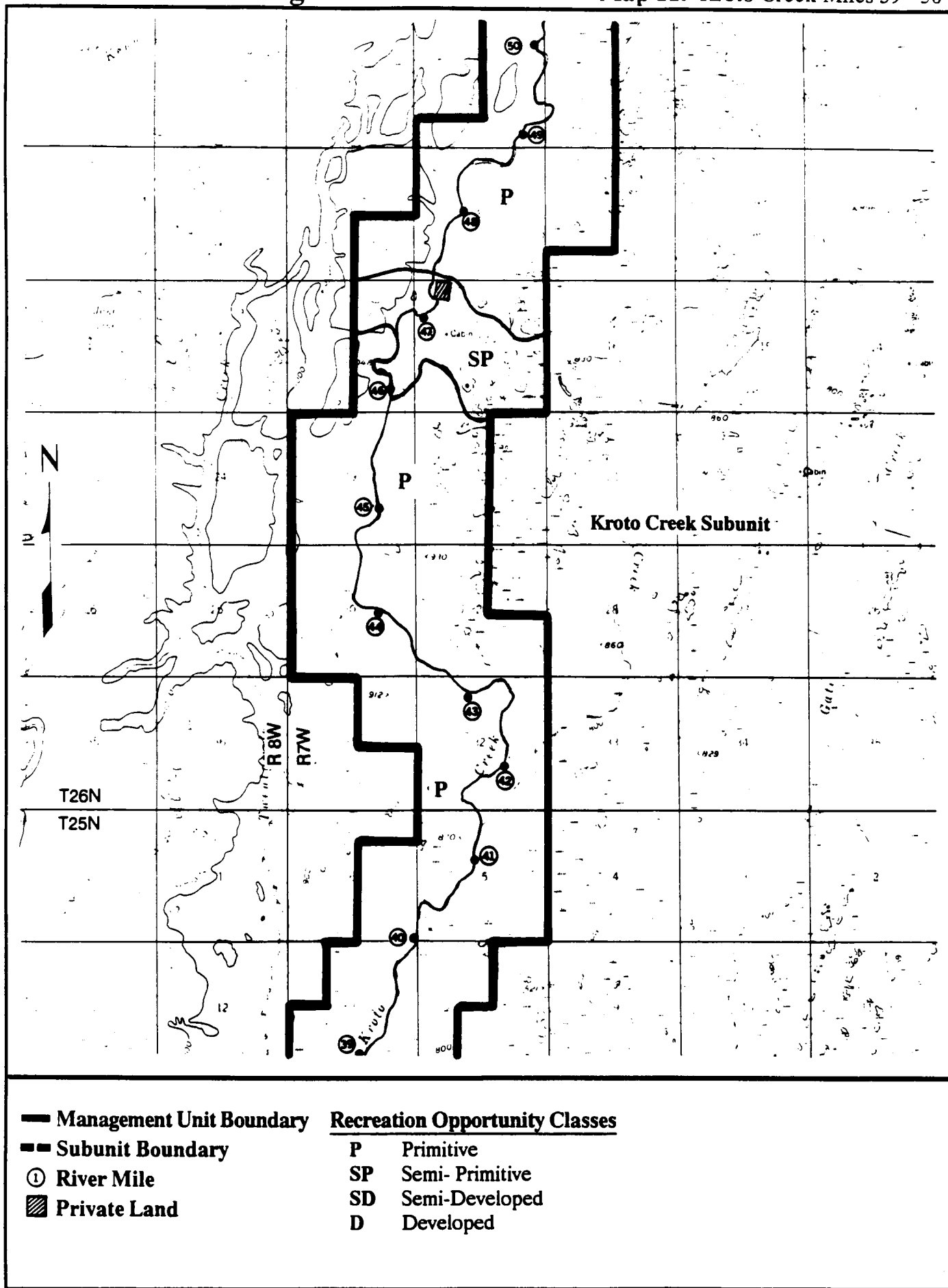


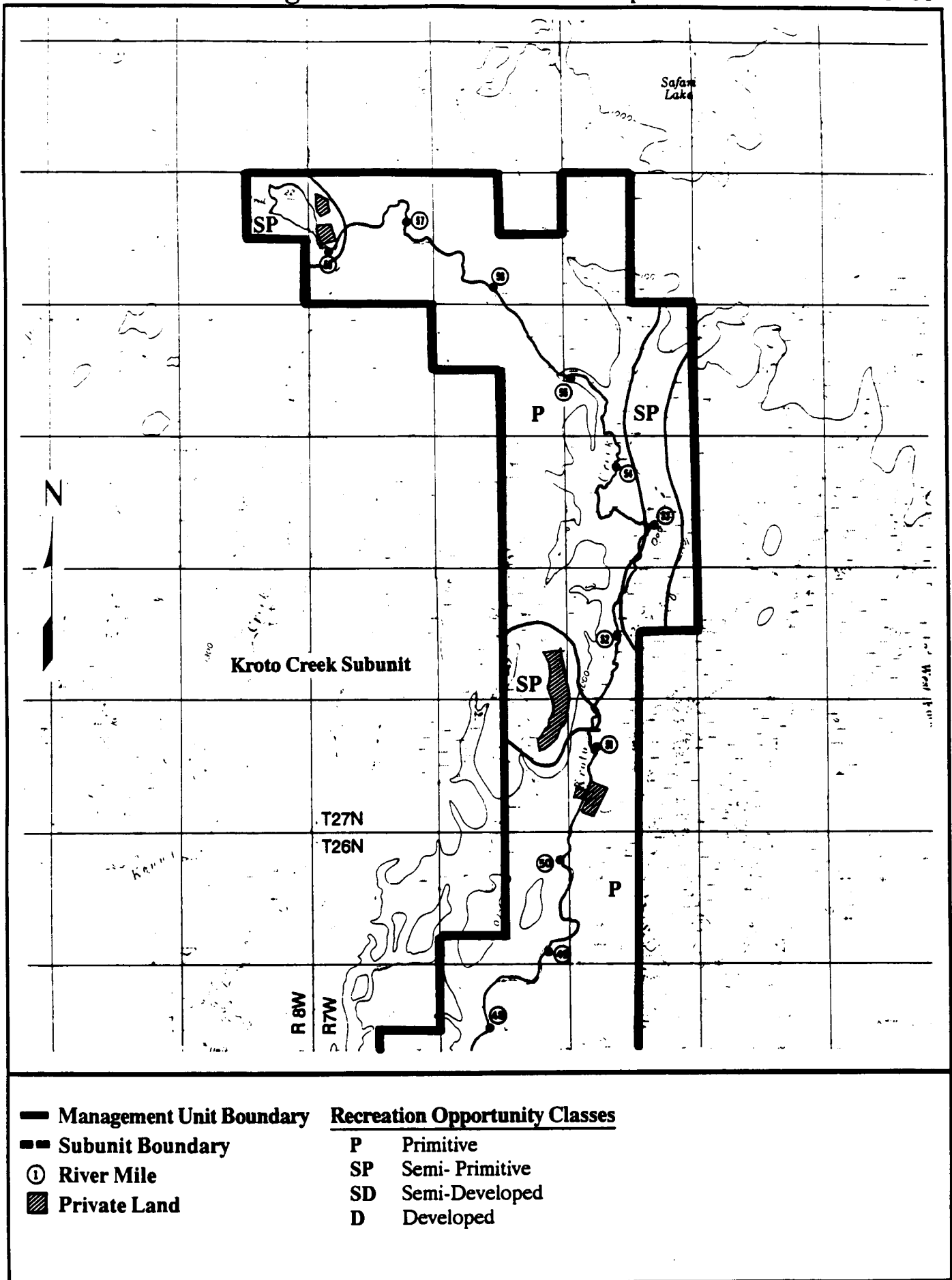
- | | |
|-----------------------------------|---------------------------------------|
| — Management Unit Boundary | Recreation Opportunity Classes |
| ▬ Subunit Boundary | P Primitive |
| ① River Mile | SP Semi- Primitive |
| ▨ Private Land | SD Semi-Developed |
| Scale: 1" = 1 Mile | D Developed |











TALKEETNA RECREATION RIVER

LOCATION, BOUNDARIES, AND MAJOR USES

The Talkeetna River is about 80 air miles north of Anchorage, Alaska. It is approximately 97 river miles long, flowing southwest from its source in the Talkeetna Mountains to where it joins the Susitna River at the town of Talkeetna. The lower 45 miles of the Talkeetna River and 9.5 miles of Clear Creek, a major tributary, are part of the Talkeetna Recreation River. On Clear Creek, the recreation river consists only of the water column and streambed, as it does downstream on the Talkeetna's south bank, where residential developments are located.

The Talkeetna River supports major spawning populations of silver, king, and chum salmon, plus grayling, and Dolly Varden trout. The Talkeetna River's popularity is enhanced because its mouth is road accessible. Besides fishing, other major activities during the ice-free season are float and motorboating, and hunting.

ACCESS

Primary Access

The Talkeetna River is accessible by highway, air, or boat; its mouth is approximately a 100-mile drive from Anchorage. From the Parks Highway, a spur route serves the town of Talkeetna, where there is a boat launch at river mile (RM) 0.2. This launch is owned by the City of Talkeetna and operated by a concessionaire. Boaters can also reach the Talkeetna River by traveling up the Susitna River from Susitna Landing, at mile 82.5 of the Parks Highway.

Wheel plane access is available at the Talkeetna airfield, and at an unimproved gravel bar that serves as a primitive airstrip at the mouth of Clear Creek. A gravel bar at RM 16, one mile above the Sheep River, was formerly used as strip but has been rendered unusable in recent years by floods. Above the recreation river, several sites serve as aircraft landing areas and staging areas for recreational float trips. In the past the most popular trip was to fly in to Murder or Stephan Lake and float down Prairie Creek to join the Talkeetna at RM 51.5. However, the land around Murder Lake is owned by a Native corporation. The corporation has recently restricted use of the area; its future availability as a float trip staging area remains uncertain. Alternative sites, gravel bar strips accessible by Super Cub and 185, are at Buck Stewart's camp and at Yellow Jacket Creek. Of these two, Yellow Jacket is the better site; Buck Stewart's strip has been washing out and is now down to 700 feet from its former length of 800 feet (Jacques, 1989).

An off-road vehicle (ORV) trail runs from Talkeetna out to Larson Creek (RM 12.7), providing access to private property and important public access for fishing and hunting. It is largely outside the river corridor.

Secondary Trail Access

The Talkeetna-Larson Creek route mentioned above is intersected by the intertie power transmission line at RM 10, which also serves as an ORV trail. At Larson Creek, there are three main spur routes (outside the river corridor). These are the Bald Mountain ORV trail, the Talkeetna Bluffs Addition trail, and a trail that follows Larson Creek to Larson Lake. Another secondary ORV trail was observed at RM 14.4 during the field trip in late September, 1989. It apparently connects the private property at RM 14.7 with the Larson Creek trail system. There are other secondary trails particularly in the Talkeetna Bluffs Subdivision.

Additional details about access to and within the area are presented in Chapter 7 of this report.

RECREATION RESOURCES: THE PHYSICAL SETTING

General Characteristics of Each River Subunit

Lower Talkeetna River (RM 0 to RM 6.0, and RM 6.6 to RM 30.8). This subunit runs from the Susitna River to Iron Creek, excluding the mouth of Clear Creek and that portion of the Talkeetna within one-half mile downstream of Clear Creek. Wide and braided with numerous gravel bar islands, the river is a glacial grayish green. Clusters of residences exist between RM 3 and 5, and at the mouth of Larson Creek, RM 12.7. Isolated cabins are found along the right bank between RM 17.5 and 19. Recreation use is heaviest in the lower portion, below RM 6.5.

Clear Creek. This subunit includes the lower 9.5 miles of Clear Creek, plus that portion of the Talkeetna within one-half mile downstream. As its name suggests, Clear Creek, or Chunilna Creek as it is also called, is a clear-water tributary of the Talkeetna. Its mouth is extremely popular with salmon anglers. Talkeetna River Lodge is at the mouth, catering to anglers in summer and cross country skiers in winter.

Talkeetna Canyon (RM 30.8 to RM 51.5). This subunit runs from Iron Creek to Prairie Creek. The river drops from 1,500 feet to about 900 feet, or at an average gradient of 29 feet per mile. With 12 to 14 miles of continuous whitewater (Jacques, 1989), it has high value for whitewater rafting and kayaking. This subunit was not visited by the recreation inventory team.

Visual Resources

The visual quality ratings were done in late September, well past the summer peak-use period. The results of the visual resource assessment are described below; the methodology is more fully described in the introduction to this chapter.

Lower Talkeetna River. This subunit received an overall scenic quality rating of 20 points. A variety of land forms are present, from steep ridges to low rolling hills, and one small canyon area between RM 21 and 23 with gray rock walls about 60 feet high. Other areas have small rock outcrops. The overstory vegetation is mostly birch and poplar, with some cottonwood and spruce. The understory is willow and alder shrubs, and a variety of herbaceous plants, including some ferns. The water is a glacial gray-green; the riverbed is only visible in depths of one foot

or less. As for color contrast, fall foliage was at its peak during the evaluation, but was ignored for rating purposes since these colors are absent during the peak use season. Dominant summer colors are provided by the white birch trunks, many shades of green from the leaves and needles of the diverse vegetation, the gray-green water, black to gray rock outcrops, and brown gravel bars. There are frequent views of mountains to the north and east, which were snow-capped during the evaluation and probably part of the summer also. These mountains are not major peaks; still, the view moderately enhances overall scenic quality. Areas with cultural modifications alternate with stretches of natural-appearing landscape. Structures, a major powerline, and other signs of civilization detract slightly from the natural scenic quality. The overall landscape of the Talkeetna River is not unusual within the Mat-Su Valley region. The Kahiltna River, the upper Skwentna, and other braided glacial streams are similar.

Clear Creek. This subunit's scenic quality has not been formally evaluated.

Talkeetna Canyon. This area's scenic quality has not been formally evaluated.

RECREATION RESOURCES: THE SOCIAL SETTING

Opportunities During Peak Season

The social settings provided by the recreation river are shown on the maps at the end of this chapter. These maps depict conditions during the period of peak use, which corresponds to the time during which king salmon and silver salmon returning to spawn are plentiful, in good condition, and can legally be harvested. The peak use period for 1989 was mid-June to the end of August. The inventory team did not visit the area until late September, so conditions during peak-use were inferred.

The map reflects that recreation users rarely leave the river bank. This is because of the difficulty of traveling overland across boggy ground or through thick vegetation, and more importantly, because most users are there to fish. Consequently, the river becomes a ribbon that is largely semi-developed and semi-primitive. This is due principally to the number of people on the river at one time, rather than the presence of structural improvements. Away from the river, the river corridor is seldom visited and generally exhibits the characteristics of a primitive area.

Lower Talkeetna River (Maps 1 to 4). The area immediately adjacent to the riverbank from the Talkeetna mouth to Clear Creek is classified as developed, based principally on encounters with other parties. Moving away from the banks, either semi-primitive or semi-developed opportunities are available.

Between Clear Creek and Larson Creek the riverbank environment is semi-developed, reflecting that users gradually thin out as one moves upstream. As before, away from the river itself, or important ORV travel routes, semi-primitive opportunities are available. The immediate area surrounding the mouth of Larson Creek is developed, not only because it is a popular fishing area where users congregate, but because there are quite a few private cabins here.

Above RM 20, the rest of this subunit becomes semi-primitive as encounters with others drop even more. The whitewater of a mini-canyon at RM 20 turns back the vast majority of powerboaters who travel this far. Away from the river, a primitive environment is maintained, with ample opportunities for solitude.

A small area surrounding the mouth of Disappointment Creek is classified as semi-developed. Signs of use are prevalent here (in the form of scattered trash and a visqueen shack) and the probability of encountering others is greater because this site is a drop-off point for the riverboat charters. Likewise, the mouth of Iron Creek is semi-developed, because of its well-established campsite with outhouse, and because it, too, is a drop-off point used by the riverboat charter companies.

Clear Creek (Map 2). The confluence of this tributary is developed; it is probably the most used recreation area on the entire Talkeetna River. In addition to the many anglers one would encounter on the public lands, private property containing Talkeetna River Lodge is located here. Crowded conditions are rapidly left behind as one moves upstream. Although upper Clear Creek has not been visited and so has not been evaluated, opportunities would likely vary between semi-primitive and semi-developed giving way to the latter category where private residences are present.

Talkeetna Canyon (Maps 4 to 5). This entire subunit is tentatively classified as primitive, although it was not visited by the inventory team. Both signs of use and encounters with others are infrequent. River users are limited to whitewater rafters or kayakers.

Recreation Opportunities Before and After Peak Season

Generally, away from the zones containing permanent structures near Larson Creek, at Clear Creek, and between Clear Creek and Talkeetna, the entire river would revert to a primitive or semi-primitive setting during the off-season, depending on visitor use levels. An exception might be during late summer and fall, when debris left by peak-season visitors might result in human waste and litter being found at over 50 percent of the campsites. Such areas would retain a semi-developed rating, until snow covered the ground and spring runoff removed most of the debris.

Larson Creek and Clear Creek would retain their semi-developed rating year-round. The area between the boat launch and Clear Creek would revert to semi-developed, when use levels are low enough that less than 30 groups a day are encountered. Areas which provide primitive opportunities during peak season would continue to do so year-round.

RECREATION ACTIVITIES, ICE-FREE SEASON

Powerboating

The recreational boating season begins soon after break-up, or about May 1, and continues through the moose hunting season, or until about October 1. Peak use occurs during the king and silver salmon runs, usually mid-June to the end of August. In 1984 the Alaska Department of Fish and Game conducted a survey of boaters on the Talkeetna and other rivers (Howe, 1985)

Talkeetna River Recreation Resources and Use

which yielded valuable information about the nature of boating activities. Jetboats are used almost exclusively on the Talkeetna River, mostly in association with fishing. Other major recreation activities engaged in by powerboaters include hunting and sightseeing (Howe, 1985). Table TK-1 summarizes the types of boats used on the Talkeetna. Although no airboats were encountered during the 1984 survey, these craft are now in occasional use on the Talkeetna, as evidenced by the comments made at public scoping meetings (DNR, 1989a).

TABLE TK-1. Boats Using Talkeetna River from Talkeetna Boat Launch and Talkeetna Airstrip, July through September 1984

	Boat Type			
	Inboard Jet	Outboard Jet	Outboard Propeller	Airboat
Number	196	52	2	0
Percent of Total	79%	21%	Less than 1%	0

Source: Howe, 1985.

Engines are typically large. Howe (1985) found that for all boats exiting at the Talkeetna locations, only 27 percent had engines under 81 horsepower, and the largest percentage (38 percent) had engines over 240 cubic inch displacement. Although not all boaters exiting at the Talkeetna locations were Talkeetna River users -- some had other destinations along the Susitna River -- the survey results give a general picture of the boats most frequently used on the Talkeetna. Boating characteristics of each river subunit are discussed below.

Lower Talkeetna River. The most heavily used powerboating area on the river is from the mouth to Clear Creek. Boating to Larson Creek and to the Sheep River is also common. The few private powerboaters who venture above the Sheep River at RM 15 generally do not proceed beyond the lower canyon at RM 21, with its large waves and narrow channel (NPS, 1989). Gravel bars above Disappointment Creek present additional obstacles to further upstream travel (NPS, 1989). Commercial guides routinely bring their fishing and sightseeing clients as far as Iron Creek, RM 30.9, which is also a drop-off point for float parties.

Most powerboaters are salmon anglers, and catching fish is their primary purpose for being on the river. The availability of productive fishing encourages boaters to congregate at or near the mouth of Clear Creek, which involves travel through the most accessible and easily navigable stretch of the Talkeetna. For boaters who simply want to catch fish, there is no incentive to attempt further upstream travel at the risk of damaging equipment. Powerboaters who go above Clear Creek are those who wish to avoid the crowded conditions there, and tend to be experienced boaters who know the river well.

Clear Creek. From the comments made at public scoping meetings, it appears that the public does not generally boat above the mouth of Clear Creek (DNR, 1989a). According to the owner of a major riverboat service and lodge at the mouth of Clear Creek, in most years the lower four

to six miles of Clear Creek are navigable (Mahay, 1988). However, in some years, including 1988, water levels are too low for boating (Mahay, 1988).

Talkeetna River Canyon. The canyon's whitewater precludes powerboat use.

Rafting, Canoeing, and Kayaking

Rafting is the dominant form of float boating on the Talkeetna River, followed by kayaking. Open canoes are rarely used because of the difficulty of navigating through the Talkeetna's whitewater. Whitewater is probably the single greatest attraction that influences floaters to choose the Talkeetna over other rivers. Users report that other reasons for floating the Talkeetna River are fishing for salmon and resident species, viewing scenery and wildlife, camping, and experiencing solitude (NPS, 1989). There are two types of float trips on the Talkeetna: from the upper river, above the recreation river boundary, to the mouth, and from Iron Creek or Disappointment Creek to the mouth. Although it is also possible to fly in by Super Cub to float Clear Creek, this trip is rarely done (NPS, 1989).

Upper river put-in sites include Stephan or Murder lakes on upper Prairie Creek, or on the Talkeetna at Yellow Jacket Creek or Buck Stewart's camp. These sites can only be reached by air; there are some access problems, discussed at the beginning of this report under *Access*. Putting in on the upper river affords a four or five day trip, where whitewater is the primary attraction. Talkeetna Canyon offers almost 14 miles of continuous Class III rapids, with several Class IV drops and holes (NPS, 1989). Rafters and kayakers interviewed for the instream flow needs assessment considered the Talkeetna to be the premier wilderness whitewater trip in Alaska (NPS, 1989).

Floaters who put in on the lower river at Iron Creek or Disappointment Creek are dropped off by jetboat. The float from Iron Creek takes two days, and from Disappointment Creek one to two days. Fishing is the primary attraction on these lower float trips.

Kickers -- small outboard motors of about 5 horsepower or less -- are rarely used on the Talkeetna. The current is swift enough that they are not needed, and there are relatively few sections where they can be safely used.

Because the river naturally restricts powerboat use, the Talkeetna has been largely without the user conflicts between powerboaters and floaters seen on some of the other recreation rivers, particularly the Little Susitna.

Fishing

As already mentioned, fishing is the dominant recreation activity in terms of the numbers of people that it draws to the area. More anglers are present during the height of the king salmon and silver salmon runs than at any other time, which for 1989 was mid June through August.

Angler distribution is influenced by the probability of success, along with ease of access. The most popular fishing area is the mouth of Clear Creek, with ready boat access from the town of Talkeetna. The mouths of other tributaries are fishing destinations also: most notably Larson

Creek, and Sheep River, Disappointment Creek, and Iron Creek. Table TK-2 details the sport fish harvest, showing that while salmon attract the most anglers, resident fish species are more prominent in the total harvest. More detailed information about fishing is presented in Chapter 4 of this report.

TABLE TK-2. Sport Fishing Harvest on Talkeetna River and Tributaries, 1987

Species	Number Harvested	Percent of Total Harvest
Dolly Varden/arctic char	2,680	21
Silver salmon	2,608	21
Grayling	2,481	18
King salmon	1,407	11
Chum salmon	1,032	8
Rainbow trout	869	7
Red salmon	580	5
White fish	272	2
Pink salmon	272	2
King salmon under 16"	232	2
Burbot	145	1

Source: Mills, 1988

Hunting

Moose, black bear, and brown bear are the principal species sought. Most hunters boat in or use ORVs. More detailed information about hunting is presented in DNR's Resource Assessment, Chapter 4 of this report.

WINTER RECREATION ACTIVITIES

After freeze-up, portions of the Talkeetna River become a winter trail. The frozen river and trails discussed under *Access* are the focus of winter activities such as dog mushing, cross country skiing, snowmachining and ORV use, and ice fishing.

RECREATION SITES AND FACILITIES

Developed Facilities

The Talkeetna City Boat Launch located at RM 0.2 is owned by the City of Talkeetna and operated by a private concessionaire. Open to the public, a launch fee is charged, in addition to a parking fee for vehicles left at the launch.

There are no other developed public recreation facilities within the Talkeetna Recreation River area, with the exception of the ORV trails discussed under *Access* at the beginning of this section.

Undeveloped Sites

Undeveloped recreation sites discussed below and shown on the following maps were inventoried during late September 1989. The upper Talkeetna River above Iron Creek has not been inventoried yet, nor has Clear Creek, where there is extensive private property and the recreation river is restricted to the water column. Both the map and discussion below should be reviewed for a full appraisal of recreation sites; the map contains information on additional sites not specifically mentioned in the text. Table TK-3 presents a summary of the important sites within the recreation river boundaries. The table should not be considered a complete list. It was based on the site inventory mentioned above, which was only from Iron Creek downstream. In addition, important float trip staging areas and campsites are located far upstream, beyond the boundaries of the state recreation river.

Lower Talkeetna River. Between the Talkeetna city launch and Clear Creek, a distance of 6.3 miles, five secondary sites were inventoried. One of these was an upland site (#57), and the rest were gravel bars, for an average site density of 0.8 per mile. An additional three bars were considered marginal campsites, because they were only one to two feet above the existing water level.

At the Clear Creek confluence no definitive sites were observed, but the mouth of this tributary is a principal fishing area, from where it joins the Talkeetna River to Fish Creek, about one-quarter mile upstream.

Between Clear Creek and Larson Creek good campsites are scarce. Only two secondary gravel bar sites were observed in this 6.2-mile stretch, or 0.3 sites per mile. However, at the low water levels of late September, continuous, low, gravel bar islands were present between these two tributaries. These bars were considered marginal campsites because of the probability of flooding at higher water levels.

At Larson Creek, the primary site consists of two areas. An upland campsite on Larson Creek's left bank sports a smoker and primitive latrine made by previous users. The gravel bar at Larson Creek also serves as a campsite, and features a crude boat dock made of a pallet attached to pilings. ORV trails mentioned under *Access* lead to Larson Creek's mouth.

From Larson Creek to Disappointment Creek, a distance of 10.7 miles, nine secondary sites were inventoried, two upland sites and seven gravel bars. The average site density is 0.8 per mile. An additional seven gravel bars were considered marginal, because they are low or covered with large cobbles. One of these low bars is an island that stretches about three miles from RM 17.3 to RM 14.4.

At Disappointment Creek is a primary site (#19), a gravel bar over 1,000 square feet. In the 7.4 river miles between Disappointment Creek and Iron Creek, nine secondary sites were inventoried, all gravel bars, for an average density of 1.2 sites per mile. There were an additional seven marginal sites, mostly low gravel bars only one to two feet above the existing low water level (the gauge at Disappointment Creek was at 0.1).

The mouth of Iron Creek is a fishing destination, and a put-in site for float trips. The primary upland campsite here (number 1 on Map 4) consequently sees heavy use, both for camping and day use. An outhouse has been constructed here.

Talkeetna Canyon. Although the canyon has not been inventoried, there are apparently few campsites (Jacques 1989). Both the canyon terrain and the heavy whitewater are limiting factors. During high water there are reportedly only five places to eddy out in a 12-mile stretch (Jacques, 1989).

TABLE TK-3. Talkeetna State Recreation River: Important Recreation Sites and Facilities on Public Land

Type	River Mile	Description	GIS No.
Boat Launch	0.2	Talkeetna City Launch. Operated by concessionaire. Fees charged.	67
Fishing Area	6.5	Clear Creek, mouth to Fish Creek. Private lodge on Clear Creek left bank.	52
Primary Campsites (2)	12.7	Larson Creek mouth. One gravel bar site, one upland. Popular fishing area.	42-43
ORV Trail System	12.7	Connects with Larson Lake, town of Talkeetna. Spur routes to numerous private cabins.	45; 41
Primary Campsite/ Day-use Area	23.4	Disappointment Creek mouth, gravel bar and adjoining upland. Visqueen shack present. Fall 1989.	19
Primary Campsite/ Day-use Area	30.8	Iron Creek mouth. Upland site; outhouse, primitive furniture present.	1

Site Conditions and Adequacy of Sites Relative to Existing Use

Overall, the undeveloped recreation sites appear adequate to handle existing public recreation use on the Talkeetna River. There are remaining legal constraints listed previously to public access on Prairie Creek.

During the recreation site inventory, time constraints did not permit a thorough inspection of each undeveloped site; most were evaluated while floating by on the river. However, the gravel bar campsites on the Talkeetna seem relatively clean, except the primary use sites. With the exception of Disappointment Creek, even the primary use sites generally contained less than a handful of litter. Large amounts of human waste were not seen, either. The cleanliness of the

primary sites may be due to riverboat charter companies maintaining them during the use season, and the fact that the inventory trip took place in late September, after a period of high water brought on by heavy rains. An outhouse has been constructed at the Iron Creek site. At Disappointment Creek, the gravel bar was relatively clean, but a visqueen shack and pile of trash was about 200 feet back in the bushes. Potential sites for establishing toilets are available during the peak use season include: Clear Creek, Larson Creek, Disappointment Creek, and Iron Creek.

The maps on the following pages indicate the
Talkeetna River Recreation Opportunity Classes

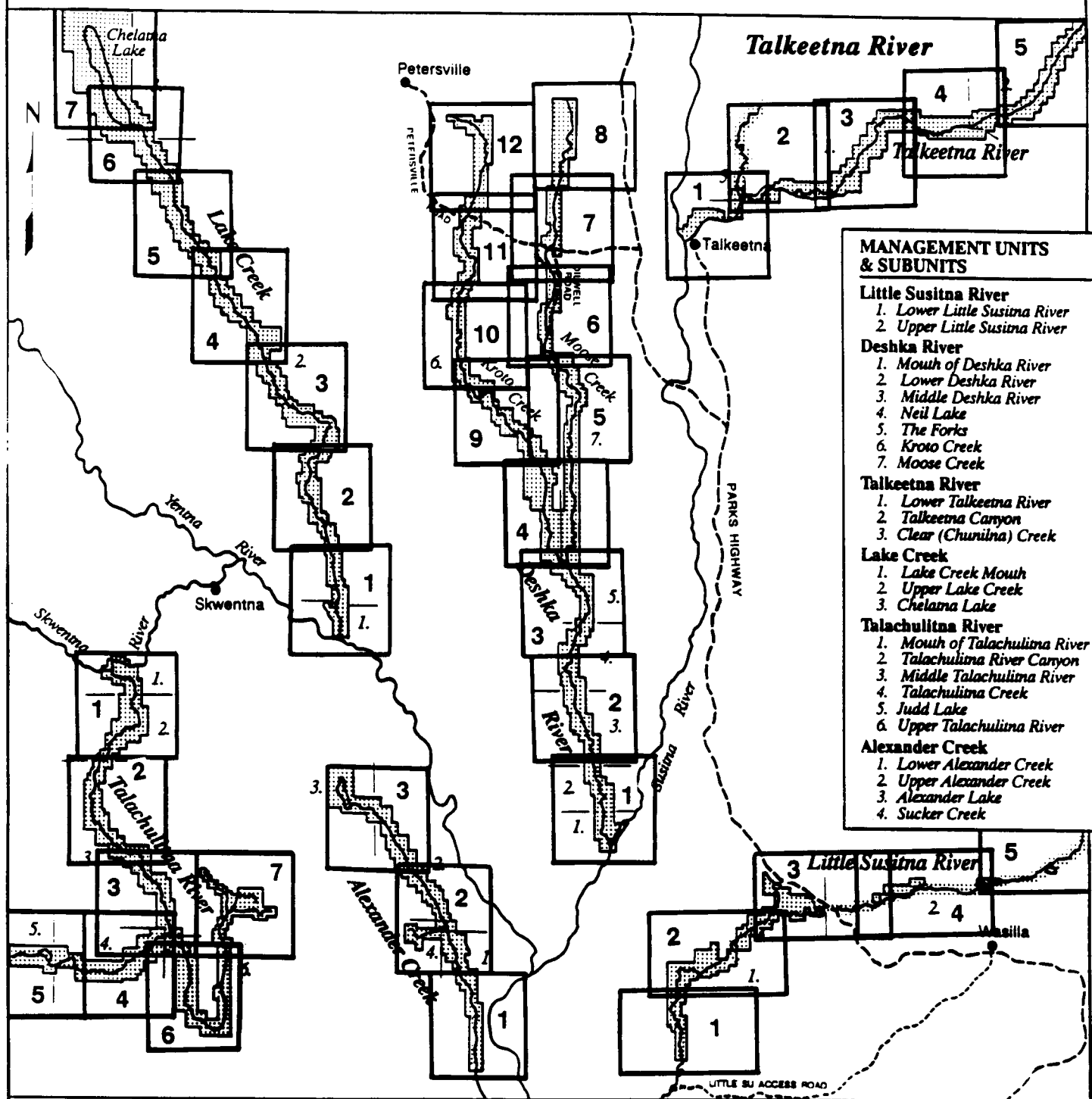
During Peak Use Period
(mid-June through August)

and

Recreation Sites on Public Land.

SUSITNA BASIN RECREATION RIVERS MANAGEMENT PLAN

Index Map

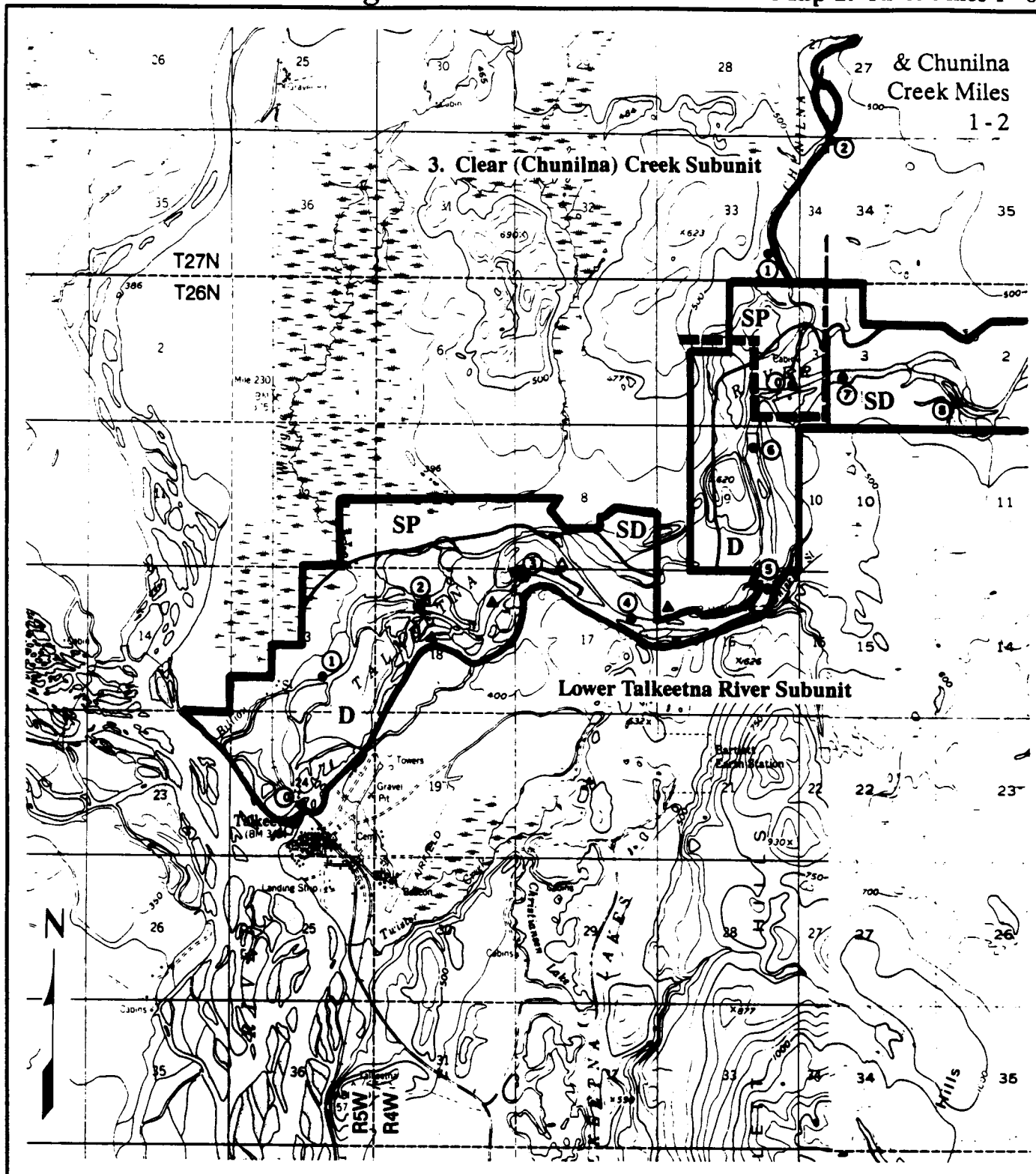


1 Index To Adjoining Maps

Recreation Rivers Corridors

Talkeetna River Management Unit

Map 1: River Miles 1 - 8



— Management Unit Boundary

— Subunit Boundary

① River Mile

▨ Private Land

Scale: 1" = 1 Mile

Recreation Opportunity Classes

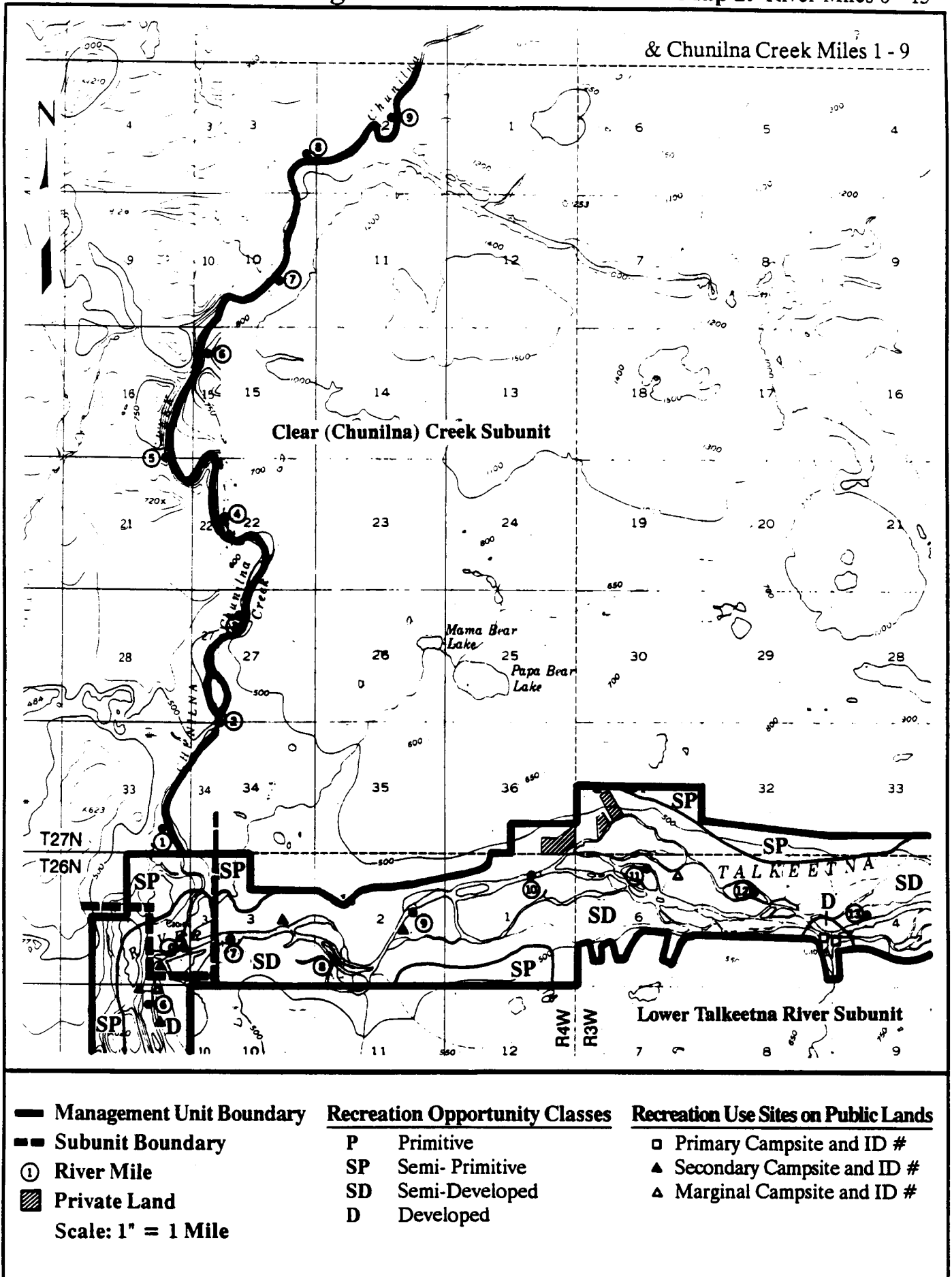
- P Primitive
- SP Semi-Primitive
- SD Semi-Developed
- D Developed

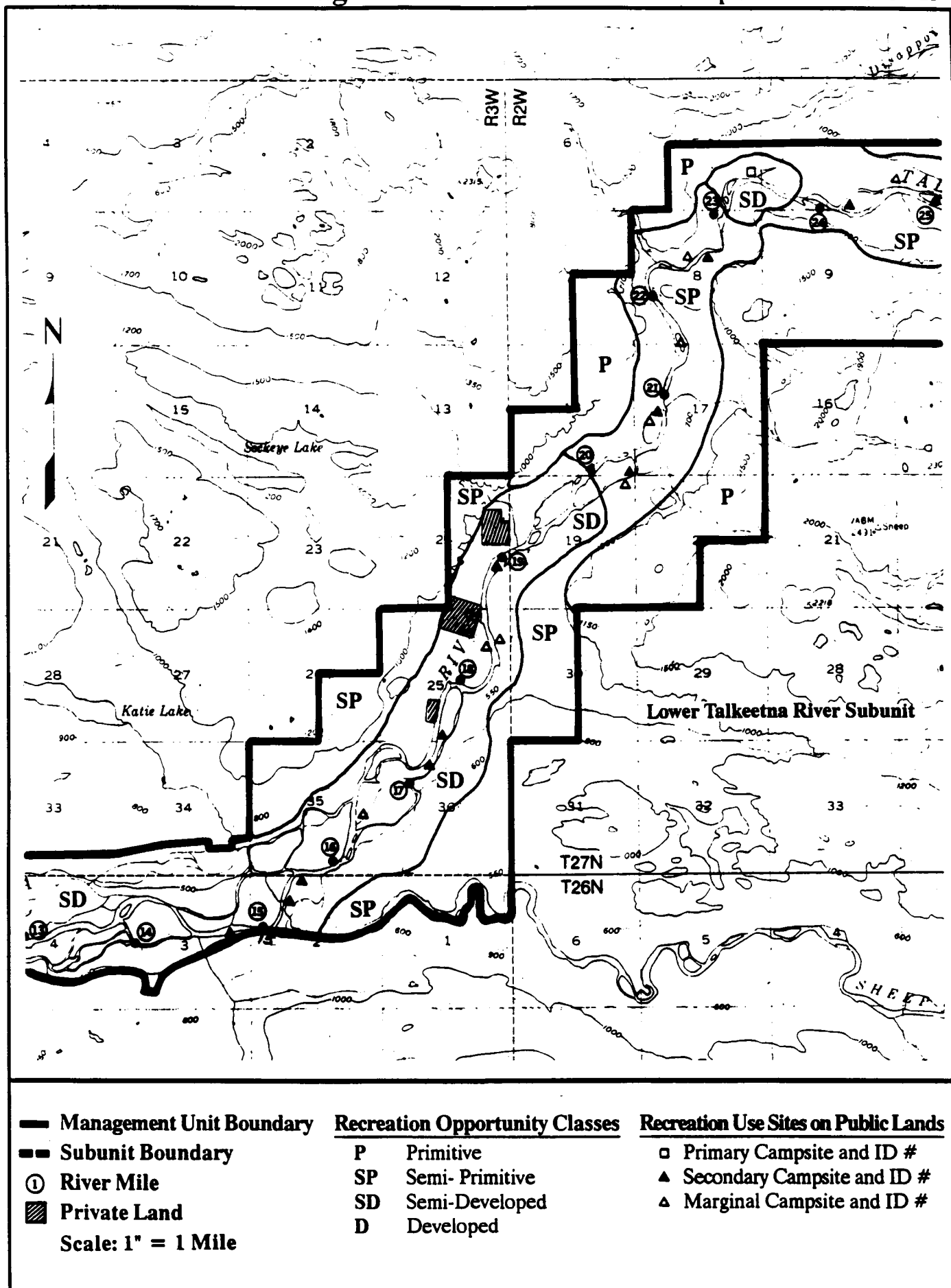
Recreation Use Sites on Public Lands

- Primary Campsite and ID #
- ▲ Secondary Campsite and ID #
- ▲ Marginal Campsite and ID #

Talkeetna River Management Unit

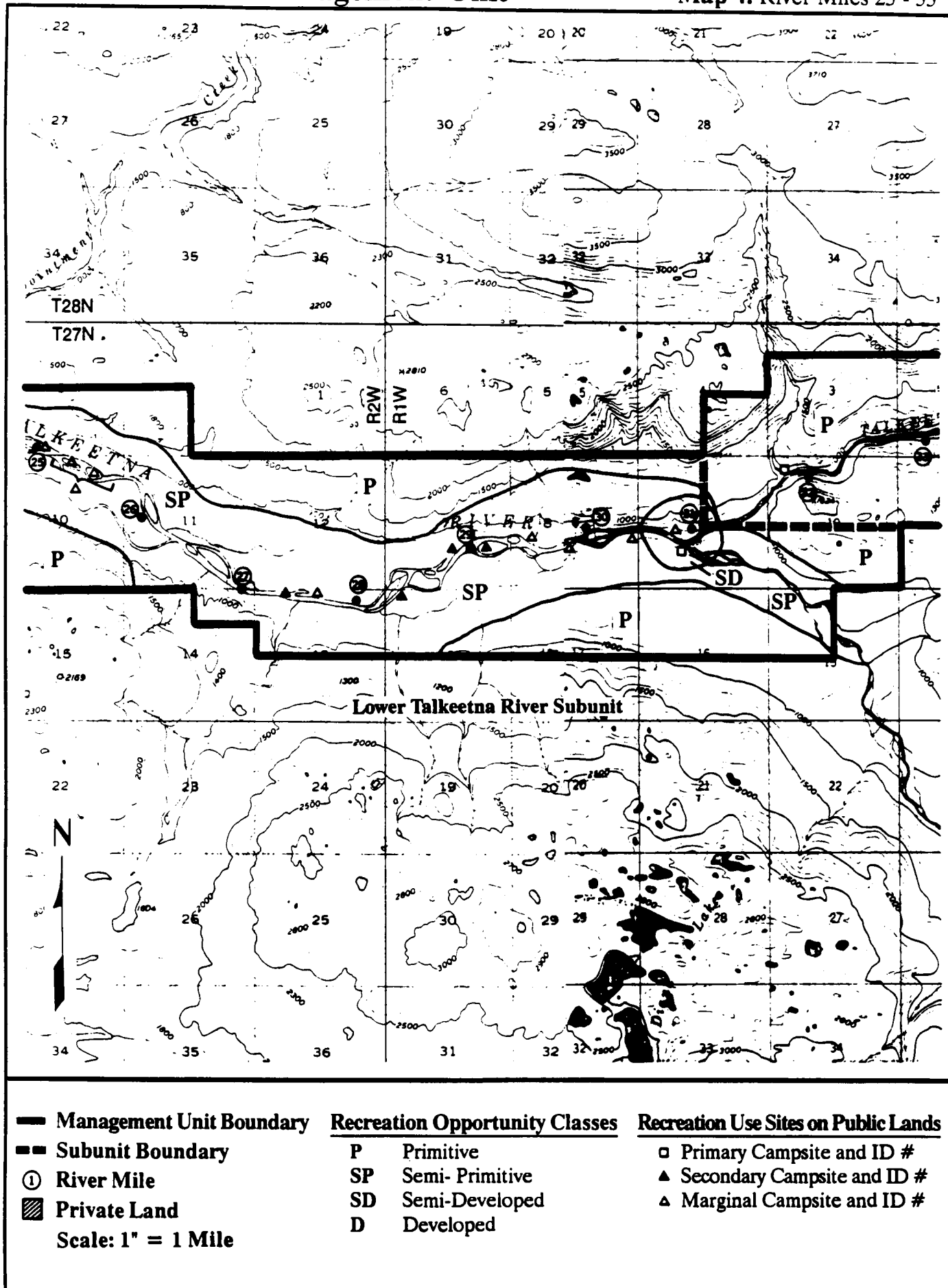
Map 2: River Miles 6 - 13

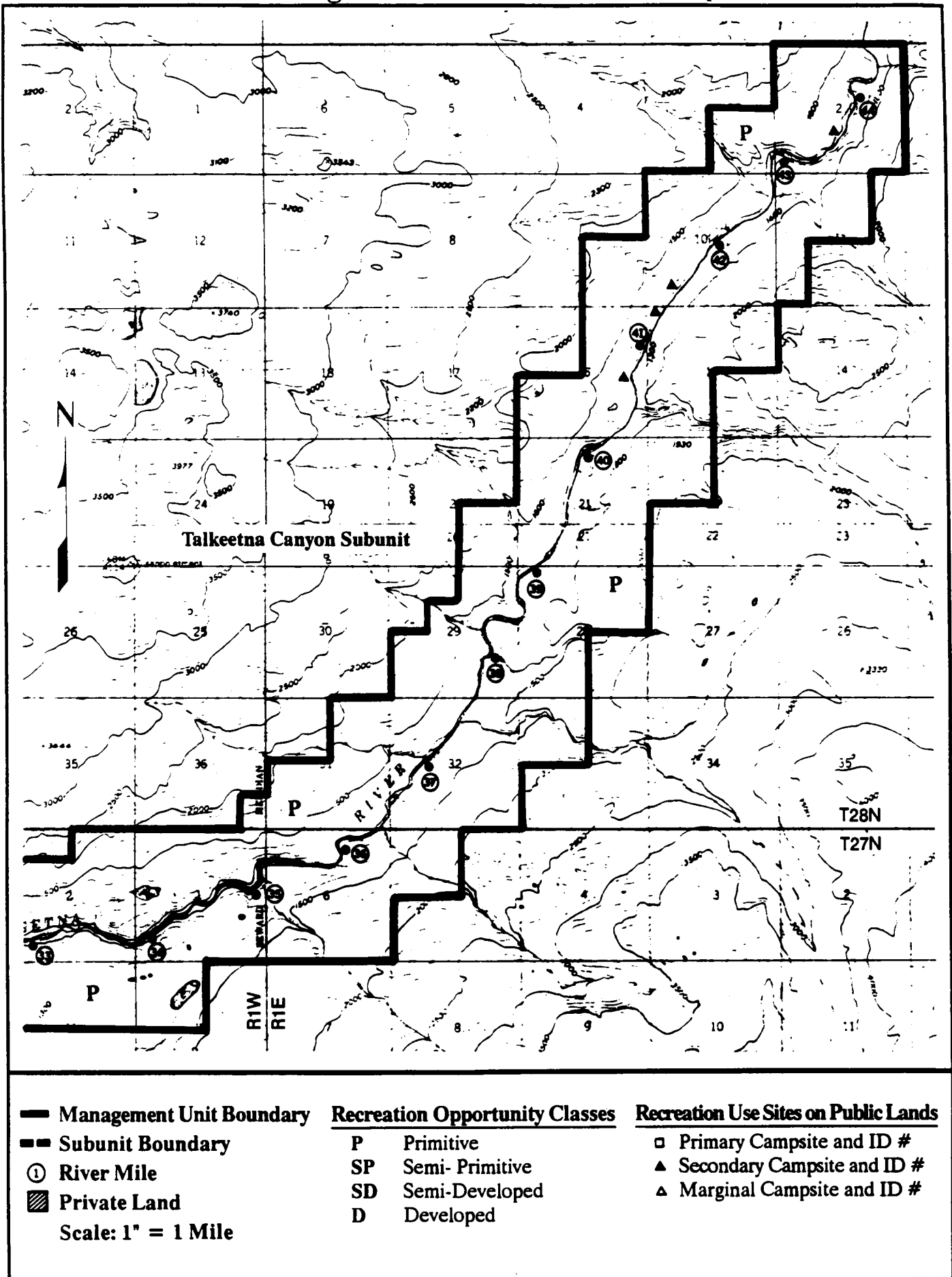




Talkeetna River Management Unit

Map 4: River Miles 25 - 33





LAKE CREEK RECREATION RIVER

LOCATION, BOUNDARIES, AND MAJOR USES

Lake Creek is in the northwestern part of the Susitna Basin. The mouth, the most popular fishing area, is about 60 air miles northwest of Anchorage, Alaska. Chelatna Lake, the put-in site for float trips at the headwaters, is about 100 air miles northwest of Anchorage. The creek is approximately 54 river miles long between Chelatna Lake and its mouth on the Yentna River. The legal boundaries of the recreation river include state and borough land adjoining the stream course for approximately one-half mile on either side.

The most outstanding recreation resource of Lake Creek is its fishery, with major spawning populations of king and silver salmon, plus grayling and rainbow trout. It is the fishery that, by far, attracts the most recreation users to the river during the ice-free season. Lake Creek's popularity is enhanced by its closeness to Anchorage, and relatively inexpensive air access compared to more remote parts of bush Alaska. Besides fishing, other major activities during the ice-free season are floating, powerboating, and hunting. Other than snowmachine and ice fishing use at the mouth, Lake Creek State Recreation River is seldom used for winter recreation.

ACCESS

Lake Creek is accessible only by air or boat. Major float plane landing sites are Chelatna Lake at the headwaters of Lake Creek, on Bulchitna Lake at river mile (RM) 2.5, and in the Yentna River at the mouth. Although the above sites are the most frequently used for public access, float planes also land on other lakes in the recreation river area. Shovel Lake, Martana Lake, and Quiet Lake all serve as landing sites, along with a lake west of the creek at RM 45, known locally as Rock Lake. Wheel planes land at a private airstrip on the Chelatna Lake Lodge property, on a strip at the creek mouth, or on a gravel bar island from RM 39.1 to 38.8. Boaters can travel up the Yentna to the Lake Creek mouth. The most commonly used launch sites by Lake Creek boaters are Dershka Landing, on the Susitna River about 12 miles upstream from the mouth of the Yentna, or Susitna Landing, an additional 14 miles upstream on the Susitna. Both launches are accessible via secondary roads from the Parks Highway. Additional details about access to and within the area are presented in Chapter 7 of this report.

RECREATION RESOURCES: THE PHYSICAL SETTING

General Characteristics of Each River Subunit

Lake Creek Mouth (RM 0 to RM 2.5). This is the area from the Yentna River to Bulchitna Lake outlet. Moving upstream from the mouth, the river gradually narrows from approximately 200 feet to 75 feet wide. Three commercial lodges (Wilderness Place, King Point, and Lake Creek Lodges) are within this subunit. Other lodges are located nearby. There are three across the Yentna from the mouth of Lake Creek, and several more on the Yentna within a mile up and downstream.

Lake Creek (RM 2.5 to RM 53). This relatively swift, boulder-strewn subunit runs from the Bulchitna Lake outlet to RM 53, where Lake Creek widens as it leaves Chelatna Lake. The creek drops from 1,384 feet to 145 feet in this subunit, for an average gradient of 24.5 feet per mile.

Chelatna Lake Area (RM 53 to RM 64). The Chelatna Lake subunit includes the first mile of Lake Creek. This upper portion of the creek provides a gradual transition between Chelatna Lake and the rest of Lake Creek. It is about 500 feet wide, slow and placid.

At an elevation of 1,384 feet, Chelatna Lake is about three-quarters of a mile wide from east to west and seven miles long from north to south. Chelatna Lake Lodge is on the south end of the lake near the outlet at RM 54.5; Chelatna Shores Resort is on the east shore at RM 59.5. Four cabins are scattered around the outlet area; an additional three cabins are along the east shoreline between RMs 56 and 58. Three cabins are scattered along a mile of the west shoreline at the north end of the lake, near Cripple Creek and Easter Creek. The recreation river boundary extends two to three miles beyond the north and east lakeshore, abutting the Denali National Park boundary on those sides.

Visual Resources

Lake Creek's scenic attributes were rated during 1989 a field trip. Scenic quality rating units were chosen to include areas with similar scenery. The ratings were done in late August, after the peak-use period. The results of the visual resource assessment are described below; the methodology is more fully described in the introduction to this chapter.

Lower Lake Creek (RM 0 to RM 9). This subunit received an overall scenic quality rating of 11 points. The immediate terrain is flat to low hills. The overstory vegetation is dominated by large cottonwoods with some birch and spruce. The understory consists of willow and alder shrubs, ferns, and grasses. The water was abnormally turbid during the evaluation, with visibility eight inches or less. Shades of green and brown are the dominant colors; white birch trunks provide some contrast. No long range views were possible when this area was observed on August 24 and 25, 1989, during overcast, rainy weather. Some views might be available during clearer weather; if so, they would raise the overall scenic quality score by one to three points. The landscape of the lower creek is a common one in the Mat-Su Valley region. Permanent structures -- cabins lining the east shore of Bulchitna Lake, and lodges and associated outbuildings between the mouth and RM 0.2 -- detract slightly from the natural setting.

Lake Creek Canyon (RM 9 to RM 24). This subunit received an overall scenic quality rating of 17 points. The land form varies from thickly vegetated, 45- to 50-degree slopes to sheer bluffs, the tallest about 200 feet. Vegetation consists of a spruce-birch-cottonwood overstory with an understory dominated by willow shrubs, ferns, and grass. The water was abnormally turbid, with visibility of eight inches or less -- this situation is mentioned further under the discussion of Chelatna Lake, below. There were no striking color contrasts; greens of the vegetation and browns of the water and bluffs dominated the landscape. Views were limited to the creek banks; there were no long-range vistas. The canyon setting makes this subunit distinctive, though not unique to the region. The Talachulitna and Talkeetna State Recreation Rivers have similar landscapes. Cultural modifications detract slightly from the natural setting, although these are all temporary features -- campsites, and one very messy abandoned camp at RM 19.5.

Upper Lake Creek (RM 24 to RM 53). This portion of the creek between the head of the canyon and Chelatna Lake received an overall scenic quality rating of 20 points. The immediate terrain is flat to low hills; there are a few cut banks, and the creek contains rocks and big boulders (glacial erratics). Overstory vegetation is predominantly white spruce with some cottonwoods. The understory consists of willow and alder shrubs, grasses, and other herbaceous plants. The creek water was clouded with silt from an unknown source above Chelatna Lake. Quiet stretches alternate with cascading whitewater. Ripening berries and creekbed rocks provided some color contrast to a landscape dominated by the greens of vegetation and the brown/grey of water and gravel bars. Denali, Mount Foraker, and lesser peaks of the Alaska Range are visible about 25 percent of the time, looming spectacularly in the distance. The views make this creek subunit somewhat rare within the region, although the Kahiltna and the Tokositna provide as good or better vistas. There are almost no cultural modifications visible from the creek, except for a picturesque old trapper's cabin and fire rings and small amounts of litter where people have camped.

Chelatna Lake Area. This area received an overall scenic quality rating of 20 points. At the upper end of the lake, steep ridges forming the lower slopes of the Alaska Range meet the water and rise as much as 2,000 feet within one-half mile of the shoreline. The crests of some of these are rounded, while others are knife-edged. The immediate terrain shifts to rolling tundra and spruce-covered slopes on the lake's lower end, becoming flat at the outlet. The shoreline vegetation is predominantly willow, alder, and birch; a spruce/deciduous shrub mixture is present at the outlet.

The water was very muddy when observed on August 21, 1989. This is very unusual for Chelatna Lake, and lowered its score by three points from what it would have been had the lake been clear, as it usually is. The water entering the lake from Coffee Creek and Cripple Creek was still very turbid, perhaps from a landslide or other geologic event.

Colors were predominantly dark and light greens next to the gray lake, giving way to lighter green and grays as tundra vegetation takes over at the higher altitudes. The tips of snow-covered peaks were visible to the north. Closer to the lake outlet, views of the Alaska Range are better. The top of the Yenlo Hills are visible to the south, as are mountain tops to the east and west. There are few large mountain lakes within the Matanuska-Susitna Valley region, making Chelatna Lake distinctive. The natural scenery is slightly depreciated by the structures and associated cultural modifications discussed above, under *General Characteristics of Each River Subunit*.

RECREATION RESOURCES: THE SOCIAL SETTING

Opportunities During the Peak Season

The distribution of recreation opportunity classes along Lake Creek and within the boundaries of the recreation river is shown on the maps at the end of this chapter. The maps depict conditions during the period of peak use, which corresponds to the time during which king salmon returning to spawn are plentiful, in good condition, and can legally be harvested. The peak use period for 1989 was mid-June to the end of king salmon season on July 13. The inventory team did not visit the area until late August, so conditions during the peak-use period were inferred. A second, though smaller peak in terms of visitor numbers, occurs at the height of the silver salmon run in August.

The maps reflect that recreation users rarely leave the creek bank. This is because of the difficulty of traveling overland across boggy ground or through thick vegetation, and more importantly, because most users are there to fish. Consequently, the river becomes a ribbon that is largely semi-developed and semi-primitive. This is due principally to the number of people on the river at one time, rather than the presence of structural improvements. Away from the river, the river corridor is seldom visited and generally exhibits the characteristics of a primitive area.

Lake Creek Mouth. Use levels are high during peak season, as this section is always navigable by powerboat and fishing for salmon is usually good. Fishing regulations are less restrictive than upstream, which also helps concentrate anglers here. Buildings and docks of three lodges are located along the lower one-half mile of the creek, and the southeast shore of Bulchitna Lake contains cabins and outbuildings. Guests and personnel of local lodges mix with anglers who boat in from other lodges on the Yentna River, or from Susitna River boat launches, and with float parties completing their trip. Floatplane traffic is also frequent. Because of the high level of activity, and the clusters of structural development, this subunit is classified as developed.

Lake Creek. Below RM 5, Lake Creek is semi-developed because of frequent encounters with other parties. Jetboat traffic is common, and anglers traveling by foot along the bank are encountered near the Bulchitna Lake outlet.

Above RM 5, the creek and immediate adjacent area provides semi-primitive opportunities. Away from the creek banks the setting is generally a primitive one, except for lakes which are a focus of development and activity, and the trails that lead to them from the creek. Shovel Lake, Martana Lake, Quiet Lake, and the lake west of the creek at RM 6 all contain structures; these areas are classified as semi-developed.

Because Chelatna Lake is in a military training area, sonic booms occur regularly. However, sonic booms did not enter into the evaluation of opportunity classes, because the writer was unsure of their frequency, and therefore, the significance of their potentially great effect on the social setting. On August 22, 1989, shortly after 10:00 a.m., four sonic booms in quick succession were heard as the recreation inventory team floated just below the mouth of Camp Creek (RM 41.7). In the afternoon of that same day, low-flying military jets passed overhead repeatedly at Shovel Lake (RM 31), changing what would otherwise have been a quiet setting. When it happens often, the jet noise detracts from any feeling of remoteness that might otherwise be available. It creates a more developed social setting than what would be caused strictly by ground-level activity and structures.

Chelatna Lake Area. Chelatna Lake and its immediate surroundings are classified as semi-developed because of the lodges and cabins there and because it is a focus of activity, where one would encounter more than five groups each day. Besides the people associated with the lodges and private cabins, Chelatna Lake is a put-in site for float trips. Moving away from the lake, direct encounters with others would be rare; however, lake activity could be readily seen and heard. Accordingly, a band encircling the lake is classified as semi-primitive. At distances of approximately one mile or more from the lake, the setting would be a primitive one.

Recreation Opportunities Before and After Peak-season

Generally, away from the zones containing permanent structures at Chelatna Lake, Bulchitna Lake, and the mouth, the entire river and creek revert to a primitive or semi-primitive setting during the off-season, depending on visitor use levels. An exception might be during late summer and fall, when debris left by peak-season visitors might result in human waste and litter being found at more than 50 percent of the campsites in high-use subunits. Such areas would retain a semi-developed rating until snow covered the ground and spring runoff removed most of the debris.

Chelatna Lake and Bulchitna Lake would retain their semi-developed rating year-round. The mouth area would revert to semi-developed, when use levels are low enough that less than 30 groups a day are encountered. Areas which provide primitive opportunities during peak season would continue to do so year-round.

RECREATION ACTIVITIES: ICE-FREE SEASON

Powerboating

Propeller and jetboats, and a few airboats, are used on Lake Creek, mostly in association with fishing. Powerboats are also used by hunters for moose and bear.

The Alaska Department of Fish and Game recorded information on boat size and type during creel census surveys during the 1987 king salmon season; the results are summarized in Table L-1.

Lake Creek Mouth. This is the most heavily used powerboating area on the river, visited by boats coming into the mouth from the Yentna River, and boats originating from the lodges and other private property in the lower two and one-half miles of Lake Creek. Most powerboaters are salmon anglers, and catching fish is their primary purpose for being on the river. The availability of productive fishing in this subunit discourages most boaters from attempting further upstream travel.

Many people who commented at the public scoping meetings urged a motor-size restriction for Lake Creek, citing safety concerns with boats traveling at high speeds in the heavily congested portion of the lower creek (DNR, 1989a).

TABLE L-1. Boats on Lake Creek, 1987

<u>Boat Type</u>					<u>Motor Size (horsepower)</u>			
Sample Size	Outboard	Inboard	Airboat	Raft	Sample Size	2-49	50-80	> 80
2,302	83%	15%	1%	1%	1,935	84%	6%	10%

Source: Alaska Department of Fish and Game, 1989d

Lake Creek. This creek subunit is seldom used by powerboats, except for the lower two and one-half miles. The presence of navigational hazards (many exposed or barely submerged rocks), combined with the availability of productive fishing downstream, makes few boaters willing to risk damaging their equipment here. The fact that bait fishing is prohibited above RM 3.0 also discourages the vast majority of boaters from using this area. The boaters who do use this subunit are anglers who wish to avoid the crowds and to fish with single-hook artificial lures. Most of these users stay between RM 3 and RM 5, where there is a relatively clear channel. Above RM 5, Lake Creek becomes progressively more rocky, making powerboat use very infrequent.

Chelatna Lake Area. Boating on Chelatna Lake is limited to boats that have been flown in by lodge and private cabin owners. Powerboating is an integral part of recreation use at Chelatna Lake, probably engaged in by all visitors for whom the lake is a final destination.

Rafting, Canoeing, and Kayaking

Rafting is the dominant form of float boating on Lake Creek. Kayaking and canoeing are limited by the expense of transporting the boats into the area on the exterior of small float planes.

Most floaters put in at Chelatna Lake and float to the mouth; three other trips are available commercially but are generally not taken by private parties. Chelatna Lake Lodge offers a trip for its guests from Chelatna Lake to Rock Lake, just west of the creek at RM 45. Several air taxis pick up parties at Shovel Lake, accessible via primitive trail from RM 31. From a rock in the creek channel spray painted "Martana," a few trips evidently take out at Martana Lake, one mile southwest of the creek by trail at RM 27. A few air taxi companies sell fishing/float trip packages with put-in on Bulchitna Lake and pickup at the mouth. The short trip avoids the Class III-IV rapids at RM 17.5. Above RM 5, Lake Creek provides considerable Class I and II and minor Class III whitewater.

From Chelatna Lake to the mouth is a leisurely four- or five-day float. The recreation inventory team required approximately 15 hours of float time to complete the trip in rafts; average speed was 3.6 mph. The trip could be extended an additional one to two days to allow more time for other activities, such as fishing, hunting, or exploring away from the water column.

Like powerboaters, peak-season floaters come to Lake Creek primarily to fish for salmon, and also resident species. Besides its proximity to Anchorage, other qualities that influence floaters to choose Lake Creek over other streams are its normally clear water, relatively swift current with whitewater, lack of powerboats, opportunities to view wildlife, and natural scenery (DNR, 1989a).

Kickers -- small outboard motors of about 5 horsepower or less -- are rarely used on Lake Creek. The current is generally swift enough that they are not needed, and there are relatively few sections where they can be safely used.

Although a few public meeting participants have advocated closure of portions of Lake Creek to motorized use (DNR, 1989a), Lake Creek has been largely without the user conflicts between powerboaters and floaters seen on some of the other recreation rivers, particularly the Little Susitna. This is because historically, the creek has naturally restricted powerboating to the mouth area or a few miles above.

Fishing

As already mentioned, fishing is the dominant recreation activity that draws people to the area. There are two fishing areas, in terms of intensity of visitor use, and now also in terms of regulation. The Bulchitna Lake outlet is the approximate boundary between the two. From the mouth of Lake Creek to about one-quarter mile above Bulchitna Lake outlet, anglers may use bait and treble hooks. Above this point, fishing is restricted to single-hook, artificial lures only, and all rainbow trout must be released.

More anglers are present during the height of the king salmon run than at any other time, which for 1989 was mid-June to early July. Rainbow trout fishing is also popular, as previous harvest records show. Serious trout anglers usually prefer late summer, when the water is typically low and clear, and the salmon are finished spawning. This year's unusually turbid water conditions had a big impact on the sport fishery, causing many anglers to cancel trips to Lake Creek and go elsewhere instead. Table L-2 shows the relative importance of each sport fish species, in terms of the percentage of total harvest.

TABLE L-2. Sport Fishing Harvest on Lake Creek, 1987

Species	Number Harvested	Percent of Total Harvest
King salmon	2,845	27
Rainbow trout	1,902	18
Silver salmon	1,358	13
Grayling	1,322	13
White fish	851	8
Pink salmon	670	6
Burbot	507	5
King salmon under 16"	437	4
Red salmon	435	4
Dolly Varden/arctic char	36	< 1
Chum salmon	36	< 1

Source: Mills, 1988

More detailed information about fishing is presented in Chapter 4 of this report.

Hunting

Moose, black bear, and brown bear are the principal species sought. More detailed information about hunting is presented in Chapter 4 of this report.

WINTER RECREATION ACTIVITIES

After freeze-up a portion of Lake Creek becomes a winter trail which, along with other trails discussed under *Access*, is the focus of winter activities such as dog mushing, cross country skiing, snowmachining and ORV use, and ice fishing.

RECREATION SITES AND FACILITIES

This section describes all sites, developed and undeveloped, which currently can support public use, regardless of the intensity of that use. That is, it is a summary of the recreation site inventory, which included sites of major importance for one or more recreation activities and also minor sites. Following this comprehensive discussion is a table summarizing the important recreation use sites.

Developed Facilities

The only developed recreation facilities within the Lake Creek State Recreation River area are trails that have either been privately constructed, or have developed over time through repeated use. Mainly, these lead from the creek to nearby lakes, whose use as float trip take-out sites has been discussed under "Rafting, Canoeing, and Kayaking." Although there are other minor trails, and seismic lines that could be used as trails, only the trails that appear to receive more than incidental recreation use are described below.

A recently cut off-road vehicle (ORV) trail leads from RM 45.2 to a lake about one mile west, locally known as Rock Lake. As mentioned previously, the lake serves as a pick-up point for Chelatna Lake Lodge float trips.

At RM 31, a wooden sign denotes the Shovel Lake "trailhead;" the route connects with a cabin on the southwest shore of Shovel Lake. For most of its length this "trail" is nothing more than a flagged route, crossing very boggy ground. Where the flagging tape is missing it becomes difficult to stay on course. Approximately the last quarter mile is an actual trail made by a tracked vehicle.

At RM 27, the word "Martana" spray painted in black on a creekbed rock denotes the Martana Lake trail. Flagging tape marks the beginning of the trail through thick willow brush at streamside. A foot trail up to the top of the bluff, a distance of perhaps 150 yards, the remainder of the trail is suitable for small ORVs. The trail ends on private property at the lakeshore.

A trail also reportedly leaves Lake Creek at RM 26.2, leads to the lake immediately south of Martana Lake, and then continues north to Martana Lake. However, this trail was not observed on the August 1989 field trip.

On the lower creek, a trail connects to Bulchitna Lake along the south bank of its outlet stream, at RM 2.5. This route is used mainly by anglers.

Undeveloped Sites

Undeveloped recreation sites discussed below and shown on the maps at the end of this chapter were inventoried during July and August 1989. Most of these sites serve as camping areas, although a few have other uses, such as staging areas.

Lake Creek Mouth (RM 0 to RM 2.5). Four secondary gravel bar campsites were inventoried in this subunit, along with two primary sites (one on each side of the creek) at the Bulchitna Lake outlet. One of these primary sites was under long-term occupation when observed by DNR staff on the July 4th weekend; the camp had been removed when the site was visited by NPS on August 25, 1989. There were no marginal sites in this subunit.

Lake Creek (RM 2.5 to RM 53). Gravel bars are relatively scarce on Lake Creek, compared to the other five recreation rivers. Campsites of any description are scarce above RM 5.5 and tend to be unevenly distributed. Sites usually exist at the mouths of major tributaries. Because these areas are favored fishing spots, if a gravel bar is not present, users have generally created upland sites.

In contrast to the rest of the creek, campsites are plentiful between the subunit boundary at the Bulchitna Lake outlet and RM 5.5. Fourteen secondary sites were inventoried in this three-mile stretch, two on the uplands at RM 5.4 and RM 5.1, and the rest on gravel bars. Large islands provide eight of the campsites. There was only one marginal site in this section.

From RM 5.5 to RM 11.3 is a 5.8-mile stretch of river in which no sites were observed. Campsites remain scarce up to Yenlo Creek at RM 13.8. There are two secondary campsites, a gravel bar at RM 13.2 and an upland site at RM 11.3. The stretch between RM 11.3 and 13.8 also contains five marginal sites.

Between the mouth of Yenlo Creek at RM 13.8 and the head of the canyon, RM 24, are 3 primary and 11 secondary campsites, all but 2 on gravel bars. The primary sites are located on uplands at Yenlo Creek (RM 13.8) and at RM 20.5, and on a gravel bar at RM 21. While the two upland sites are adjacent to gravel bars, these bars are large cobbles and the tent sites are back in the trees. The average density of sites in this reach is 1.4 per mile. There are an additional five marginal sites, which are not included in the density calculation. Campsites are unevenly distributed. No campsites, not even marginal ones, were seen in the nearly four miles between RM 14.0 and RM 17.9. This section contains the most serious whitewater on the creek, with a Class III-IV rapid at RM 17.5 and nearly continuous Class I-II for the remaining three and one-half miles.

Between the head of the canyon (RM 24) and Home Creek, RM 35.2, only four secondary sites and one primary site were seen: a primary upland site immediately below Home Creek, and four secondary gravel bars between RM 30.0 and RM 34.7. The average site density is 0.4 sites per mile, but as above, they are unevenly distributed. Only marginal campsites were observed in the six river miles between RM 24 and RM 30. Between Home Creek and the head of the canyon are a total of 18 marginal campsites.

Between Home Creek and Camp Creek (RM 41.8), are two primary and five secondary campsites: five gravel bars and 2 upland sites, for an average density of 1.1 sites per mile. Sites per mile is given to indicate relative abundance; in reality they are unevenly distributed (See *maps*). Two of the secondary sites (numbers 55 and 56) are on the large gravel bar island that serves as a primitive airstrip. The two

primary sites, one gravel bar, one upland, are at the mouth of Home Creek. This reach contains an additional nine marginal sites that are not included in the site density calculation.

Between Camp Creek and Sunflower Creek (RM 46.1), two gravel bar sites were inventoried: a secondary site approximately one-third mile downstream from Sunflower Creek, and a primary site at the Camp Creek mouth. A four-mile section of creek between these two tributaries provides only four marginal campsites.

Between the mouth of Sunflower Creek and the upstream subunit boundary (RM 53), two primary and five secondary sites were inventoried, three gravel bar and four upland sites. The average site density is thus 0.9 sites per mile. One of the primary sites is across from the mouth of Sunflower Creek; the other is slightly more than a mile upstream at RM 47.2. The first campsite available to rafting parties after leaving the Chelatna Lake area is at RM 50.3, an upland site. An upland site at RM 52.2 is used all summer by the Cook Inlet Aquaculture Association for red salmon enhancement field work. No marginal campsites were observed in this reach.

Chelatna Lake Area (RM 53 To RM 64). Except for the outlet area, the lakeshore was not systematically inventoried; there are undoubtedly more campsites and day-use sites above the outlet. The site at Chelatna Lake most frequently used as a drop-off and staging area for float trips is on the right bank at RM 54 (shown as number 14 on Map 6). Other nearby sites are occasionally used when this one is occupied.

Site Conditions and Adequacy of Sites Relative to Existing Use

Overall, the undeveloped recreation sites appear adequate to handle existing public recreation use on Lake Creek. During the recreation site inventory, time constraints did not permit a thorough inspection of each undeveloped site; most were evaluated while floating by on the river. However, approximately 10 percent of the sites inventoried contained more than a handful of litter or obvious human waste. These sites tended to be primary use sites on the upper creek, or were within the zone of heavy fishing pressure from Bulchitna Lake downstream. They included the primary use sites at Sunflower Creek, Camp Creek, and Yenlo Creek, and two sites on the lower portion of Lake Creek near Bulchitna Lake (numbers 202 and 206).

The areas mentioned above are in need of seasonal litter pickup. In addition, toilets should be considered for the Chelatna Lake float trip staging area, at the high-use primary sites at the major tributaries, and near Bulchitna Lake where the bank shows evidence of heavy foot traffic by anglers during king salmon season.

A secondary site on river left at RM 19.6, under long-term occupation when it was observed on June 30, still had a camp set up on August 24. The camp appeared to be part of a mining operation but had not been used for most of the summer and was badly damaged.

TABLE L-3. Lake Creek: Important Recreation Sites & Facilities on Public Land

Type	River Mile	Description	GIS No.
Fishing Area	0 to 2.5	Mouth to Bulchitna Lake, bait fishing legal.	118
Trail	2.5	Between creek and Bulchitna Lake. Mostly foot traffic.	142
Primary Campsites (2)	2.5	At Bulchitna Lake outlet.	203
Primary Campsite	13.8	Yenlo Creek mouth.	96
Primary Campsite	20.5	Upland site, river right. Fishing hole adjacent.	92
Primary Campsite	21	Gravel bar, river right. Known to some as "Canyon Camp."	90
ORV/Foot Trail	27	Between creek and Martana Lake; ends on private property.	79
Foot Trail	31	To Shovel Lake. Mostly a route marked with flagging tape.	71
Primary Campsite	35.1	Immediately below Home Creek. Upland site, river right.	61
Primary Campsite	35.2	Gravel bar at Home Creek mouth.	60
Primary Campsite	41.5	Upland site; immediately below Camp Creek mouth.	49
Primary Campsite	41.8	Island gravel bar immediately above Camp Creek.	48
ORV Trail	45.2	Recently cut to Rock Lake.	39
Primary Campsite	46.1	Gravel bar across from Sunflower Creek.	36
Primary Campsite	47.2	Gravel bar, river right.	35
Staging Area	54	Chelatna Lake float trip put-in; right bank.	14

**The maps following this page indicate the
Lake Creek Recreation Opportunity Classes**

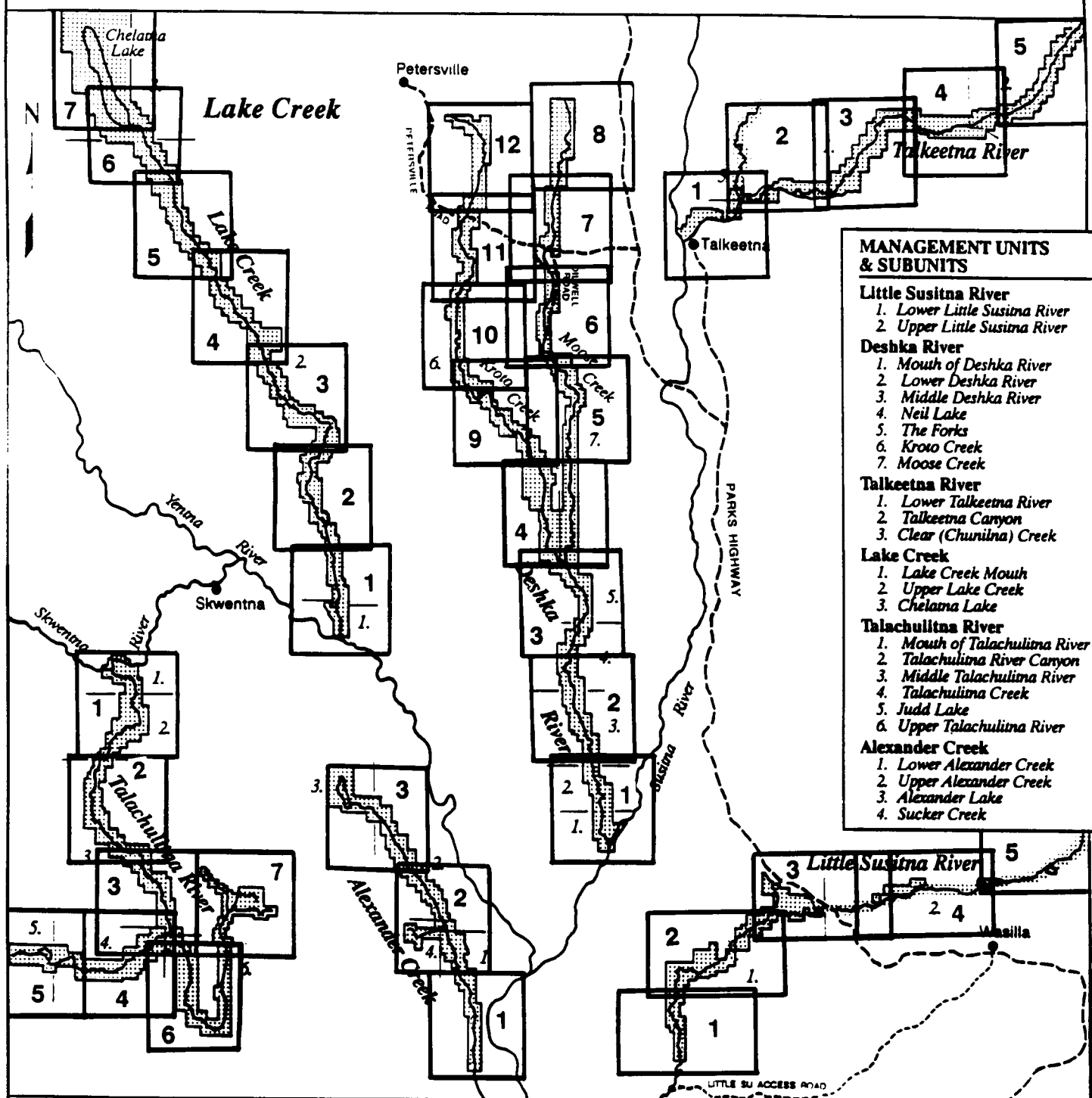
**During Peak Use Period
(mid-June to early July)**

and

Recreation Sites on Public Land.

SUSITNA BASIN RECREATION RIVERS MANAGEMENT PLAN

Index Map

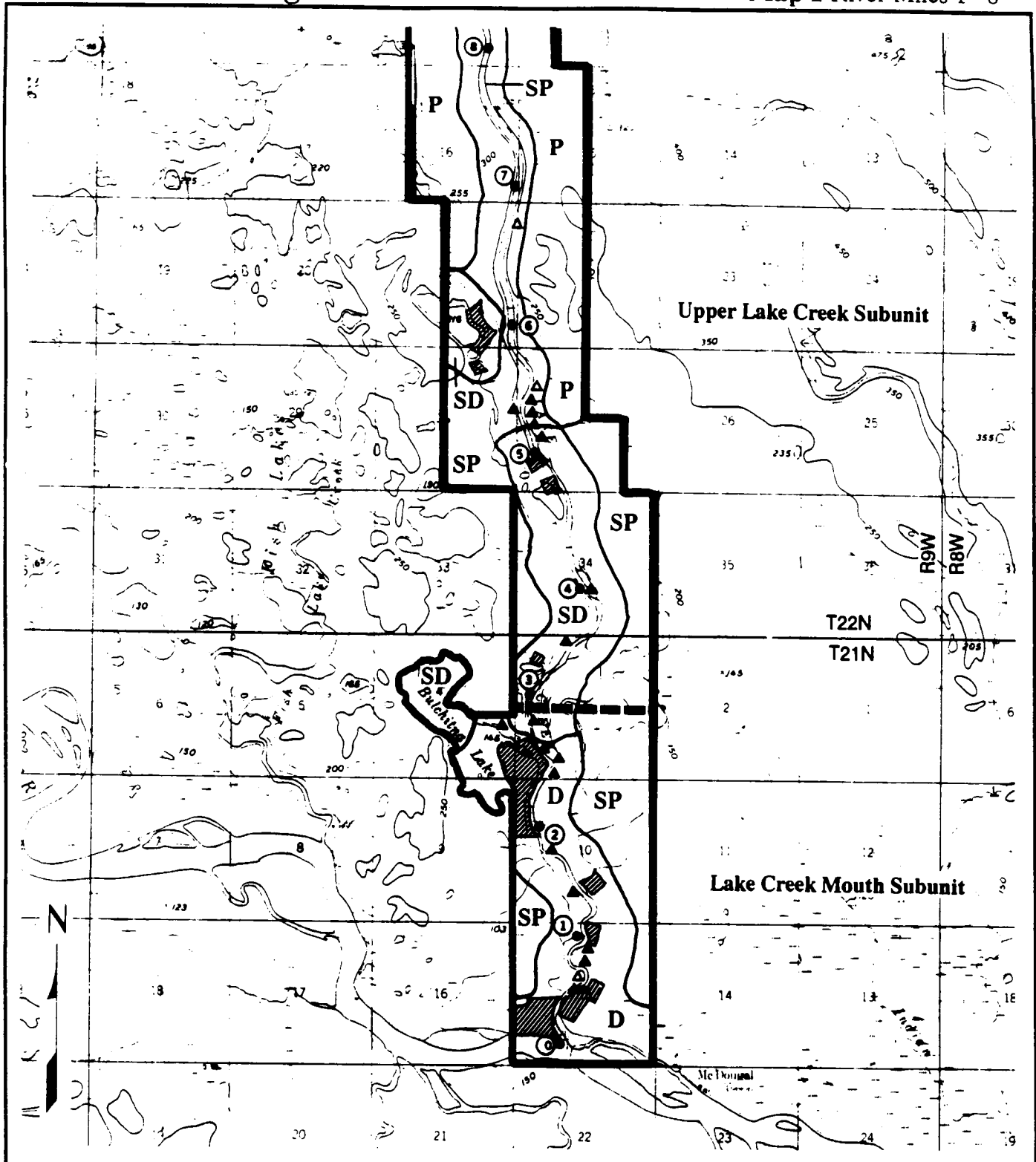


1 Index To Adjoining Maps

Recreation Rivers Corridors

Lake Creek Management Unit

Map 1 River Miles 1 - 8



— Management Unit Boundary

- - - Subunit Boundary

① River Mile

▨ Private Land

Scale: 1" = 1 Mile

Recreation Opportunity Classes

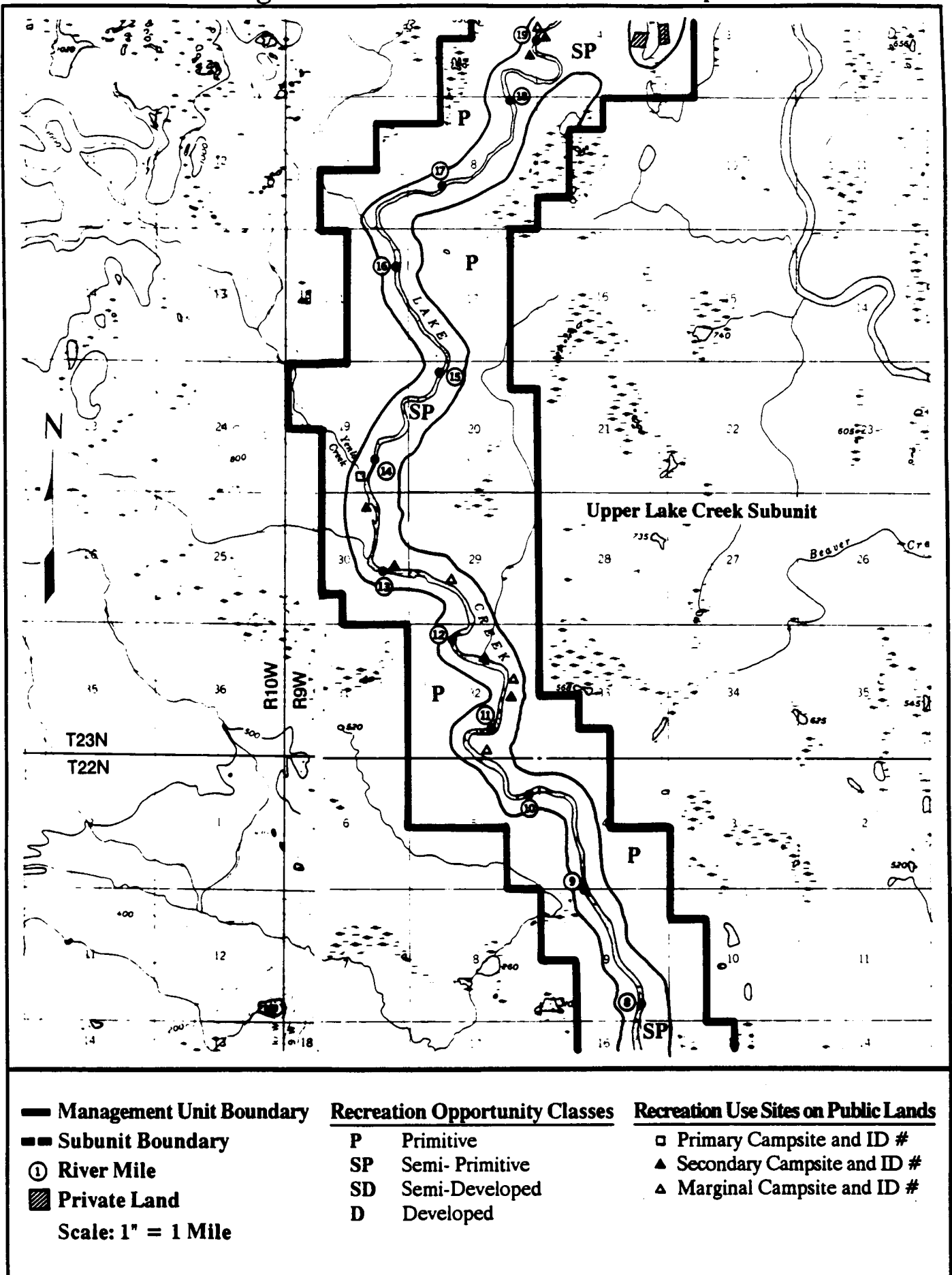
- P Primitive
- SP Semi-Primitive
- SD Semi-Developed
- D Developed

Recreation Use Sites on Public Lands

- Primary Campsite and ID #
- ▲ Secondary Campsite and ID #
- △ Marginal Campsite and ID #

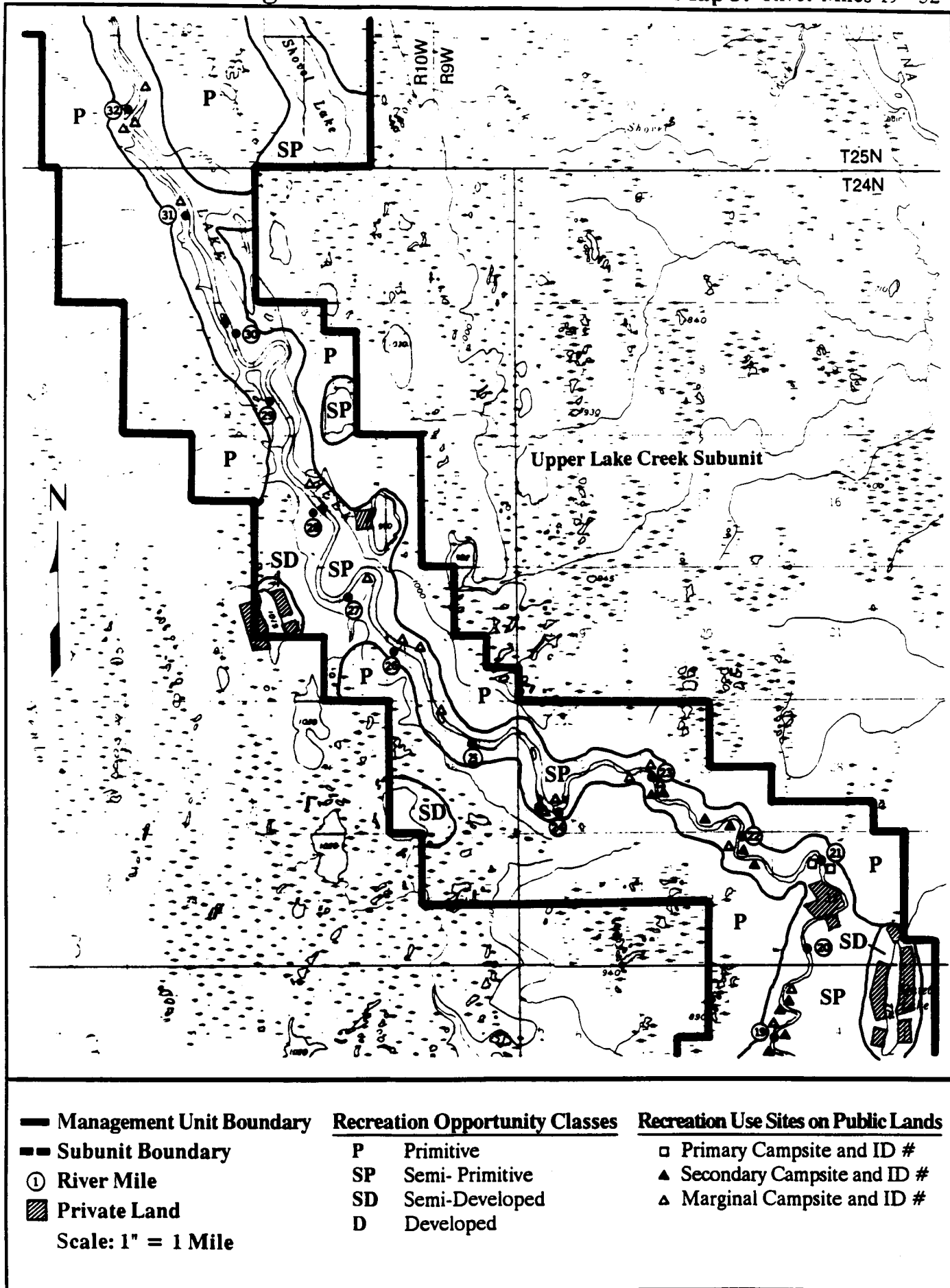
Lake Creek Management Unit

Map 2: River Miles 8 - 19



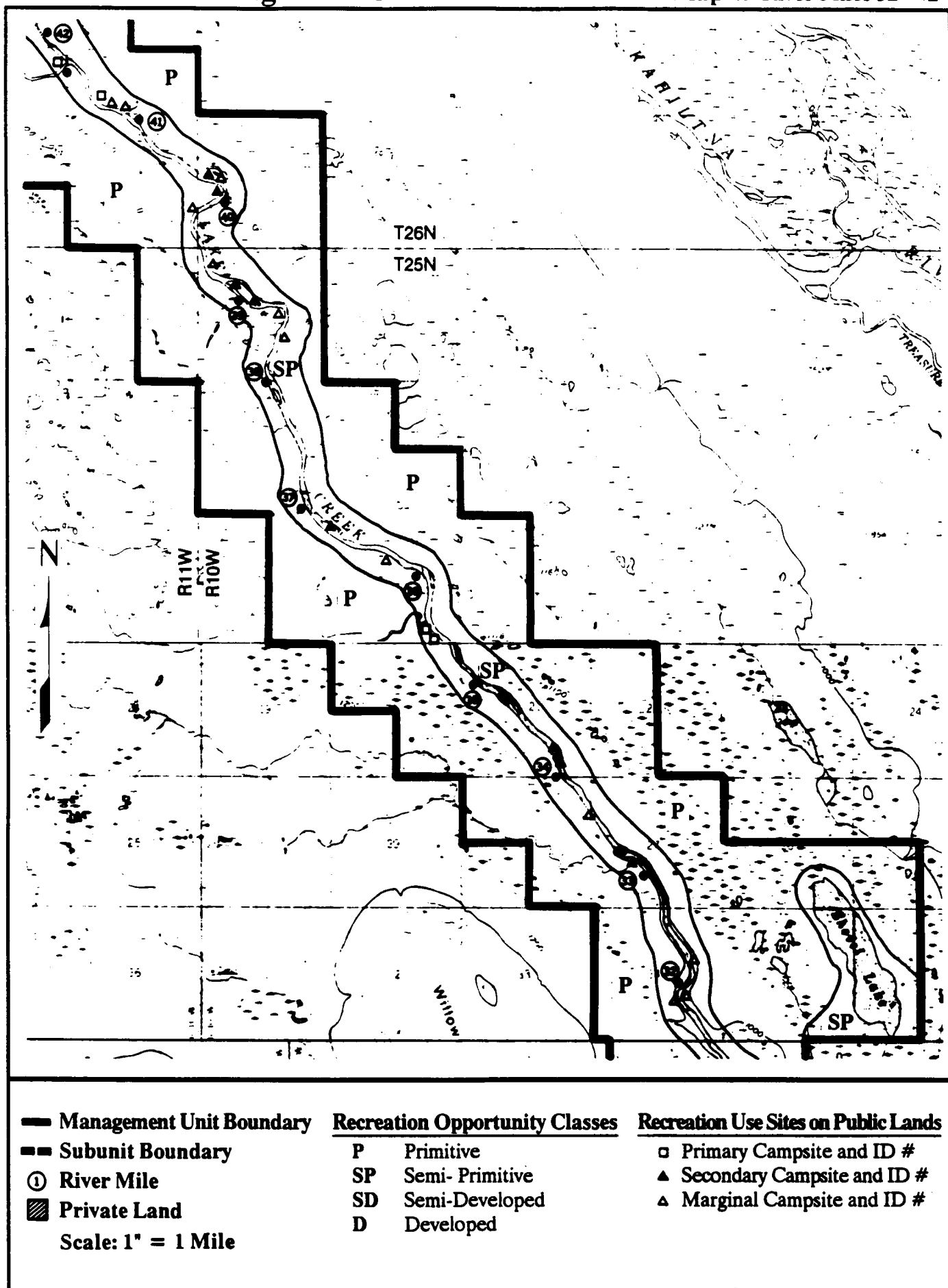
Lake Creek Management Unit

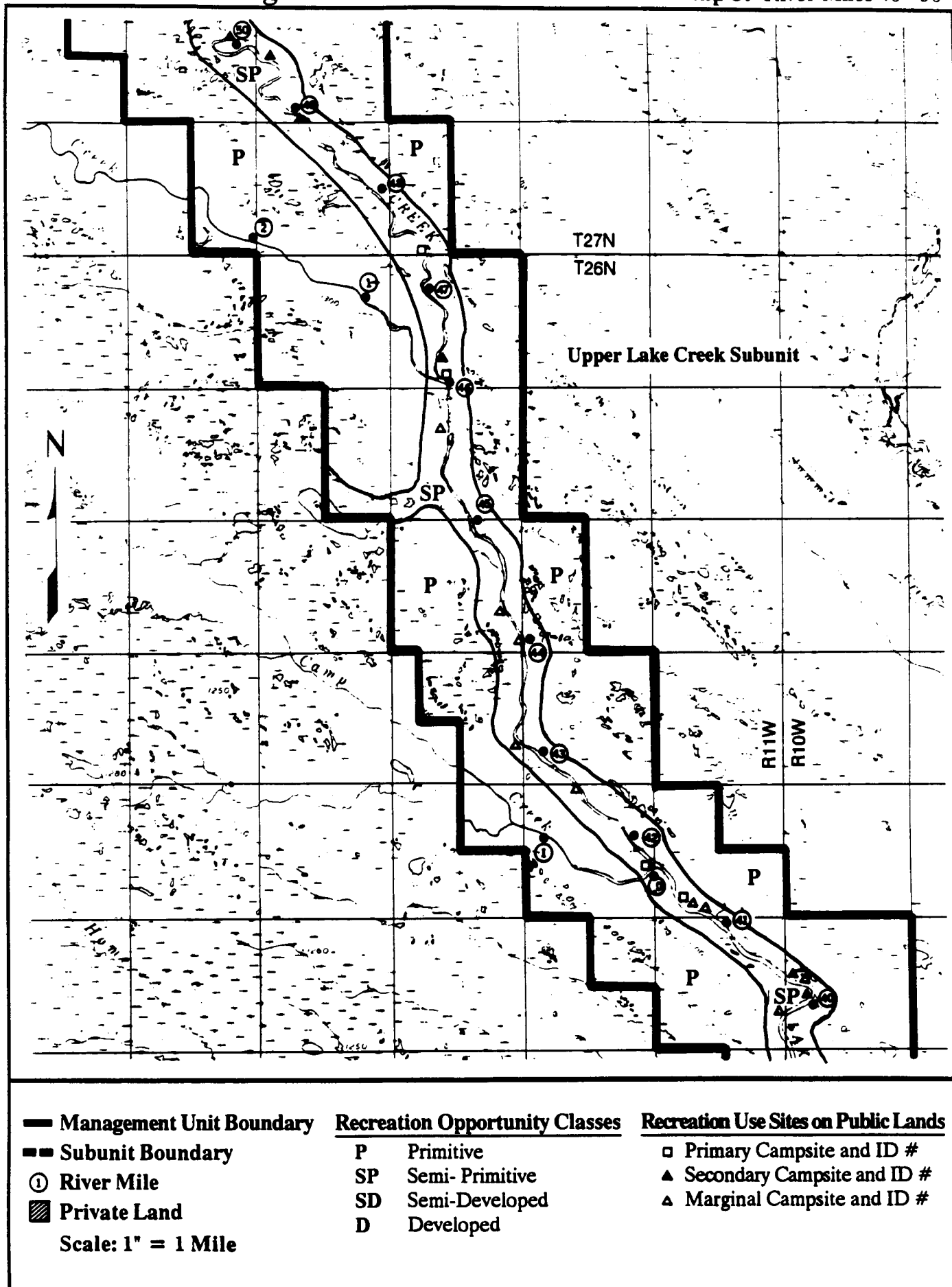
Map 3: River Miles 19 - 32

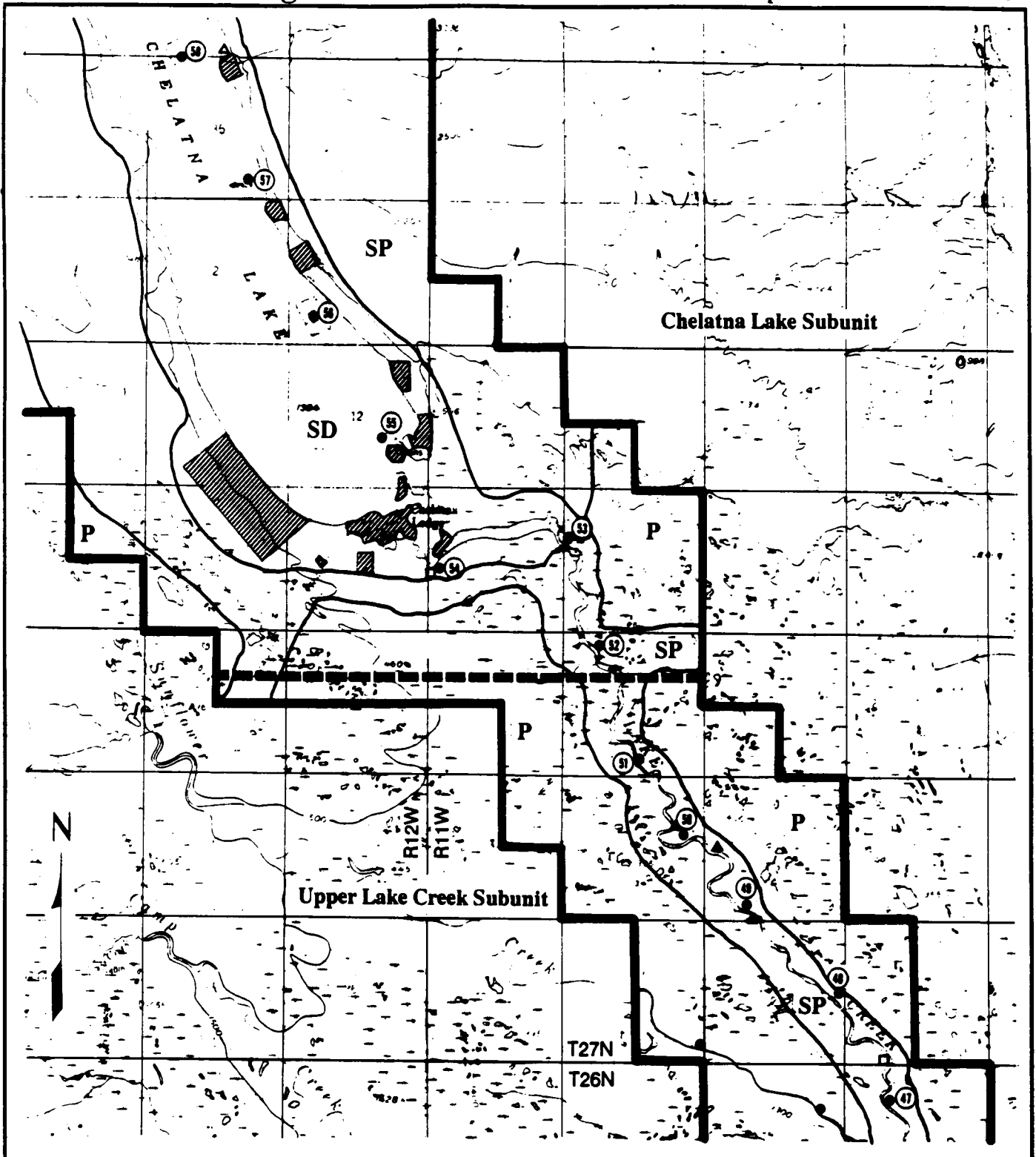


Lake Creek Management Unit

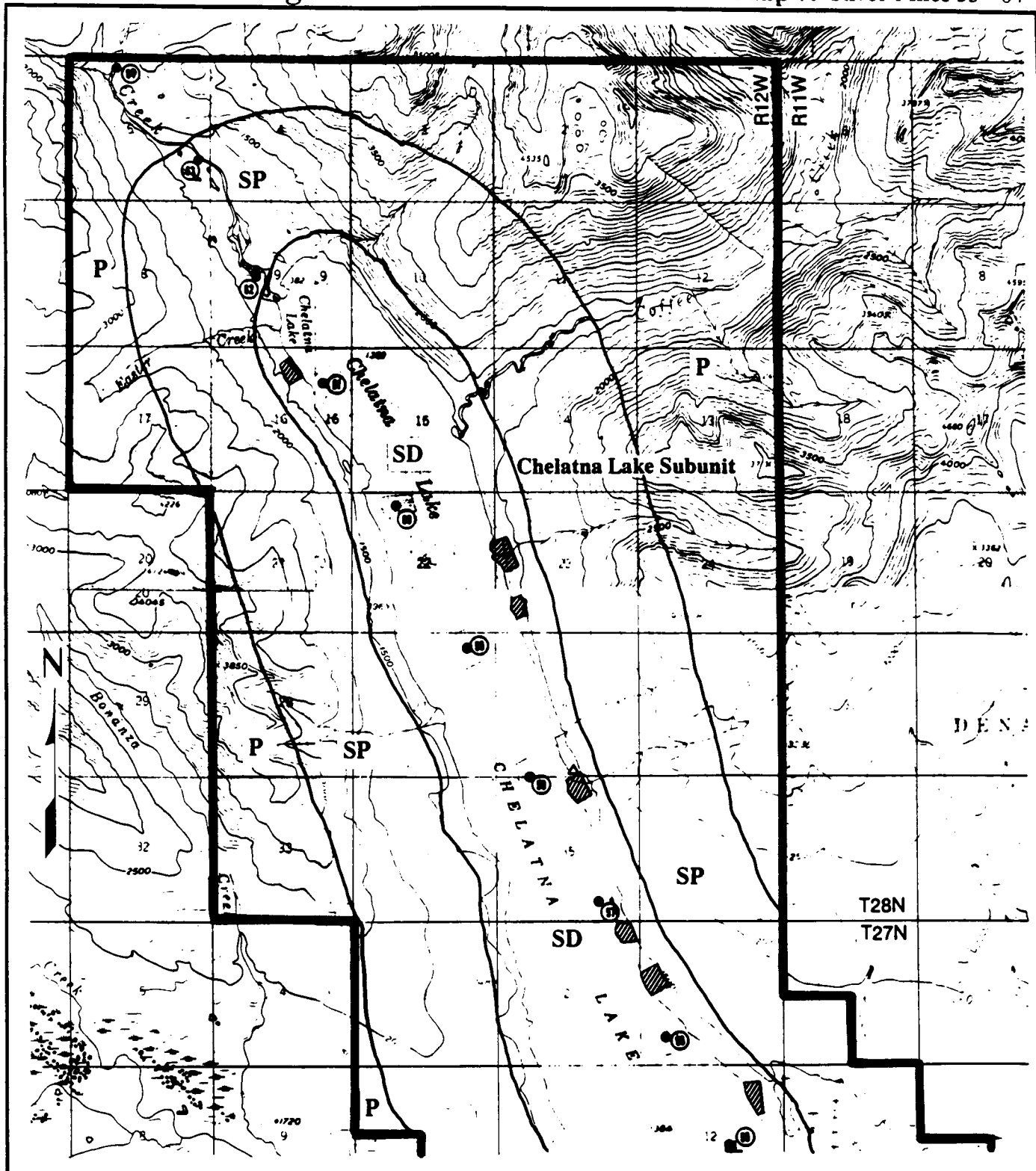
Map 4: River Miles 32 - 42







Management Unit Boundary		Recreation Opportunity Classes		Recreation Use Sites on Public Lands	
—	Management Unit Boundary	P	Primitive	□	Primary Campsite and ID #
- - -	Subunit Boundary	SP	Semi- Primitive	▲	Secondary Campsite and ID #
①	River Mile	SD	Semi-Developed	▲	Marginal Campsite and ID #
▨	Private Land	D	Developed		
Scale: 1" = 1 Mile					



— Management Unit Boundary

- - - Subunit Boundary

① River Mile

▨ Private Land

Scale: 1" = 1 Mile

Recreation Opportunity Classes

- P Primitive
- SP Semi- Primitive
- SD Semi-Developed
- D Developed

Recreation Use Sites on Public Lands

- Primary Campsite and ID #
- ▲ Secondary Campsite and ID #
- △ Marginal Campsite and ID #

TALACHULITNA RECREATION RIVER

LOCATION, BOUNDARIES, AND MAJOR USES

The Talachulitna River is about 55 air miles northwest of Anchorage, Alaska. It is approximately 64 river miles long from its source on the slopes of Beluga Mountain to its mouth on the Skwentna River. Talachulitna Creek is a major tributary of the river; at the confluence both streams are comparable in size. The Talachulitna River and Talachulitna Creek are a "recreation river," designated by the Alaska State Legislature in 1988. The legal boundaries of the recreation river include state and borough land adjoining the stream courses for approximately one-half mile on either side.

The most outstanding recreation resource of the Talachulitna River is its fishery, with major spawning populations of red, silver, and king salmon, plus grayling, Dolly Varden trout, and rainbow trout. It is the fishery that, by far, attracts the most recreation users to the river during the ice-free season. The Talachulitna River's popularity is enhanced by its closeness to Anchorage, and relatively inexpensive air access compared to more remote parts of bush Alaska. Besides fishing, other major activities during the ice-free season are floatboating, powerboating, and hunting. The Talachulitna State Recreation River is seldom used for winter recreation.

ACCESS

The Talachulitna River is accessible only by air or boat. Major float plane landing sites are on Judd Lake, near the headwaters of Talachulitna Creek; on the river at the midpoint, river mile (RM) 19; and at the mouth or just downstream on the Skwentna River. Wheel planes land at a private airstrip at the Talachulitna River Lodge, RM 1.3, or at RM 6.8, on an unimproved gravel bar strip. Boaters can travel up the Skwentna to the Talachulitna River mouth. Additional details about access to and within the area are presented in the Department of Natural Resources' Resource Assessment, Chapter 3, Section III, "Transportation," which provides a map of access points and routes.

RECREATION RESOURCES: THE PHYSICAL SETTING

General Characteristics of Each River Subunit

Talachulitna River Mouth (RM 0 to RM 2.8). This is the area from the Skwentna River to the lower end of the canyon. Traveling upstream, the river gradually narrows from approximately 120 feet to 75 feet wide. Four commercial lodges (Talachulitna River Lodge, Talaview, Alaska River Camp, and Silvertip), another lodge under construction, and a couple of cabins are clustered in the lower 1.3 miles.

Talachulitna River Canyon (RM 2.8 to RM 12.5). This subunit stretches from the lower end of the canyon upstream to where the canyon again gives way to low hills, covering about 9.7 river miles. The river is tea-colored, 40 to 60 feet wide, and occasionally narrowing even more where it is squeezed between canyon walls. A major rapid is located at about RM 12, with

another one at RM 9.8. Although there are no other notable rapids, the current remains relatively swift, with stretches of Class II and Class I whitewater. An exception is an approximate half-mile stretch between RM 9 and 10, where, hemmed in by canyon walls, the water is so flat it resembles a lake.

Middle Talachulitna River (RM 12.5 to RM 32.3). This subunit runs from the head of the canyon to the confluence with Talachulitna Creek, encompassing 19.8 river miles. About 40 to 60 feet wide, the river is tea-colored but still clear. Lodges and residences are clustered between RM 20.5 and 19.9, including Talaheim Lodge, Bear Tracks Lodge, three residences, and a lodge property that was advertised for sale and not operating during Summer 1989. A rapid at RM 17.6 effectively divides this subunit into two use zones. Between this rapid and the subunit boundary at the head of the canyon, three major tributaries join the river: Grayling Creek, Friday Creek, and Deep Creek.

Talachulitna Creek. This subunit runs from Talachulitna Creek's mouth on the Talachulitna River to the Judd Lake outlet. Clear and shallow, Talachulitna Creek is about 20 to 30 feet wide, and flows through a spruce forest. The narrow channel is blocked in places by sweepers and small log jams. The current ranges between three and five miles per hour (BOR 1977), and the creek drops at an average rate of 18 feet per mile.

Judd Lake Area. At an elevation of 980 feet, Judd Lake is about three-quarters of a mile wide in both directions. The much smaller Talachulitna Lake is about two and one-half miles upstream to the west. The recreation river extends about 1.3 miles above Talachulitna Lake. Silvertip Lodge is at the Judd Lake outlet, and four private dwellings are scattered around the lakeshore. There has been no development at Talachulitna Lake or elsewhere in the recreation river area above Judd Lake.

Upper Talachulitna River (RM 32.3 to RM 64). The upper river meanders through rolling spruce and poplar forests and extensive muskeg marshes to its confluence with Talachulitna Creek (BOR, 1977). The river is very small and shallow, especially in the first 10 miles out of Wolf Lakes, where the channel is less than 20 feet wide and averages less than a foot deep (BOR, 1977). Beaver dams occasionally block the entire channel and shallow riffles typically alternate with long, meandering pools (BOR, 1977). Approximately five miles above the Talachulitna Creek confluence, the river plunges through a one-half mile long rocky gorge, where the small stream drops over and between automobile-size boulders (BOR, 1977). The current averages three to four miles per hour on the upper river (BOR, 1977); the average gradient is 26 feet per mile.

Although part of the recreation river, the Talachulitna River above Talachulitna Creek is relatively inaccessible and seldom visited. There are no airstrips, and the lakes in this area are small enough that many pilots will not attempt landing a float plane. At the river headwaters, small float planes occasionally land on the longest Wolf Lake (Holzapfel, 1988). Bush planes with tundra tires also occasionally land in the headwaters area during hunting season (Holzapfel, 1988). The river is too shallow and obstructed to travel more than five miles upstream by powerboat. Because of the extremely low use levels (it would have been difficult to readily identify any current-year users, let alone come up with an adequate sample size), questions about the headwaters were omitted from the recreation user survey. Neither was the area visited by the

recreation inventory team. Consequently, minimal information is available on the upper Talachulitna River.

VISUAL RESOURCES

Visual quality ratings were done in mid-July 1989, slightly past the summer peak-use period. The results of the visual resource assessment are described below; the methodology is more fully described in Chapter 2.

[The scenic attributes were rated during the 1989 field trip on the recreation river and prior to some subunit redesignations of 1990.]

Talachulitna River Mouth. This subunit received an overall scenic quality rating of 12 points. The immediate terrain is flat to low hills. The overstory vegetation is mostly spruce, but with big cottonwoods on the gravel bars. The understory is willow, alder, ferns, and grass, with fewer wildflowers than upstream. The water is somewhat silty and tannin stained, but clear to a depth of five to six feet. There are few dramatic color contrasts; green vegetation and brown gravel bars predominate. Views are limited usually only to the first ridge top, although the Alaska Range is visible at RM 0. Commercial lodges are clustered in the last river mile. Although most buildings are either difficult to see from the river or blend with the natural setting, a red roof, a visqueen camp with silver roof, and fuel shacks on the beaches are discordant visual elements that detract from the natural scenic quality.

Talachulitna River Canyon. This subunit received an overall scenic quality rating of 20 points. The canyon is not an uninterrupted gorge; sections with cliffs over 50 feet high alternate with more open settings. The overstory vegetation is mostly spruce, with some birch and cottonwood between the canyon areas. The water is somewhat silty and tannin stained, but clear to a depth of about six feet. This landscape exhibits more color contrast than any in the Talachulitna drainage. Yellow cliffs striped with bands of gray clay add to the contrast provided by blooming wildflowers and stream bottom rocks. Views are very limited; the open areas present a few long-range vistas, but only for very short stretches. The canyon setting makes this subunit somewhat distinctive in comparison with other landscapes in the region, although the Talkeetna River, Lake Creek, and the upper Skwentna River have similar canyon areas. The landscape appears entirely natural, with no permanent cultural modifications.

Middle Talachulitna River. This area received an overall scenic quality rating of 18 points. The land form along the river banks is mostly low rolling hills and flat valley bottoms, except for occasional cut banks, and cliffs at the first whitewater drop, RM 17.6. The overstory vegetation is a spruce/cottonwood mixture with occasional birch; the understory is willow and alder shrubs, grasses, herbs, and a few ferns. Cow parsnip, dwarf fireweed, bluebell, and geranium were in bloom during the evaluation. The water was slightly stained with tannic acid. Although not as clear as Talachulitna Creek, it is transparent to a depth of about six feet. Occasional views of the Alaska Range enhance the scenery between RM 29 and RM 20. This subunit is free of permanent cultural modifications except for a cluster of lodges and cabins around RM 20, which are not overly obtrusive or out of character with the natural setting.

Talachulitna Creek. This area received an overall scenic quality rating of 16 points. The terrain along both sides of the creek is flat to gently rolling. Overstory vegetation is at first

almost pure spruce, but changes to a spruce/cottonwood mixture at about RM 12. The understory consists of willow and alder shrubs, grasses, and herbs. The water is perfectly clear; the creek bottom is visible even in pools 12 feet deep, which alternate with shallow riffles. The rocks on the creek bottom add color contrast, as do wildflowers. Cow parsnip, geranium, rose, bluebell, and dwarf fireweed were all blooming in July. Views are confined to the creek banks most of the time, but there are occasional views of Beluga Mountain and adjacent low ridges. There are virtually no cultural modifications visible from the creek. Except for an abandoned bulldozer, and fire rings and small amounts of litter where people have camped, the environment appears completely natural.

Judd Lake Area. This area received an overall scenic quality rating of 17 points. The immediate surrounding terrain varies from steep hills on the north and west shores of the lake, to flat to rolling terrain on the south and east shoreline. The overstory vegetation is predominantly spruce; the understory is a mixture of willow and alder shrubs, grasses, and herbs. The water is very clear and has a slight greenish cast when looking across the lake surface. The rocky lake bottom is easily visible to depths of perhaps 15 to 20 feet, and rocks in a variety of earth tones add color and texture interest. Patches of snow were scattered on the surrounding hilltops when the scenic quality was evaluated on July 6, adding further contrast to the landscape. There were no distant views available during the evaluation, but that might not always be true. Although the weather was partly sunny that day, low clouds obscured the surrounding hilltops. Although lakes of this size are common in the Matanuska-Susitna Valley region, Judd Lake's clarity makes it somewhat distinctive. Cabins are scattered around the lake, and a commercial lodge is located at the outlet, but these blend harmoniously with the natural setting, overall.

Upper Talachulitna River. The scenic quality of this subunit has not been evaluated.

RECREATION RESOURCES: THE SOCIAL SETTING

Opportunities During Peak Season

The distribution of recreation opportunity classes within the boundaries of the recreation river is shown on the maps at the end of this chapter. The maps depict conditions during the period of peak use, which corresponds to the time during which king salmon returning to spawn are plentiful, in good condition, and can legally be harvested. The peak use period for 1989 was mid-June to the first week of July. The inventory team did not visit the area until July 6-11, so conditions during peak-use were inferred. A second, though smaller peak in terms of visitor numbers, occurs at the height of the silver salmon run. Silver salmon fishing generally begins around July 25, peaks about two weeks later, and lasts until the end of August (Johnson, 1989).

The maps show that recreation users rarely leave the river bank. This is because of the difficulty of traveling overland across boggy ground or through thick vegetation, and more importantly, because most users are there to fish. Consequently, the river becomes a ribbon that is largely semi-developed and semi-primitive. This is due principally to the number of people on the river at one time, rather than the presence of structural improvements. Away from the river, the river corridor is seldom visited and generally exhibits the characteristics of a primitive area.

Talachulitna River Mouth. From its mouth to the Talachulitna River Lodge the river is classified as developed. There are four other lodges or commercial recreation providers (one of these under construction), plus two cabins. Associated with each establishment are riverfront improvements such as signs, docks, and fuel storage shacks. Use levels are high during peak season, as this section is always navigable by powerboat and fishing for salmon is usually good within the last mile of river. Guests and personnel of local lodges mix with anglers who boat in for the day from locations on the Skwentna River, and with float parties completing their trip. Semi-developed opportunities are provided from the Talachulitna River Lodge at about RM 1.3 to the upstream boundary of this subunit. Riffles restrict powerboat use in the upstream portion of this subunit, except during high water. However, some guests from the mouth-area lodges commonly walk upstream to fish, so it is common to encounter parties on foot. Above Talachulitna River Lodge there is no development visible from the river, except primitive campsite improvements.

Talachulitna River Canyon. The entire canyon subunit provides semi-primitive opportunities. No development is visible except primitive log furniture at a few campsites. Encounters with others are limited, because there are no specific attractions where users congregate, and because the canyon receives less use than any other river subunit. Use is relatively low because many floaters take out upstream at RM 19, and powerboaters from downstream are blocked from the canyon by shallow, rocky stretches. The inventory team encountered one other party in the canyon subunit on July 10.

Middle Talachulitna River. Based on encounters with other groups, most of this subunit provides semi-primitive opportunities. Exceptions are at Grayling Creek and Friday Creek, major tributaries where users typically stop to fish, and in the section between RM 20.4 and RM 18.4 which contains lodges and cabins and a float plane landing area. These sections are classified as semi-developed. Probably half of all float trips take out at the float plane landing area at RM 19 (commonly known as "the midpoint"), reducing encounters downstream. On July 8, the inventory team floated 9.8 miles, from the river's confluence with Talachulitna Creek at RM 32.3 to RM 22.5. In that stretch there were two separate encounters with the same party, first at the mouth of Talachulitna Creek, and later at Grayling Creek. The next day, July 9, other people were encountered around the lodges and cabins and float plane landing site mentioned above, and at and just below Friday Creek. No other parties were seen elsewhere along the 8.4 river miles that the inventory team covered that day. Compared to Talachulitna Creek, parties were dispersed enough by the time they reach the river that there are few encounters except at specific attractions where users congregate. Except for the cluster of lodges and cabins, development visible from the river is limited to primitive log furniture at a few popular campsites, such as Grayling Creek, and a primitive trail for scouting and lining the rapids at RM 17.6.

Talachulitna Creek. Talachulitna Creek provides semi-developed opportunities. Although no development is visible from the water surface, encounters with other float parties are common along the entire length of the creek. On July 7, the recreation inventory team had six encounters in the 12.7 river miles between RM 14.7 and RM 2.0, as the team "leap-frogged" with other float parties. In addition, another group camped within sight and sound that night. There were no particular attractions around which other people were encountered; rather, other parties were met at random along the creek. Float trips putting in at Judd Lake eventually disperse, with varying destinations and rates of travel. But generally, parties are close enough together on the creek that contacts are frequent.

Judd Lake Area. The area immediately around Judd Lake is classified as semi-developed, because of the lodge and cabins there, and because it is a focus of activity, where one would encounter well over five groups each day. Besides the people associated with the lodge and private cabins, Judd Lake is a put-in site for float trips. A foot trail between Judd Lake and Talachulitna Lake offers semi-primitive opportunities. Away from the two lakes encounters with others would be rare, and signs of use seldom seen. Accordingly, these areas are classified as primitive.

Upper Talachulitna River. This subunit is classified as primitive from the headwaters to about one-half mile above the confluence with Talachulitna Creek. The area is seldom visited and contains no development, except perhaps several old trapping cabins. The area within one-half mile of the confluence is semi-primitive, because of the likelihood of meeting other parties.

Recreation Opportunities Before and After Peak Season

Generally, away from the zones containing permanent structures at Judd Lake, the midpoint, and the mouth, the entire river and creek would revert to a primitive or semi-primitive setting during the off-season, depending on visitor use levels. An exception might be during late summer and fall, when debris left by peak-season visitors might result in human waste and litter being found at over 50 percent of the campsites. Such areas would retain a semi-developed rating, until snow covered the ground and spring runoff removed most of the debris.

Talachulitna Creek is almost entirely undeveloped, and yet received a semi-developed rating because of the frequency of user contacts. As use levels drop it would provide semi-primitive, and finally primitive opportunities at the extreme ends of open water season in early summer and late fall, provided that little debris remained from peak season. The same can be said for those portions of the river free of structural improvements, that in peak season provide semi-primitive or semi-developed opportunities.

Judd Lake and the midpoint area would retain their semi-developed rating year-round. The mouth area would revert to semi-developed, when use levels are low enough that less than 30 groups a day are encountered. Areas which provide primitive opportunities during peak season would continue to do so year-round.

RECREATION ACTIVITIES: ICE-FREE SEASON

Powerboating

Propeller and jetboats, and a few airboats, are used on the Talachulitna River, mostly in association with fishing. Powerboats are also used by hunters for moose and bear.

Talachulitna River Mouth. This is the most heavily used powerboating area on the river, visited by boats coming into the mouth from the Skwentna River and boats originating from the lodges and other private property in the lower one and one-half miles of the Talachulitna. Most powerboaters are salmon anglers, and catching fish is their primary purpose for being on the river. The availability of productive fishing encourages boaters to congregate in the most accessible and easily navigable stretch near the mouth. There is no incentive to attempt further

upstream travel at the risk of damaging equipment. Jetboats routinely travel to RM 1.3 or slightly higher, depending on water levels. Regardless of water level, it appears that the vast majority of boaters never attempt going above the river subunit boundary and into the canyon. When the fish are running, salmon fishing generally remains good immediately at the mouth or within the one-quarter mile upstream of the mouth. Accordingly, this area supports the most concentrated boat traffic.

Talachulitna River Canyon. The canyon receives little powerboat use. Rocky whitewater discourages most boaters from attempting to use the canyon, especially since pools downstream provide good salmon fishing.

Middle Talachulitna River. The only boats on this subunit are jetboats and small propeller craft that have been flown in for use at one of the six lodges or residences at the midpoint, and which are used on approximately 15 miles of the middle river. Downstream travel is blocked by a rapid at RM 17.6. At normal summer water levels, a jetboat can travel upstream as far as the river-creek confluence. In most years, late summer or fall rains generally raise the water level, enabling midpoint lodge owners to transport hunting guests beyond the confluence (Miller, 1989).

Talachulitna Creek. There is usually no powerboat use on the creek during summer, because it is so shallow and rocky that jet or propeller driven craft are unable to enter it from Judd Lake or from the river. However, during 1989, early season floaters reported seeing jetboats above the forks (Johnson, 1989).

Judd Lake Area. Presently powerboat use is restricted to Judd Lake itself, with boats that have been flown in by the lodge and by private cabin owners. Powerboating is an integral part of recreation use at Judd Lake, probably engaged in by all visitors for whom the lake is a final destination.

Talachulitna Creek above the lake is too small for boating. Talachulitna Lake could support motorized use, but would require transporting boat and motor overland or by air. Since there is no private property at this lake, there is presently little incentive for someone to haul a boat here.

Rafting, Canoeing, and Kayaking

Rafting is the dominant form of float boating on the Talachulitna River. Whitewater stretches are too discontinuous to attract serious kayaking use; kayaking and canoeing are also limited by the expense of transporting the boats into the area on the exterior of small float planes.

Although variations are possible, there are essentially two float trips on the Talachulitna: Judd Lake to the "midpoint" at RM 19, and Judd Lake to the mouth. A take out at midpoint avoids the major rapids and is suitable for relatively inexperienced floaters. For those with the skills, continuing on to the mouth offers the excitement of three Class III-IV rapids, considerable Class II whitewater, and a chance to enjoy the scenic canyon. Another option would be to put in at midpoint and take out at the mouth. This trip is rarely done, probably because it is only a 19-mile float, yet the cost of air transportation is comparable to the other two trips, which offer 30 and 49 miles. Another possibility for those floating to the mouth is to continue down the Skwentna River for 14 miles to the Skwentna airfield.

From Judd Lake to the mouth is a leisurely five-day float. The recreation inventory team required approximately 23 hours of float time to complete the trip. The trip could be extended an additional one to two days to allow more time for other activities, such as fishing, hunting, or exploring away from the water column. From Judd Lake to the take-out at RM 19 can easily be done in three days, although this trip can be extended also.

Like powerboaters, peak-season floaters come to the Talachulitna River primarily to fish for salmon and resident species. Besides its proximity to Anchorage, other qualities that influence floaters to choose the Talachulitna over other streams are the clear water, relatively swift current with some whitewater, and scenic quality.

Kickers -- small outboard motors of about 5 horsepower or less -- are rarely used on the Talachulitna. The current is generally swift enough that they are not needed, and there are relatively few sections where they can be safely used. A kicker's very limited utility makes it not worth carrying through the many shallow spots in the upper section of the float trip.

Because the river naturally restricts powerboat use, the Talachulitna has been largely without the user conflicts between powerboaters and floaters seen on some of the other recreation rivers, particularly the Little Susitna. However, floaters complained about seeing jetboats above the confluence of Talachulitna Creek and the Talachulitna River during Summer 1989 (Johnson, 1989). Whether this conflict was an unusual event, or a future trend remains to be seen. The floating qualities of the applicable river subunits are briefly discussed below. The discussion is organized from upstream to downstream, the order in which the subunits are floated.

Talachulitna Creek. Floaters putting in at Judd Lake immediately encounter a shallow, rocky channel. During the recreation inventory trip on July 6 there were so many exposed rocks that the rafts could not fit between them, and had to be dragged for short stretches; other times the rafts scraped over rocks that were barely submerged. One of the three rafts was punctured by a rock in the first mile out of Judd Lake; however, it was patched and the trip was able to continue next day. The stream is less rocky after the initial two miles, though it remains narrow, with sweepers and log jams frequently obstructing the main channel, requiring floaters to drag their rafts through shallows. However, the jams are not massive; it is fairly quick and easy to get around them. An estimated 12 to 15 sweepers and log jams requiring dragging were encountered on the creek, mainly between RM 15 and 1. Higher water would mean less dragging; however, the conditions experienced by the inventory team are probably not unusual for peak season. Although floating conditions can be marginal, the creek provides good camping opportunities, pleasant scenery, and fishing for salmon, trout, and grayling.

Middle Talachulitna River. The river below the confluence with Talachulitna Creek becomes wider and deeper, so that dragging is no longer necessary. From the confluence to the midpoint take-out at RM 19 is fairly gentle water, although there are rocky stretches of Class I that require an ability to move from side to side in the current. At RM 17.6 is the first and most difficult rapid, Class III to IV depending on flow. It is short, about 50 yards long, and it is possible to line the boat from shore through the most difficult portion. Below the rapid, the river settles down again with just Class I and a few short, rocky stretches of minor Class II.

Talachulitna River Canyon. A Class III rapid is just below the canyon entrance at RM 12; another Class III rapid is at RM 9.8. The remainder of the canyon consists of long stretches of Class II and Class I whitewater, interspersed with segments of swift flatwater.

Talachulitna River Mouth. The lower 2.8 miles of the Talachulitna are relatively placid, with nothing more than a few minor riffles. The principal take-out and float plane pick-up site is approximately two and one-half miles downstream on the Skwentna River.

Fishing

As already mentioned, fishing is the dominant recreation activity that draws people to the area. More anglers are present during the height of the king salmon run than at any other time, which for 1989 was mid June to early July. Rainbow trout sport fishing is not counted in Alaska Department of Fish and Game's reporting system, because the system records only those fish kept, and the rainbow is a catch-and-release fishery. However, the Talachulitna has a reputation for trophy rainbows that is a recreation drawing card in its own right. Serious rainbow anglers prefer the late summer, when the water is typically low and clear and the salmon are finished spawning.

Angler distribution is influenced by the probability of success, along with ease of access. Fishing in each of the river subunits is discussed briefly below. More detailed information about fishing is presented in DNR's Resource Assessment, Chapter 3, Section VII.

TABLE TL-1. Sport Fishing Harvest on the Talachulitna River, 1988

Species	Number Harvested	Percent of Total Harvest
Grayling	1,128	30
King salmon	871	24
Red salmon	800	22
Dolly Varden/arctic char	382	10
Silver salmon	418	11
Chum salmon	91	2
Pink salmon	18	< 1
Rainbow trout	0*	*

Source: Alaska Department of Natural Resources, 1989c, page FW-72

* catch-and-release fishery; only fish caught and kept are recorded

Talachulitna River Mouth. This subunit receives the highest fishing use, because it is the most accessible and most developed. Powerboaters coming in for the day from points on the Skwentna River or below mix with floaters on the last leg of their trip, and with guests of the four lodges located in this subunit. Most fishing is by boat, but lodge guests also walk upriver as far as two to two and one-half miles to fish for trout and grayling.

Talachulitna River Canyon. This subunit receives the lightest fishing use. Besides having the lowest number of users overall, this subunit is swift, with fewer beaches on which it is easy to pull out and fish.

Middle Talachulitna River. Besides the effort expended by floaters, guests of the midpoint lodges and owners of the several private residences there fish from the bank and by powerboat between RM 17.6 and 32.3. In addition, one of the lodges has a helicopter which is used to take clients fishing and sightseeing. The mouths of Grayling Creek and Friday Creek are two of the most popular fishing spots in this subunit, the latter not accessible to powerboaters.

Talachulitna Creek. Anglers on this subunit are either floaters, or day-users who walk down from Judd Lake. Anglers based at the lake walk the creekbed, or follow a trail which begins near the outlet and ends at approximately RM 15.8. Day-use anglers usually do not travel down the creek more than two to three miles. The opportunity to catch king salmon is one reason why float trip parties tend to bunch up on the creek, a characteristic noted in the earlier section describing the social setting. During the recreation inventory field trip on July 6-7, 1989, king salmon were observed in some of the pools, particularly in the upper 10 to 12 miles. The fish, so readily visible either resting in the pools or darting between them, tempt anglers to throw in a line.

Judd Lake Area. The Alaska Department of Fish and Game records harvest information separately for Judd Lake. In 1987, red salmon was the most frequently harvested species, followed by Dolly Varden, silver salmon, and small numbers of grayling and pink salmon (Mills, 1988).

Hunting

Moose, black bear, and brown bear are the principal species sought. Most hunters fly in and out (BOR, 1977), although they may use boats as a secondary means of transportation. More detailed information about hunting is presented in DNR's Resource Assessment, Chapter 3, Section VII.D.

WINTER RECREATION ACTIVITIES

Snowmachining and ORV Use

The canyon generally does not freeze over (Miller, 1989); consequently the Talachulitna River is a poor snowmachine trail. Although snowmachines are used by local lodge owners and residents as a means of transportation, there is virtually no public recreational snowmachine use or other winter recreation (Johnson, 1989).

Dog Mushing, Cross Country Skiing and Ice Fishing

Portions of the Talachulitna have potential for these winter activities that is currently not being realized. The lack of use is probably due to a combination of factors. The Talachulitna is too distant from population centers for day use, and none of the lodges remains open in winter. There are other areas suitable for these activities much closer to population centers that are either

suitable for day use or where public use cabins or commercial lodging is available. Although a small segment of the public engages in overnight or longer winter backcountry trips, suitable areas also abound within easy driving distance of population centers.

RECREATION SITES

Undeveloped Sites

There are no developed recreation facilities within the Talachulitna Recreation River area, except two foot trails. Foot trails have either been constructed or have developed through visitor use between Judd Lake and Talachulitna Lake, and from Judd Lake's outlet to approximately RM 15.8 on Talachulitna Creek (numbers 1 and 11 on the map). The trails are used mainly for fishing access by lodge guests.

Undeveloped recreation sites discussed below and shown on the maps which follow were inventoried during July 1989. The upper Talachulitna River above the creek confluence has not been inventoried yet. Both the maps and discussion below should be reviewed for a full appraisal of recreation sites; the maps contain information on additional sites not specifically mentioned in the text.

Judd Lake Area. Three sites at Judd Lake serve as float trip staging areas; however, they are apparently all on private property. Their continued availability depends on the willingness of the property owners to accommodate this use. Site 9, at Silvertip Lodge, is probably most frequently used. The lodge managers have been allowing floaters to unload their planes at the lodge dock, and use a shoreline area at the outlet to assemble rafts and gear.

Talachulitna Creek. Immediately below Judd Lake, between RM 17 and RM 15, most of the gravel bars are only marginally usable as campsites, mainly because they are covered with large cobbles rather than pea gravel. Good gravel bar campsites become plentiful below RM 15. Between RM 15.1 and RM 0.1, 61 gravel bars suitable for camping were inventoried, or an average density of 4 sites per mile. Only one upland campsite was observed along the creek, at RM 16.6. This site appeared to be under long-term occupation when it was observed on July 6; it contained a white canvas wall tent on a plywood platform.

Middle Talachulitna River. Campsites are plentiful in this subunit. A total of 70 campsites were inventoried, 69 gravel bars and 1 upland site, for an average site density of 3.6 per mile. An additional 14 marginal sites are available, but these are either too narrow, too muddy, or with gravel too large to be considered as anything other than a campsite of last resort.

The midpoint float plane landing area that serves as a take-out point for float trips is completely undeveloped; it is merely one of the gravel bars included in the total above.

Talachulitna River Canyon. There are fewer campsites in the canyon subunit compared to upstream. Where the river is hemmed in by rock walls the bars tend to be mostly large cobbles. The swift current of this subunit has carried much of the pea gravel that makes good campsites further downstream. Most of the good campsites are located between canyon areas. A total of 17 gravel bar campsites were inventoried, for an average density of 1.8 per mile. No upland

sites were observed. An additional 10 marginal sites were counted, all with a surface of large cobbles.

An undeveloped gravel bar from RM 6.9 to RM 6.7 serves as a landing strip, principally during hunting season.

Talachulitna River Mouth. Five campsites were seen between the canyon and the mouth, all on gravel bars, for an average density of two sites per mile.

Site Conditions and Adequacy of Sites Relative to Existing Use

Overall, the undeveloped recreation sites appear adequate to handle existing public recreation use on the Talachulitna River. To assure continued public access to Judd Lake for float trip put-ins, it would be advantageous to either acquire an easement on one of the private properties now being used, or negotiate with the Borough to provide a public use site. (The Matanuska-Susitna Borough owns all of the Judd Lake shoreline not in private ownership).

During the recreation site inventory, time constraints did not permit a thorough inspection of each undeveloped site; most were evaluated while floating by on the river. However, the gravel bar campsites on the Talachulitna seem relatively clean, largely without the toilet paper strewn through the bushes that is commonplace on some of the other recreation rivers. On the Talachulitna, human waste and trash seem to be a problem only at the primary use sites. Toilets should be considered for the Judd Lake float trip staging area, after one is firmly established; at the midpoint take-out; and at the gravel bar campsite/airstrip at RM 6.8, and perhaps at Grayling Creek and Friday Creek. Sanitation facilities are also desirable within one-quarter mile of the river's mouth, to accommodate the many anglers who congregate here during peak season.

Several members of the public have identified a need for a public airstrip near the river mouth, stating that the only airstrip there is private, and unavailable to the general public (DNR, 1989a).

TABLE TL-2. Talachulitna River: Important Recreation Sites & Facilities on Public Land

Type	River Mile	Description	G I S No.
Fishing Area	0-0.25	Anglers based at local lodges, and also boat in from other areas.	265
Primary Campsite	6.7-6.9	Large gravel bar that also serves as primitive airstrip. Numerous fire rings.	229
Fishing Area	9	Thursday Creek mouth. Adjoining gravel bar mainly large cobbles; few tent sites.	221
Fishing Area	14.1	Deep Creek mouth. Large gravel bar available for camping.	203; 202
Primary Campsite	16	Large gravel bar at Friday Creek mouth. Popular fishing hole.	195; 194
Portage Trail	17.7	Path worn by repeated use; skirts Class III-IV rapid.	190; 188
"Midpoint" Campsite/ Take-Out	19.3	Float planes land RM 18.8-19.1 Service rafters, local lodges and residences.	180-182
Primary Campsites (2)	25.4	Grayling Creek. Upland and gravel bar site. Fishing for grayling, trout, salmon.	142-144
Primary Campsite	32.3	Tal. Creek/River confluence. Large gravel bar. Fishing.	103
Fishing Area (Tala. Creek)	13.8-14.3	Several fishing holes, with good campsites adjacent or nearby.	83
Staging Area	Judd Lake	Float trip put-in. Three sites now used all appear to be on private property.	2,3,9,10

**The maps that follow this page indicate the
Talachulitna River Recreation Opportunity Classes**

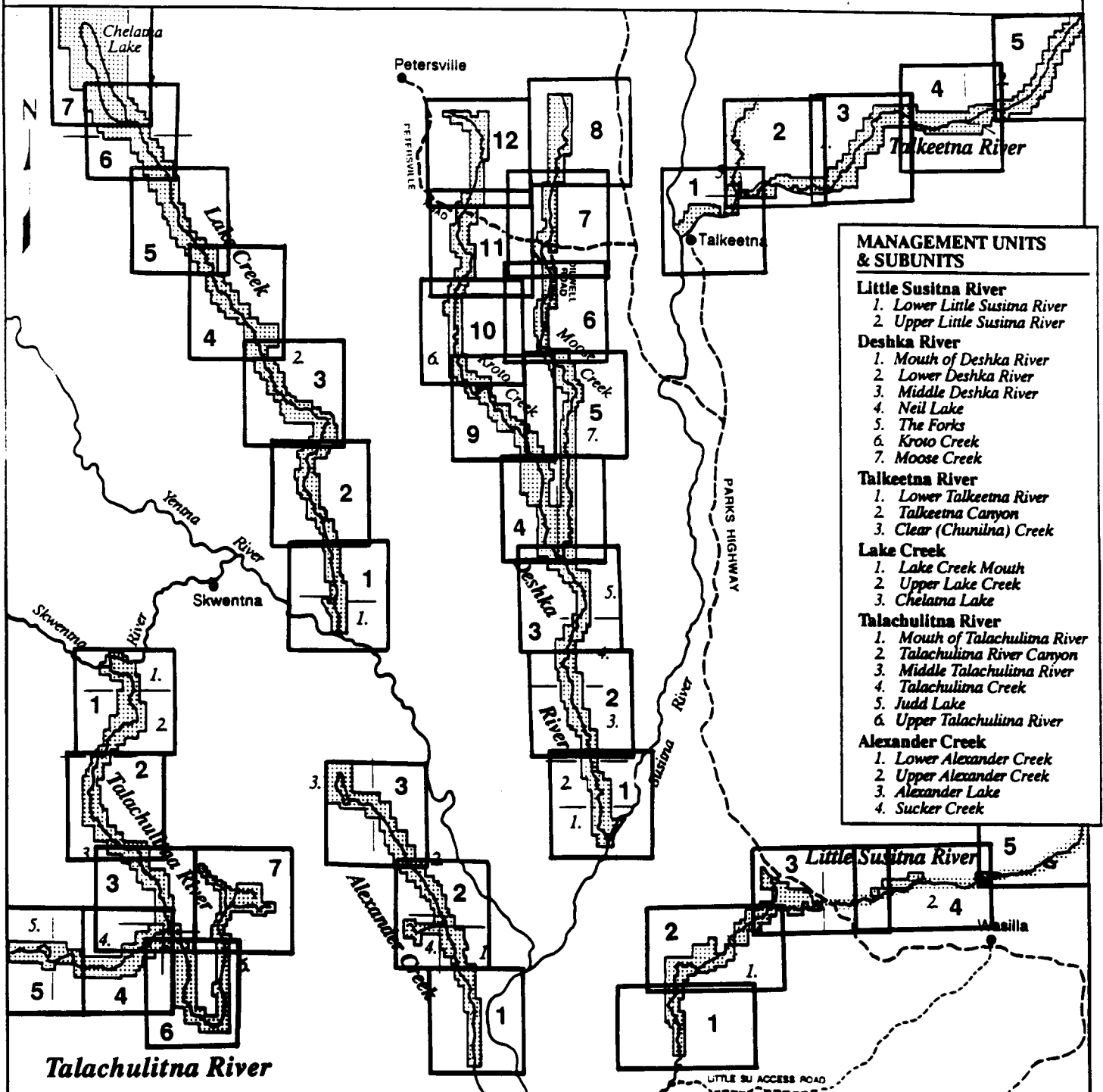
**During Peak Use Period
(mid-June to early July)**

and

Recreation Sites on Public Land.

SUSITNA BASIN RECREATION RIVERS MANAGEMENT PLAN

Index Map

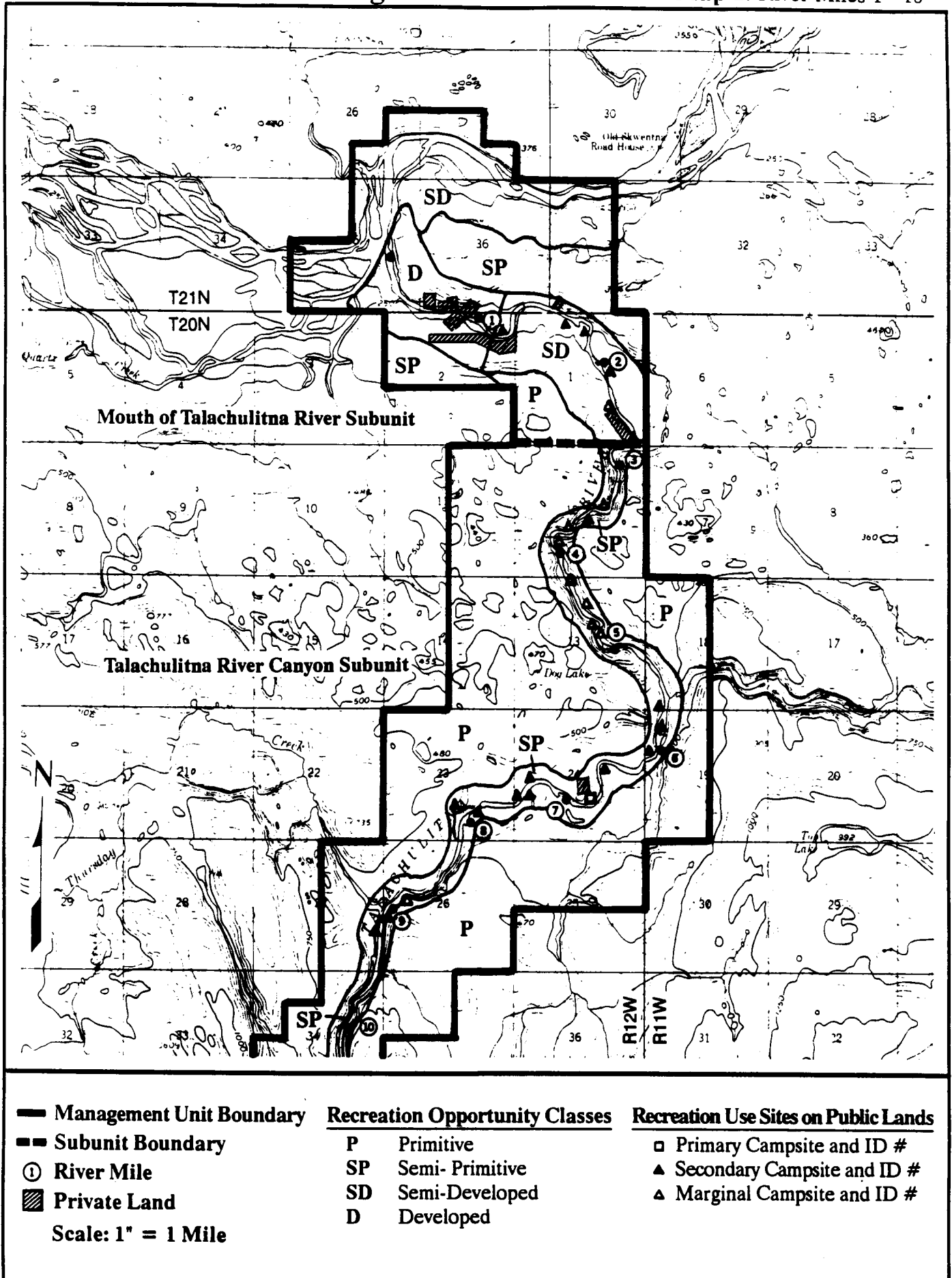


1 Index To Adjoining Maps

Recreation Rivers Corridors

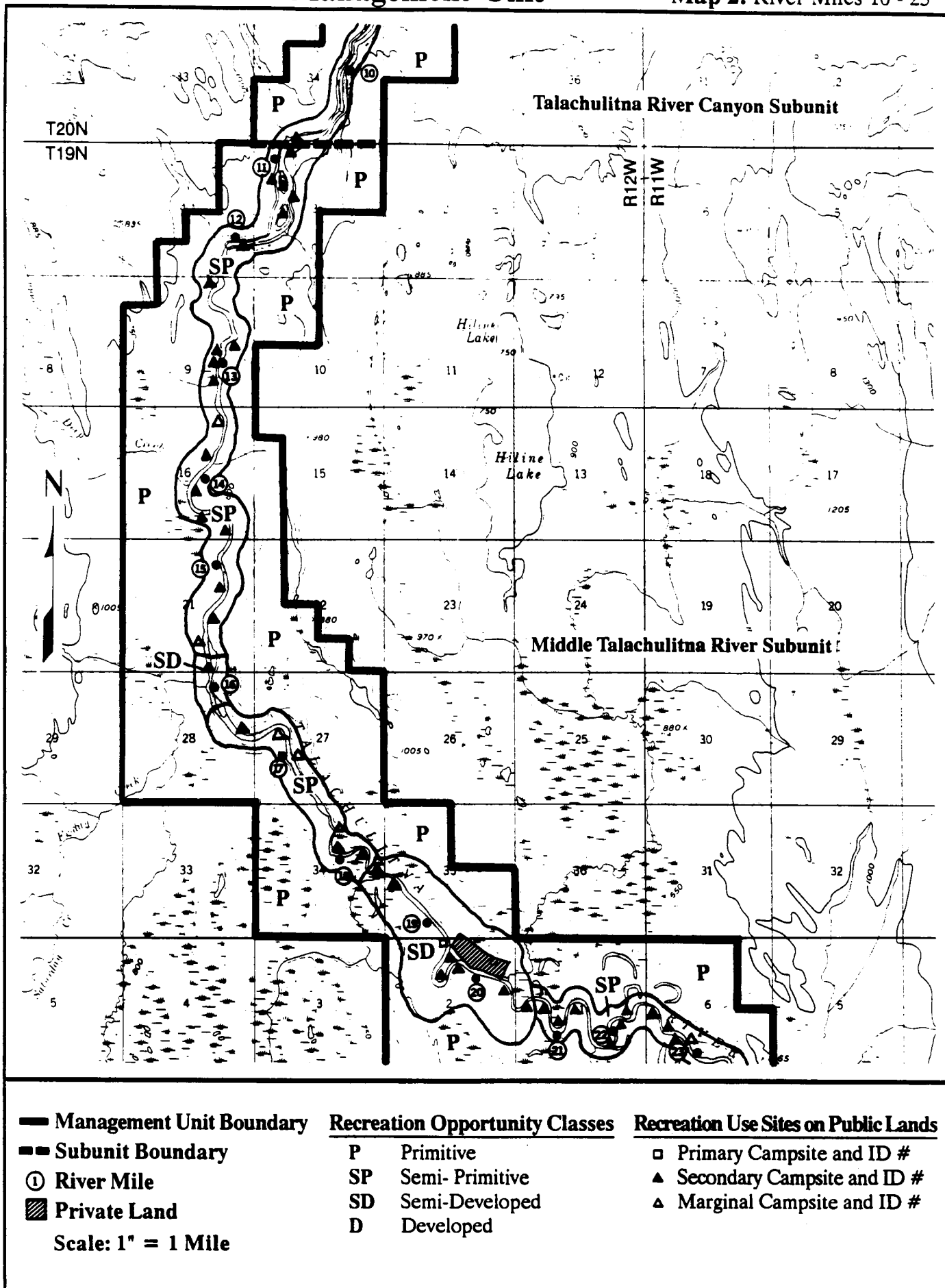
Talachulitna River Management Unit

Map 1: River Miles 1 - 10



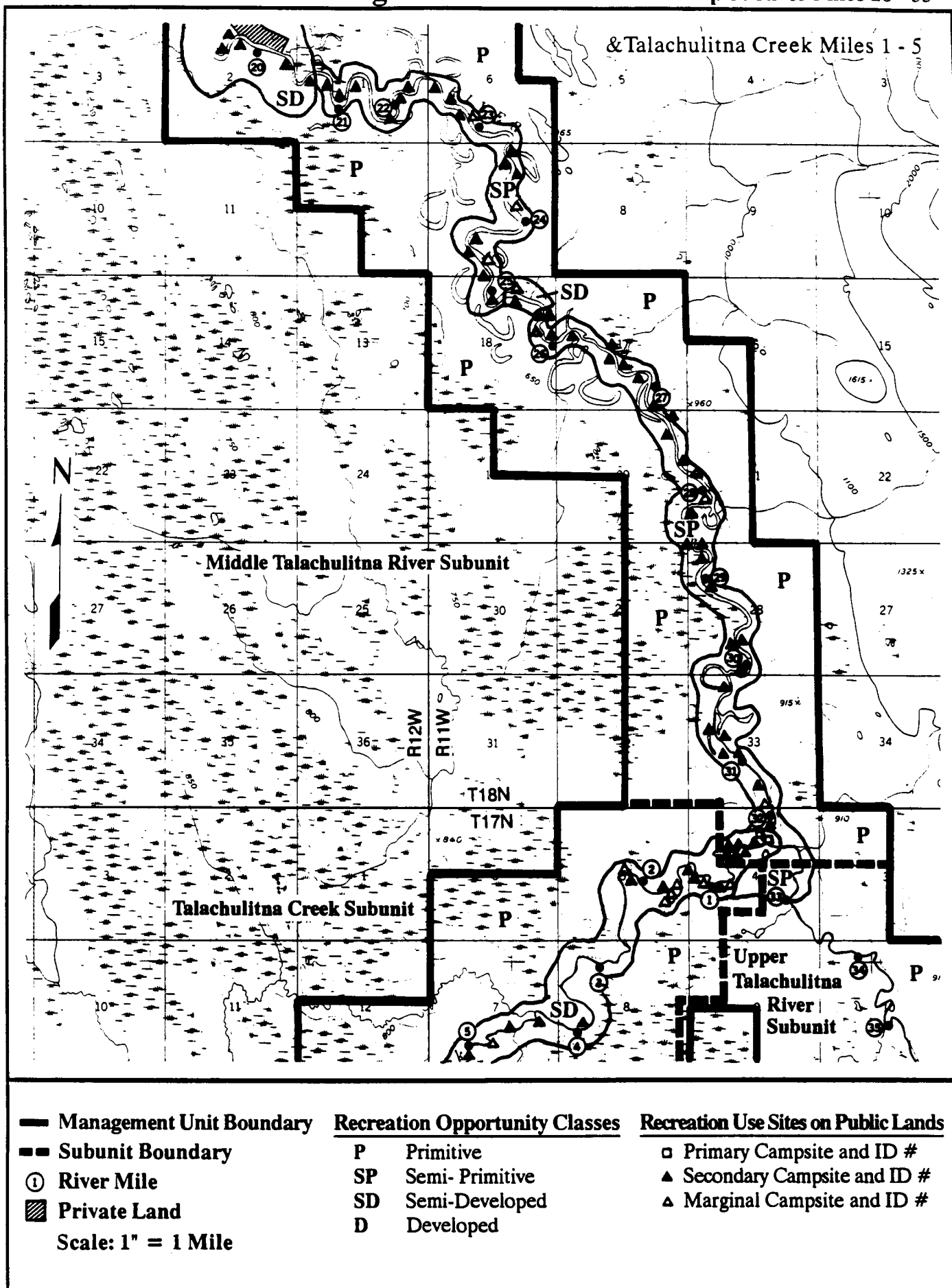
Talachulitna River Management Unit

Map 2: River Miles 10 - 23



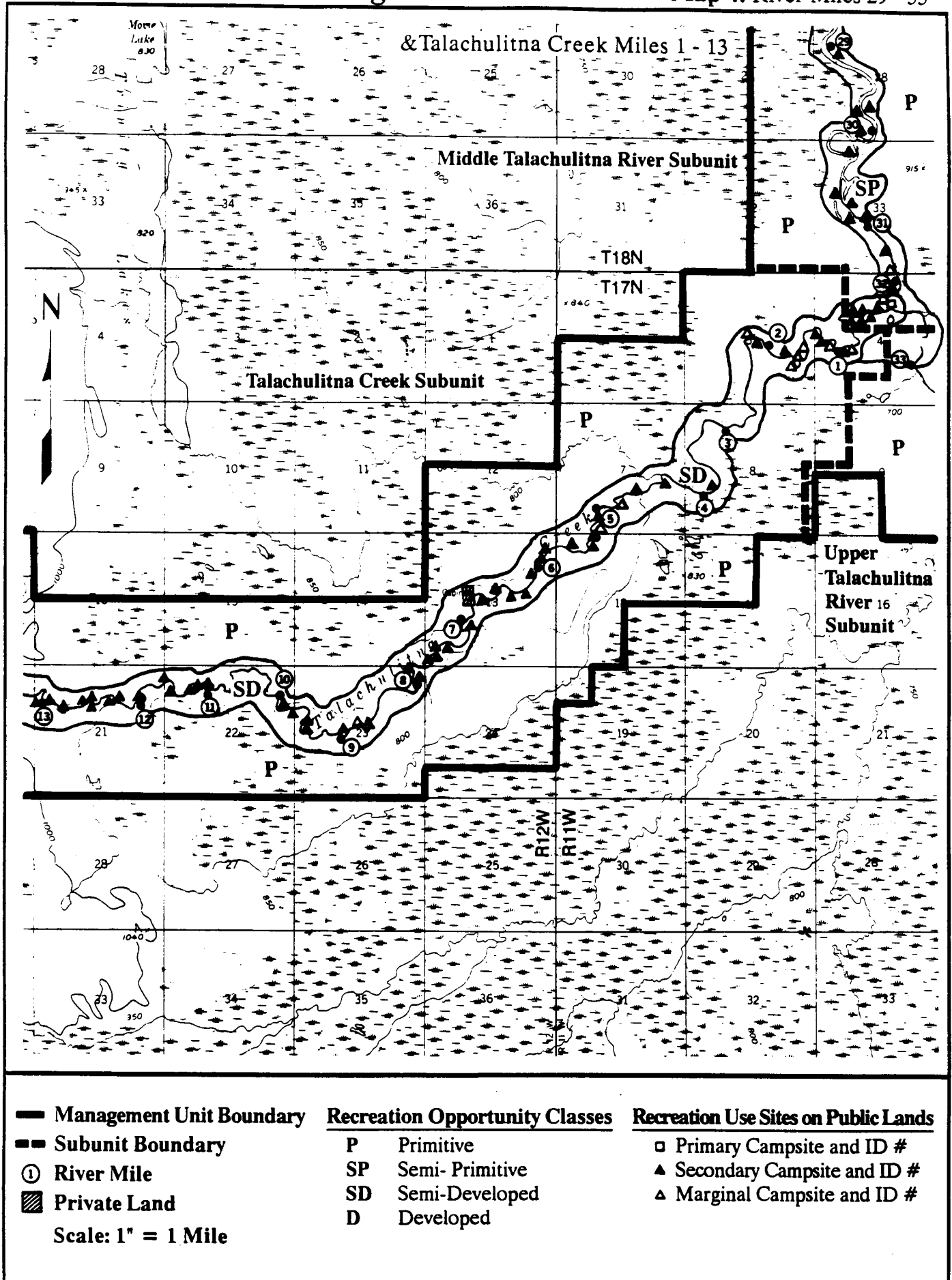
Talachulitna River Management Unit

Map 3: River Miles 20 - 35



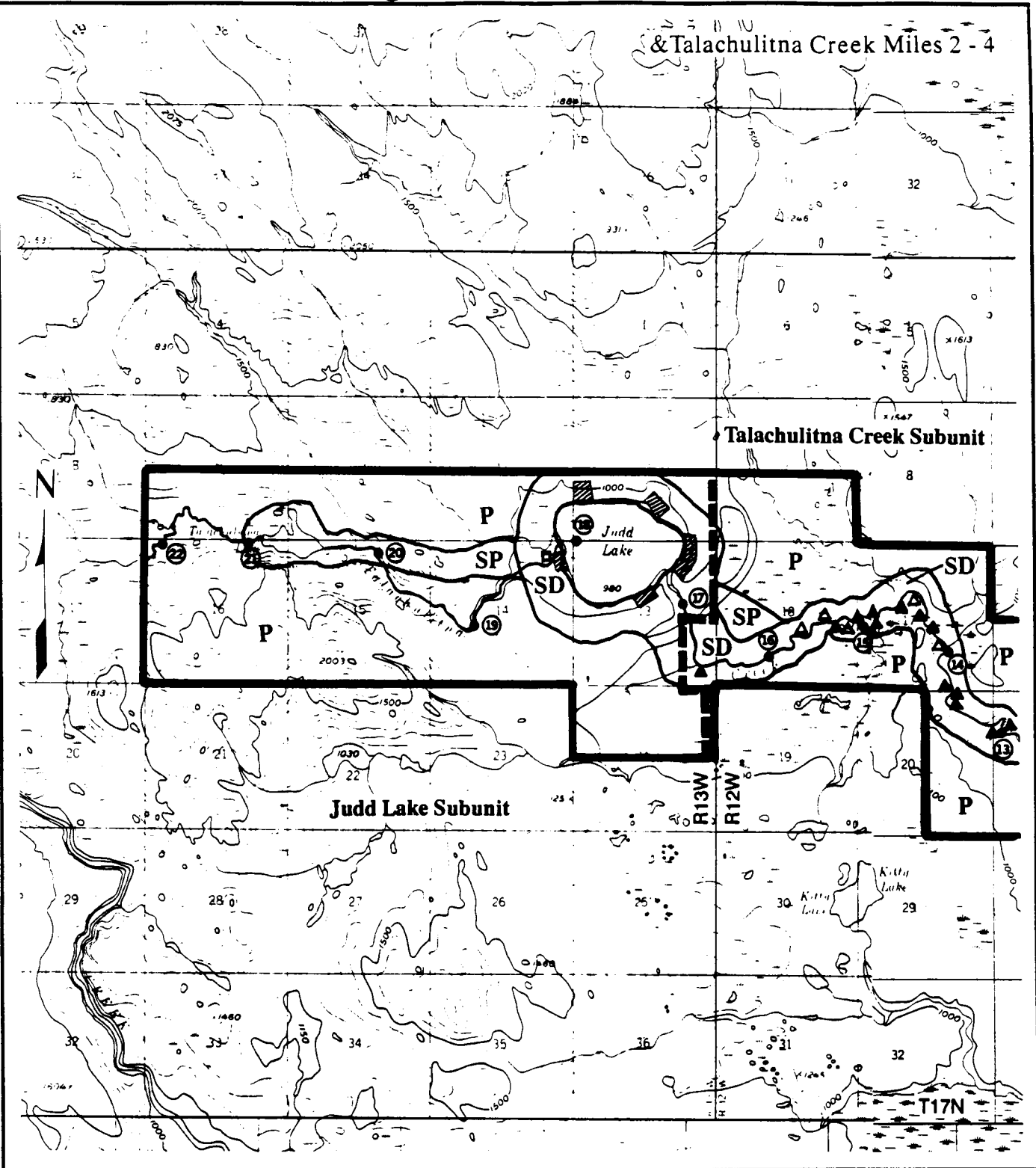
Talachulitna River Management Unit

Map 4: River Miles 29 - 33



Talachulitna River Management Unit Map 5: Talachulitna Creek Miles 13 - 22

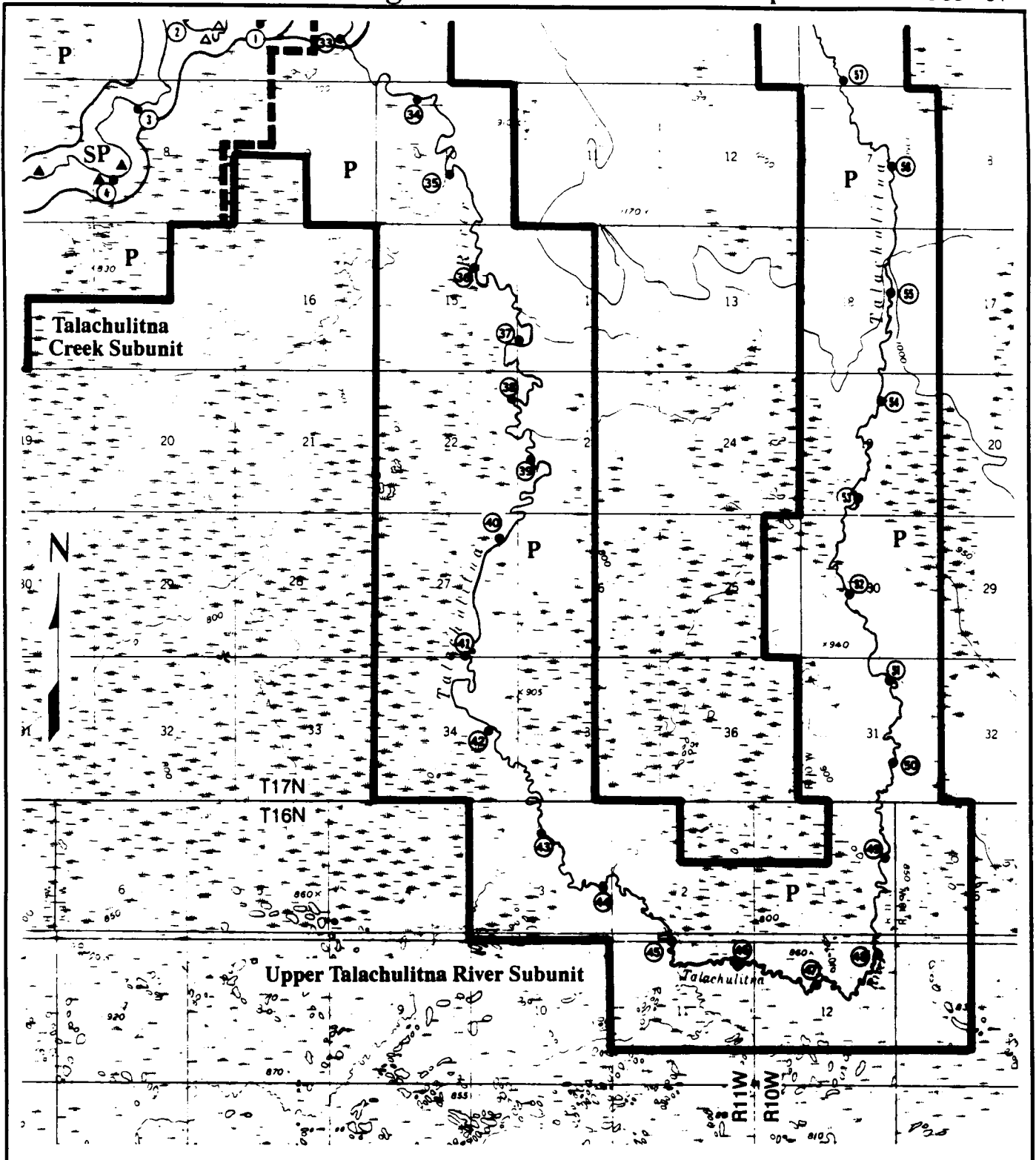
& Talachulitna Creek Miles 2 - 4



Management Unit Boundary	Recreation Opportunity Classes	Recreation Use Sites on Public Lands
Subunit Boundary	P Primitive	□ Primary Campsite and ID #
① River Mile	SP Semi-Primitive	▲ Secondary Campsite and ID #
▨ Private Land	SD Semi-Developed	△ Marginal Campsite and ID #
Scale: 1" = 1 Mile	D Developed	

Talachulitna River Management Unit

Map 6: River Miles 33 - 57



— Management Unit Boundary

--- Subunit Boundary

① River Mile

▨ Private Land

Scale: 1" = 1 Mile

Recreation Opportunity Classes

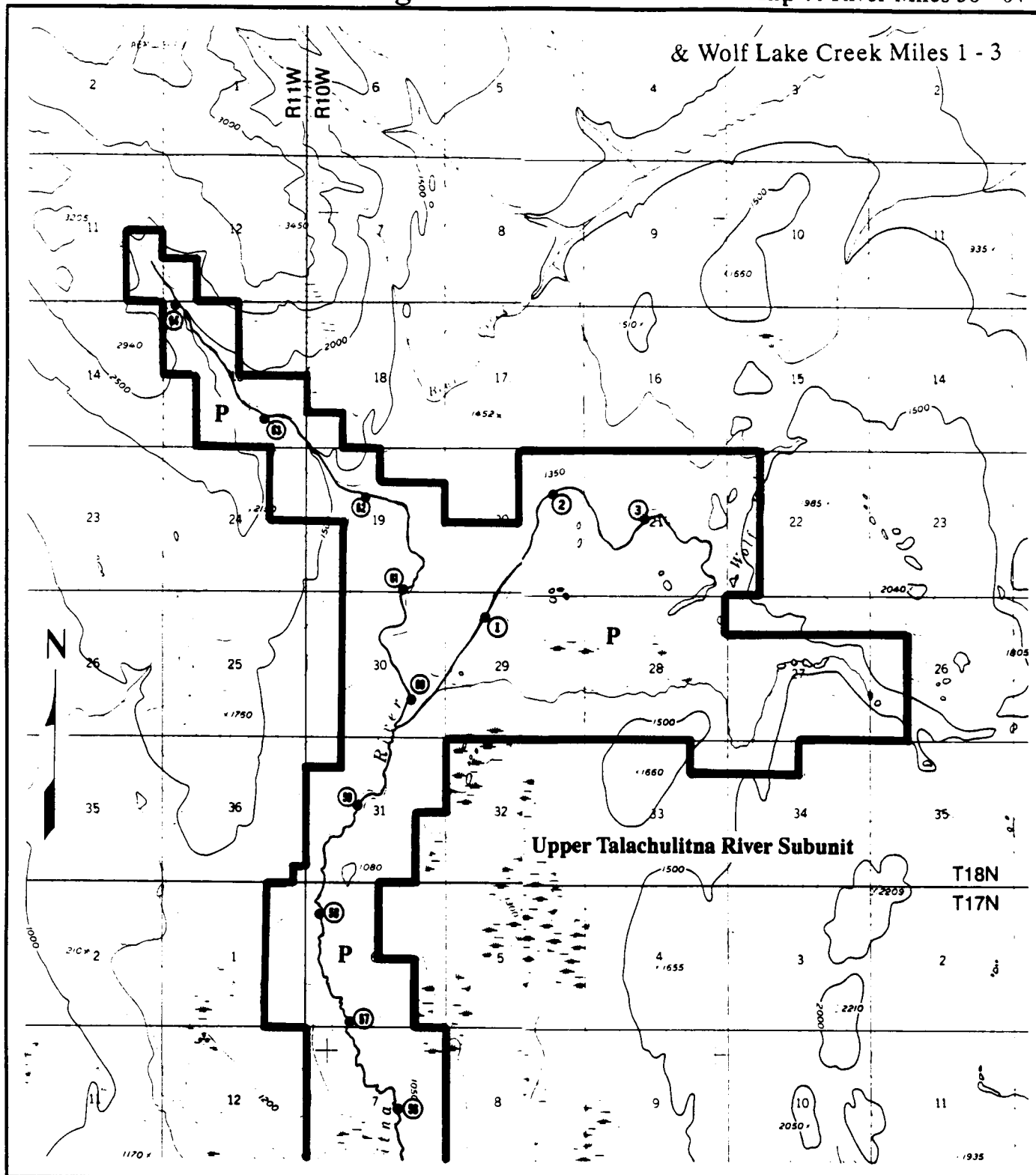
P Primitive
 SP Semi- Primitive
 SD Semi-Developed
 D Developed

Recreation Use Sites on Public Lands

□ Primary Campsite and ID #
 ▲ Secondary Campsite and ID #
 △ Marginal Campsite and ID #

Talachulitna River Management Unit

Map 7: River Miles 56 - 64



Management Unit Boundary

Subunit Boundary

① River Mile

Private Land

Scale: 1" = 1 Mile

Recreation Opportunity Classes

- P Primitive
- SP Semi-Primitive
- SD Semi-Developed
- D Developed

ALEXANDER CREEK RECREATION RIVER

LOCATION, BOUNDARIES, AND MAJOR USES

Alexander Creek is in a roadless area of the Susitna Basin, about 40 air miles northwest of Anchorage, Alaska. The legal boundaries of the recreation river include the land adjoining Alexander Creek and six river miles of Lower Sucker Creek for approximately one-half mile on either side. The Recreation River does not include the lower four miles of Alexander Creek.

The most outstanding recreation resource of Alexander Creek is its fishery, with major spawning populations of king and silver salmon, plus grayling, rainbow trout, and northern pike. Other salmon and resident species are present, but those listed above are the most frequently harvested (Mills, 1988). It is the fishery that, by far, attracts the most recreation users to the creek during the ice-free season. Alexander Creek's popularity is enhanced by its closeness to Anchorage, and therefore relatively inexpensive air access. Besides fishing, other major activities during the ice-free season are float and powerboating and hunting. Principal winter activities are ice fishing for burbot, primarily near the creek mouth (HCRS, 1978), snowmachining, dog mushing, and cross country skiing on the creek and on trails that bisect the area.

ACCESS

The only way to reach Alexander Creek in summer is by air or boat. Heavy brush, extensive marshlands and the Susitna and Yentna Rivers block overland travel into the area during the summer. Visitors travel to the mouth of Alexander Creek by powerboat, primarily from Dushka Landing on the Susitna River or via Cook Inlet from Anchorage's Ship Creek boat launch. Both float and wheel planes land at the creek mouth and at Alexander Lake, which are the major access points serving the majority of recreation visitors to the area. Float planes land at other lakes in the recreation river area, but use is light because these landing sites do not serve important public recreation attractions. Yensus Lake and two other, unnamed lakes at the east edge of the corridor between river mile (RM) 18 and RM 15 are used as landing sites mainly by owners of the surrounding private property. A lake west of the creek at RM 32.5 serves as an alternate starting point for float trips, and an access point for hunters.

The Iditarod National Historic Trail crosses Alexander Creek at RM 21.5 and runs within the recreation river area for about 5.5 miles between RM 16 and 21.5. This 938-mile route between Seward and Nome was one of three main trans-Alaska land routes between 1908 and the 1930s (BLM, 1986). A decline in mining and the advent of commercial air travel led to the demise of the Iditarod Trail as a major transportation route (BLM, 1986). Today it is an historical and recreation resource. Every year since 1973 the Iditarod Sled Dog Race has been staged between Anchorage and Nome and has evolved into an event attracting national and international attention. Besides this major event, the trail serves casual recreation users all winter.

In winter the frozen creekbed and the Iditarod Trail (and secondary winter trails) provide for both motorized and non-motorized access by dog sled, skis, or snowmobile. Winter access is also

possible via ski plane. Additional details about access to and within the area is presented in Chapter 7 of this report.

THE PHYSICAL SETTING

Alexander Creek meanders slowly through marshy lowlands. Its water is relatively clear, compared to the many glacial streams in the Susitna River drainage. Tannic acid from decaying plants gives the water a brownish cast and a slight tannic acid flavor. The current is a steady one-mile per hour or less, except where the creek is confined to a narrow channel, where it reaches speeds of two to three mph (HCRS, 1978). The ice-free season is generally May through October, with water temperatures ranging between 50 and 60 degrees Fahrenheit. [Water temperature measured on June 16, 1989, was 54 degrees at RM 12. Water temperatures measured in August ranged between 56 and 60 degrees Fahrenheit (HCRS, 1978).] Mosquitoes and biting flies are present in large numbers for most of the summer.

Lower Alexander Creek¹ (RM 0 to RM 3.5). This subunit stretches from the mouth of Alexander Creek on the Susitna River to Granite Creek, which enters Alexander Creek on the north side of Dinglishna Hill. This area is entirely outside the recreation river boundary. Such an addition would reflect the actual pattern of recreation use. Lower Alexander Creek widens from about 200 feet at the upper end to about 450 feet near the mouth. The stream bottom is only visible within several feet of the shoreline in shallow water. This lower section of the creek includes both float and wheel plane landing sites used for public access and three commercial lodges. Considerable fishing activity is concentrated in this subunit.

Middle Alexander Creek (RM 3.5 to RM 19.9) This subunit runs from Granite Creek to one-tenth mile below Lower Sucker Creek and encompasses 16.4 river miles. Approximately the lower one-half mile of this subunit is outside the legal boundary of the recreation river. It is logical, however, to include that portion of the creek in this analysis because recreation use not only occurs below the boundary; it is more concentrated than at upstream locations. Middle Alexander Creek narrows from about 200 feet to 50 feet wide between Granite Creek and Pierce Creek, at RM 7.5. Above Pierce Creek, the width of the water column remains relatively constant. The stream bottom is never visible, except close to shore in water depths less than two feet.

Lower Sucker Creek (RM 19.9 to RM 20.1, plus the lower 6 miles of this creek). The legal boundary of the recreation river extends approximately six miles up this stream, a clear water tributary of Alexander Creek. Lower Sucker Creek is 15 to 20 feet wide near its mouth, shallow (from less than 1 to 3 feet deep) and clear. Fallen trees hang low over the water or are partially submerged, blocking the channel to all but canoes or other small craft. These obstacles, adverse

¹ Note that the "Lower Alexander Creek" subunit is not the same area as the Alaska Department of Natural Resources' Lower Alexander Creek Management Subunit. That subunit comprises both the lower and middle Alexander Creek subunits discussed here.

weather, and a tight time schedule precluded a thorough exploration of this tributary during the June 1989 recreation resource inventory trip. Lower Sucker Creek is not surrounded by the low-lying bog areas and dense underbrush typical of Alexander Creek and therefore has more potential for overland travel, such as backpacking, hiking, and hunting.

Upper Alexander Creek (RM 20.1 to RM 40.4). This subunit runs from one-tenth mile above the mouth of Lower Sucker Creek to Alexander Lake Lodge at the lake outlet, encompassing 20.3 river miles. Below RM 25, the creek is more than four feet deep and silty, and the bottom is generally not visible, except close to shore where the water is less than two feet deep. The creek becomes gradually less silty and more shallow from RM 25 to RM 32; the water depth is generally not more than three to four feet. The stream bottom is generally visible, except in the occasional hole that exceeds four feet. From roughly RM 32 to RM 40, Upper Alexander Creek averages approximately two feet deep. This subunit ranges from 50 to 20 feet wide.

Alexander Lake (RM 40.4 to RM 43). The source of Alexander Creek, the lake is about 2.5 miles long and one-half mile wide. It is a recreation destination in its own right and also the starting point for most float trips down Alexander Creek. Alexander Lake is shallow and swampy, with pond lilies and water grass covering about half of the lake surface by late summer. Maximum water depths range from four to five feet (Mosby, 1979). Like the creek, the lake is a light brown, tannic acid color.

Visual Resources

The visual quality ratings were done in mid-June, during the height of the summer recreation season. The results of the visual resource assessment are described below; the methodology is more fully described in the introduction to this chapter.

[The scenic attributes were rated during the 1989 field trip on the recreation river and prior to some subunit redesignations of 1990.]

RM 0 to RM 10.2. This area received an overall scenic quality rating of 15 points. With the exception of Dinglishna Hill (479 feet), this portion of the creek exhibits very little local topographic relief. The heavy vegetation is a mixture of spruce, birch, and cottonwood with an understory dominated by willows, ferns, grass, and horsetails. The stream is very slow moving, tannin-colored flat water. Close-range views of snow-capped Mount Susitna add color, although there are almost no gravel bars in this section to add foreground texture and color interest. The landscape is common to the region and drainage, but with extensive cultural modifications and human activity, especially in the lower 2.2 miles. Cabins are common; there are three commercial lodges.

RM 10.2 to RM 26.6. This area received an overall scenic quality rating of 15 points. Compared to the downstream unit, this area offers a more natural landscape, but fewer views of adjacent scenery. These two factors cancel each other, resulting in a point score identical to the downstream unit. The terrain along the creek banks is flat to gently rolling. The thick vegetation is a mixture of spruce, birch, and cottonwood with an understory of willow and alder shrubs, ferns, grasses, and other herbs. The creek is consistently slow-moving flat water, with a few minor riffles. As downstream, the creek bottom is seldom visible through the tannin-colored

water. The adjacent scenery moderately enhances overall visual quality, with occasional views of Mount Susitna and Beluga Mountain. Overall, the landscape is common, both in the region and the drainage. The upper portion of this rating unit is free of cultural modifications, except for temporary camps. An isolated cabin is at RM 18.8. From RM 10.6 to RM 13.2 cultural modifications are more common, including two cabins, weir pilings, and several "for rent" and "for sale" signs. Human influences, however, are not so extensive or inharmonious as to detract appreciably from the natural setting.

RM 26.6 to Alexander Lake Outlet. This area received an overall scenic quality rating of 12 points. Principal features contributing to the difference in score between this unit and the one downstream are less variety of vegetation and fewer views of local mountains. The terrain along both sides of the creek is flat, with views confined to the creek banks most of the time. Vegetation is a spruce/birch mixture, with an understory of ferns, grasses, and willow. The stream is tannin-stained, slow-moving flat water with a few small riffles. There are no dramatic color contrasts in the landscape, although gravel bars are abundant and add texture. Dominant colors are shades of brown exhibited by the water and gravel bars and many shades of green vegetation with contrasting white birch trunks. Scenic quality is not influenced by adjacent scenery; views are limited to the immediate creek bank, except around RM 27. Here river travelers have a view of Mount Susitna, or Sleeping Lady as it is also called, and Beluga Mountain, with elevations of 4,396 and 3,699 feet, respectively. The overall landscape is common within the region. The only cultural modifications visible from the creek are temporary camps, except for the ruins of an old trapper cabin, which is picturesque.

Alexander Lake. This area received an overall scenic quality rating of 19 points. The lake's relatively large size, coupled with views of the Alaska Range, contributed most to the score. The terrain around the lake is flat and marshy. Vegetation is a mixture of spruce, birch, alder and willow with an understory of ferns, grasses, and other herbs. Various flowering plants were blooming in June, scattering white blooms amid the green leaves and grasses. The water is tannin stained, but clear to a depth of about two feet. On a clear day there are good views of the Alaska Range, including Denali and Mount Foraker. Though there are many lakes in the Mat-Su Valley region, Alexander Lake's large size and views of the distant peaks make it somewhat distinctive. Cultural modifications to the landscape consist of Alexander Lake Lodge and a few cabins, which are not visually obtrusive.

RECREATION RESOURCES: THE SOCIAL SETTING

Opportunities During Peak Season

The distribution of recreation opportunity classes along Alexander Creek and within the boundaries of the recreation river is shown on the maps at the end of this chapter. The maps depict conditions during the period of peak use, which corresponds to the height of the king salmon runs when the salmon are in good condition and can legally be harvested. The peak use period generally corresponds to the month of June.

The maps reflect that recreation users rarely leave the creek bank. This is because of the difficulty of traveling overland across the boggy ground, and more importantly, because most

Alexander Creek Recreation Resources and Use

users are there to fish. Consequently, the creek becomes a ribbon that is largely semi-developed and developed. This is due principally to the number of people on the creek at one time, rather than the presence of structural improvements. Away from the creek, the river corridor is seldom visited and generally exhibits the characteristics of a primitive area.

Lower Alexander Creek. Most of this subunit is classified as developed. Users congregate here, and one can expect to meet well over 30 groups a day during peak season. There are three lodges, more than 14 cabins or houses, and a gear storage and customer pick up/drop off station operated by a commercial air service. The mouth of Alexander Creek receives heavy recreational boat traffic. In addition to lodge guests, cabin owners, and day use anglers, all Alexander Creek float trips take out here. Float planes land and take off along the lower two miles of the creek. Wheel planes land on a sandbar in the Susitna River at the mouth of Alexander Creek.

Middle Alexander Creek. This section of Alexander Creek provides semi-developed opportunities. A visitor could expect to encounter up to 30 groups per day here, as boat traffic moves up and downstream. Permanent improvements are less concentrated in this subunit than they are downstream. There is an isolated cabin at RM 18.8; development is clustered between RM 12.9 and RM 12.7, where there are three cabins on the right bank and an Alaska Department of Fish and Game weir. Six cabins are clustered between RM 10.1 and RM 9.25, all on the left bank. Two more cabins and a dock are found between RM 7.2 and the subunit boundary at RM 3.5.

Most of the river corridor away from the creek provides primitive opportunities. This changes to semi-primitive where there are improvements or where user density is likely to be higher. Semi-primitive locations are around an airstrip, near private property around Yensus Lake, and adjacent to the Susitna River, which serves as a recreation and commercial highway. Other semi-primitive spots include lower Pierce Creek and an area between RM 5 and RM 6 where there are two trails.

Lower Sucker Creek. Except for this creek's confluence with Alexander Creek, which is a popular angling spot, a visitor to Lower Sucker Creek could expect to find a primitive setting.

Upper Alexander Creek. The uppermost portion of this unit, from the lake outlet to just below RM 40, is semi-developed. The Alexander Lake Lodge property extends into this subunit. Moving downstream away from the lodge, the creek provides semi-primitive opportunities between RM 40 and RM 32. This subunit contains no development visible from the creek bank, except one ORV trail and a foot trail. A visitor can expect to encounter about four or five other parties. Boat traffic is almost exclusively one way and consists of float craft moving downstream. User density is relatively low here because there are few good salmon fishing holes.

Semi-developed opportunities are available between RM 32 and Lower Sucker Creek at RM 20. Compared to the upstream reach described in the above paragraph, user density is higher because this section of Alexander Creek contains many productive salmon fishing holes. Because floaters are traveling at varying rates of speed, alternately moving downstream and stopping to fish for up to a couple of hours at promising spots, the number of encounters increases. Also, there is

some powerboat use in this reach. A visitor may have about 20 encounters with other groups. It is common to "leap frog" with other groups, passing each other several times as one group or the other stops to fish. There is no development in this stretch, except for the ruins of a trapper's cabin at RM 30.5.

Moving away from the creek banks, a visitor will find primitive experiences are generally available throughout the remainder of the Upper Alexander Creek subunit. The lake west of the creek between RM 32 and RM 33 provides semi-primitive experiences; there is a cabin on its southeast shore, with a trail running from there to the creek.

Alexander Lake. The lake and its immediate surroundings are semi-developed. A visitor can expect to meet many other groups, such as anglers based at the lake and rafting parties assembling their boats and gear. Alexander Lake Lodge and about four private cabins are here. Float planes land and take off regularly throughout the peak use season. Moving away from the lake, the surrounding areas of the river corridor are primitive, except for a semi-primitive area along an ORV trail that leaves the north shore of the lake.

Recreation Opportunities Before and After Peak Season

Generally, the entire creek above RM 13 would revert to a semi-primitive setting during the off-season. An exception may be during late summer and fall, when debris left by peak-season visitors could result in human waste and litter being found at more than 50 percent of the campsites. Such areas would retain the semi-developed rating until snow covered the sandbars and spring runoff removed most of the debris. The creek between RM 13 and RM 3 would also become semi-primitive, except for areas where cabins are clustered, which would remain semi-developed. Because of their level of development, Alexander Lake and Alexander Creek below RM 3 would retain their ratings year-round, regardless of use levels. Areas which provide primitive opportunities during peak season would continue to do so year-round.

RECREATION ACTIVITIES ICE-FREE SEASON

Powerboating

Propeller, jetboats, and a small number of airboats are used on Alexander Creek. Alexander Lake is also used for powerboating by seasonal residents, guests of Alexander Lake Lodge, and visitors with inflatable craft that are dropped off at the lake by air taxis. When water levels are relatively high, boaters in all types of craft motor up Alexander Creek as far as Lower Sucker Creek. During 1989 water levels remained high enough to allow unrestricted boating from the mouth to Lower Sucker Creek throughout the peak of the king salmon run, which lasted until about the end of June. Later in the summer during low water, Trail Creek becomes the general cutoff point; above this tributary shallow water prevents propeller and jetboat use. Airboat use is unrestricted by water conditions all summer.

The number and distribution of various types of boats is shown graphically in the tables below, using data collected by the Alaska Department of Fish and Game. Departmental staff made aerial

surveys of boating use from May 28 to June 29, 1988, separating Alexander Creek into two subunits: from Gabbert's Camp (RM 0.6) to Sucker Creek and from Sucker Creek up to Alexander Lake.

TABLE A-1. Boats on Alexander Creek, 1988

	2-49 HP	50-80 HP	> 80 HP	Inboards	Airboats	Rafts
Gabbert's to Sucker Creek	336 (32%)	222 (21%)	106 (10%)	57 (5%)	4 (0.4%)	326 (31%)
Sucker Creek to Alex. Lake	65 (19%)	9 (3%)	0	5 (1%)	0	261 (77%)

Source: Alaska Department of Fish and Game, 1989a

The Department of Fish and Game made a similar aerial survey during 1989 with sample dates between May 22 and July 13. The area between Gabbert's Camp and Sucker Creek was separated into two subunits as shown below, and a new subunit was added, mouth to Gabbert's.

TABLE A-2. Boats on Alexander Creek, 1989

	2-49 HP	50-80 HP	> 80 HP	Inboards	Airboats	Rafts
Mouth to Gabberts	484 (72 %)	46 (7 %)	62 (9 %)	82 (12 %)	1 (< 1 %)	2 (< 1 %)
Gabbert's to Weir (RM 12.7)	394 (35 %)	376 (38 %)	150 (13 %)	21 (2 %)	0	175 (16 %)
Weir to Sucker Creek	54 (10 %)	50 (9 %)	22 (4 %)	10 (2 %)	0	405 (75 %)
Sucker Creek to Alex. Lake	21 (6 %)	9 (2 %)	2 (< 1 %)	5 (1 %)	0	344 (90 %)

Source: Alaska Department of Fish and Game, 1989

For most boaters, powerboating is not their main purpose for coming to Alexander Creek, but a means of access for engaging in other activities. By far the greatest number of boats are associated with salmon fishing. Powerboats are also used by hunters to hunt moose and bear.

Rafting, Canoeing, and Kayaking

Rafts are used almost exclusively to float down Alexander Creek; there is almost no canoeing or kayaking. Kayakers are usually interested in whitewater, of which Alexander Creek has none. Canoes are not in general use because they require extra trouble and expense to fly in, since they must be tied to the outside of the aircraft. Like powerboaters, rafters float Alexander Creek primarily to fish for salmon. The raft is the boat of choice because it is easily transportable by small plane, and because it has plenty of capacity to handle both the occupants' gear and their catch. Commercial interests contribute to the popularity of rafting; charter airplane operators commonly sell fishing trip packages which include a raft, along with airplane drop-off and pickup. Besides fishing, some rafters come to hunt moose or bear during the established seasons, while for a few, the float trip itself is the primary activity.

Floater almost always put in via float plane at Alexander Lake and take out at or near the mouth. An alternate put-in site offered by a couple of air services is at the lake west of Alexander Creek between RM 32 and RM 33. This site is not heavily used because there is no boatable stream passage between this lake and Alexander Creek. Rafters must carry their gear by trail about one-half mile to the creek.

Alexander Creek is a leisurely four- or five-day float, with a gentle gradient suitable for novice boaters. During low water, typically in late summer, many areas of the upper creek are too shallow, and the boats must be lined over the small, smooth stones of these riffles. In mid-June 1989, lining was necessary at only a few locations above RM 30, where sweepers obstructed the main channel. These sections were short and easily and quickly negotiated. The most serious limitation to floating appears to be a lack of campsites, most critical in the Middle and Lower subunits between RM 10.8 and RM 0. Campsites are also scarce in the Upper subunit between RM 26.5 and RM 20.0. Campsite distribution is discussed in more detail later.

Rafting on Alexander Creek is not a strictly non-motorized activity. Many rafters use a small "kicker" motor -- generally an outboard of less than five horsepower. Kickers are used most below Lower Sucker Creek and particularly in the lower 10 miles of Alexander Creek. Here the broad stream channel coupled with long, straight stretches and a sluggish current, make a slow, monotonous chore of paddling or rowing to the take-out locations near the mouth.

Fishing

Fishing is the dominant recreation activity that draws people to the area. Alaska Department of Fish and Game estimates show wide variations from year to year in the percent each species contributes to total sport fishing harvest. For that reason, for each species Table A-3 below gives the percent of harvest in 1988, followed by the average percent of annual harvest in the ten years from 1979 through 1988. Although harvest percentage has varied from 14% in 1979 to a high of 51% in 1988, overall averages show that king salmon is the most frequently harvested species, followed, in descending order, by rainbow trout, silver salmon, grayling, and other species. Heaviest recreation use of Alexander Creek occurs from early June to the close of king salmon season, which for 1989 was July 13.

Besides the more traditional methods of fishing by boat, non-traditional fly-in helicopter fishing occurs on Alexander Creek. On June 15, 1989, during the recreation inventory, a helicopter with five anglers was observed on a gravel bar between RM 15.7 and RM 13.8.

**TABLE A-3. Sport Fishing Harvest on Alexander Creek, 1988,
Compared to 10-Year Averages**

Species	Number Harvested in 1988	Percent of Total Harvest	
		in 1988	10-Year Average
King salmon	3,958	51%	29%
Rainbow trout	236	3%	22%
Silver salmon	55	1%	20%
Grayling	800	10%	14%
Pink salmon	18	under 1%	4%
Red salmon	400	5%	2%
Chum salmon	1,419	18%	2%
Lake trout	891	11%	1%
Northern pike	36	under 1%	1%

Source: Alaska Department of Fish and Game 1989

Angler distribution is influenced by the probability of success, along with ease of access. Fishing in each of the subunits is discussed briefly below. More detailed information about fishing is presented in Chapter 4 of this report.

Lower Alexander Creek. This subunit receives the highest fishing use because it is the most accessible. Powerboaters coming in for the day from Deshka Landing or the Ship Creek launch in Anchorage mix with fly-in day users, lodge guests, cabin owners, and rafters on the last leg of their trip. The Alexander Creek mouth and Granite Creek are favored fishing spots.

Middle Alexander Creek. Many pools throughout this subunit serve as fishing holes. Fishing effort is also concentrated at the mouths of the major tributaries, Trail Creek and Pierce Creek.

Lower Sucker Creek. The confluence of this stream with Alexander Creek can provide excellent fishing. Powerboaters come up from the mouth to fish this area, and it is an important stopover for anglers rafting downstream. Also, visitors to Trail Lake, outside the recreation river about eight miles up Lower Sucker Creek, commonly walk to the creek to fish. These anglers wade Lower Sucker Creek, and some cross into the recreation river boundary. The portion of Sucker Creek between these two nodes of activity is seldom fished.

Upper Alexander Creek. During king salmon season, fishing effort is light in the upper portion of this subunit, down to about RM 32. The lack of intensive use is reflected in the recreation opportunity class map, where this area is rated as providing semi-primitive recreation opportunities. Presumably, anglers do not concentrate their efforts here because this creek subunit is small and shallow, without major tributaries or many pools where salmon tend to congregate. Fishing use is high, and success generally good, between RM 32 and the downstream subunit boundary.

Alexander Lake. A small population of red salmon spawn in the lake, but these provide minimal sport fishing opportunities. For 1987, the total red salmon harvest reported for the entire Alexander Creek drainage was 72 fish (Mills, 1988). Most anglers at Alexander Lake concentrate on northern pike, rainbow trout, and grayling.

Hunting

Alexander Creek is in Game Management Unit 16b. Moose is the most harvested big game species, followed by black bear and brown bear. Hunters typically use boats, both motorboats and rafts, to gain access to the area and to transport their game meat after the hunt. More detailed information about hunting is presented in Chapter 4 of this report.

WINTER RECREATION ACTIVITIES

The Iditarod National Historic Trail crosses Alexander Creek at RM 21.5 and runs within the recreation river boundary for about five and one-half miles between RM 16 and RM 21.5. It figures prominently in winter recreation. After freeze up, Alexander Creek itself becomes a winter trail which is the focus of winter activities such as dog mushing, cross country skiing, snowmachining and off-road vehicle (ORV) use, and ice fishing.

RECREATION SITES

Undeveloped Sites

There are no developed recreation facilities (public or private campgrounds, day-use areas, or boat launches) within the Alexander Creek Recreation River. Undeveloped recreation sites discussed below and shown on the maps at the end of this chapter were inventoried from June 12-16, 1989. Both the maps and discussion below should be reviewed for a full appraisal of recreation sites; the maps contain information on additional sites not specifically mentioned in the text.

Lower Alexander Creek. No campsites were seen in this subunit, except one upland site at RM 3.1. This site appeared to be under long-term occupation on June 16, 1989. It contained a large canvas wall tent and an outhouse.

Middle Alexander Creek. Attractive gravel bar campsites are plentiful in the upper portion of this subunit, RM 19.8 to RM 10.9. (See map for details). There are no primary or secondary sites between RM 10.9 and the downstream subunit boundary, except for an isolated site at RM 7.2. A few marginal sites are available in this seven and one-half mile subunit, but these are low, narrow, muddy, or with thick vegetation harboring millions and zillions of biting insects.

Lower Sucker Creek. An upland campsite at the mouth of Lower Sucker Creek is utilized by anglers stopping at this favored fishing hole. Although gravel bars exist on Lower Sucker Creek itself, these appear to be seldom utilized, and the team did not conduct a systematic inventory of campsites along this tributary.

Upper Alexander Creek. From RM 40 to RM 31 gravel bar campsites are abundant on both sides of the creek at an average density of 4.3 per mile. These sites are shown collectively as Site 10. The gravel bars range in size from under 500 to more than 1,000 square feet.

Between RM 30 and RM 26.6 is another stretch of abundant gravel bar campsites, similar to those discussed above, mapped collectively as Site 17. Sites are located on both sides of the creek at an average density of 3.5 per mile.

A six-mile stretch from 26.6 to 20.7 contains gravel bars that provide only marginally usable campsites. Most of these bars are small, and either low and muddy, narrow, or sloping. This stretch of the creek, however, can provide productive salmon fishing, and many of the bars see considerable day use as fishing spots. Some anglers decide to tolerate the poor camping conditions to camp at a productive fishing hole.

Alexander Lake. The most heavily used sites here are two staging areas where float planes drop off rafting parties, and the rafters inflate their boats and pack their gear for the trip downstream. One (labeled Site 1 on the map at the end of this chapter) is on the west shore of the lake; the other, Site 2, is on the east shore.

The lakeshore at Site 1 is marshy ground, as is most of the Alexander Lake shoreline. A steep bank drops off three to four feet to the water surface. A trail leads from the shoreline to a small rise where the ground is dry and covered with birch trees. The rise contains a campsite; it consists of about a 600-square-foot clearing with a fire ring in the center. It appears that Site 1 gets major use as a day-use staging area and minimal use as a campsite, at least during peak season. Mosquitoes and other biting insects are thick along the lakeshore, which lessens the attractiveness of the area for camping.

Site 2 is completely surrounded by flat, marshy ground; there is no associated upland area. Shipping pallets and pieces of plywood have been laid on the ground in an attempt to provide a dry surface for unloading gear from float planes. However, the wood is unsupported, and begins to sink into the marsh under the weight of gear.

The only other site inventoried on Alexander Lake, Site 3, is an upland campsite about 20 feet above the water, on the east shore about one-half mile above the lake outlet. The site appears to be used mostly during hunting season; it showed no evidence of recent use in June. It consists of an approximate 500 square foot clearing with two fire rings and a picnic table. The site contains much debris, including discarded camping equipment and a small garbage dump.

No other sites were recorded for Alexander Lake. However, an exhaustive inventory of the lakeshore was not undertaken. There could easily be additional public use sites.

TABLE A-4. Alexander Creek: Important Recreation Sites & Facilities on Public Land

Type	River Mile	Description	GIS No.
Primary Campsite	19.5	Gravel bar, 1/2 mile below Lower Sucker Creek.	42
Fishing Area	20	Lower Sucker Creek mouth.	36
Iditarod Trail	16-21.5	Winter use: Mushing, snowmachining, skiing. National Historic Trail.	none
Foot Trail	32.7	Connects with lake to the west, which is an air taxi drop-off point.	12
Staging Area	41.2	Alexander Lake air taxi drop-off, float trip put-in.	2
Staging Area	41.4	Alex. L. air taxi drop-off, float trip put-in. Associated upland campsite.	1
Primary Campsite	41.4	Upland (hunting season?) campsite. Across lake from above site.	3

Site Conditions and Adequacy of Sites Relative to Existing Use

The lack of campsites in the lower 11 miles of Alexander Creek is an inconvenience, particularly for floaters, who are less mobile than powerboaters. Rafters are either traveling approximately at the speed of the current (estimated at one mph), or with a small kicker motor at three to four mph. Powerboaters who wish to camp on the creek must travel a considerable distance upstream before suitable sites are found. A campground near the mouth would likely be utilized by both groups, but would be most useful and convenient for powerboaters. Floaters would probably benefit most from a camping area located midway between the mouth and the last good gravel bar campsites.

The sites used as float trip staging areas on Alexander Lake are inadequate for the volume of use they receive, in terms of both user convenience and resource protection. Not only is it awkward and inconvenient to assemble a raft and gear on the marshy ground, there is no place to dispose of human waste. People typically spend about an hour inflating their raft and loading gear, after about a 40 minute flight from Anchorage. Consequently, toilet facilities are desirable even

though the staging areas are day-use, rather than overnight, sites. Because of the lake's marshy shoreline, not all sites could accommodate toilets. Staging areas should only be located where some type of toilet facility can be provided to protect public health and the water quality of the lake.

During the recreation site inventory, time constraints did not permit a thorough inspection of each site; most were evaluated while floating by on the creek. Sites were rated "clean" if less than a handful of litter was observed. From the water most sites generally appeared to be clean. However, of those sites inspected, it was common, even on gravel bars that contained less than a handful of litter, to find large amounts of toilet paper and human waste in the willow bushes on the edge of the gravel bar. To help alleviate this condition, toilets could be provided in heavy use areas and a public education program could be conducted on how to properly dispose of waste where toilets are unavailable.

**The maps following this page indicate the
Alexander Creek Recreation Opportunity Classes**

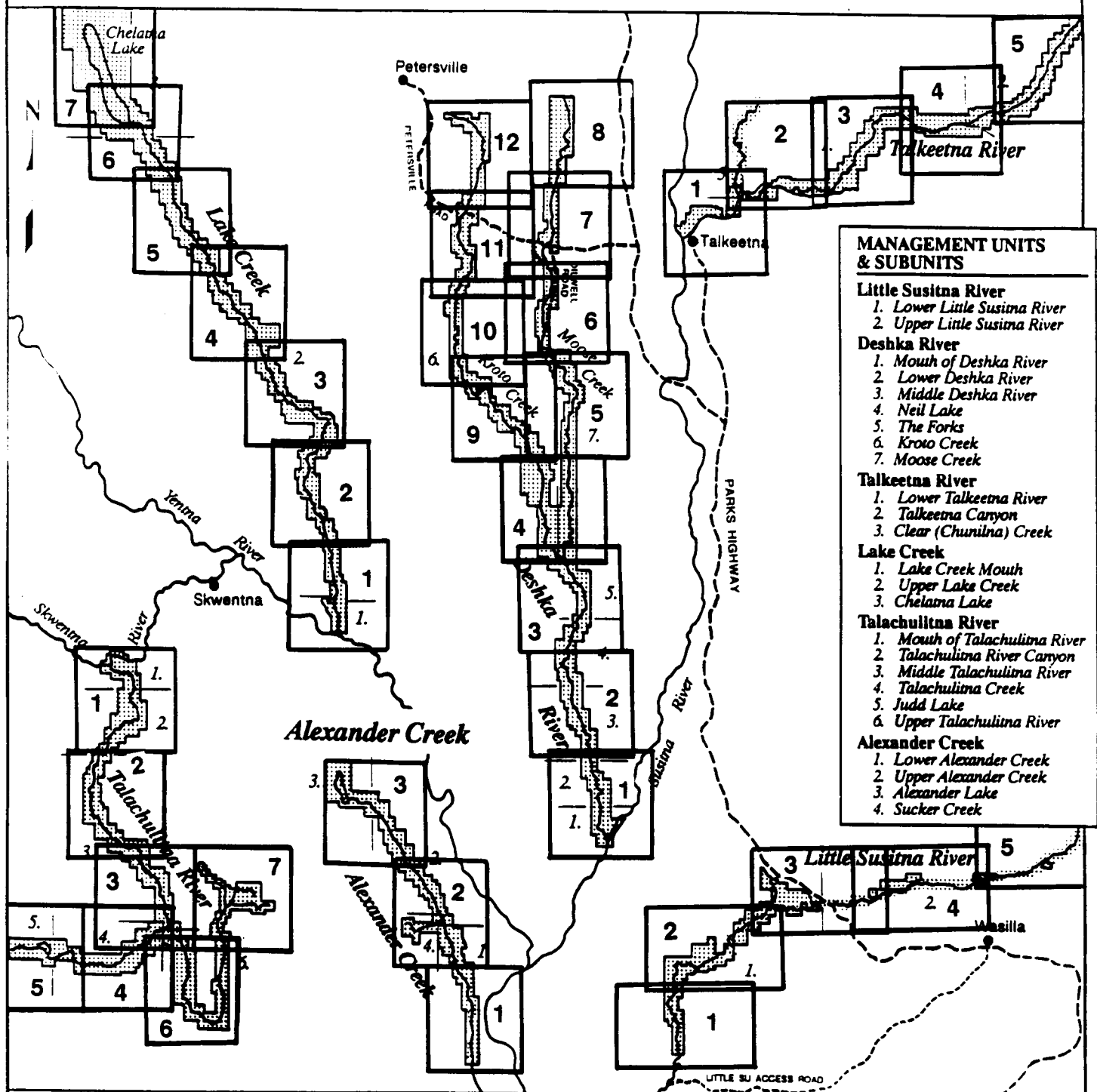
**During Peak Use Period
(mid-June to early July)**

and

Recreation Sites on Public Land.

SUSITNA BASIN RECREATION RIVERS MANAGEMENT PLAN

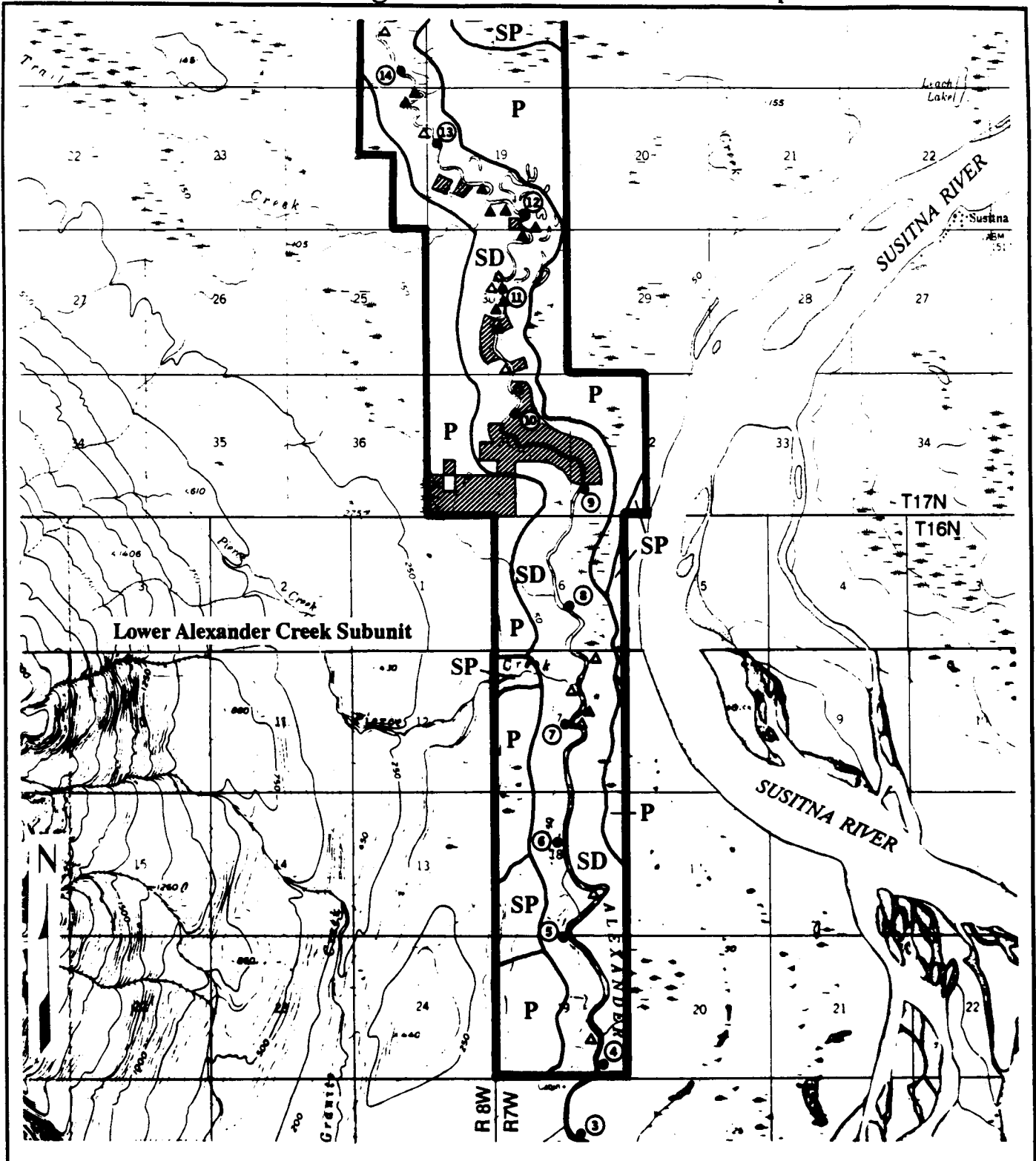
Index Map



- 1 Index To Adjoining Maps
- Recreation Rivers Corridors

Alexander Creek Management Unit

Map 1 : River Miles 3 - 14



— Management Unit Boundary

▨ Subunit Boundary

① River Mile

▨ Private Land

Scale: 1" = 1 Mile

Recreation Opportunity Classes

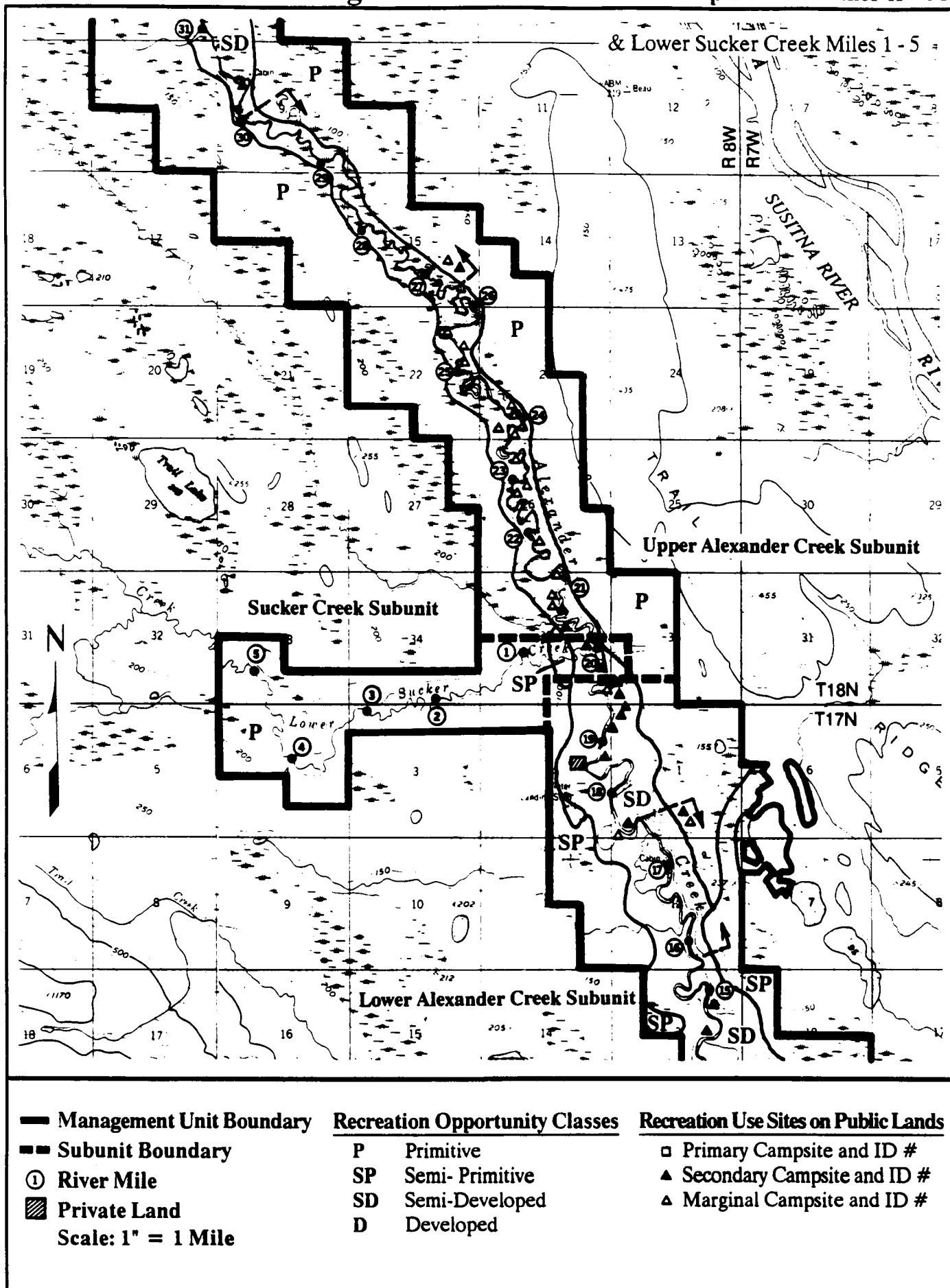
- P Primitive
- SP Semi-Primitive
- SD Semi-Developed
- D Developed

Recreation Use Sites on Public Lands

- Primary Campsite and ID #
- ▲ Secondary Campsite and ID #
- △ Marginal Campsite and ID #

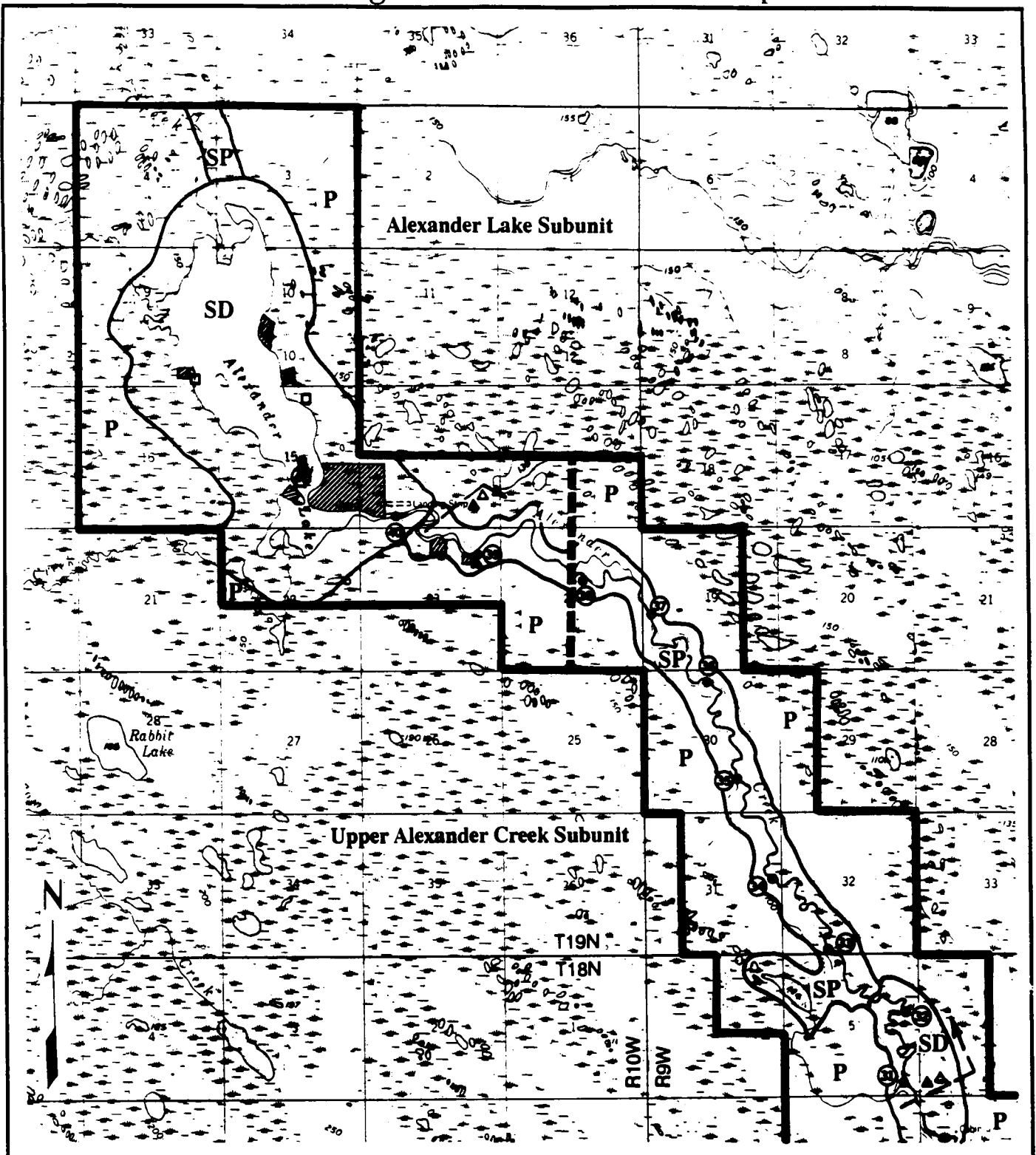
Alexander Creek Management Unit

Map 2: River Miles 15 - 31



Alexander Creek Management Unit

Map 3: River Miles 31 - 41



— Management Unit Boundary

— Subunit Boundary

① River Mile

▨ Private Land

Scale: 1" = 1 Mile

Recreation Opportunity Classes

- P Primitive
- SP Semi- Primitive
- SD Semi-Developed
- D Developed

Recreation Use Sites on Public Lands

- Primary Campsite and ID #
- ▲ Secondary Campsite and ID #
- △ Marginal Campsite and ID #

Literature Cited

ALASKA DEPARTMENT OF FISH AND GAME (DFG)

- 1989a "Alexander Creek Summary of (1988) Aerial Surveys." Unpublished information on file at DFG, Palmer, Alaska.
- 1989b "Deshka River Summary of Aerial Surveys." Unpublished information on file at DFG, Palmer, Alaska.
- 1989c "Little Susitna River Demographic Data by Weekend/Weekday Strata, Coho Salmon Sport Fishery, 1988." Unpublished information on file at DFG, Palmer, Alaska.
- 1989d "Demographic Data for Selected Northern Cook Inlet Chinook Sport Creel Survey Locations, 1987." Unpublished information on file at DFG, Palmer.

ALASKA DEPARTMENT OF NATURAL RESOURCES (DNR)

- 1989a "Susitna Basin Recreation Rivers Plan, Summary of Public Comments."
- 1989b "Draft List of Plan Issues and Questions." Memorandum from Susitna Basin Recreation Rivers Plan Project Manager to Advisory Board and Planning Team members, April 14, 1989, 38 pages.
- 1989c "Susitna Basin Recreation Rivers Management Plan, Draft Resource Assessment." October 1989.

BARTLEET, ANDREW

- 1988 Memorandum to Dale Bingham, September 2, 1988, on Little Susitna River fishing observations. 3 pages.

BARTLETT, LARRY

- 1989 Personal communication to Jack Mosby, National Park Service, from Larry Bartlett, Alaska Department of Fish & Game Biologist, August 12, 1989.

BENJAMIN, AARON

- 1989 Personal communication to Lynn Anderson, National Park Service, from Talkeetna City Boat Launch operator, Summer 1989.

BUREAU OF LAND MANAGEMENT (BLM)

- 1980 "Visual Resource Management Program." 39 pages.
- 1986 "Iditarod National Historic Trail Comprehensive Management Plan." 157 pages.

BUREAU OF OUTDOOR RECREATION (BOR), Alaska Field Office

- 1977 "The Talachulitna River: A Wild and Scenic River Analysis." 45 pages.

CLARK, R.N., and G.H. STANKEY

- 1979 "The Recreation Opportunity Spectrum: A Framework for Planning, Management, and Research." USDA Forest Service General Technical Report PNW-98. Portland, Oregon: Pacific Northwest Forest and Range Experiment Station.

CONKLIN, NANCY

- 1989 Personal communication from co-owner/manager of Black Fox Lodge, September 17, 1989.

DICK, JOAN

- 1989 Personal communication from co-owner of Deshka Silver-King Lodge, July 27, 1989.

ENGLE, LARRY

- 1990 Personal communication from Alaska Department of Fish and Game Biologist, February 1990.

HERITAGE CONSERVATION AND RECREATION SERVICE (HCRS)

- 1978 Unpublished draft report, "Interagency Field Inspection of Alexander Creek." August 20-24, 1978. 28 pages.

HOLZAPFEL, LISA

- 1988 Unpublished report on Talachulitna River field trip, August 19-23, 1988. 7 pages.

HOWE, ALLEN L.

- 1985 "A survey of boaters exiting at the Susitna Landing, Talkeetna Boat Launch and Airstrip, and Willow Creek during 1984." Alaska Department of Fish and Game, 76 pages.

JACQUES, JERRY

- 1989 Personal communication to Bruce Talbot, Alaska Department of Natural Resources, and National Park Service staff, from whitewater rafting and hunting outfitter-guide, July 29, 1989.

JOHNSON, LOUISE

- 1989a Personal communication to Bruce Talbot, Alaska Department of Natural Resources, and other DNR and NPS staff from co-owner of Talaview Lodge. July 11, 1989.

- 1989b Personal communication (letter and use report) from co-owner of Talaview Lodge, September 11, 1989.

MAHAY, STEVE

- 1988 Personal communication to Bruce Talbot, Alaska Department of Natural Resources, from riverboat service owner/operator. July 8, 1988.

MEDRED, CRAIG

- 1989 Editorial, Anchorage Daily News. June 25, 1989.

MILLER, JUDI

- 1989 Personal communication to Bruce Talbot, Alaska Department of Natural Resources, and other DNR and National Park Service staff, from co-owner of Talaheim Lodge. July 9, 1989.

MILLS, MICHAEL J.

- 1988 "Alaska Statewide Sport Fisheries Harvest Report, 1987." Alaska Department of Fish and Game, Fishery Data Series No. 52.

MOSBY, JACK

- 1979 Unpublished memorandum to files, "Trip Report for Alexander Creek." August 20-24, 1978. 4 pages.
- 1989 Unpublished memorandum to files, "Trip Report for Lake Creek." July 31, 1989. 2 pages.

NATIONAL PARK SERVICE

- 1989 "Instream Flow Needs for Recreation: Little Susitna River, Deshka River, Talkeetna River." Draft report, 65 pages. By Doug Whittaker, Alaska Regional Office Rivers and Trails Conservation Assistance Program, for State of Alaska Department of Natural Resources.
- 1990 "Susitna Basin Recreation Rivers User Survey Results and Implications." Internal review draft, 155 pages plus figures. By Doug Whittaker, et al, Alaska Regional Office Rivers and Trails Conservation Assistance Program, for State of Alaska Department of Natural Resources.

WILDLIFE FEDERATION OF ALASKA

- 1987 "A Method of Evaluating the Recreation Potential of Alaskan Rivers." Prepared for National Park Service, Alaska Regional Office. 118 pages.

CHAPTER 3

VISITOR USE ESTIMATES

CHAPTER 3 - VISITOR USE ESTIMATES

INTRODUCTION

This chapter includes estimates of visitor use levels and patterns on each of the six Recreation Rivers. This section briefly discusses the general type of sources and assumptions used in developing use estimates. Specific information sources and assumptions used vary and are described in more detail at the end of sections describing use on each river.

Information Sources

Information was gathered from a number of sources including recreation businesses that volunteered information about their clients and visitor registers located at major ingress/egress points. However, only a portion of total use was reported. Not all commercial recreation providers were willing to report their use of the recreation rivers, and only a small percentage of private parties filled out the visitor registers. Information from periodic DFG aerial visitor counts and counts of users during creel censuses were also used to gauge the percentage of use being reported and to adjust estimates.

Estimates and Definitions

Different methods were used to estimate total use on each river, depending on the availability of DFG visitor counts. DFG had relatively reliable counts for the Deshka River, Alexander Creek, and the lower Little Susitna River, but had less information for the Talkeetna and Talachulitna Rivers and Lake Creek.

In addition to providing overall seasonal use estimates by river, this chapter estimates use by river section. While estimates of total person days spent within each river subunit were not always possible, the number of trip starts within each subunit were estimated. Estimates of use are summarized by the following categories:

Day Use on Public Land. This category includes people who arrive and depart on the same day, and who are based on public lands or waters. This category does not include one-day visitors to lodges; those people are included in the "private facility based" category.

Overnight Use on Public Land. This category includes visitors who remain on Alexander Creek for one or more nights. It includes people camping on public land rather than staying at a lodge or cabin.

Float Trip. Float trip estimates are a subset of the category "overnight use on public land." Estimates of float trip use are reported separately because it was possible to identify them from reviewing air taxi records, which provided a large percentage of the data used in the visitor estimates. Although ideally it would be desirable to break the two gross categories of "day use" and "overnight use on public lands" into several sub-categories, other users, such as powerboaters, were not readily identifiable from the majority of records available.

Private Facility Based. These categories include all visitors, regardless of length of visit, who stayed at lodges or private cabins.

GENERAL ESTIMATES FOR ALL RIVERS

This section summarizes DFG use data that compares use on the Recreation Rivers with use on other rivers, regions, and statewide.

Comparative Estimates

Table S-1 shows the percentage of angler use on the Recreation Rivers versus other rivers in the state.

TABLE S-1. Percentage of Fishing Use by River, Region, & Statewide

	Number of Angler-Days	Percentage of Total
Kenai River	374,000	16
Recreation Rivers	138,000	6
Northern Cook Inlet (includes Rec. Rivers)	517,000	22
Statewide Total	2,321,000	100

Results show that Recreation River use makes up a relatively small proportion of total statewide fishing use and is considerably less than use along the Kenai River system. Recreation River use makes up only about 27 percent of total fishing use in the Northern Cook Inlet region (most of the Anchorage Basin and Matanuska-Susitna Borough).

Table S-2 shows how rapidly angler use is increasing on the Recreation Rivers relative to other areas.

TABLE S-2. Percentage Increases in Fishing Use by River, Region, & Statewide.

	Total Increase (%)	Rate of Increase (% per year)
Kenai River	206	17
Recreation Rivers	327	27
Northern Cook Inlet (includes Rec. Rivers)	128	11
Statewide Total	94	8

These figures suggest that use on the Recreation Rivers is increasing considerably faster than fishing use statewide, than fishing use in the region, and than on the Kenai River. If use in all these areas were to continue to increase at these rates, use on the Recreation Rivers would eventually surpass the Kenai River.

Figures S-1 and S-2 that follow summarize the trends in visitor use for each of the six rivers. Figures are based on DFG yearly statewide angler surveys.

FIGURE S-1. Use Trends on the Little Susitna River, Deshka River, & Alexander Creek.

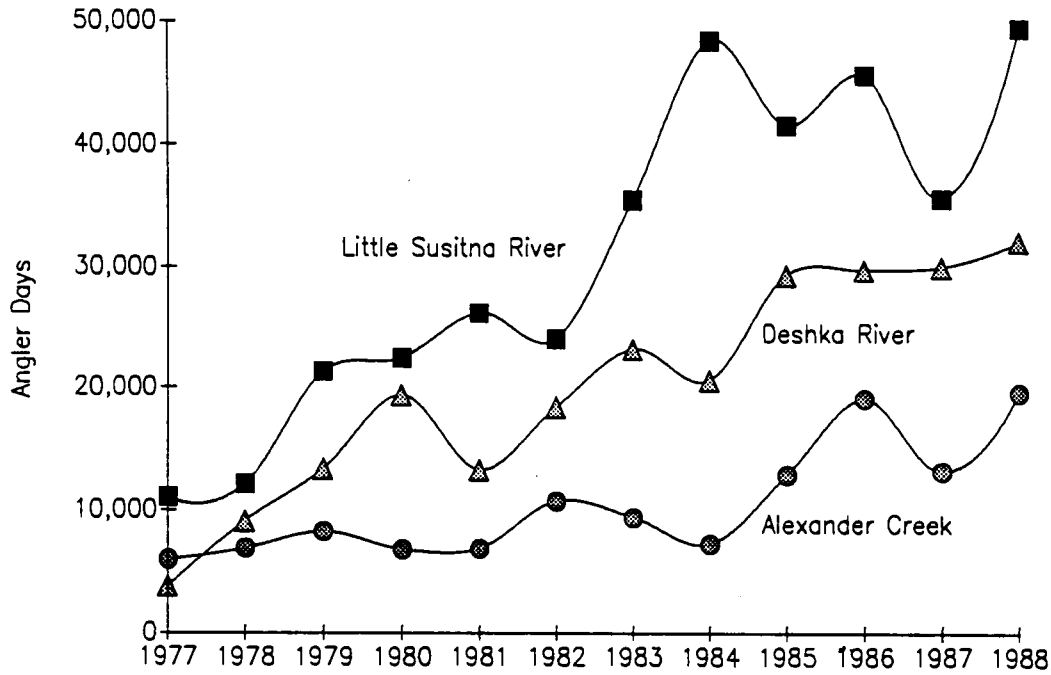
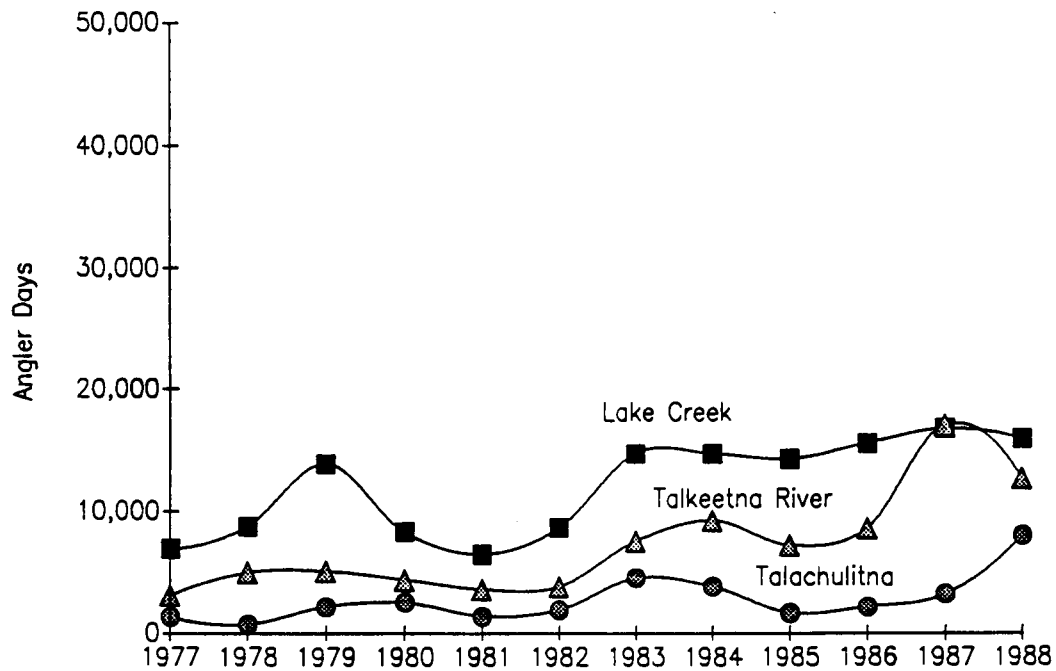


FIGURE S-2. Use Trends on the Lake Creek, the Talkeetna River, & the Talachulitna River.



Little Susitna River

1989 Visitor Use Estimates

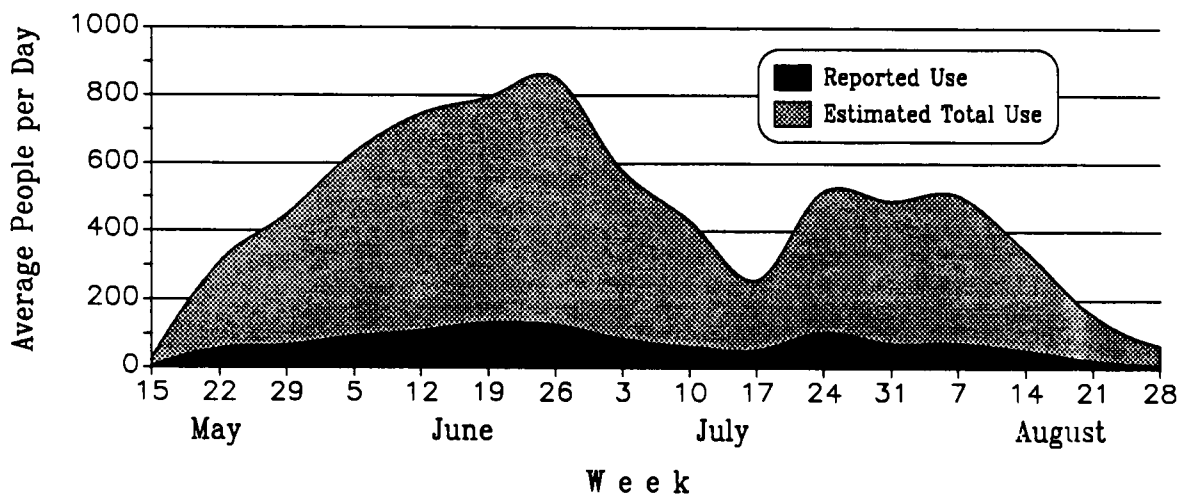
Visitor use estimates for the Little Susitna River were derived from DFG creel census data, weir records (boats passing through the weir), reported use from outfitter-guides, and launch registers during the 1989 summer season. Reported use covered the entire season, but did not reflect total use. Not all businesses on the Little Susitna volunteered information, and very little information was collected from visitor registers. In contrast, DFG counts were far more accurate, but referred only to certain subunits of the river or certain periods of the year. DFG also estimated total use on the river from statewide angler surveys. This data was used to adjust many estimates.

The last section of the chapter, "End Notes," contains the methods used to convert reported recreation use data into visitor use estimates. Readers should note that the information refers to visitor use on the entire river during the 1989 summer season (except where noted), including the subunit of the river below the weir and outside of the recreation river boundaries.

SEASONAL OVERVIEW

Figure LISU-1 displays estimated average weekly visitor use for the 1989 season. Reported use comes from outfitter-guides and visitor registers. The shape of the estimated use curve is based on reported use. The size of the curve was adjusted through comparisons with DFG data from the 1988 season (1989 data was not available.).

FIGURE LISU-1. Seasonal Overview of Little Susitna Recreation Use, 1989.



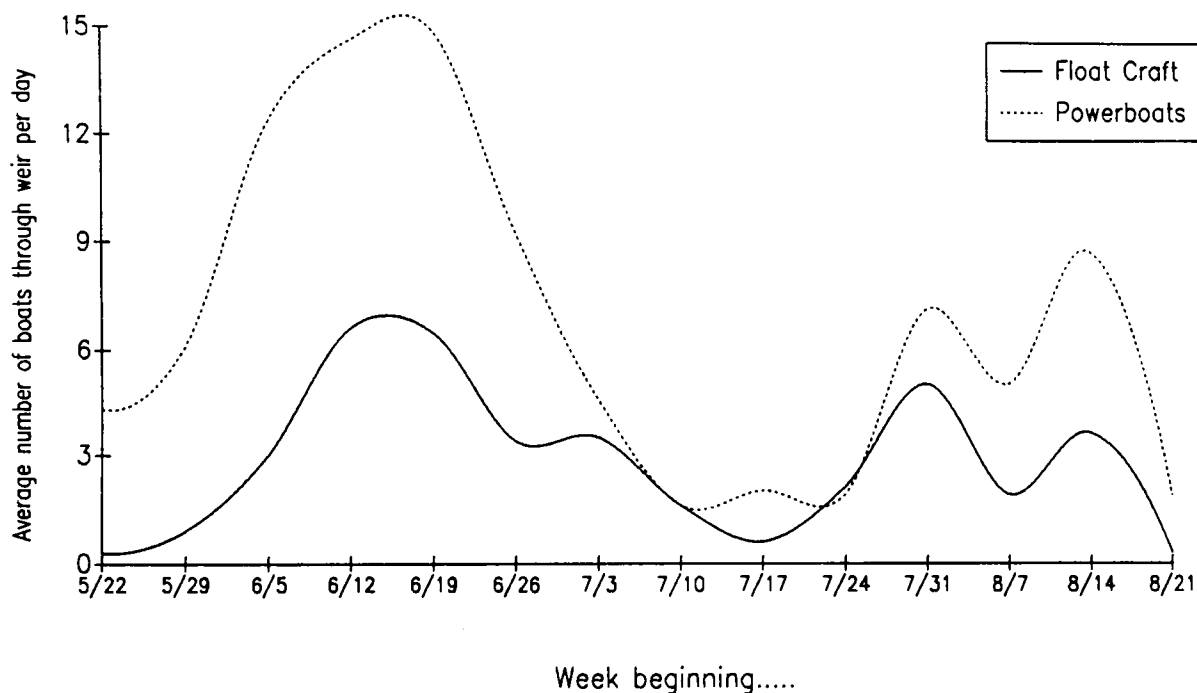
The summer season on the Little Susitna River essentially runs from mid-May through Labor Day weekend. Use peaks in mid-June, then drops until late July, when a second peak begins. The two peaks represent the king and silver salmon runs respectively.

Estimates suggest the following:

- * The peak visitor use period corresponded to the height of the king salmon run during the weeks of June 19 and June 26. The average use during this period exceeded 800 people per day.
- * A second use peak corresponded to the silver salmon run from July 24 through August 7. The average use during this period was about 500 people per day.
- * Total use during the 1989 summer season was estimated at 49,731 person-days (from 1988 DFG data).
- * Based on the assumption that the average trip length was three days, there were approximately 16,577 separate visits to the river.

Figure LISU-2 displays the number of powerboats and float craft passing through the DFG weir in 1989. Data refers to the average number of boats per week. Powerboats pass through the weir twice, once while going upstream and again when coming back downstream. The figure represents only the number of powerboats passing upstream.

FIGURE LISU-2. Number of Craft Passing through the ADF&G Weir in 1989.



This graph displays two peak visitor use periods corresponding to the king and silver salmon runs. In 1989, the king salmon season had the higher visitor use. DFG staff indicated that in typical years, visitor use during the silver salmon run is generally higher than during the king salmon season (Bartlett, personal communication). In 1989, however, particularly heavy rains during the silver salmon run probably contributed to fewer users during that time.

Weir data also indicated that powerboat use is roughly twice as high as float craft use during the peak fishing seasons. During the off-peak seasons, powerboat and float use are similar. In total, over 270 float craft and over 660 powerboats passed through the weir in 1989. This translates to 621 floaters (2.3 users per float craft) and 2,112 powerboaters (3.2 users per boat) per year, or 2,733 users per year.

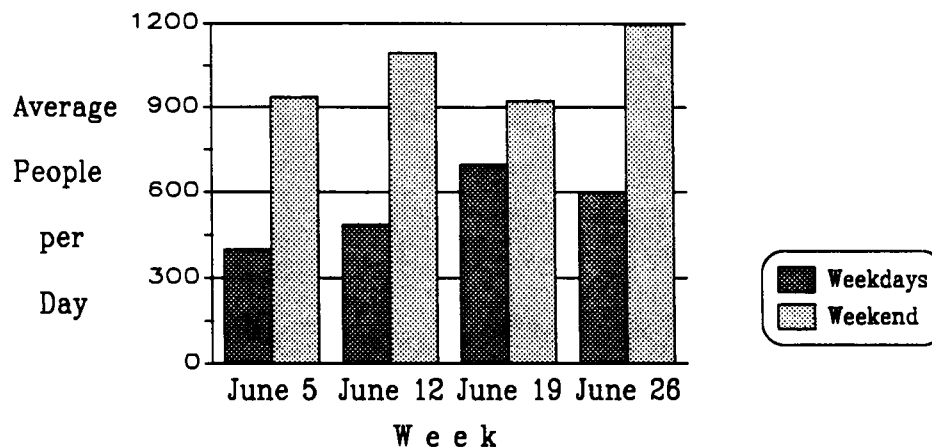
Assuming users spend an average of three days on the river per trip, (NPS, 1990), the weir data accounts for roughly 8,000 person-days per year, or 16 percent of total Little Susitna River use. While this may at first seem relatively low, weir data only reflects floater use from the Parks Highway to Burma Road and powerboat use from the weir to Hock Lake. Powerboats that stay in the Houston-Nancy Lake Creek area, or do not cross the weir, were not counted. Similarly, floaters who put-in at Houston and then travel through Nancy Lakes were not counted.

Anecdotal evidence suggests other users could easily represent more than 80 percent of total Little Susitna River use.

VARIATION IN WEEKDAY/WEEKEND USE

Figure LISU-3 displays variation in weekend and weekday use during the peak king salmon season. This figure is derived from reported use. Weekends are defined as Friday, Saturday, and Sunday. Weekdays are Monday through Thursday.

FIGURE LISU-3. Variation is Weekday/Weekend Use on the Little Susitna River.



These data suggest that weekend use is about twice as high as weekday use, although there is some fluctuation. DFG weir data supported this finding. Among floaters, 64 percent of all boats passed through the weir on weekends or the day after a weekend. Among powerboaters, 61 percent pass upstream on weekends.

VISITOR USE BY RIVER SUBUNIT

Most of the visitor use information from the Little Susitna does not allow confident assertions about how use is distributed through the recreation river area. While DFG weir counts and creel census data provide some distribution information, this data has a number of limitations and only reflect use for a portion of the year. The following discussion combines available observations with anecdotal information from veteran river users to qualitatively describe use on the various sections of the river.

Hatcher Pass - Fishhook Road Subunit

This subunit of the river is used only by whitewater kayakers. Discussions with veteran kayakers from the Anchorage area suggest no more than 50 different people take Little Susitna River trips during the year, but more than half of this number take multiple trips. One kayaker estimated more than 200 kayak trips are taken on this subunit of the river each year. These trips are typically concentrated during the spring run-off when flow levels are high. Heavy rains in August 1989 also provided enough water for kayak use for several days.

Upper Little Susitna River

Very few trips are taken on the river upstream of the Parks Highway. Salmon fishing is prohibited above the bridge. All use in this subunit is focused on trout fishing, scenic floating, and powerboat access to private property. No reported use or DFG use data refer to activities in this subunit. Discussions with veteran users suggest there are less than 30 float trips taken on this subunit, along with similar numbers of powerboat trips. The powerboat estimate does not refer to the number of boats owned by Houston residents who live upstream of the bridge, but to the powerboaters who actually go well upstream of the Houston residences.

Houston Area

Approximately 200-300 floaters per year enter Nancy Lake Recreation Area from the Little Susitna River, mostly in June and July (Heikes, personal communication.) The operator of Miller's Landing, the principal boat launch for this section of river, estimates 500 powerboats launch each year. Assuming 3.2 people per boat and an average trip length of three days, approximately 1,600 powerboaters spend 4,800 person-days or about 10 percent of total Little Susitna River use. Added to this figure are bank anglers from the Parks Highway Bridge and float users from the Parks Highway to Nancy Lakes. Although data are is not very supportive regarding the level of these uses, it is probably less than five percent of total use.

Nancy Lake Creek to DFG Weir

DFG weir counts suggest approximately 16 percent of visitors on the Little Susitna River use this subunit. DFG on-site creel census data from Burma Landing during the 1989 king salmon season suggests similar percentages, with powerboats accounting for about 10 percent of Burma Landing use. Float craft accounted for about five percent of Burma Landing use.

Burma Landing to DFG Weir

DFG creel census data from the 1989 king salmon season suggests about 36 percent of total use from Burma Landing use this subunit. Counting the number of boaters who traveled above the weir, approximately 49 percent of the users who launch from or take-out at Burma Landing use the river upstream of the landing.

Downstream from Burma Landing

DFG creel census data from the 1989 king salmon season suggests about 51 percent of visitors originating from Burma Landing use this subunit.

COMPARING COMMERCIAL AND PRIVATE RECREATION USE

Visitor use data from the river does not provide reliable information about differences in private and commercial use. Current commercial use appears to be limited to three main operators, two at Burma Landing and one at Miller's Landing. These operators do not use more than three boats. Based on the assumption that these commercial operations run about 50 days per summer and average less than 30 clients per day, total commercial use probably accounts for less than

1,500 person-days, or less than three percent of total visitor use. Even if this estimate is 100 percent below actual use, commercial use would still account for a relatively small percentage of total use.

END NOTES: ASSUMPTIONS AND METHODS

Seasonal Overview Estimates

Reported use in Figure LISU-1 refers to the numbers of users reported by outfitter-guides and those users who registered at boat launches at Burma Landing, Miller's Landing, and the Little Susitna Campground.

Total estimated use was based on the DFG estimate for 1988, (1989 estimates were not available), which came from the statewide survey of users. We simply determined a factor by which we could increase reported use to equal total use. In other words, the shape of the estimated use curve is based on reported use, while the magnitude of use is based on the DFG estimate. (Note that this overview graph is the least reliable of all the rivers; other rivers had more accurate reported use, greater percentages of commercial use, and DFG aerial counts which could be used to adjust estimates.)

DFG Weir Data

In contrast to the data given in Figure LISU-1, DFG weir data (Figure LISU-2) is extremely accurate, representing actual counts by DFG personnel at the weir. The weir is staffed 24 hours a day throughout the summer. Unfortunately, these data refer to only a proportion of the use: boats that pass through the weir.

The numbers represented in the graph refer to the average number of powerboats and float craft passing through the weir each week. Daily counts are available, but fluctuate enough that a graphic representation would be confusing. By showing weekly averages, however, the graph suggests consistent use patterns when in fact there are often very large changes from day to day. Weather conditions are a significant factor in these fluctuations.

Modeling Use Trends

The discussion about visitor use trends (percentage increases in use) is based solely upon DFG use estimates, which come from their statewide angler survey. Information about this survey and how estimates are determined is available in the statewide Harvest Report (Mills, 1989).

Weekend/Weekday Variation Data

The numbers represented in Figure LISU-3 are reported use on weekdays and weekends for the weeks shown. This information comes from visitor registers and outfitter-guide reports.

Weir count information also supported the weekend/weekday difference conclusion. The percentages noted were based on two assumptions: 1) weekend floaters passed through the weir

on Saturday, Sunday, or Monday; and 2) weekend powerboaters passed through the weir going upstream on Friday, Saturday, and Sunday.

Use by Subunits

Hatcher Pass and Upper Little Susitna River use information came from veteran river users. Miller's Landing information was based on an estimate from the landing operators. Use from Houston to the DFG weir was based on DFG total use estimates and weir count data. This discussion also focuses on on-site creel census data from the 1989 king salmon season. Details about these data are available in the DNR resource assessment (1989c). The Burma Landing information also comes directly from the on-site creel census data.

PROJECTING FUTURE USE

Estimates of use in subsequent years may be projected by combining data from these 1989 seasonal use estimates and previous DFG statewide angler surveys. Because the DFG statewide angler survey has been conducted annually since the mid-1970's, it is the best source for evaluating visitor use trends on the Talachulitna River. However, since the survey reports only the overall angling use estimates for each year our 1989 seasonal estimates may be used to distribute use over the June through September period.

We have projected use from June through September 1990 by using our 1989 seasonal use estimates and applying a growth rate derived from the statewide angler survey, as provided below.

The Alaska Department of Fish and Game estimates total fishing use has been on a general upward trend for the 12 years from 1977 through 1988 (Department of Natural Resources (DNR), 1989c). Through this entire period, use has increased roughly 349 percent or about 29 percent per year. However, most of this growth occurred between 1977 and 1985. Since 1986, use has increased roughly nine percent, or three percent per year. At the three percent rate of growth, 1989 use was approximately 51,200 person-days, and projected 1990 use is about 52,700 person-days.

Considerations for Modeling Future Use Trends

In 1988, Little Susitna River use accounted for approximately 36 percent of total recreation rivers fishing use, more than for any other river. The Deshka accounted for approximately 23 percent of the total use, and each of the other four rivers accounts for less than 14 percent of the total visitor use.

Considerations for Considering Modeling Seasonal Distribution of Use

The data accurately reflect the timing of the peak use seasons, during the height of the king salmon and silver salmon runs, but are unlikely to accurately portray the relative size of those peaks. As noted earlier, DFG staff indicated visitor use during the silver run is usually higher than during the king run.

Deshka River

(Moose Creek & Kroto Creek)

1989 Visitor Use Estimates

Visitor use estimates for the Deshka River (Moose Creek and Kroto Creek) were derived by comparing Alaska Department of Fish and Game (DFG) aerial counts, conducted from late May to late June, with use reported to the National Park Service by air taxis, lodges, and fishing outfitter-guides for the 1989 summer season. While reported use covers the entire season, it is not total use. Not all businesses operating on the Deshka River (Moose Creek and Kroto Creek) volunteered information, and virtually no information was obtained from private sources. In contrast, the Department of Fish and Game counts are assumed to represent total use, but for only a small portion of the summer season. We compared the two data sets for the time period where they coincided and derived mathematical equations to calculate estimated use from reported use.

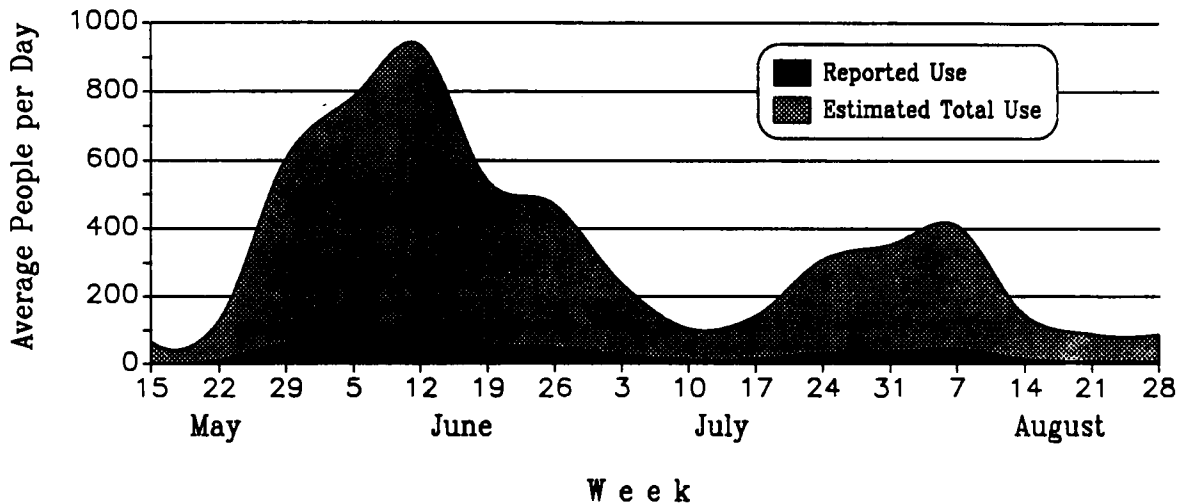
The last section of the chapter, "End Notes," contains the methods used to convert reported recreation use into visitor use estimates.

Note that the following information refers to use on that portion of the Deshka River (including Moose Creek and Kroto Creek) downstream of the Petersville Road.

SEASONAL OVERVIEW

Figure DESH-1 shows average weekly visitor use levels for the 1989 summer season. Reported use comes from lodges, air taxi operators, and outfitter-guides. Estimated use is based on reported use and adjusted through comparisons with DFG use data.

FIGURE DESH-1. Seasonal Overview of Deshka River Recreation Use for 1989.



The summer season on the Deshka River is essentially mid-May through Labor Day weekend. Use peaks during mid-June, then drops precipitously until mid-July, followed by a second, much smaller peak in early August. These two peaks represent the king salmon and silver salmon runs, respectively. The lull in visitor use between the two peaks in 1989 corresponds to the July 13th closing date of the king salmon fishing season. Figure DESH-1 displays the following highlights:

- * The highest visitor use corresponded to the peak of the king salmon season during the week of June 12. The average use level during this time was 935 people per day.
- * A second peak corresponded to the silver salmon run during the week of August 7. The average use level during this week was 409 people per day.
- * Estimated total use for the year was 37,778 person-days.¹
- * Based on the assumption that the average trip length is 3 days, there were an estimated 12,593 separate visits to the Deshka River during 1989.

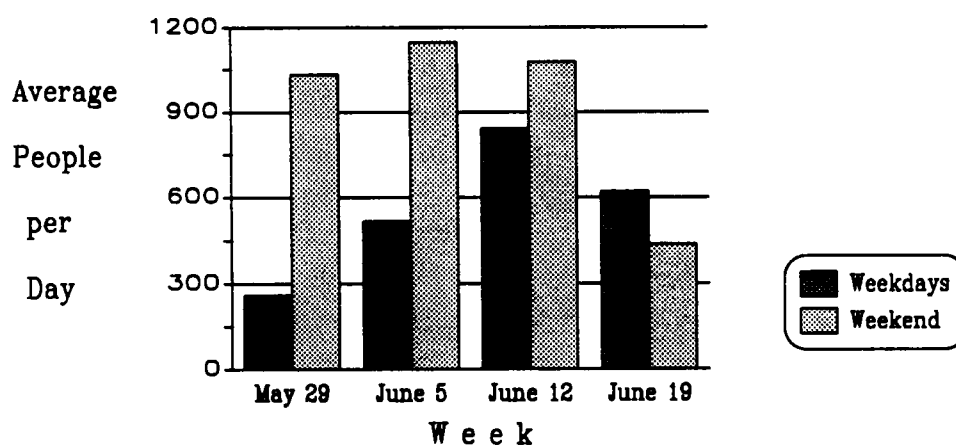
¹ A person-day is one individual engaging in recreation for any portion of a 24-hour day.

VARIATION IN WEEKDAY/WEEKEND USE

Deshka River use, particularly at the mouth where many users congregate, shows strong increases on the weekends as compared to the weekdays during the peak use period. Even so, the biggest factor determining the number of people per day seems to be fishing success. When "the kings are in," people are on the Deshka River. Figure DESH-2 shows variation in weekday and weekend use during the height of the king salmon season.

Figure DESH-2 was constructed using Department of Fish and Game weekend and weekday counts to adjust the weekly "average people per day" numbers (Figure DESH-1). Results are different, but considered more accurate than what would have been obtained using only the average people per day generated from the National Park Service data base. Additional discussion and rationale for this decision is presented in the end notes.

FIGURE DESH-2. Variation in Weekday/Weekend Visitor Use on the Deshka River.



The data suggest three general conclusions:

- * The highest use of the season is estimated to have occurred on the June 9-11 weekend with an average of 1,145 people per day.²
- * There is more use on weekends than weekdays during the early stages of the king salmon run, before many fish have reached the stream and fishing success is relatively low. At that time, many more people visit on the weekends than on weekdays.
- * In contrast, as salmon fishing at the mouth peaked and then declined, visitor use rose and fell. For the week of June 19, use declined during the weekend compared to the preceding weekdays.

Overall, weekend use appears to be generally higher than weekday use.

²Calculated using method described in the appendix, "Assumptions Used in Breaking Total Use into Sub-Categories."

VISITOR USE BY RIVER SUBUNIT

Reported use included information about the type, timing and location of trip starts. DFG data also contains information about use by river subunit. While limitations of the data preclude definitive estimates of total person-days spent within each river subunit, it is possible to estimate the proportion of use which originates within each subunit and to characterize the type of use by subunit. Figures DESH-3 through DESH-6 give the number of trips beginning at the mouth, Neil Lake, Oilwell Road, and Amber Lake for each of the four trip types as defined in the introduction to this chapter.

Information presented in the figures and DFG data suggests the following conclusions about use of the river subunits:

Deshka River Mouth. Figure DESH-3 shows the estimated number of people beginning a trip at the Deshka River mouth (RM 0 to RM 1.7) each week. In this subunit, it is estimated there are more day users each week than any other category of recreation user. DFG data suggest between 38 and 79 percent of total users on any given day are present at the mouth. No float trips begin in the Deshka River Mouth subunit. Only estimated visitation at mouth-area lodges is included in the "private facility based" total.

Lower Deshka River. Although many visitors use this subunit, no trips begin within the lower Deshka River. All float trips pass through this subunit on their way to the mouth. The percentage of powerboaters at the mouth who travel upstream and enter this subunit depends on the progress of the salmon run. Early in the run, fish and anglers are concentrated near the mouth. As the salmon move upstream, anglers tend to follow, spreading use over a wider area. However, during high-use periods, the number of people in the lower subunit is always much less than the number in the mouth subunit. DFG data suggest between 9 and 20 percent of total use occurs within the Lower River subunit on any given day.

Middle Deshka River. No trips begin within the Middle Deshka River. User groups travel through this subunit by coming downstream or motoring upstream from the mouth. This subunit contains a couple of well-known fishing holes and numerous parcels of private property with cabins and vacation homes. Several properties in this subunit have been operated as lodges in the past. However, according to the various owners, who were contacted by phone during Summer 1989, none of these properties operated as a lodge during Summer 1989. Visitor use is always lower in this subunit than at the mouth. The number of visitors present is generally similar to the Lower Deshka River. DFG data suggest between 4 and 15 percent of total use occurs in this subunit on any given day.

Neil Lake Area. Estimated trip starts are displayed in Figure DESH-4. Neil Lake is accessible by float plane and receives use in all four general categories. Neil Lake is both a put-in and take-out site for float trips. The lake shore is predominantly private property on which cabins have been constructed, and which generates a fair amount of recreation use. Day users fly in during the height of the king salmon and silver salmon runs, but do not frequent the area at other times. Some of the drastic fluctuations on the graph, particularly the weeks in which there is no estimated use in some categories, are caused by the small size of the data base from which these

extrapolations were made. A larger data base would probably result in somewhat smoother curves, but would still conform to the general pattern exhibited in Figure DESH-4. DFG data suggest between 1 and 21 percent of total visitation on any given day occurs in the Neil Lake area.

The Forks. No trips begin in this subunit. Users are predominantly floaters taking out at either Neil Lake or the mouth. A few powerboats, mainly airboats, also use this subunit. DFG data suggest between 1 and 20 percent of the total visitors on any given day are in the Forks area.

Moose Creek and Kroto Creek. Data was insufficient to estimate all trips beginning on these two streams, but enough information was collected for two locations, Oilwell Road and Amber/Whistling Lakes, to make rough estimates of visitor use. These are graphed as Figures DESH-5 and DESH-6, respectively. Information from these figures should be used cautiously, particularly that presented in Figure DESH-5, which is based on very limited data. (See *End Notes* for details.)

At Oilwell Road, the predominant users are overnight campers and floaters. Day use and private property visits also occur, but attract significantly fewer visitors to this area.

The only reported use of Amber/Whistling Lakes was for float trip put-ins. Although there is private property around these lakes which undoubtedly generates some recreation use, none was reported. Consequently, Figure DESH-6 displays estimated total trip starts for float trips only. From the trip reports received, it was impossible to tell if users were starting at Amber Lake or at Whistling Lake, and therefore, whether they were floating down Kroto Creek or Moose Creek. (A complicating factor is that the name "Whistling Lake" is not in general usage, although it appears on the U.S. Geological Survey topographic quadrangles. Apparently the entire lake chain is referred to simply as Amber Lakes, at least by the air taxi operators who provided information on this area.) Floaters are known to participate in both trips, but without additional data it was impossible to break apart the information into estimated total use for each stream.

FIGURE DESH-3. Number of People Beginning Trips from the Mouth of the Deshka River.

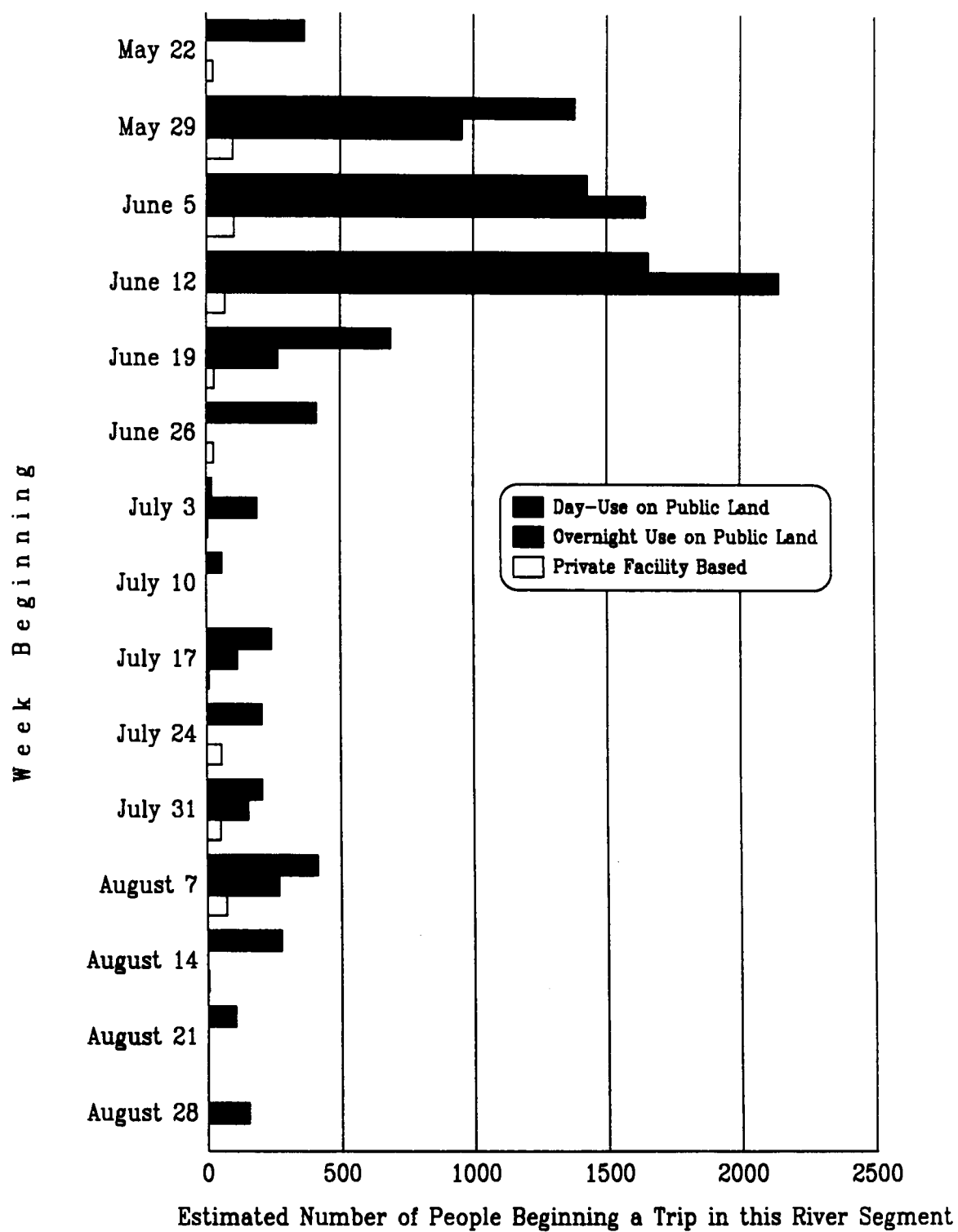


FIGURE DESH-4. Number of People Beginning Trips from Neil Lake.

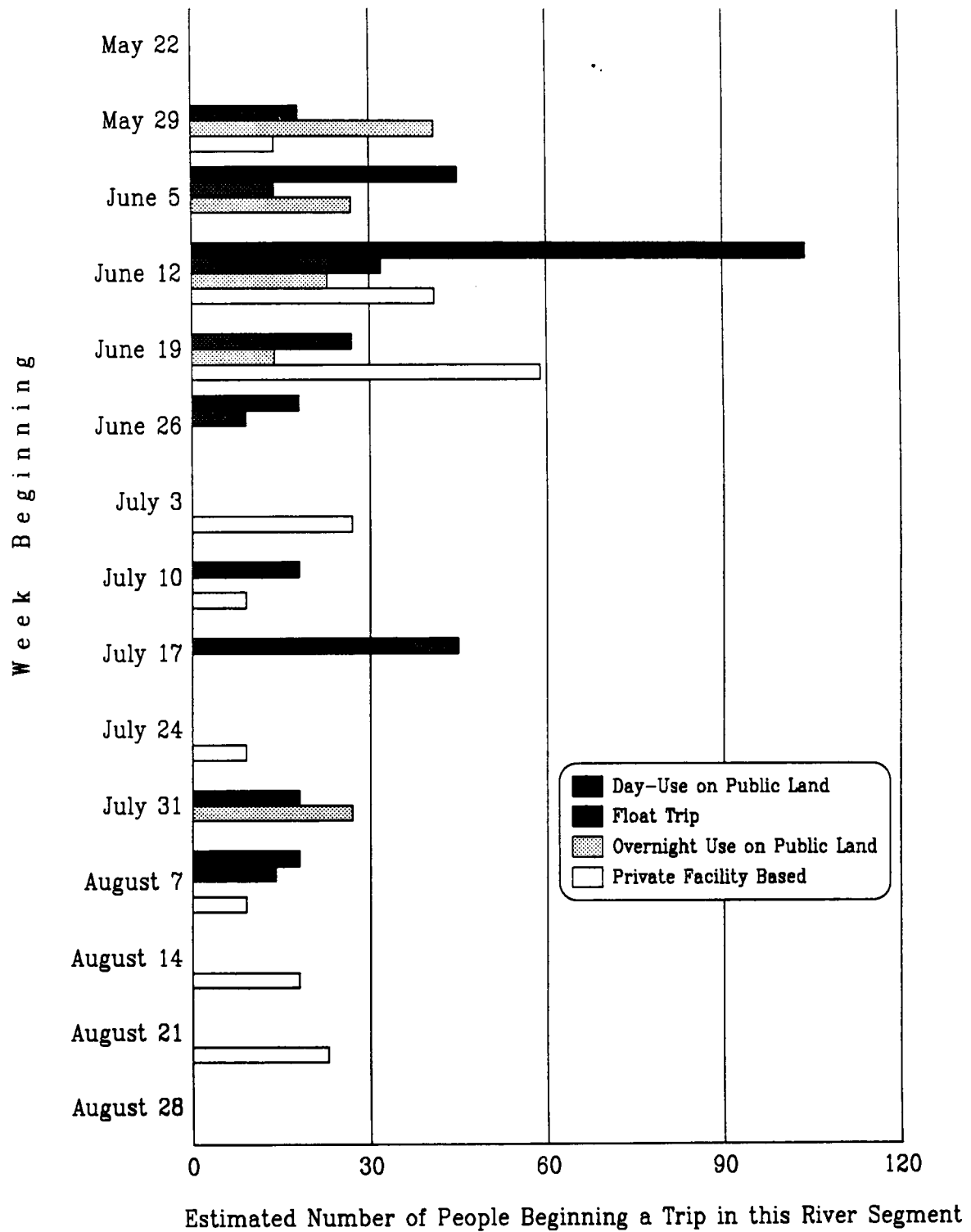


FIGURE DESH-5. Number of People Beginning Trips from Oilwell Road.

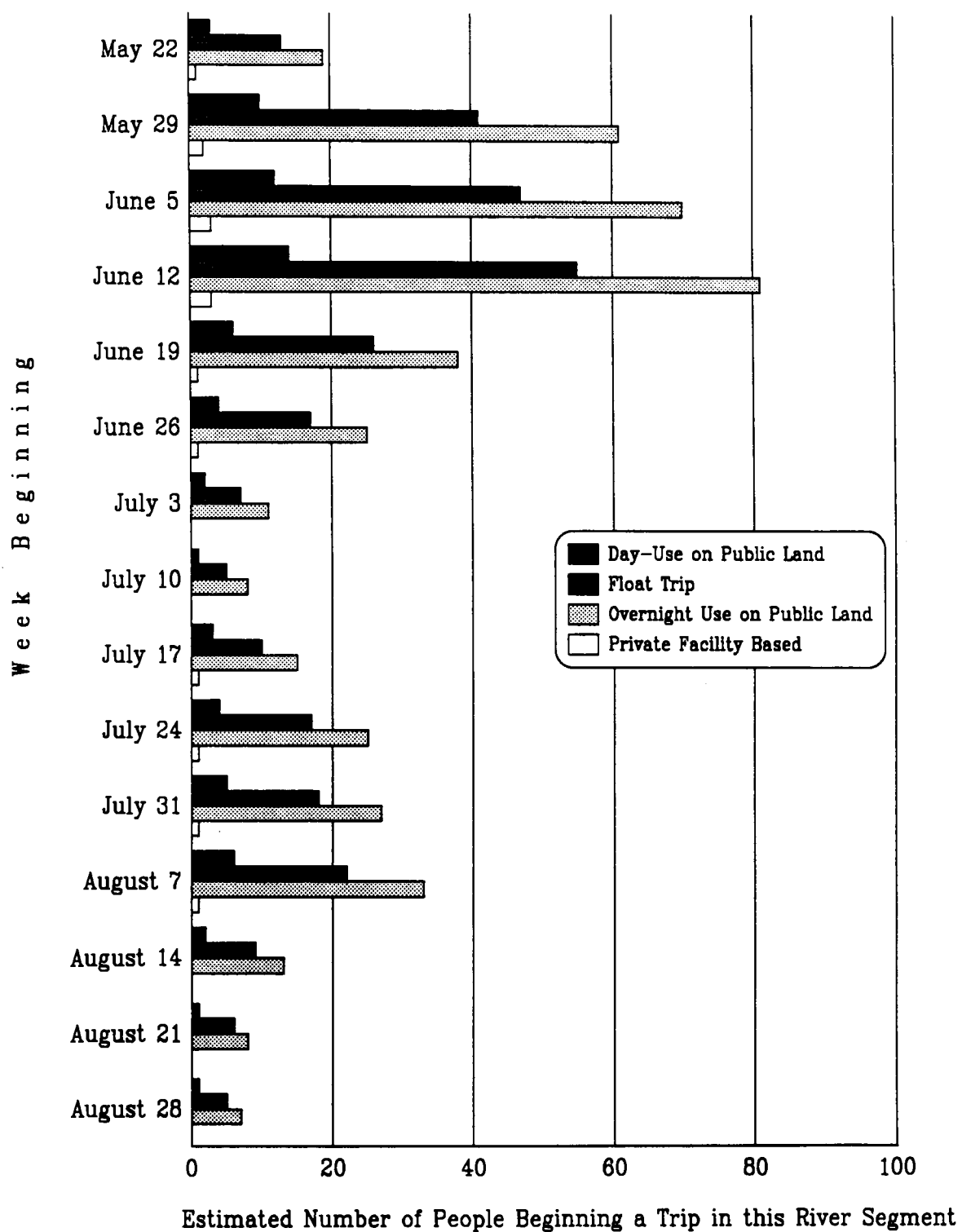
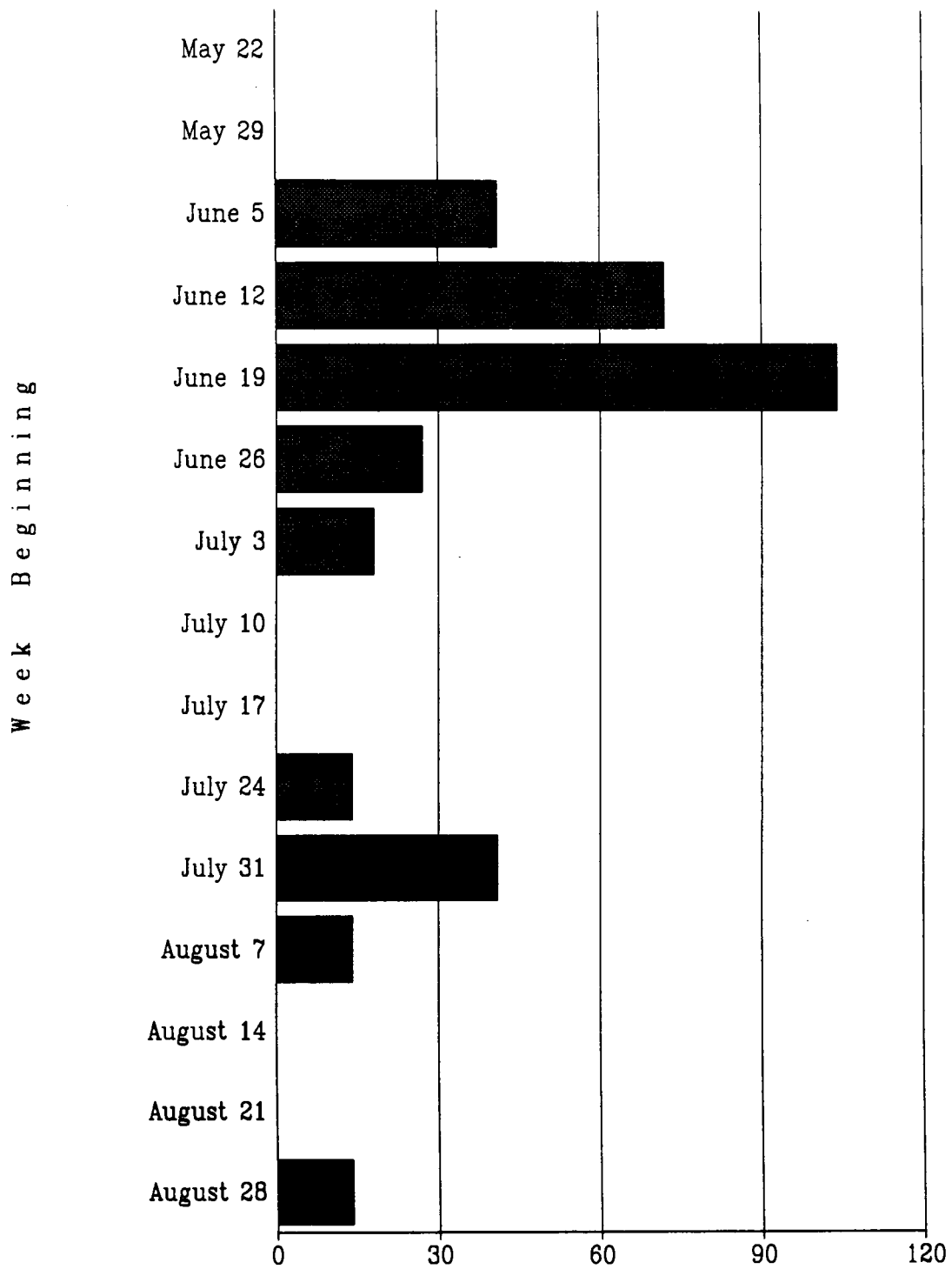


FIGURE DESH-6. Number of People Beginning Trips from Amber Lake.



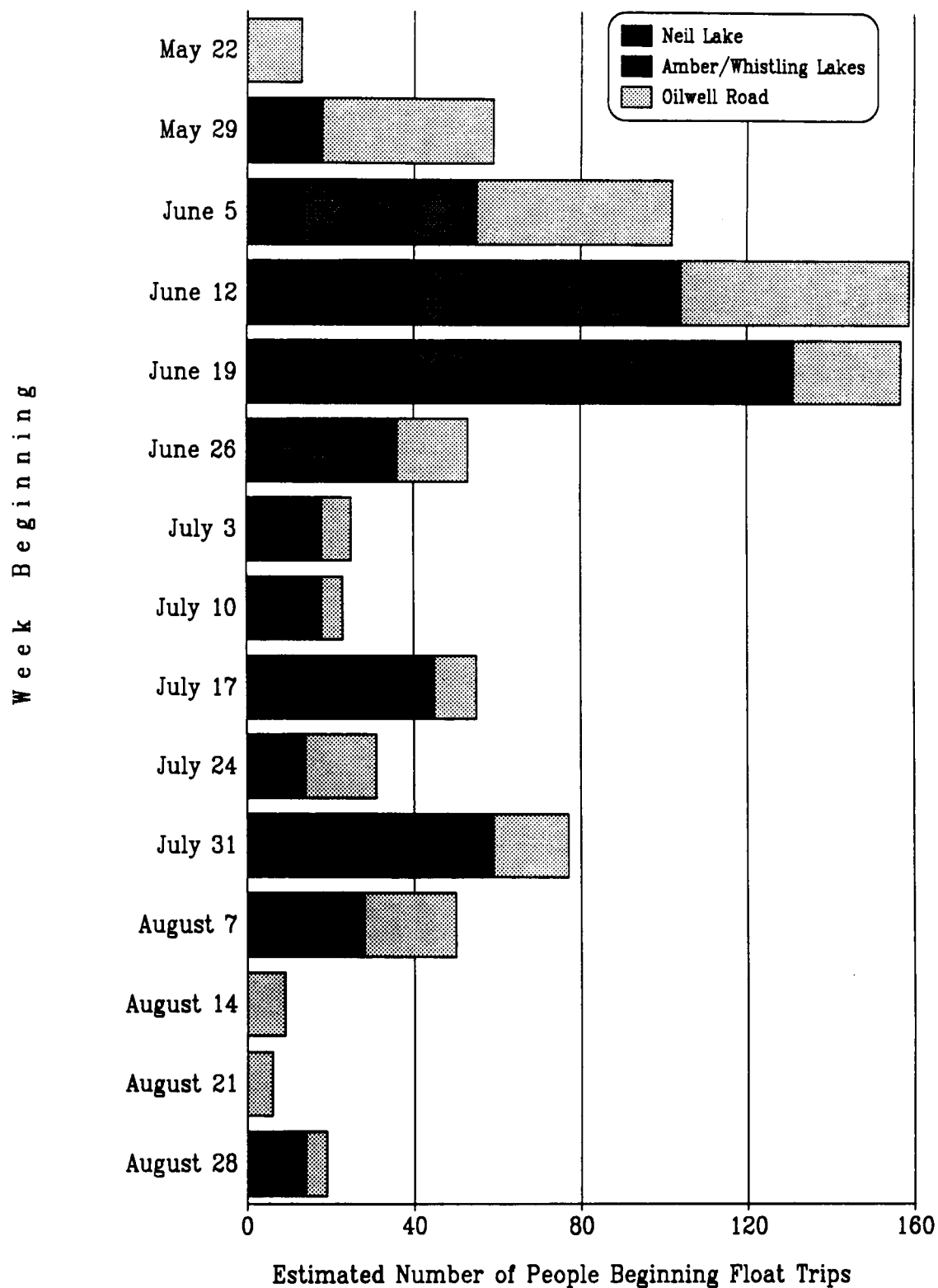
Estimated Number of People Beginning a Float Trip Here

Summary of Deshka River (Moose Creek and Kroto Creek) Floating Use

Figure DESH-7 summarizes combined floater use totals for each week from Neil Lake, Oilwell Road, and Amber/Whistling Lakes. The information suggests the following conclusions:

- * Floaters follow the general pattern seen for Deshka River users as a whole, indicating salmon fishing opportunities are very important to floaters.
- * 100 percent of Neil Lake floaters take out at the Deshka mouth.
- * 96 percent of Amber/Whistling Lakes parties take out at Neil Lake; the remaining four percent float to the mouth.
- * 71 percent of Oilwell Road trips take out at the mouth. The remaining 29 percent take out at Neil Lake.

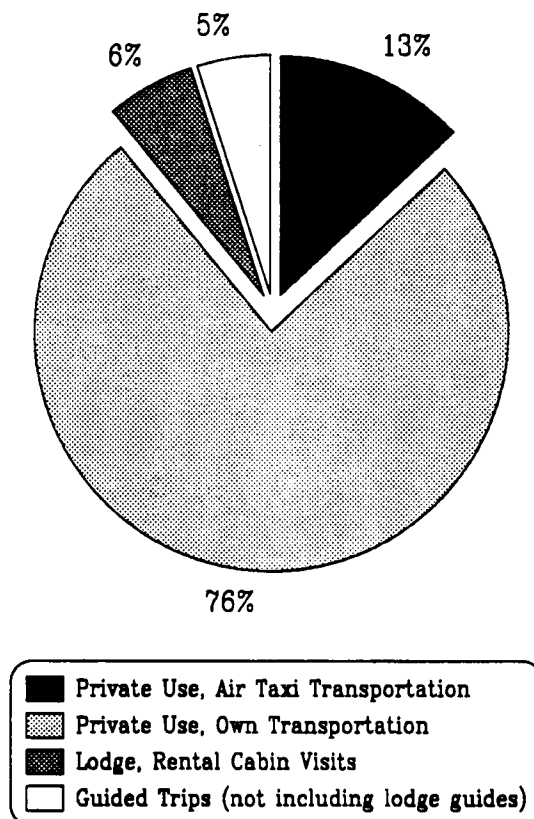
FIGURE DESH-7. Percentage of Float Trips Beginning at Neil Lake, Amber/Whistling Lakes, and Oilwell Road.



COMPARING COMMERCIAL AND PRIVATE RECREATION USE

Figure DESH-8 shows the estimated percentage of person-days by type of private and commercial use for the May 15 through September 3, 1989, season. Tables D-4 and D-5 provide further details about commercial and private use.

FIGURE DESH-8. Proportions of Private and Commercial Use.



Data suggest two conclusions.

- * Approximately 89 percent of total use is private. About 15 percent of private users are transported by air taxi and 85 percent furnish their own transportation.
- * About 11 percent of total use depends on commercial facilities or services, such as lodges, rental cabins, or outfitter-guides.

Commercial Use

Table D-4 shows reported and estimated commercial use. Commercial use is divided into two categories, lodges and guided trips. Definitions for these two categories are:

Lodge and Rental Cabin visits include commercial lodge visits and visits to cabins owned by air taxi companies. It does not include visits by owners and their invited guests to private cabins.

Guided trips include all trips by charter boat, guided float trips, or any other recreation visit where the participants hired a guide to accompany them.

TABLE D-4. Reported and Estimated Commercial Recreation Use.

	Reported Use		Estimated Use	
	Visits	Person-Days	Visits	Person-Days
Lodges	404	1,401	604	2,096
Guided Trips	675	1,138	1,120	1,889
TOTAL	1,079	2,539	1,724	3,985

Private Recreation Use

Table D-5 gives reported and estimated private recreation use. Private recreation use is divided into two types:

Air taxi transportation includes private users who hire an air taxi to bring them to or from the Deshka River. While on the river these users stay on public land and do not use any commercial guides or lodge services.

Private use, own transportation, refers to private users who are fully self-sufficient. They do not employ air taxi operators, river guides, or lodge operators. Private users who transport themselves to the Deshka River arrive by a variety of means. Some fly their own planes, accompany other private pilots, or arrive via their own boats. The most common launch site is Deshka Landing on the Susitna River, although some large boats cross Cook Inlet from Anchorage's small boat harbor.

TABLE D-5. Reported and Estimated Private Recreation Use.

	Reported Use		Estimated Use	
	Visits	Person-Days	Visits	Person-Days
Air Taxi	298	1,129	1,342	5,081
Own Transportation	136	650	7,187	28,712
TOTAL	434	1,779	8,529	33,793

END NOTES: ASSUMPTIONS AND METHODS**Background**

The basis for the visitor use estimates presented comes from two sources, visitor use reported during the 1989 season which was obtained almost entirely from commercial sources, and Alaska Department of Fish and Game (DFG) aerial counts. Lodges, air taxis, and guides reported a total of 415 separate trips to the Deshka River, involving 1,650 people. Although these trip reports spanned the entire season, they represent only a small portion of total recreation use. The aerial counts measure total use, but only for selected dates early in the season. DFG counts were used to estimate what portion of the total use is contained in the reports, and then adjusted to reflect the estimated total use throughout the season.

Although DFG personnel counted boats, planes, anglers, and non-anglers during their aerial observations, only the boats and planes were used as a basis for estimating total use. Individual people can be easily missed, whereas boats and planes are readily seen and were assumed to be accurately counted. Since nearly all summer visitors to the Deshka River use a boat or plane for transportation, the number of these craft on the river should reflect the number of people present, after making an adjustment for visitors who drive to the recreation river via Petersville Road and Oilwell Road.

Assumptions about Aerial Counts

To use the aerial counts as representative of all people present on a given day, several adjustments were required. The aerial observer flew over at a specific moment in time, yet our objective is to estimate how many people use the recreation river over the course of each day. At any given moment, not all users are on the river. Some have already departed, others have not yet arrived, and others are present but at lodges, cabins or in camp. Visitors are expected to be particularly transient at the mouth, which is quickly accessible via Deshka Landing on the Susitna River. Also, the mouth area contains three lodges and many temporary camps, several of the latter away from the river in the trees. For these reasons, we have estimated approximately one third of all visitors who used the river mouth each day were absent when the count was made. Boats and planes counted between the Susitna River and the Alaska Department

of Fish and Game cabin at RM 1.7 were multiplied by a factor of 1.33. Counts above the cabin were not increased; it was assumed powerboaters above that point who were missed during the count would be covered by increasing the mouth count by 33 percent. Rafters would have been present regardless of when the count was conducted.

Converting the adjusted count of boats and planes into an estimate of the total use required calculating the number of people per craft. A 1984 survey of 8,600 boaters exiting at Susitna Landing found an average of 3.2 people per boat (Howe, 1985). We assumed 3.2 people were present on each boat and plane on the Deshka River and multiplied the adjusted counts by 3.2 to estimate the total number of people present.

Correlating DFG Aerial Counts with Reported Use

A regression analysis was performed to test the correlation between the data sets and to establish a factor for adjusting reported use to arrive at an estimated total use. Figure DESH-9 compares Alaska Department of Fish and Game counts on 18 dates from May 28 through June 28, 1989, with reported use for those same dates. In order for each data set to reflect the same users, trips beginning above the forks were removed from the reported use data base.

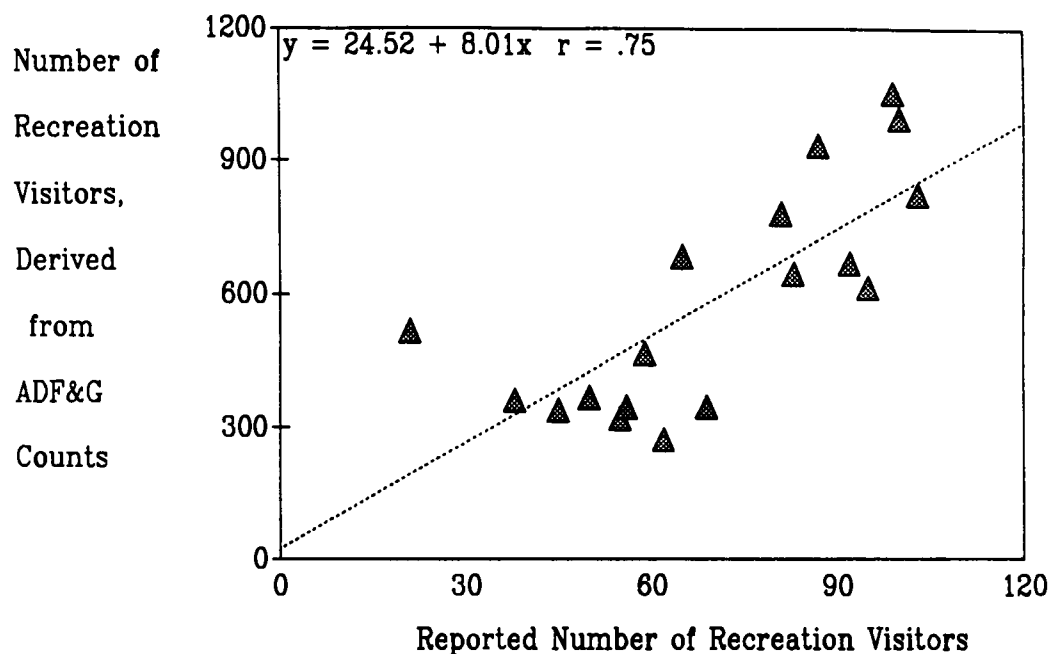
The regression analysis supplied the formula for estimating total use from reported use:

$$y = 24.52 + 8.01x$$

where y is total estimated people present on a given day,
and x is reported people present on that day.

This equation, with the modification discussed below, was used to make the seasonal overview graph and the estimate of total person-days. The correlation between the two data sets for the Deshka River is not as close as for Alexander Creek. On some days, our estimates were off by as much as 100 percent. However, the points for Figure DESH-9 are distributed both above and below the line, suggesting that while results for individual days may be inaccurate, the overall seasonal use estimate is reasonably correct. Actual person-days on the Deshka probably did not vary more than 25 percent from the total person day estimate presented.

FIGURE DESH-9. Correlation between DFG Counts & Reported Recreation Use.



Estimating Total Use

Since use above the forks had been excluded, it had to be factored back into the total use equation. The only above-forks use we are able to estimate at this time originates at two locations: Oilwell Road and Amber/Whistling Lake. To estimate Oilwell Road use, a visitor register was installed on Moose Creek at the end of Oilwell Road in mid-June 1989. A total of 29 parties registered on 10 different dates from June 15 through June 30. On or about this time the register was vandalized and ceased to be used. Total visitors per day was estimated for each of the 10 days with reported use. The regression equation was performed on the overall Deshka reported use (minus Oilwell Road reported use) for the same 10 dates. The two numbers were then compared. The steps in this process are summarized below.

1. The following assumptions were made about visitor registrations and about the trips being reported:

50 percent of all float parties registered. Floating registrations were multiplied by two for an estimated total.

15 percent of non-float parties registered. Non-floating registrations were multiplied by 6.66 for an estimated total.

Floaters are above the forks for two days. To estimate total number of Oilwell Road floaters above the forks on a particular day, launches from the preceding day were added to total estimated launches on that day.

The assumptions about the percentage of each type of user who registered is that the longer the distance covered in the trip, the more likely visitors were to use the register. While studies conducted outside Alaska show recreation visitor registers are generally used by only 10 to 15 percent of visitors to a site, we felt there was a high rate of compliance among floaters while the Oilwell Road register was functional.

2. After performing the above calculations on the visitor register information, the totals for each of the 10 dates were compared to total estimated use. On the average, estimated Oilwell Road use was 17 percent of estimated total use. The regression formula was adjusted accordingly, so the final formula for calculating estimated total number of people per day on the Deshka River became:

$$\text{total number of people present} = [(\text{those reported present} \times 8.01) + 24.52] \times 1.17$$

This formula was then applied to all the use reports from the Deshka River, exclusive of Oilwell Road. The results are shown in the seasonal overview, Figure DESH-1.

No further adjustments were made in the calculations for Figure DESH-1 to account for Amber/Whistling Lake use. However, our data base included a seasonal total of 25 trips to Amber or Whistling Lake, involving 76 participants, all engaged in float trips. This information was left in the data base and was considered adequate to account for use at those lakes. Different methods were used to calculate Oilwell Road use, since vandalism of the register box caused a huge gap in reported trips.

Weekday/Weekend Variations

Data used to compare weekday/weekend variations in visitor numbers, Figure DESH-2, was modified to account for a weakness in reported use. Essentially all the reported use came from businesses, primarily guides, lodges and air taxis. We estimate 76 percent of Deshka River use is from self-sufficient private parties who do not use any commercial lodging or transportation. Alaska Department of Fish and Game aerial counts generally show substantially more users on weekends as compared to weekdays. Private use definitely increases on weekends, but is not reflected in the data base because of the data's commercial origin. To correct for this deficiency in the database, the following steps were taken:

1. We used as a base the average people per day for each of the four weeks of peak use. (This average was calculated by performing the regression equation on reported use and is shown in Figure DESH-1).
2. Then we looked at DFG boat counts conducted during the same period, and performed the following calculations for each of the four weeks:
 - a. Average the weekday boat counts.
 - b. Average the weekend boat counts.
 - c. Find the overall average for the week, through the following equation:
$$[(\text{average weekday count} \times 4) + (\text{average weekend count} \times 3)] \text{ divided by } 7 = \text{overall weekly average}$$

- d. Compare the overall weekly average with the separate averages for weekdays and weekends; express the weekday and weekend averages as a percent of the overall average.
3. Multiply the average people per day (discussed in step 1), by the weekday and weekend percentages discussed in step 2.

As an example, for the week of June 12, analysis of DFG counts showed weekday use averaged 90 percent of the overall weekly average; weekend use averaged 115 percent. From Figure DESH-1, we took the average number of people per day for the week (935) and multiplied it by .90 and 1.15. The result, 842 people per weekday and 1,075 people per weekend day is shown in Figure DESH-2.

Manipulating the data in this way produces more accurate results than using the daily averages calculated by performing the regression equation on our reported use database. Using the results from the latter method shows some similarity to Figure DESH-2. Within weeks, the general relationship between weekdays and weekend days remains the same. That is, within weeks, both results show the greater number of people present during the same period: weekends for the first three weeks, and weekdays for the final week of peak use. However, Figure DESH-2 shows more substantial increases in use on weekends, which we believe more closely conforms to reality. Figure DESH-2 results in three weekends showing the highest use (more than 900 people per day), while using a regression equation does not provide the same results.

Estimating Use by Trip Category

There is little scientific basis for separating total estimated use into use categories. To arrive at the trip start estimates shown in Figures DESH-3 through DESH-7, assumptions were made about the relative amount of each type of use reported, based on familiarity with the river and familiarity with the reported use database.

Trip Starts from the Mouth of the Deshka River

For Figure DESH-3, it was assumed a much lower percentage of day use and overnight public land use was reported compared to private facility use. The basis for this assumption was that use reports were received from two of the three lodges in the area and from air taxis with overnight lodging accommodations. In contrast, no private use at the mouth was reported, which would almost all be either day use or overnight public land use, with some private cabin visits.

The following steps were used to break down the estimated total person-days for the season.

1. Divide estimated total person-days of 37,778 by 1.17, to remove the use assumed between the forks and Oilwell Road. The result is 32,289 person-days.
2. Determine the percentage of the remaining person-days believed to have started from the mouth versus other locations. The Alaska Department of Fish and Game aerial counts are broken into five subunits. Although called by different names, they correspond to the following five subunits discussed in this report: mouth area, lower Deshka, middle Deshka, Neil Lake area (minus Neil Lake itself), and the forks. We tallied the number of powerboats

and rafts found in each subunit on 18 different dates. We assumed all powerboats as far upstream as the Neil Lake subunit (Trapper Creek to Neil Lake) started from the mouth. We assumed all rafts, regardless of location, and all powerboats above Neil Lake started from a location other than the mouth. We compared these two tallies and found the tally of those assumed to be starting from the mouth averaged 82 percent of the total tally. We then multiplied 32,289 person-days by .82, to estimate the percent starting from the mouth. The result is 26,477 person-days.

3. Subtract the lodge and private cabin person-days. Since we had good estimates on private facility-based visits, we deducted that use from the total. We assumed the use at the unreported lodge equaled the average use reported from the other lodges. The total of the estimated lodge guests plus the air taxi visitors was then multiplied by a factor of 1.1, to account for private cabin visitors. The resulting private facility based person-days totaled 1,928. This was deducted from the results of step 2 to arrive at an estimated total person-days attributable to day and overnight public land use: $26,477 - 1,928 = 24,549$.
4. Determine how many person-days are attributable to each activity. The user survey results (NPS, 1990) indicate that of the powerboaters who did not depend on commercial facilities, 69 percent camped overnight, while 31 percent were day-users.

$$.69 \times 24,549 = 16,939 \text{ person-days of overnight use}$$

$$.31 \times 24,549 = 7,610 \text{ person-days of day use}$$

5. Determine reported person-days for each of the two activities: A reported 449 overnight person-days occurred, plus 671 day-use person-days.

6. Determine factors for increasing reported use:

$$16939/449 = 37.73 \text{ (factor for overnight use)}$$

$$7610/671 = 11.34 \text{ (factor for day use)}$$

7. Determine factor for private facility based use (See step 3 above) by dividing estimated total by reported total:

$$1,928/1248 = 1.54 \text{ (factor for private facility based use)}$$

8. Multiply the number of reported weekly trip starts in each category by the selected factor. Results are in Figure DESH-3.

Trip Starts from Neil Lake

Figure DESH-4 displays trip starts from Neil Lake. As discussed above, it was assumed 82 percent of Deshka River users began their trip at the mouth. Of the remaining 18 percent, it was assumed roughly half, or 9 percent, started from Neil Lake. The following steps were performed to estimate Neil Lake trip starts:

1. Determine Neil Lake estimated total person-days:

$$32,289 \times .09 = 2,906$$

2. Determine factor for increasing reported use to estimated use by dividing estimated person-days by reported person-days:

$$2,906/645 = 4.5$$

3. Multiply the number of reported weekly trip starts in each category by the selected factor. Results are shown in Figure DESH-4.

Trip Starts from Oilwell Road

Figure DESH-5 displays estimated trip starts from Oilwell Road. DFG counts covered the entire Deshka River main stem but stopped at the confluence of Moose Creek and Kroto Creek. No counts were made of users at Oilwell Road. The basis for estimating use at Oilwell Road is explained earlier in this section under "Estimating Total Use." The following steps were used to produce the data in Figure DESH-5:

1. Break Oilwell Road person-days into trip categories. We used the person-days reported in the visitor register and multiplied the person-days by either 2 or 6.66, depending on the use category.
2. It was assumed all of the visitors, except float trip participants, remained above the forks throughout their visit. The average trip length reported by floaters was six days; it was assumed they were above the forks on the first two days. To deduct floating person-days occurring below the forks (and already counted in overall visitor use) the floating person-days were multiplied by 0.33.
3. Determine total person-days above the forks which originated at Oilwell Road, and calculate the percent of total represented in each use category. The results were as follows:
 - * day-users made up 3 percent of person-days originating at Oilwell Road
 - * floaters generated 24 percent
 - * overnight campers were responsible for 71 percent
 - * private facility-based users accounted for 2 percent of the total
4. To generate the number of trip starts from Oilwell Road, Figure DESH-5, the person-days had to be changed into visits. For day users, person-days and visits are the same number, since the length of stay is one day each. Float trip person-days were multiplied by a factor of 0.5, since they are assumed to be above the forks for two days. Information from the Oilwell Road visitor register indicated overnight visitors stayed an average of four days, while private facility-based users stayed an average of three days. Those person-days were therefore multiplied by 0.25 and 0.33, respectively, to estimate total visits.

5. Finally, the percentages generated in step 3 were each multiplied by .17, to determine what portion of the total Oilwell Road use they represented. The result is a factor by which total estimated Deshka River use is multiplied to arrive at the number of people starting trips in each category from Oilwell Road. Here are the results of steps 4 and 5:

- * day trips = $.03 \times .17 = .0051$ of total use
- * float trips = $(.5 \times .24) \times .17 = .0204$ of total use
- * overnight trips = $(.25 \times .71) \times .17 = .0302$ of total use
- * private facility-based trips = $(.33 \times .02) \times .17 = .0011$ of total use

The Oilwell Road conclusions presented in Figure DESH-5 must be considered extremely tentative for several reasons. First, only 29 use reports are available for roughly a two-week period, representing a very small fraction of estimated total use. Because of the small sample size, each individual trip report carries great weight. There are potential problems with assuming Oilwell Road use remains a constant 17 percent of overall use throughout the summer season. Since most floaters are interested in catching salmon below the forks, floating use could be reasonably expected to roughly mirror use on the Deshka as a whole. However, the same may not be true of day users and overnight campers, who remain on-site at Oilwell Road, where fishing regulations prohibit catching salmon. Use by these groups may not mirror use on the remainder of the Deshka.

Trip Starts from Amber/Whistling Lakes

All use reports beginning from Amber/Whistling Lakes were float trips, shown in Figure DESH-6. While other uses occur, these could not be estimated for lack of information. Reported float trips were multiplied by the same factor used for Neil Lake (4.5).

Summary of Float Trip Starts from All Locations

Figure DESH-7 is a summary graph of estimated float trip starts, and shows the combined totals from Figures DESH-4, DESH-5, and DESH-6.

Private and Commercial Use

The following steps were taken to calculate the numbers used in Tables D-4 and D-5 and Figure DESH-8:

1. **Determine air taxi usage.** Air taxis transport the majority of visitors to Neil Lake and Amber/Whistling Lakes. Since reported use at these two locations was multiplied by 4.5 to estimate total use, the same factor was used to increase reported air taxi use at all locations.
2. **Determine guided use.** In the survey of users (NPS 1990), 5 percent of respondents reported using guide services. Five percent of total estimated use is $37,778 \times .05 = 1889$ person-days.
3. **Determine lodge and rental cabin use.** Multiply use reported for all locations by 1.5, the same factor used for Figure DESH-3.

4. Sum total visitor days attributed to air taxis, guides, and rental accommodations, subtract that total from the total estimated person-days of 37,778. Assume that the balance is private use, own transportation.

PROJECTING FUTURE USE

Estimates of use in subsequent years may be projected by combining data from these 1989 seasonal use estimates and previous DFG statewide angler surveys. Because the DFG statewide angler survey has been conducted annually since the mid-1970's, it is the best source for evaluating visitor use trends on the Talachulitna River. However, since the survey reports only the overall angling use estimates for each year our 1989 seasonal estimates may be used to distribute use over the June through September period.

We have projected use from June through September 1990 by using our 1989 seasonal use estimates and applying a growth rate derived from the statewide angler survey, as provided below.

The Alaska Department of Fish and Game (DFG) estimates total fishing use on the Deshka River has been on a general upward trend for the 12 years from 1977 through 1988 (Department of Natural Resources (DNR) 1989c). During this entire period, use has grown by an estimated 734 percent, or an average increase of 68 percent per year. Estimated growth, however, has not been steady. Some general conclusions from this data are as follows:

- * Most of the estimated growth occurred in the first two years, 1977-1979.
- * From 1979 through 1988, visitor use has grown by an estimated 141 percent, or an average of 15.6 percent per year.
- * During the last three years, the growth curve has flattened even more, averaging about 3 percent per year.
- * At this rate of growth, using 1989 estimates as a base, projected use in 1990 will be approximately 38,900 person-days.

Considerations for Modeling Future Use Trends

Visitor use on the Deshka is about 23 percent of the total recreation use on all six rivers studied. The Little Susitna receives 36 percent of the recreation use. None of the other rivers with receive more than 14 percent of the total recreation use.

Growth of recreation use on the Deshka River appears to be leveling off in comparison to other Susitna Basin rivers. This may be related to perceived crowding on the river; while many users continue to go to the Deshka, others are displaced by the changing conditions. As on the other recreation rivers, several other factors figure strongly in use fluctuations from year to year, including the Alaska economy, the number of salmon returning, changes in fishing regulations, fishing opportunities on other rivers, and weather conditions.

Considerations for Modeling Seasonal Distribution of Use

Visitor use during the 1989 season was probably typical for general timing of the use peaks corresponding to the two salmon runs. However, the 1989 season included unusually adverse weather which is believed to have caused August recreation use to be lower than usual. Low cloud ceilings forced the cancellation of many air taxi flights. Also, anecdotal evidence indicates fishing quality declines with poor weather, or at least many users prefer not to fish during hard rains when the rivers are cloudy.

The 1989 visitor use season could be characterized as "typical" through the last week of July, and projections of use in future years can be made with some confidence. However, August 1989 use estimates are probably lower than average, due to poor weather.

Talkeetna River

1989 Visitor Use Estimates

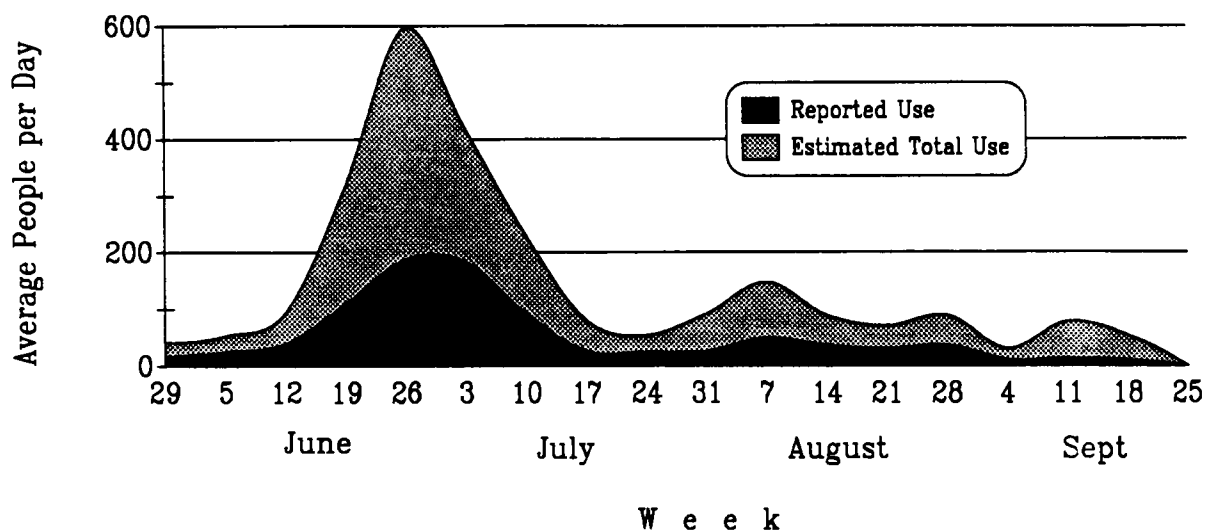
These estimates of Talkeetna River recreation use were derived by comparing 1987 data on launches and camping at Talkeetna City Boat Launch with 1989 visitor use data obtained from a self-service visitor register at the launch site and data reported by fishing outfitter-guides and riverboat services.

The last section of the chapter, "End Notes," contains details about the methods used to convert reported recreation use to estimated total use.

SEASONAL OVERVIEW

Figure TALK-1 displays the estimated average weekly visitor use for the 1989 season. Reported use comes from the self-service registers at the Talkeetna Boat Launch and from outfitter-guides and lodges. Estimated use is based on reported use after adjusting for 1987 launch data, the latest available.

FIGURE TALK-1. Seasonal Overview of Talkeetna River Recreation Use, 1989.



The summer season on the Talkeetna River is essentially late May through Labor Day weekend. Visitor use peaks during late June and mid-July in response to the migration of the king salmon and then drops precipitously. While use rises slightly again in early August, unlike the other recreation rivers, the Talkeetna River does not exhibit much activity during the silver salmon run. Also unlike the other recreation rivers, reliable data for the Talkeetna River was available through the month of September, which is reflected in Figure TALK-1.

Figure TALK-1 does not include visitor use information for the portions of Clear Creek upstream of its confluence with the Talkeetna River. However, it is believed that almost all use on upper Clear Creek is by property owners.

Highlights of the seasonal overview estimates are as follows:

- * The highest use corresponded to the peak of king salmon season during the week of June 26. The average use during this time was 595 people/day.
- * A second peak corresponded to the silver salmon run during the week of August 7. The average use during this week was 147 people/day.

- * Total visitor use was estimated at 16,660 person-days from May 15 through September 3 and 17,954 person-days¹ through September 30.
- * Based on the average trip length of 2 days, the number of separate visits is estimated at 7,330 and 8,977 visits, respectively, for the two periods.

VARIATION IN WEEKDAY/WEEKEND USE

The primary factor determining the number of people per day seems to be fishing success. Day of the week² is a secondary, though important, factor. When "the kings are in," people are on the Talkeetna River. The highest use of the season is estimated to have occurred during the 1989 Fourth of July holiday, the weekend of June 30-July 2, with an average of 874 people per day.

FIGURE TALK-2. Variation in weekday/weekend visitor use on Talkeetna River.

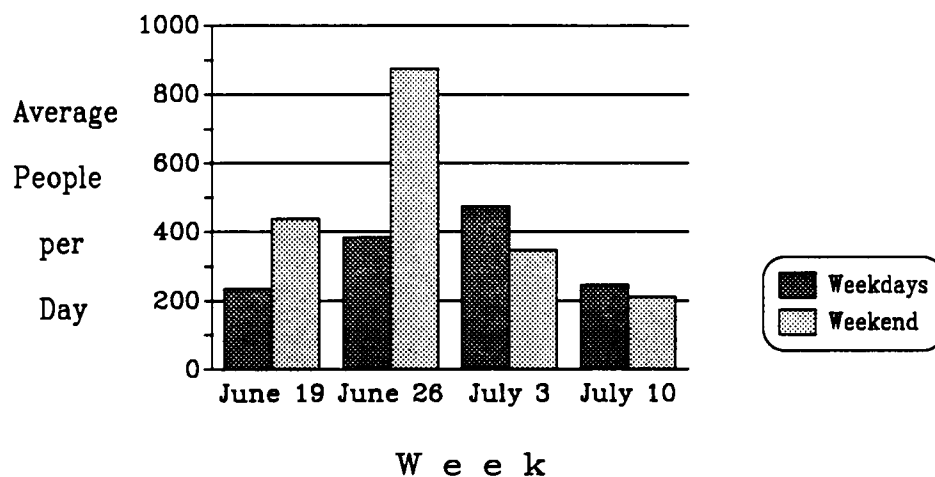


Figure TALK-2 shows much higher use on weekends during the king salmon run, including the July 4th weekend, when visitor use peaks. Yet as visitor use begins to decline in response to the salmon run, each period shows progressively less use, regardless of whether it falls on a weekend or a weekday. During the remainder of the summer, weekday use averages an estimated 64 percent of weekend use. Overall, weekend use is probably higher than weekday use, although during the peak use periods, differences are slight.

¹ A person-day is one individual engaging in recreation for any portion of a 24-hour day.

² Monday through Thursday are considered weekdays. Weekends are Friday, Saturday, and Sunday.

VISITOR USE BY RIVER SUBUNIT

Reported use included information about the type, timing and location of trip starts. While limitations of the data preclude definitive estimates of total person-days spent within each river subunit, it is possible to estimate the proportion of use which begins within each subunit and to characterize the type of use by subunit. Figures TALK-3 and TALK-4 give the number of trips beginning on the Lower Talkeetna River or above Iron Creek, respectively for four trip types as defined in the introduction to this chapter. The graphs suggest the following conclusions about use by river subunits:

Lower Talkeetna River

Most people present on a given day are congregated at the mouth of Clear Creek, a favorite fishing location. Moving upstream, progressively fewer users are found. The vast majority of private parties stay below Disappointment Creek. Above Iron Creek, rafters and kayakers are the only recreation users generally present.

It is estimated the Lower Talkeetna River has visitor use of about 17,249 person-days from late May through September. Figure TALK-3 shows the estimated number of people beginning a trip on the lower river each week. These visitors arrive by boat, generally launching from Talkeetna City Boat Launch. A few users also travel up from Susitna Landing. Private facility use is underestimated on Figure TALK-3 because no data was obtained about Talkeetna River Lodge visitors, the only commercial lodging establishment on the river. (Currently, the "private facility based" category only includes private cabin users.) It is believed the Talkeetna River Lodge guests have been included with the "day-use on public land" category. While Figure TALK-3 shows estimated total visitation, some public-lands based use would have to be redistributed to the "private facility based" category. Data was insufficient to perform that step when this report was written.

Day users tend to outnumber other use categories. Except for a few trips that put in at Iron Creek, no float trips begin on the lower Talkeetna River.

Upper Talkeetna River (Above Iron Creek)

All reported recreation use on the Talkeetna River above Iron Creek is for float trips. Iron Creek subunit was included, even though trips pass through the lower river, because it seemed useful to represent all float trips on one graph.

The following information on float trip characteristics was obtained from reported use, which was provided by whitewater guide services.

Overall, annual use on this subunit was estimated at 705 person-days in the Talkeetna River canyon. This included the float trip users who put-in upstream of the recreation river boundary.

The average length for float trips was five days, and the average party size including guides was eight people.

FIGURE TALK-3. Number of People Beginning Trips on Lower Talkeetna River.

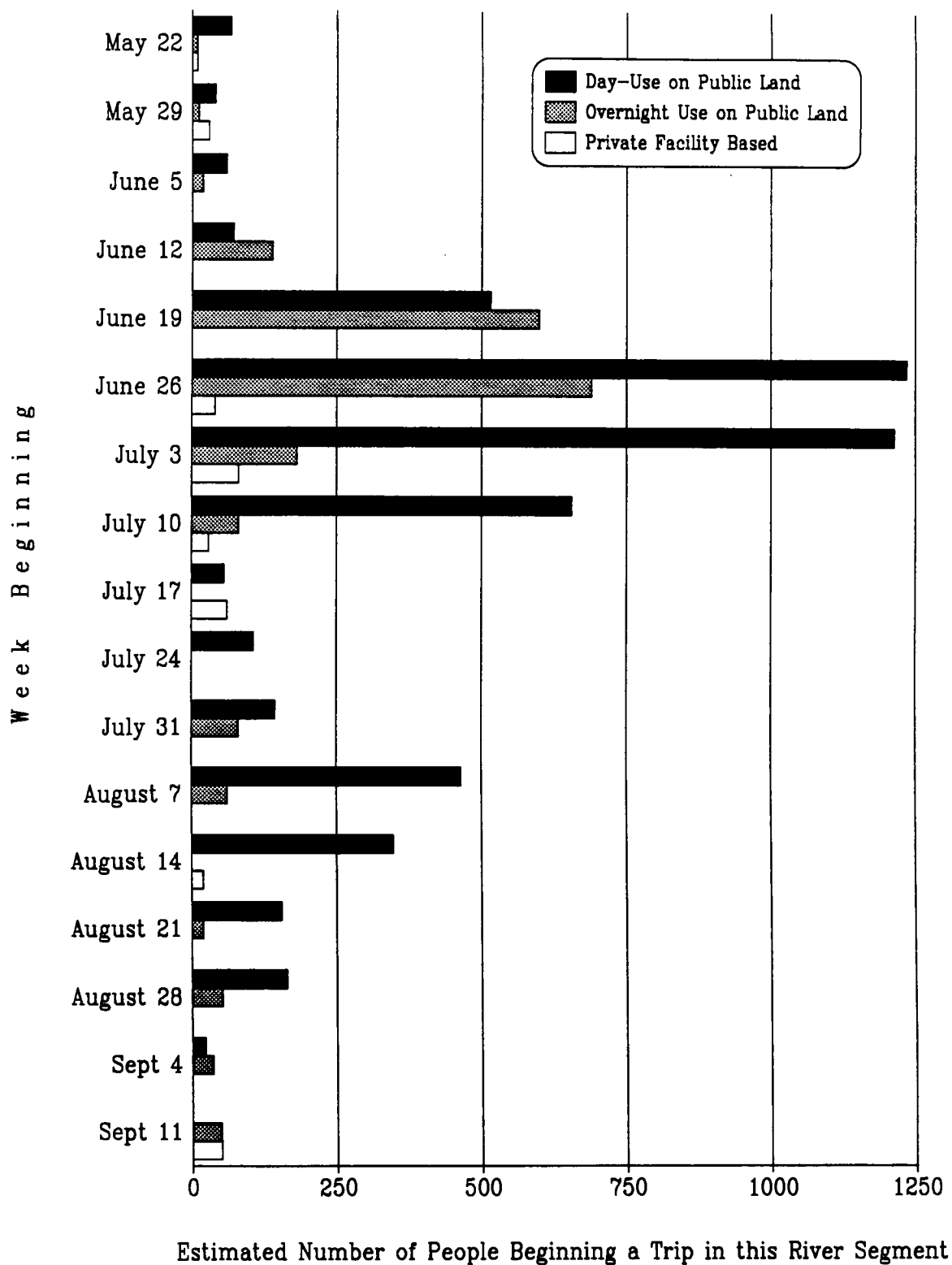
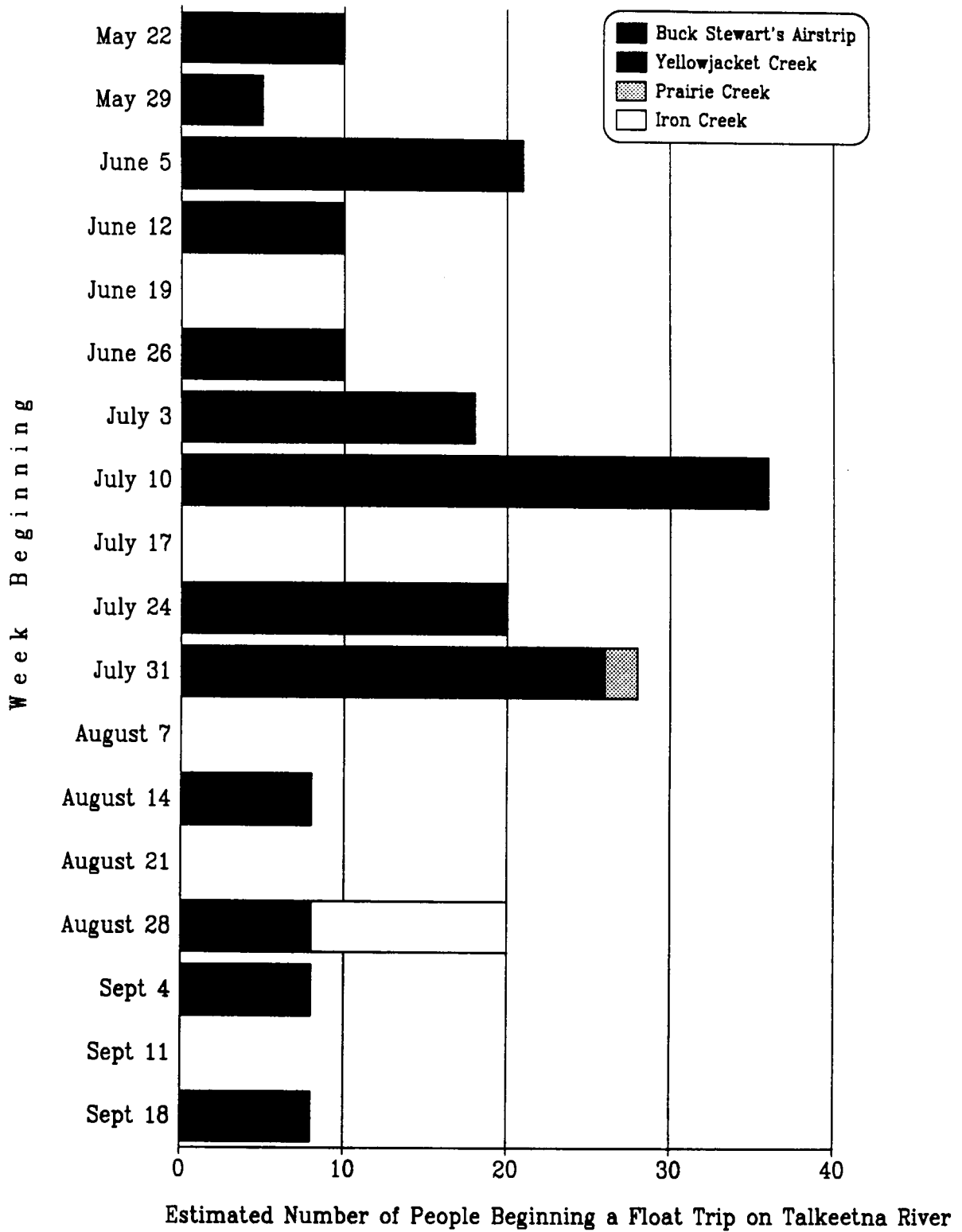


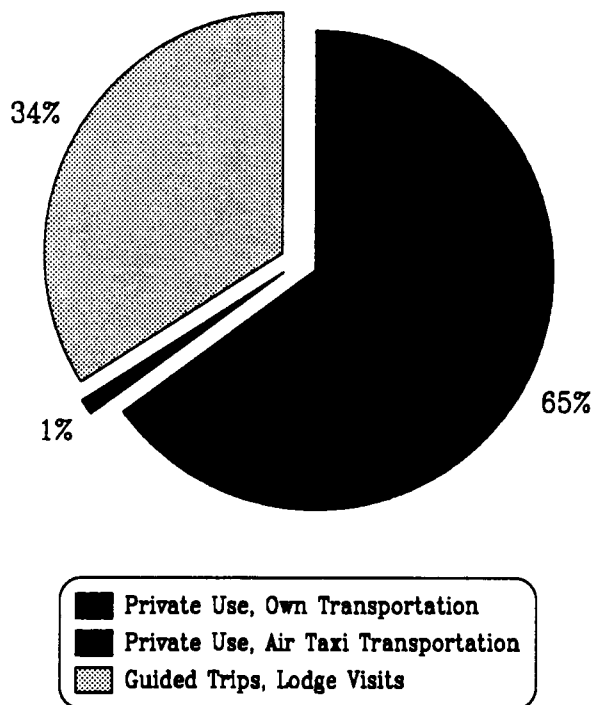
FIGURE TALK-4. Number of People Beginning Trips above Iron Creek (Float Trip Use).



COMPARING COMMERCIAL AND PRIVATE RECREATION USE

Figure TALK-5 shows the estimated percentage of person-days by the types of private and commercial activities for the May 15 through September 30, 1989, season. Tables TK-4 and TK-5 provide further details about commercial and private use.

FIGURE TALK-5. Proportions of Private and Commercial Use.



The data suggest two basic conclusions:

- * Approximately two-thirds of total use is private. Almost all of this is self-sufficient private use. A small minority of private float trip users are transported by air taxi.
- * One-third of the total use depends on commercial facilities or services, primarily fishing guides, riverboat shuttle services and lodges.

COMMERCIAL USE

Table TK-4 shows reported and estimated commercial use for two types of use. Commercial use is divided into two categories - lodges and guided trips. Definitions for these two categories are:

Lodge and Rental Cabin visits include commercial lodge visits and visits to cabins owned by air taxi companies. It does not include visits by owners and their invited guests to private cabins.

Guided trips include all trips by charter boat, guided float trips, or any other recreation visit where the participants hired a guide to accompany them.

TABLE TK-4. Reported and Estimated Commercial Recreation Use.

	Reported Use		Estimated Use	
	Visits	Person-Days	Visits	Person-Days
Lodges	0	0	?	?
Guided Trips	4,482	5,448	4,994	6,073
TOTAL	4,482	5,448	4,994	6,073

Private Recreation Use

Table TK-5 gives reported and estimated private recreation use. Private recreation use is divided into two types as defined below:

Air taxi transportation refers to private users who hire an air taxi to bring them to or from the Talkeetna River. While on the river, these users stay on public land and do not use any commercial guides or lodge services.

Private use, own transportation, includes private users who are fully self-sufficient. They do not employ air taxi operators, river guides, or lodge operators. Private users generally transport themselves by private vehicles to the Talkeetna River and launch their powerboats from the Talkeetna Boat Launch. Some visitors without boats camp at the launch and fish from the banks, while other visitors use ORVs to travel upstream as far as Larson Creek.

TABLE TK-5. Reported and Estimated Private Recreation Use.

	Reported Use		Estimated Use	
	Visits	Person-Days	Visits	Person-Days
Air Taxi	0	0	26	132
Own Transportation	290	1,175	2,895	11,749
TOTAL	290	1,175	2,921	11,881

END NOTES: ASSUMPTIONS AND METHODS**Background**

The basis for the visitor use estimates presented comes from two sources, use reported during the 1989 season from commercial sources and from a self-service visitor register at the Talkeetna City Boat Launch and from the 1987 Talkeetna City Boat Launch statistics. The launch statistics are records of the number of paid launches and the number of camping permits issued during the year, along with the launch operator's estimate of the number of non-paying customers.

Riverboat shuttle services and guides reported a total of 161 separate trips to the Talkeetna River, involving 3,248 people. A total of 66 trips were recorded in the visitor register with 329 participants. The 1987 Talkeetna City Boat Launch statistics were used to estimate the percentage of 1989 visitors using the register. Estimates of total commercial use were based solely on the authors' judgment.

Assumptions About Visitor Register Reports

It is generally accepted among recreation managers that approximately 10 percent of visitors will use a voluntary registration system. Although 10 percent was the assumption used for the Talkeetna Boat Launch register, the 1987 launch statistics were also reviewed to calculate the total estimated use.

Launch operator Aaron Benjamin reported 640 paying launches during 1987, and estimated that there were an additional 5 percent of unpaid launches (Benjamin, personal communication, 1989). The total estimated launches for 1987 would thus be 672. The 66 launches reported in 1989 are approximately 10 percent of the 1987 estimated total launches. That similarity gives further credence to the assumption that 10 percent of visitors use the register, assuming the 1989 season was similar to 1987.

Benjamin also reported that 250 camping permits were issued in 1987. Assuming again that five percent do not pay, that brings the total estimated camping use to 264 parties. A review of the

visitor register showed that no campers without boats registered; everyone reported using a boat to travel upstream. We assumed that 79 parties, 30 percent of the campers, did not launch boats, but fished from the bank. Those 79 parties are 12 percent of the estimated 666 parties assumed to be launching boats, a figure which will be used in the overall use calculations.

Assumptions About Commercial Operators Reported Use

Of businesses using powerboats to transport clients upstream, six riverboat/guiding services furnished use reports. Based on discussions with these operators and other users of the Talkeetna City Boat Launch, it was assumed that these reports represented 97 percent of actual commercial powerboating use.

Four whitewater rafting companies furnished use reports. This information was assumed to be 80 percent of the total floating use.

Estimating Total Use

Based on the estimates explained above, reported use (both numbers of people and person-days) was multiplied by an appropriate factor to equal estimated total use. The following factors were used for each category:

<u>Factor</u>	<u>Category</u>
10.12	Visitor registrations
1.03	Fishing guides/riverboat services
1.25	Whitewater rafting guides

These factors were applied to all the Talkeetna River use reports. The results are shown in the seasonal overview graph, Figure TALK-1.

Weekend/Weekday Variations

No additional assumptions were used to generate Figure TALK-2, depicting weekday/weekend variations in visitor numbers. It was generated by adjusting reported use according to the factors given above. It is possible that there are even stronger variations than our data indicate between weekend and weekday use. This possibility exists because about 91 percent of reported visits came from businesses; yet our estimate is that 65 percent of Talkeetna River use is self-sufficient private parties who do not use any commercial lodging or transportation. Commercial use may be less subject to weekend/weekday fluctuations than is private use.

Trip Starts - Talkeetna City Boat Launch

The same factors used to produce the seasonal overview were used to produce the estimate of trip starts shown as Figure TALK-3. As mentioned in the text, no information was available nor were estimates made regarding the number of guests at the Talkeetna River Lodge. However, it is assumed that these lodge visitors are included in the day-use total, as the riverboat service that transports these lodge guests filed daily reports of drop-offs at Clear Creek.

Float Trip Starts

Figure TALK-4, depicting float trips on the Talkeetna River, was produced by applying the factor of 1.25 to all reported trips. Because of the limitations of this method, there likely were trip starts during some of the weeks where none are shown, and fewer trip starts for some weeks with reported use.

Commercial and Private Recreation Use

The following steps were performed to calculate the numbers presented in Tables TK-4 and TK-5 and Figure TALK-5:

1. Determine air taxi use. Assume that one-half of the float trips thought to be unreported were private parties who used air taxis.
2. Determine guided use by simply adding visits and person-days, using the factors discussed previously to estimate total use.
3. Sum total person-days attributed to air taxis, guides, and riverboat services, and subtract that total from the total estimated person-days of 17,954. Assume that the balance was from private users with their own transportation.

PROJECTING FUTURE USE

Estimates of use in subsequent years may be projected by combining data from these 1989 seasonal use estimates and previous DFG statewide angler surveys. Because the DFG statewide angler survey has been conducted annually since the mid-1970's, it is the best source for evaluating visitor use trends on the Talachulitna River. However, since the survey reports only the overall angling use estimates for each year our 1989 seasonal estimates may be used to distribute use over the June through September period.

We have projected use from June through September 1990 by using our 1989 seasonal use estimates and applying a growth rate derived from the statewide angler survey, as provided below.

The Alaska Department of Fish and Game estimates indicate that the Talkeetna River total fishing use is extremely variable. No observable trend is apparent from the estimates of previous years (Department of Natural Resources (DNR), 1989c), although use which was 3,000 to 5,000 person-days per year in the late 70s is 6,000 to 12,000 person-days today, an increase of between 2 and 25 percent per year. Between 1986 and 1988, use increased at a rate of 16 percent per year, which is among the highest of any recreation river. Based on a 16 percent rate of increase, 1990 visitor use would be about 9,300 person-days.

Considerations for Modeling Future Use Trends

Growth of recreation use on the Talkeetna River appears comparable to other recreation rivers overall, although recent growth in use is higher. Overall, use appears to mirror state population trends, but may also be influenced by the number of salmon returning to the Talkeetna River, changes in fishing regulations, fishing opportunities on other rivers, and weather conditions.

Talkeetna River visitor use makes up about 9 percent of total fishing use on the recreation rivers, according to DFG statewide angler survey data. This is less visitor use than for any of the other five rivers, except the Talachulitna (6 percent), and considerably less than the two road-accessible streams, Little Susitna (36 percent) and Deshka River (23 percent).

Considerations for Modeling Seasonal Distribution of Use

The 1989 season was probably typical for general timing of the visitor use peaks corresponding to the two salmon runs. The 1989 season included unusually adverse weather, however, which is believed to have caused August recreation use to be lower than usual. Wet weather and high water curtailed or prevented many visits. Most gravel bars, the campsites of choice, were submerged. In addition, anecdotal evidence indicates fishing quality declines with poor weather, or at least many users prefer not to fish during hard rains when the water is cloudy.

:

Lake Creek

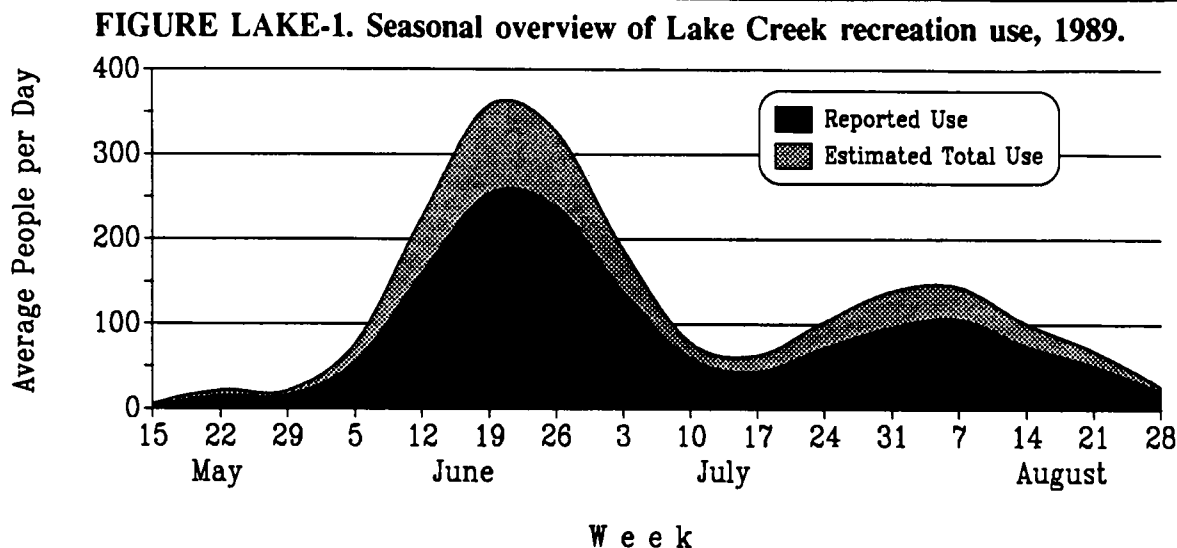
1989 Visitor Use Estimates

These estimates for Lake Creek recreation use were derived from information reported by lodges, air taxis, and guides. Reported use was adjusted to account for the portion of total use believed to be unreported (based on the number of businesses who did not report). Other use information was derived from DFG statewide angler survey data, and on-site creel census data. Data for the summer use period were compared, and mathematical equations were used to calculate estimated use from reported use.

The last section of the chapter, "End Notes," contains the methods used to convert reported recreational use into visitor use estimates. Note that the following information refers to use on Lake Creek during the summer of 1989 only (except where noted).

SEASONAL OVERVIEW

Figure LAKE-1 shows average weekly visitor use levels over the course of the 1989 summer. Reported use comes from lodges, air taxi operators, and outfitter-guides. Estimated use was based on reported use and adjusted for assumed unreported use. DFG data from the statewide angler survey was also considered (See *End Notes* for details.).



The summer season on Lake Creek is essentially late May through Labor Day weekend. Use peaks during the latter half of June, then drops precipitously, followed by a second, smaller peak in early August. These two use peaks correspond to the king salmon and silver salmon runs, respectively. The lull between the two peaks in 1989 corresponded to the July 13th closing date of the king salmon fishing season.

Highlights of the 1989 visitor use estimates are as follows:

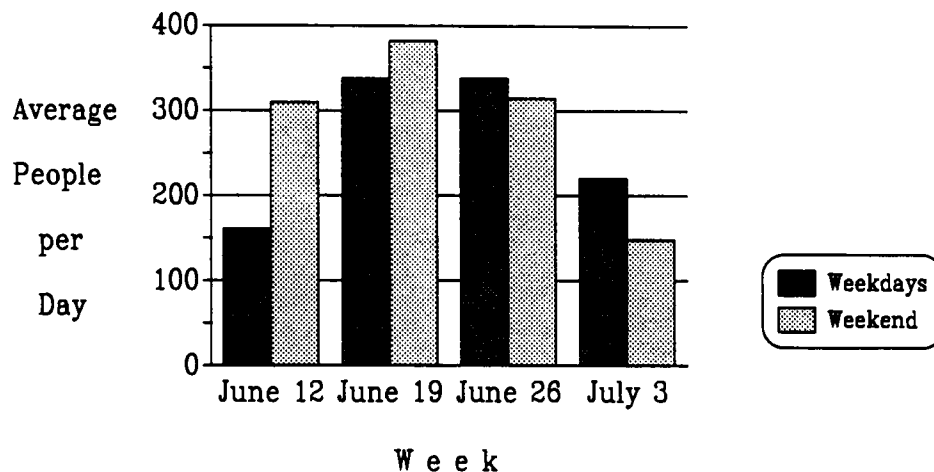
- * The highest visitor use corresponded to the peak of king salmon season during the week of June 19. The average use during this period was 357 people per day.
- * A second peak corresponded to the height of the silver salmon run during the week of August 7. During this period, the average use was 144 people per day.
- * Estimated total use was 14,500 person-days.¹
- * Based on the assumption that average trip length is 4 days, there were an estimated 3,625 separate visits to Lake Creek during 1989.

¹A person-day is one individual engaging in recreation for any portion of a 24-hour day.

VARIATION IN WEEKDAY/WEEKEND USE

The primary factor determining the number of people per day seems to be fishing success. Day of the week² is a secondary factor. When "the kings are in," people are on Lake Creek. Figure LAKE-2 shows variation in weekday and weekend use during the height of the king salmon season.

FIGURE LAKE-2. Variation in Weekday/Weekend Visitor Use on Lake Creek.



The data suggest two general conclusions:

- * The highest use of the season is estimated to have occurred on the June 23-25 weekend, with an average of 382 people per day.
- * Weekend use is not significantly higher than weekday use on Lake Creek during the king salmon season. Use increases and then declines in response to the salmon run, regardless of day of the week.

Figure LAKE-2 is believed to be a fairly accurate portrayal of actual use. Unlike other recreation rivers such as the Deshka River or Alexander Creek, Lake Creek receives relatively little self-sufficient private use. However, because private use is likely to be slightly higher on weekends, there may be some variation which is not reflected in these data. Overall, differences in use between weekends and weekdays are likely to be small.

VISITOR USE BY RIVER SUBUNIT

² Monday through Thursday are considered weekdays; the weekend is defined as Friday, Saturday and Sunday.

Reported use included information about the type, timing and location of trip starts. While limitations of the data preclude definitive estimates of total person-days spent within each subunit, it is possible to roughly characterize use by subunit and type. Figures LAKE-3 and LAKE-4 give the number of starts at the mouth of Lake Creek (Bulchitna Lake downstream) and on Chelatna Lake for each of the four trip types as described in the introduction to this chapter. Information from the graphs below and DFG data suggest the following conclusions about use by river subunits:

Lake Creek Mouth

Most people present on a given day are congregated in the lower three miles of Lake Creek, including Bulchitna Lake. This is an easily navigable subunit and a favorite fishing location, where regulations permit bait fishing, which is prohibited upstream. Moving upstream, progressively fewer recreation users are found. Very few powerboaters venture above RM 6, where Lake Creek begins to get rocky and swift.

Visitors to this subunit arrive primarily by float plane, but also by boat, generally launching from Deshka Landing on the Susitna River. Private facility use includes our estimates of the percentage of guests from lodges near Lake Creek who fish on Lake Creek. A total of 13 establishments were considered to be on or near Lake Creek.

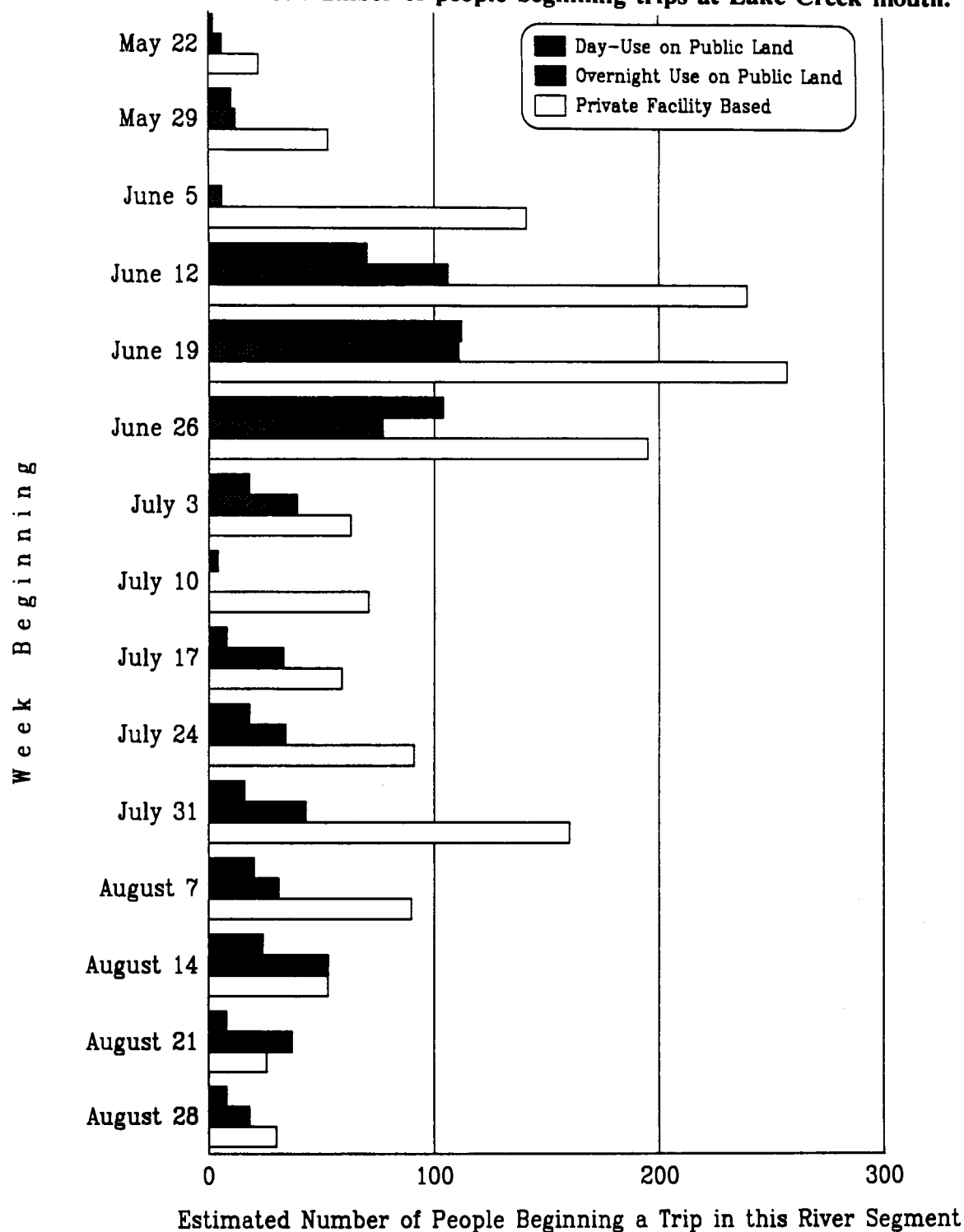
In contrast to use on the other recreation rivers, private facility based users tend to outnumber other categories of users. Except for a few air taxi-packaged trips that put in at Bulchitna Lake, no float trips begin on lower Lake Creek. The short Bulchitna float trip is taken by few parties and has not been included in Figure LAKE-3.

Upper Lake Creek

Between RM 6 and Chelatna Lake the only recreation users generally present are floaters and a few private property owners and other visitors who land by floatplane on nearby lakes.

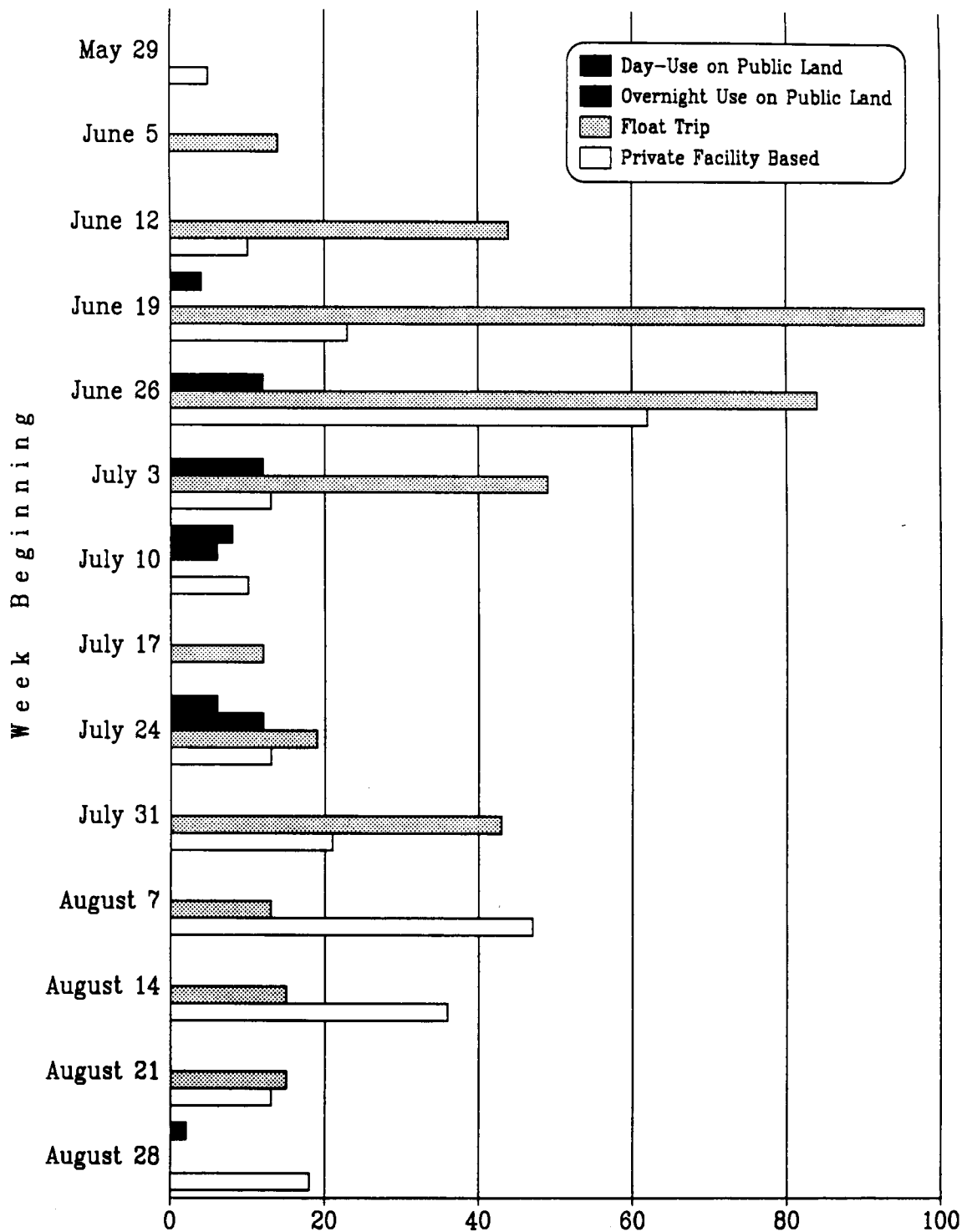
Trip starts in this subunit are negligible compared to the other two and have not been graphed. A few float trip parties (four were reported) launch from the lake at RM 6 and float to the mouth; these are outfitted trips sold by air taxi companies. In addition, a few visitors (mostly private property owners) fly in to Quiet Lake and Martana Lake (only one trip was actually reported). Some of these people walk or drive off-road vehicles (ORVs) to Lake Creek. Although at Shovel Lake there is a cabin constructed by one of the air services, no 1989 use reports were received for Shovel Lake.

FIGURE LAKE-3. Number of people beginning trips at Lake Creek mouth.



Lake Creek Visitor use Estimates

FIGURE LAKE-4. Number of People Beginning Trips at Chelatna Lake.



Estimated Number of People Beginning a Trip in this River Segment

Chelatna Lake

This is the starting point for almost all users floating Lake Creek. Float trip participants outnumber other users on this subunit for most of the season. There is little day use or overnight camping use at Chelatna Lake; most other users are private facility based, a combination of commercial lodge guests and private cabin users.

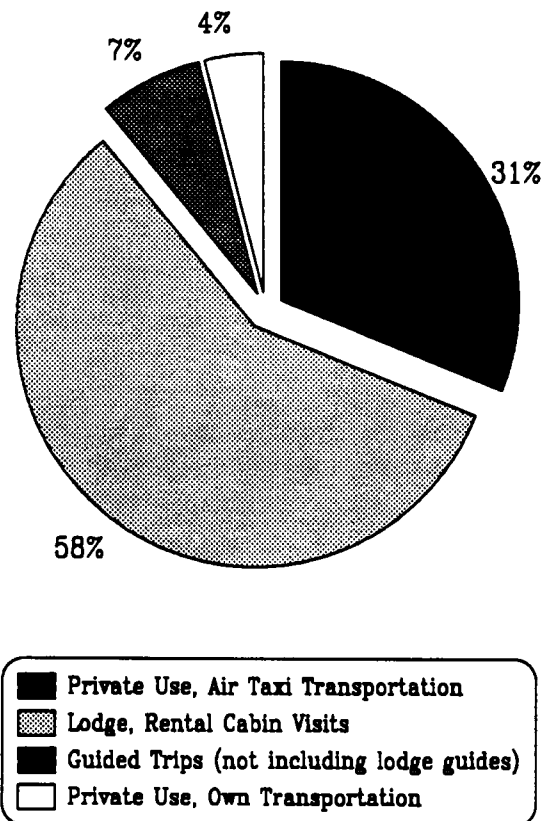
Lake Creek Float Trips

Lake Creek float trips averaged approximately five days; the average party size was five people (including guides).

COMPARING COMMERCIAL AND PRIVATE RECREATION USE

Figure LAKE-5 shows the estimated percentage of person-days by the types of private and commercial activities for the May 15 through September 3, 1989, season. Tables L-4 and L-5 provide further details about commercial and private use.

FIGURE LAKE-5. Proportions of Private and Commercial Use.



Lake Creek Visitor use Estimates

Information suggest two basic conclusions:

- * Approximately one-third of total use is private. Almost all private users are transported by air taxi. A small minority of users are self-sufficient.
- * Two-thirds of total use is dependent on commercial facilities or services, primarily lodges but also fishing and rafting outfitter-guides.

Commercial Use

Table L-4 below shows reported and estimated commercial use. Commercial use is divided into two categories; lodge and rental cabin visits; and guided trips as defined below:

Lodge and Rental Cabin visits include commercial lodge visits and visits to cabins owned by air taxi companies. It does not include visits by owners and their invited guests to private cabins.

Guided trips include all trips by charter boat, guided float trips, or any other recreation visit where the participants hired a guide to accompany them.

TABLE L-4. Reported and Estimated Commercial Recreation Use.

	Reported Use		Estimated Use	
	Visits	Person-Days	Visits	Person-Days
Lodges	1,412	6,088	1,892	8,394
Guided Trips	164	763	233	994
TOTAL	1,576	6,851	2,125	9,388

Private Recreation Use

Table L-5 gives reported and estimated private recreation use. Private recreation use is divided into two types:

Air taxi transportation refers to private users who hire an air taxi to take them to or from Lake Creek. While on the river these users stay on public land and do not use any commercial guides or lodge services.

Private use, own transportation, includes private users who are fully self-sufficient. They do not employ air taxis, river guides or lodge operators. Private users who transport

themselves to Lake Creek arrive by a variety of means. They fly their own planes, accompany another pilot or arrive via their own or a friend's boat. The most common launch site is Doshka Landing on the Susitna River, although some large boats cross Cook Inlet from Anchorage's small boat harbor.

TABLE L-5. Reported and Estimated Private Recreation Use.

	Reported Use		Estimated Use	
	Visits	Person-Days	Visits	Person-Days
Air Taxi	1,012	3,133	1,573	4,519
Own Transportation	25	63	250	630
TOTAL	1,037	3,196	1,823	5,149

END NOTES: ASSUMPTIONS AND METHODS

Background

The basis for the visitor use estimates is 1989 use reported by lodges, air taxis, and guiding services. A total of 708 separate trips to Lake Creek were reported, involving 2,613 people.

Although DFG personnel conducted periodic counts of visitors on lower Lake Creek (DNR, 1989c), these counts were made from a boat rather than an aircraft (Engel, personal communication). Because of the more limited visibility of this method, these counts are considered to be lower than actual use. The visitor counts were reviewed in the hope that a factor could be selected for estimating actual use from the boat counts. It was not possible to ascertain that consistent proportion of actual users had been counted. We decided not to use the counts because on several days for which we had received multiple trip reports the count records showed that no boats had been seen (DNR 1989c). Instead, estimates of total use were made by employing assumptions about reported use, based on the authors' judgment.

Assumptions About Reported Use

First we examined use reports received from five Lake Creek-area lodges. One of these establishments had 268 percent more clients than the lodge with the next highest figures; the data from this lodge were excluded as being atypical. Then the number of clients served by the remaining four establishments were averaged. The average number of clients throughout the summer season was 136 per lodge. We determined there were 13 lodges either at the mouth of Lake Creek or close enough to the mouth that many of their clients were fishing there. There are two lodges at Chelatna Lake, bringing the total for the recreation river to 15. Since five furnished reports, 10 are unaccounted for. Assuming 136 per season per lodge results in the following:

Lake Creek Visitor use Estimates

$$136 \times 10 = 1,360 \text{ unreported lodge guests}$$

Not all of these people actually use Lake Creek. Since almost all the non-reporting lodges are located on the Yentna River, their clients may fish in many other locations besides Lake Creek. It was assumed that for eight of the lodges, one-third of their guests fished Lake Creek on any given day. The other two of the 15 lodges are at Chelatna Lake, so their guests are assumed to be using the recreation river. (Although partial reports of Chelatna Lake lodge use were furnished by air taxi companies, these were incomplete, and the lodges themselves did not provide information.) The following calculation carried out these assumptions:

$$* 1,360 - 272 \text{ presumed at Chelatna Lake} = 1,088 \text{ guests at nearby lodges}$$

$$* 1,088 \times .33 = 359 \text{ guests from nearby lodges who use Lake Creek}$$

$$* 272 - 102 \text{ reported guests} = 170 \text{ unreported guests at Chelatna Lake lodges}$$

$$* 359 + 170 = 529 \text{ unreported lodge guests using Lake Creek State Recreation River}$$

The assumed number of additional lodge guests was then compared to reported lodge guests, which numbered 986.

$$* 986 + 529 = 1,515 \text{ estimated total lodge guests using Lake Creek}$$

$$* 1,515 / 986 = 1.5 \text{ (factor by which reported use must be increased to arrive at estimated total use)}$$

Public land-based reported visits, both day-use and overnight trips, were reviewed, using the lodge guest factor as a guideline. Day trips were believed to be more under-reported than other categories, because day trip information for one of the largest air taxi companies was not available. Therefore, a factor of 2.0 was used to estimate actual day use from reported day use. For overnight trips the same factor for lodge guests, 1.5, was used. To estimate float trips from Chelatna Lake to the creek mouth, we reviewed counts made by Cook Inlet Aquaculture Association personnel as float parties passed by their camp at RM 52.2. For 11 dates in June 1989 we compared the number of float trip participants tallied to the number reported by air taxis and guiding services. On average, the tallies equaled 121 percent of reported use. This figure was increased slightly, assuming that the aquaculture association personnel were sometimes absent from the river bank and thus missed some parties. We selected a factor of 1.25 to estimate actual floating use from reported use.

Estimating Total Use

Based on the assumptions explained above, reported use (numbers of people) was multiplied by an appropriate factor to equal estimated total number of people using Lake Creek. (Person-days were calculated by multiplying the estimated total number of people by the trip length documented in the use reports). The following factors were used for each category:

<u>Factor</u>	<u>Category</u>
2.0	public land based day-users
1.5	lodge guests, private cabin users, and overnight visitors to public land
1.25	float trip participants

These factors were applied to all Lake Creek use reports. The results are shown in the seasonal overview graph, Figure LAKE-1.

Possible Inaccuracies of this Method. It is likely the estimates of total use underestimate the number of people present in the Lake Creek mouth area during the peak of the king salmon season, when fishing success is high. We have assumed that a constant one-third of lodge guests near Lake Creek visited the creek to fish. In reality, it may be a greater number used Lake Creek during the peak use period, identified in Figure LAKE-2.

Weekday/Weekend Variation

No additional assumptions were used to develop Figure LAKE-2, depicting weekday/weekend variations in visitor numbers. It was generated by adjusting reported use according to the factors given above. As mentioned in the text, unlike other recreation rivers such as the Deshka River or Alexander Creek, there is little self-sufficient private use on Lake Creek. Thus, it is unlikely that Figure LAKE-2 is significantly skewed by the absence of these users from the reported-use data base.

Trip Starts at Mouth of Lake Creek

The same factors used to produce the seasonal overview were used for the estimate of trip starts shown as Figure LAKE-3. The number of lodge guests presumed to be at the two Chelatna Lake establishments were subtracted from the weekly totals of private facility-based users.

Trip Starts at Chelatna Lake

Figure LAKE-4, trip starts at Chelatna Lake, was produced in a manner similar to Figure LAKE-3. Reported numbers of lodge guests at the lake were adjusted to conform to the estimate of lodge use discussed previously. Day use, overnight use, and float trip participants were multiplied by the selected factors.

Private and Commercial Use

With one exception, these data were calculated by simply adding visits and person-days, using the factors discussed previously to estimate total use. An exception was made for self-sufficient private use, which was assumed to be grossly under-reported. A factor of 10 was applied to use reports in this category. (This calculation is included in the estimate of total person-days presented previously. It was not included in estimating day use and overnight use for Figure LAKE-2. While these categories in Figure LAKE-2 are therefore slightly under-reported, the weekly difference in numbers of people would be negligible, since self-sufficient private use is still assumed to be a very small fraction of overall use.)

Lake Creek Visitor use Estimates

PROJECTING FUTURE USE

Estimates of use in subsequent years may be projected by combining data from these 1989 seasonal use estimates and previous DFG statewide angler surveys. Because the DFG statewide angler survey has been conducted annually since the mid-1970's, it is the best source for evaluating visitor use trends on the Talachulitna River. However, since the survey reports only the overall angling use estimates for each year our 1989 seasonal estimates may be used to distribute use over the June through September period.

We have projected use from June through September 1990 by using our 1989 seasonal use estimates and applying a growth rate derived from the statewide angler survey, as provided below.

The Alaska Department of Fish and Game (DFG) estimates that total fishing use on Lake Creek has been on a general upward trend for the six years from 1983 through 1988 (Department of Natural Resources (DNR), 1989c). Estimated use has fluctuated in past years. However, some general projections are possible.

- * The average rate of growth from 1983-1988 was roughly 2 percent per year. From 1986 to 1988, use increased at a rate closer to 1 percent.
- * Based on this rate of growth, projected use during the 1990 season will be approximately 16,300 person-days.

Considerations for Modeling Future Use Trends

Growth of visitor use on Lake Creek appears comparable to other Susitna Basin rivers. Increases in use in many ways mirror population trends. Before 1985, use increased dramatically (in excess of 19 percent per year) and since that time has been stable or slowly increasing. Other factors which cause visitor use to fluctuate include the condition of the Alaska economy; the number of salmon returning, changes in fishing regulations, fishing opportunities on other rivers, and weather patterns.

Lake Creek receives about 12 percent of total recreation river use, based on DFG statewide angler survey data. This is slightly less than the percentage received by Alexander Creek (14 percent) and considerably less than that received by the Little Susitna (36 percent) or the Deshka River (23 percent).

Considerations for Modeling Seasonal Distribution of Use

Visitor use during the 1989 season was probably typical for general timing of the use peaks corresponding to the two salmon runs. However, the 1989 season included unusually adverse weather which is believed to have caused August recreation use to be lower than it otherwise would have been. Wet weather and high water curtailed or prevented many visits. Heavy, low cloud cover canceled many float plane flights, the primary means of getting to Lake Creek. In addition, an apparent glacial dam break above Chelatna Lake caused Lake Creek to be unusually

turbid after mid-summer, and many late season anglers apparently chose to avoid the river as a result.

Visitor use during the 1989 season could be categorized as typical through mid-July, and as low for the rest of the season. This should be noted when comparing 1989 to future seasons.

Talachulitna River

1989 Visitor Use Estimates

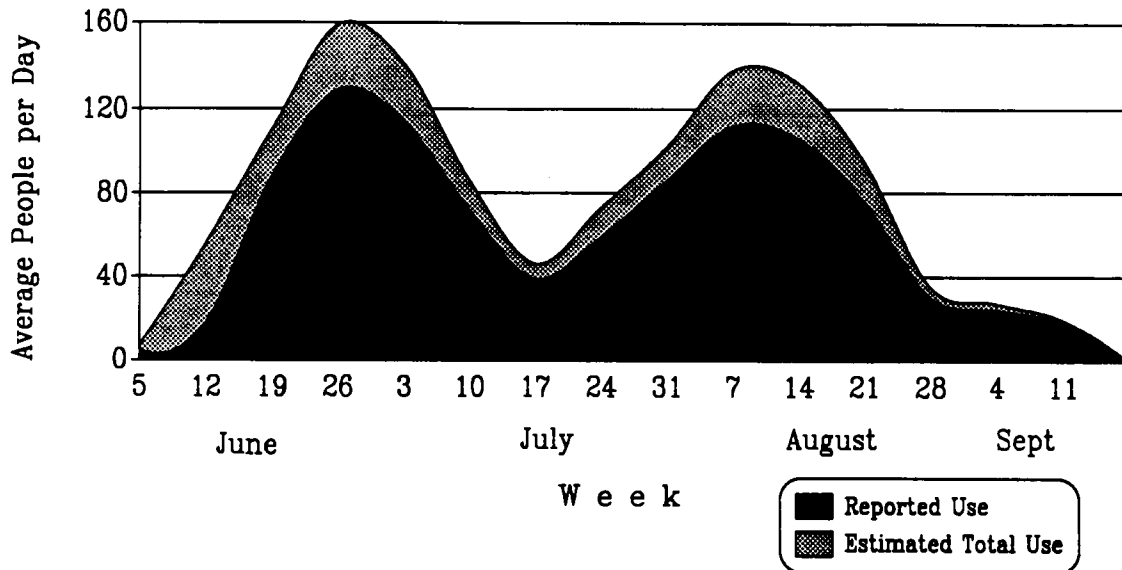
These visitor use estimates for the Talachulitna River were derived from use reported by lodges, air taxis, and guides during the 1989 summer season. Reported use was adjusted to account for the portion of total use believed to be unreported. The information depicted below is the total estimated use on the Talachulitna River for Summer 1989.

The last section of the chapter, "End Notes," contains the methods used to convert reported recreation use into visitor use estimates for the Talachulitna River.

SEASONAL OVERVIEW

Figure TALA-1 shows average weekly visitor use during the 1989 summer season. Reported use comes from lodges, air taxi operators, and outfitter-guides. Estimated use is based on reported use adjusted by a number of assumptions. (See *End Notes*.)

FIGURE TALA-1. Seasonal Overview of Talachulitna River Recreation Use, 1989.



The summer season on the Talachulitna River runs essentially from June through Labor Day weekend. Use peaks during the latter half of June, then drops sharply, followed by a second, slightly smaller peak in mid-August. These two use peaks correspond to the king salmon and silver salmon runs, respectively. In 1989, the lull between the two peaks occurred just after the July 13th close of the king salmon fishing season. The other recreation rivers show much greater use during the king salmon run than during any other period. In contrast, on the Talachulitna the two use peaks are approximately equal. The latter part of the summer is normally considered the best time to fish for trophy rainbow trout. Hunters and some late-season anglers continue to use the recreation river through September.

Highlights of the 1989 visitor use estimates are as follows:

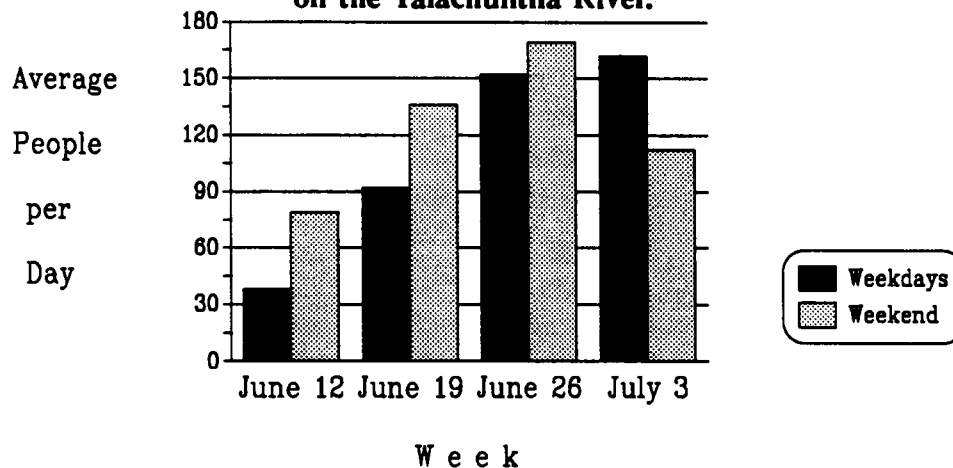
- * The highest visitor use corresponded to the peak of the king salmon season during the week of June 26. The average use during this time was 159 people per day.
- * A second peak corresponded to the height of the silver salmon run during the week of August 7. The average use during this time was 138 people per day.

- * Estimated total use was 8,235 person-days¹ for the period May 15 through September 3, and 8,814 person-days through September 30.
- * Based on the assumption that average trip length is five days, there were an estimated 1,763 visits to the river in 1989.

VARIATION IN WEEKDAY/WEEKEND USE

The primary factor determining the number of people per day seems to be fishing success. Day of the week² is a secondary factor. When the salmon are running, people are on the Talachulitna River. Figure TALA-2 shows variation in weekday and weekend use during the height of the king salmon season.

FIGURE TALA-2. Variation in Weekday/Weekend Visitor Use on the Talachulitna River.



The data suggest two general conclusions:

- * The highest use of the season is estimated to have occurred on the June 30-July 2 weekend (the Fourth of July holiday) with an average of 169 people per day.
- * Use appears to be somewhat higher on weekends than on weekdays, although some weeks show the converse to be true, particularly after the salmon season has begun.

Figure TALA-2 probably portrays actual use accurately. Unlike other recreation rivers such as the Deshka or Alexander Creek, there is little self-sufficient private use on the Talachulitna River. However, because private use is likely to be slightly higher on weekends, there may be some

¹A person-day is one individual engaging in recreation for all or any portion of a 24-hour day.

²Monday through Thursday are considered weekdays; the weekend is defined as Friday, Saturday, and Sunday.

variation which is not reflected in these data. Overall, differences in use between weekends and weekdays is probably small.

VISITOR USE BY RIVER SUBUNIT

Reported use included information about the type, timing, and location of trip starts. While limitations of the data preclude definitive estimates of total person-days spent within each river subunit, it is possible to roughly characterize use by subunit and type. Figures TALA-3 and TALA-4 give the number of starts at Judd Lake and at the mouth for each of the four trip types. The trip types are defined below:

Information from the preceding graphs and DFG data suggest the following conclusions about use within the river subunits:

Mouth of the Talachulitna River

Of all people present on a given day, most are congregated in the lower two miles of the Talachulitna River. Figure TALA-3 shows the estimated number of people beginning a trip on this subunit each week. These visitors arrive primarily by floatplane or by wheel plane at a private airstrip. Similar to the Lake Creek use pattern and contrary to the pattern seen on the other recreation rivers, private facility based users tend to outnumber other categories of users. No float trips begin on the lower Talachulitna River.

Talachulitna River Canyon, Middle Talachulitna River, and Talachulitna Creek

Except at the location generally known as "the midpoint," between the river mouth and Judd Lake, the only recreation users generally present are floaters. The midpoint contains three lodges and several private residences.

No trips begin within the recreation river boundary either in the canyon or on Talachulitna Creek. Trip starts on the Middle Talachulitna River are all private facility based and have not been graphed. The lodges and private residences in the middle river subunit generate an estimated 90 visits and 700 person-days. This figure has potential to increase significantly if additional private holdings are converted to lodges, or if existing lodges decide to pursue a more aggressive marketing strategy. Only two of the three existing lodges operated in 1989.

Judd Lake

Estimated total trip starts at Judd Lake are graphed as Figure TALA-4. Float trip participants and private facility based users greatly outnumber other users.

Talachulitna River Float Trips

The following information on float trip characteristics was obtained from reported use, which was provided by air taxis and whitewater guide services:

- * Average trip length = six days
- * Average party size = five people (including guides)
- * Take-out point: 42 percent at midpoint
 58 percent at mouth

FIGURE TALA-3. Number of People Beginning Trips at the Mouth of the Talachulitna River.

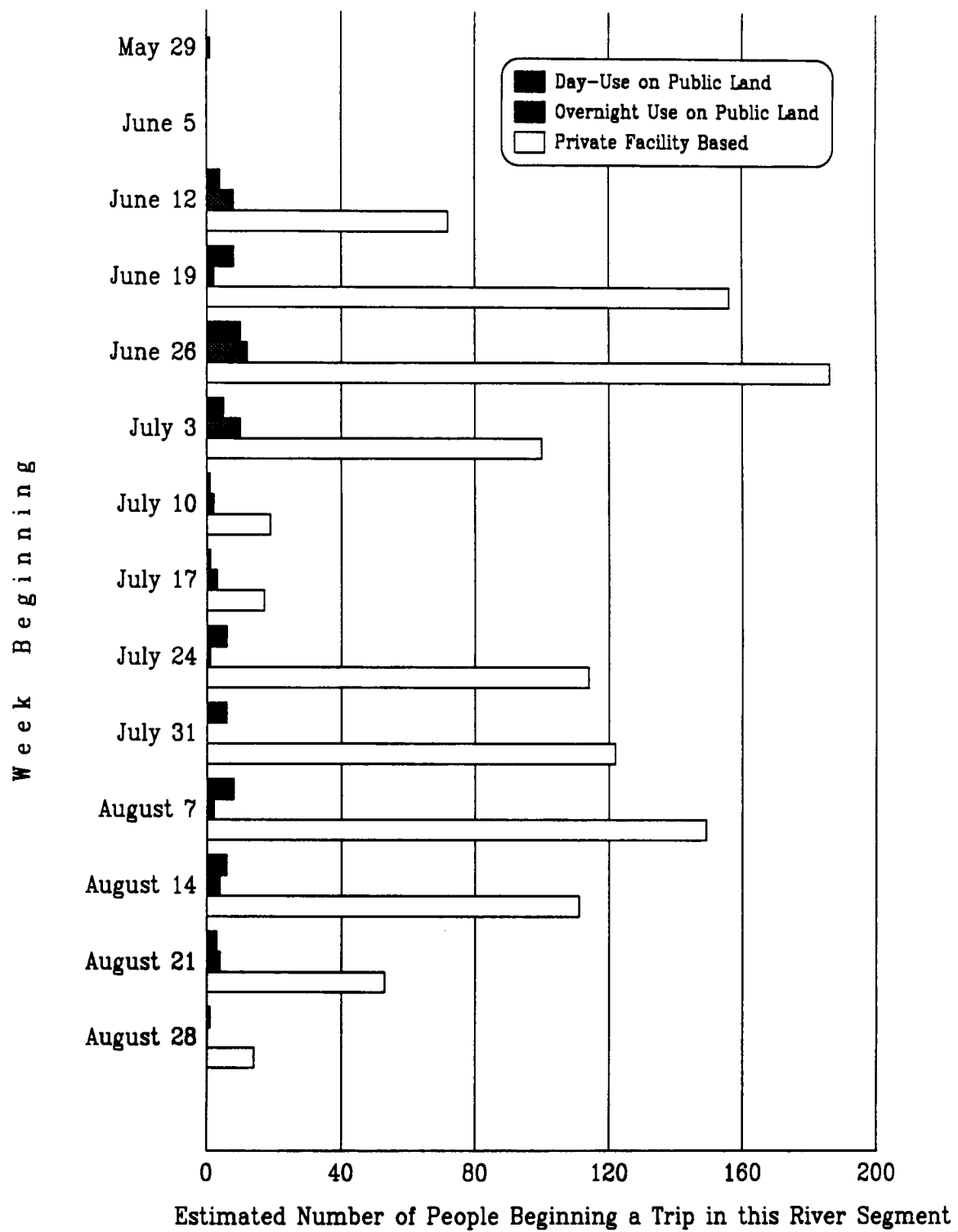
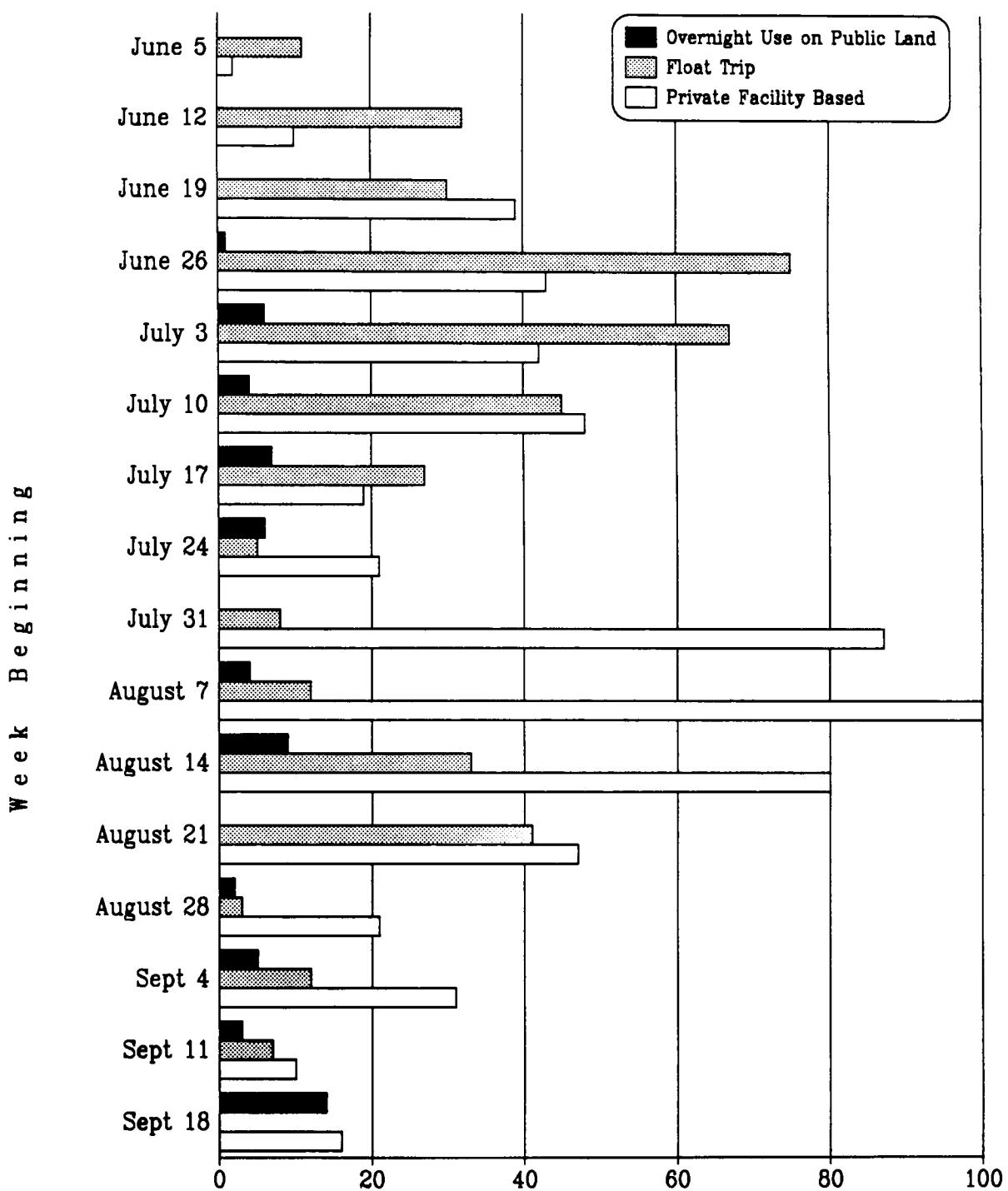


FIGURE TALA-4. Number of People Beginning Trips at Judd Lake.

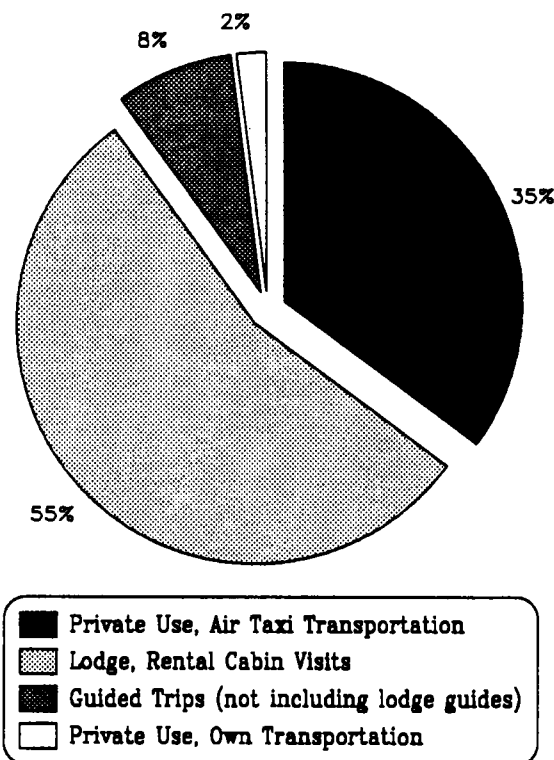


Estimated Number of People Beginning a Trip in this River Segment

COMPARING COMMERCIAL AND PRIVATE RECREATION USE

Figure TALA-5 shows the estimated percentage of person-days by the type of private and commercial activities for the May 15 through September 3, 1989, season. Tables TL-3 and TL-4 provide further details about commercial and private use.

FIGURE TALA-5. Proportions of Private and Commercial Use.



The data suggest two basic conclusions:

- * Slightly more than one-third of total use is private. Almost all private users are transported to the river by air taxi. A small minority of users are self-sufficient.
- * Nearly two-thirds of total use is dependent on commercial facilities or services, primarily lodges, but also fishing or rafting outfitter-guides.

Commercial Use

Table TL-3 shows reported and estimated commercial use. Commercial use is divided into two categories; lodge and rental cabin visits and guided trips, as defined below.

Lodge and Rental Cabin visits include commercial lodge visits and visits to cabins owned by air taxi companies. It does not include visits by owners and their invited guests to private cabins.

Guided trips include all trips by charter boat, guided float trips, or any other recreation visit where the participants hired a guide to accompany them.

TABLE TL-3. Reported and Estimated Commercial Recreation Use.

	Reported Use		Estimated Use	
	Visits	Person-Days	Visits	Person-Days
Lodges	1,702	4,234	1,861	4,859
Guided Trips	78	521	104	694
TOTAL	1,780	4,755	1,965	5,553

Private Recreation Use

Table TL-4 gives reported and estimated private recreation use. Private recreation use is divided into two types, as defined below:

Air taxi transportation refers to private users who hire an air taxi to take them to or from the Talachulitna River. These users stay on public land and do not use any commercial guiding or lodging services.

Private use, own transportation, refers to private users who are fully self-sufficient. They do not employ air taxis or guides, or stay in lodges. Private users in this category arrive by a variety of means. They fly their own planes to the river, accompany a private pilot, or arrive via their own or a friend's boat. The most common launch site is Deshka Landing on the Susitna River, although some large boats may cross Cook Inlet from Anchorage.

TABLE TL-4. Reported and Estimated Private Recreation Use

	Reported Use		Estimated Use	
	Visits	Person-Days	Visits	Person-Days
Air Taxi	568	2,545	661	3,099
Own Transportation	0	0	32	162
TOTAL	568	2,545	693	3,261

END NOTES: ASSUMPTIONS AND METHODS

Background

The basis for the visitor use estimates is 1989 use reported by lodges, air taxis, and guiding services. A total of 377 trips to the Talachulitna River were reported, involving 2,340 people.

The Alaska Department of Fish and Game has never conducted counts of visitors on the Talachulitna River. The only available method for estimating total use was to establish assumptions about reported use based on conversations with veteran Talachulitna River users and commercial operators.

Assumptions About Reported Use

Five Talachulitna River lodges furnished recreation use reports. Four other lodges did not furnish reports, two at the mouth and two at midpoint. Of the two non-reporting lodges at the mouth, one was under construction and had no known guests in 1989. Non-reported recreation use from the one operating lodge was assumed to be equal to that of a reporting lodge. Of the midpoint lodges, one was closed during 1989. To estimate visitor use at the other midpoint lodge, another lodge was selected as being most comparable in terms of the number of clients, and use reports were then doubled.

No day use was reported on the Talachulitna, yet it was known that a small number of people visit the river mouth as day users via riverboats or airplanes. Some of these visitors are based at lodges on the Skwentna River or are camping or staying at private facilities nearby. One lodge manager estimated 99 percent of anglers at the Talachulitna River mouth are clients of the on-river lodges (Johnson 1989b). We adjusted this estimate somewhat, estimating that day users equaled 5 percent of the adjusted total number of lodge guests at the mouth.

It was estimated 75 percent of all float trips had been reported; thus, a factor of 1.33 was used to estimate total use from reported use.

Besides float trips, there is apparently little overnight public land-based use on the Talachulitna River. We estimated 80 percent of such use had been reported, resulting in a factor of 1.25 for increasing reported use. Non-lodge private facility based use (visits to private residences) was increased by the same factor.

Estimating Total Use

Based on the estimates explained above, reported use (number of people) was multiplied by an appropriate factor to equal estimated total number of people using the Talachulitna River. (Person-days were then calculated by multiplying the estimated total number of people by the trip length documented in the use reports). The results are shown in the seasonal overview graph, Figure TALA-1.

Weekday/Weekend Variation

No additional assumptions were used to develop Figure TALA-2, depicting weekday/weekend variations in visitor numbers. It was generated simply by adjusting reported use according to the factors given above. Unlike other recreation rivers such as the Deshka River or Alexander Creek, there is little self-sufficient private use on the Talachulitna River. Thus, it is unlikely Figure TALA-2 is significantly skewed by the absence of these users from the reported use data base.

Trip Starts at the Mouth of the Talachulitna River

The same factors and assumptions used to produce the seasonal overview were used to estimate the number of trip starts shown as Figure TALA-3. The number of lodge guests at the non-reporting lodge was assumed to be equal to the number of guests at one of the reporting lodges.

Trip Starts at Judd Lake

Figure TALA-4 depicts trip starts at Judd Lake. It was produced using the factors and assumptions discussed previously for float trips, overnight public land-based use, and private cabin visits. Judd Lake has only one lodge, and since this establishment furnished use reports, no adjustments were necessary to estimate total lodge use.

Private and Commercial Use

These data were calculated by adding visits and person-days, using the factors discussed previously to estimate total use. There were no reports of self-sufficient private use, but we assume some occurs. When all other visits and person-days had been calculated, the total was slightly less than the previously calculated overall total person-days for the recreation river. These unaccounted-for visits were assigned to self-sufficient private use.

PROJECTING FUTURE USE

Estimates of use in subsequent years may be projected by combining data from these 1989 seasonal use estimates and previous DFG statewide angler surveys. Because the DFG statewide angler survey has been conducted annually since the mid-1970's, it is the best source for evaluating visitor use trends on the Talachulitna River. However, since the survey reports only the overall angling use estimates for each year our 1989 seasonal estimates may be used to distribute use over the June through September period.

We have projected use from June through September 1990 by using our 1989 seasonal use estimates and applying a growth rate derived from the statewide angler survey, as provided below.

The Alaska Department of Fish and Game (DFG) estimates total fishing use on the Talachulitna River has fluctuated over the 12-year period from 1977 through 1988. Use has risen in some years and fallen in others DNR, 1989c. However, some general conclusions about use trends can be made from these data:

- * From 1977 to 1988, the average rate of increase was 42 percent per year, or 499 percent.
- * From 1986 through 1988, the average rate of increase was 89 percent per year. However, this rate was skewed by unusually high use in 1988. From 1985 to 1987, use increased at a more moderate 39 percent per year.
- * Using an annual growth rate of 39 percent, projected use during the 1990 summer (June through September) season is 12,250 person-days.

Considerations for Modeling Future Use Trends

The current estimated average annual growth rate results in visitor use doubling every two and one-half years. This growth pattern cannot be expected to continue indefinitely. At some point a plateau must be reached. However, current visitor use data does not indicate that the growth rate is reaching a plateau.

While over the long-term visitor use has grown, between individual years there is a consistent pattern. As mentioned previously, use has sometimes declined in comparison to the preceding year. Factors which may cause visitor use to fluctuate include the conditions of the Alaska economy, the number of salmon returning, changes in fishing regulations, fishing opportunities on other rivers, and weather conditions.

The Talachulitna River receives about 6 percent of total recreation river use, based on DFG statewide angler survey data. This is slightly less than the percentage of use on the Talkeetna River (9 percent), and considerably less than the percentage of use on any other river in the system. Because use is relatively low on the Talachulitna, small changes in the number of users from year to year result in large percentage changes in use.

Considerations for Modeling Seasonal Distribution of Use

Visitor use during the 1989 season was probably typical with regard to the use peaks corresponding to the two salmon runs. However, the 1989 season included unusually adverse weather which is believed to have caused August and September recreation use to be lower than it otherwise would have been. Wet weather and high water curtailed or prevented many visits. According to a lodge manager at the Talachulitna River mouth, during the period August 27 to September 10 the river was "unfishable due to high, muddy water," and "constant rain, at times heavy" (Johnson, 1989b). In addition, the heavy, low cloud cover canceled many floatplane flights, the primary means of getting to the Talachulitna River.

The 1989 visitor use season could be characterized as "typical" through the last week of July, and use projections for future years for this period can be made with some confidence. However, because August and September 1989 use estimates are probably lower than would be expected, projections for that period may require adjustment.

Alexander Creek

1989 Visitor Use Estimates

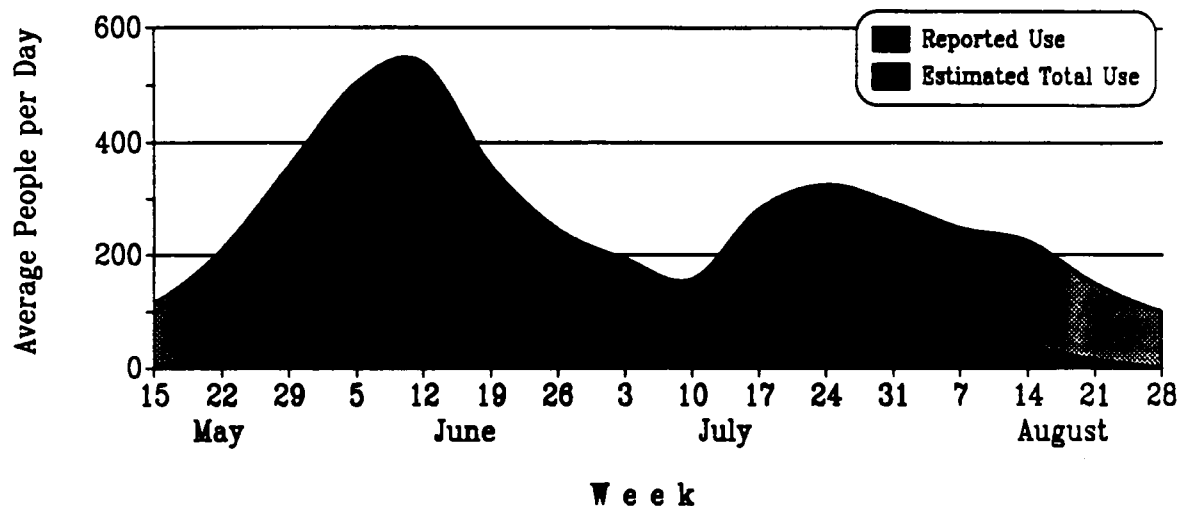
Visitor use estimates for Alexander Creek were derived by comparing Alaska Department of Fish and Game aerial counts, conducted from late May to mid-June, with visitor use reported to the National Park Service by air taxis, lodges, and fishing outfitter-guides for the 1989 summer season. While reported use covers the entire season, it is not total use. Not all businesses operating on Alexander Creek volunteered information, and virtually no information was obtained from private sources. In contrast, the Department of Fish and Game counts are assumed to represent total use, but for only a small portion of the summer season. We compared the two data sets for the time period where they coincided and derived mathematical equations to calculate estimated use from reported use.

The results of those calculations are presented below. The last section of the chapter, "End Notes," contains the methods used to convert reported recreation use into use estimates. Note that the following information refers to use on Alexander Creek, Alexander Lake, and on the lower Alexander Creek (outside of the recreation river boundary).

SEASONAL OVERVIEW

Figure ALEX-1 shows weekly average visitor use levels for the 1989 summer season. Reported use comes from lodges, air taxi operators, and outfitter-guides. Estimated use is based on reported use and adjusted through comparisons with Alaska Department of Fish and Game (DFG) use data.

FIGURE ALEX-1. Seasonal Overview of Alexander Creek Recreation Use, 1989.



The summer season on Alexander Creek essentially runs from mid-May through Labor Day weekend. Use peaks during mid-June, then drops precipitously until mid-July, followed by a second, smaller peak in late July. These two peaks represent the king salmon and silver salmon runs, respectively. The lull in visitor use between the two peaks in 1989 corresponds to the July 13th closing date of the king salmon fishing season.

Highlights of the 1989 visitor use estimates are as follows:

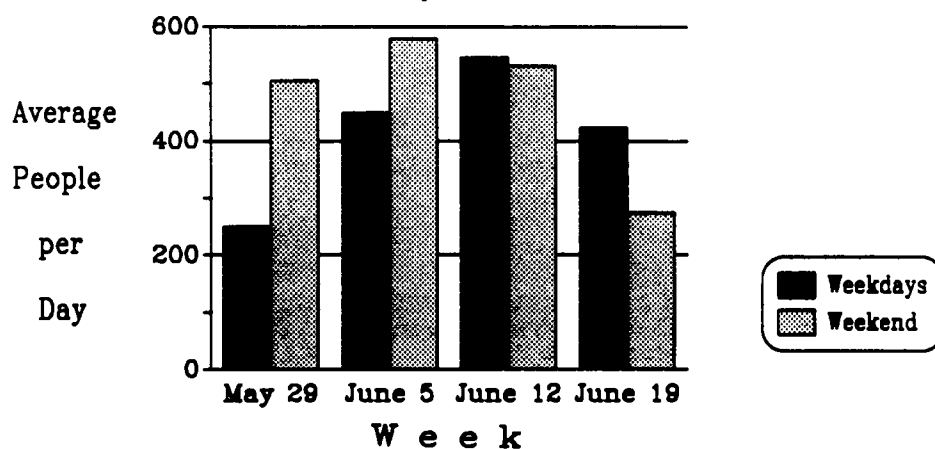
- * The peak visitor use period corresponds to the height of the king salmon run during the week of June 12. The average use during this week was 539 people per day. Over the June 9-11 weekend, it was estimated that 579 people were on the river daily.
- * A second use peak corresponded to the silver salmon run during the week of July 24. The average use during this week was 325 people per day.

- * Total use during the 1989 summer season is estimated at 30,166 person-days¹.
- * Based on the assumption that average trip length is three days, there were an estimated 10,055 separate visits to Alexander Creek in 1989.

VARIATION IN WEEKDAY/WEEKEND USE

The primary factor determining the number of people per day seems to be fishing success. Day of the week² is a secondary factor. When "the kings are in," people are on Alexander Creek. Figure ALEX-2 shows variation in weekday and weekend use during the height of the king salmon season.

FIGURE ALEX-2. Variation in Weekday/Weekend Visitor Use on Alexander Creek.



The data suggest two conclusions:

- * Weekends receive more use than weekdays during the early stages of the salmon run, i.e., before many fish have reached Alexander Creek and fishing success is relatively low. During this time, more people visit on the weekends than on weekdays.
- * In contrast, at the height of the salmon season, weekday use is the same as or higher than weekend use. During the remainder of the summer, there is no consistent variation in use between weekday and weekend.

Although not reflected in the data, anecdotal evidence and intuition suggest slightly higher weekend use. The reason this difference was not more obvious in the use data reported could be that the data was obtained almost solely from lodges and air taxi operators. There is almost no information on private parties who transport themselves to Alexander Creek. Since private

¹ A person-day is one individual engaging in recreation for any portion of a 24-hour day.

² Monday through Thursday are considered weekdays; the weekend is defined as Friday, Saturday, and Sunday.

party use is estimated to account for slightly more than one-fourth of total visitation, results would be skewed if this group follows a use pattern that differs significantly from that of commercial recreation users. Also, weekend trips may "spill over" into the weekdays at either end, thereby masking a trend. Overall, it appears that weekend use may be slightly higher than use on weekdays, but the difference is not significant.

VISITOR USE BY RIVER SUBUNIT

Reported use included information about the type, timing, and location of trip starts. DFG data also contains information about recreation use within river subunits. While limitations of the data preclude definitive estimates of total person-days spent within each river subunit, it is possible to estimate the proportion of use which begins within each subunit, and to characterize the type of use by subunit. Figures ALEX-3 and ALEX-4 give the number of trips beginning on Lower Alexander Creek or Alexander Lake (the two common access points) for each of the four trip types as defined in the introduction to this chapter. Information from the accompanying graphs and DFG data suggest the following conclusions about use within the river subunits:

Lower Alexander Creek

Figure ALEX-3 shows the estimated number of people beginning a trip on Lower Alexander Creek each week. It is estimated that there is more day use each week than any other category of recreational user. Float trips do not begin in the lower Alexander Creek subunit.

DFG data suggests that between 40 and 80 percent of recreation visitors on a given day are in the Lower Alexander Creek subunit. The use within this subunit was higher on weekends early in the salmon run. Use within the Lower Alexander Creek subunit was lowest late in the salmon run.

Middle Alexander Creek

Although many visitors use this subunit, no trips begin here. All float trips pass through this subunit on their way to the mouth. The percentage of people from Lower Alexander Creek who travel upstream and enter this subunit depends on the progress of the salmon run. Early in the run, fish and anglers are concentrated near the mouth. As salmon move upstream, people tend to follow, spreading use over a wider area. However, during high-use periods, the number of people in the middle subunit never exceeds the number in the lower subunit.

DFG data suggest that between 5 and 35 percent of recreation visitors on any given day are within the Middle Alexander Creek subunit. Early in the salmon run visitor use is generally low; it is generally high late in the run.

Lower Sucker Creek

No trips begin within the portion of Lower Sucker Creek included in the state recreation river. It was reported that 126 people began their trips at Trail Lake, two miles upstream of the recreation river boundary. Trail Lake is accessible by floatplane and contains a commercial lodge and air service rental cabins. Some of the recreation visitors to Trail Lake walk down to Sucker

Creek to fish, and a portion of them walk far enough to enter the river corridor. However, since the number of Trail Lake visitors who utilize the recreation river is unknown, they were not included in the seasonal overview totals.

Upper Alexander Creek

Trips beginning in this subunit are limited to visitors who fly in to Rose Lake (west of Alexander Creek between RM 32 and RM 33). These visitors engage in float trips or stay at a cabin on the lake maintained by one of the air services. This use is negligible compared to the overall total. Reported trips originating at Rose Lake include four float trips with a total of 11 people and 10 cabin visits with a total of 25 people.

DFG data suggest that between 5 and 35 percent of recreation visitors present on any given day are in the Upper Alexander Creek subunit.

Alexander Lake

Estimated total trips beginning at Alexander Lake are indicated in Figure ALEX-4. Float trip participants generally outnumber all other users. (Some of the people reported as lodge guests also participated in a float trip at the conclusion of their visit. These people have been counted in both categories.) There is very little day-use or overnight camping use at Alexander Lake during the summer season. The only other numerically significant use is private facility based, a combination of commercial lodge guests and private cabin users.

According to DFG data, approximately 11 percent of recreation visitors present on any given day are in the Alexander Lake subunit.

COMPARING COMMERCIAL AND PRIVATE RECREATION USE

Figure ALEX-5 shows the estimated percentage of person-days by the type of private and commercial activities for the May 15 through September 3, 1989, season. Tables A-5 and A-6 provide further details about commercial and private use.

FIGURE ALEX-3. Number of People Beginning Trips from Lower Alexander Creek.

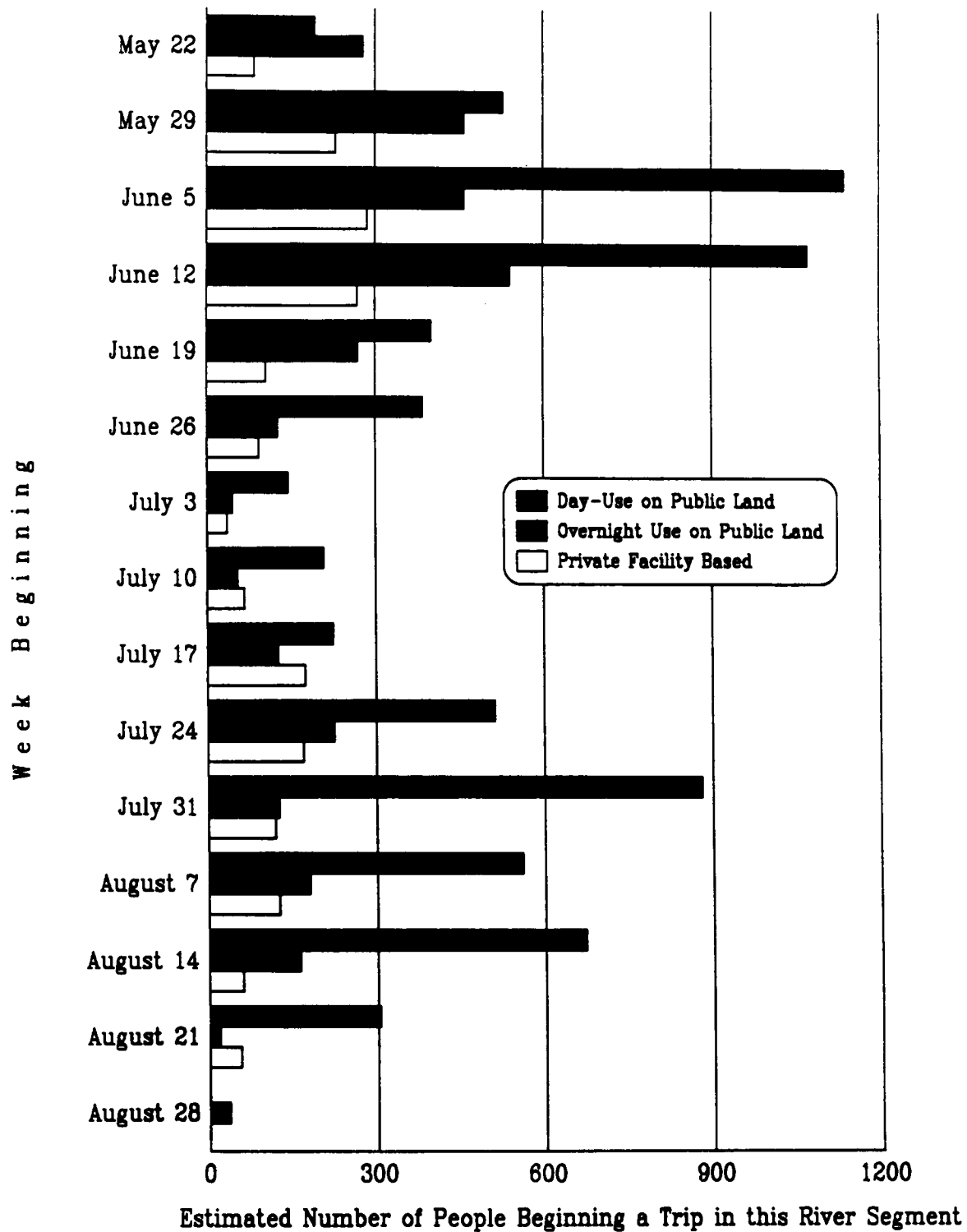


FIGURE ALEX-4. Number of People Beginning Trips from Alexander Lake.

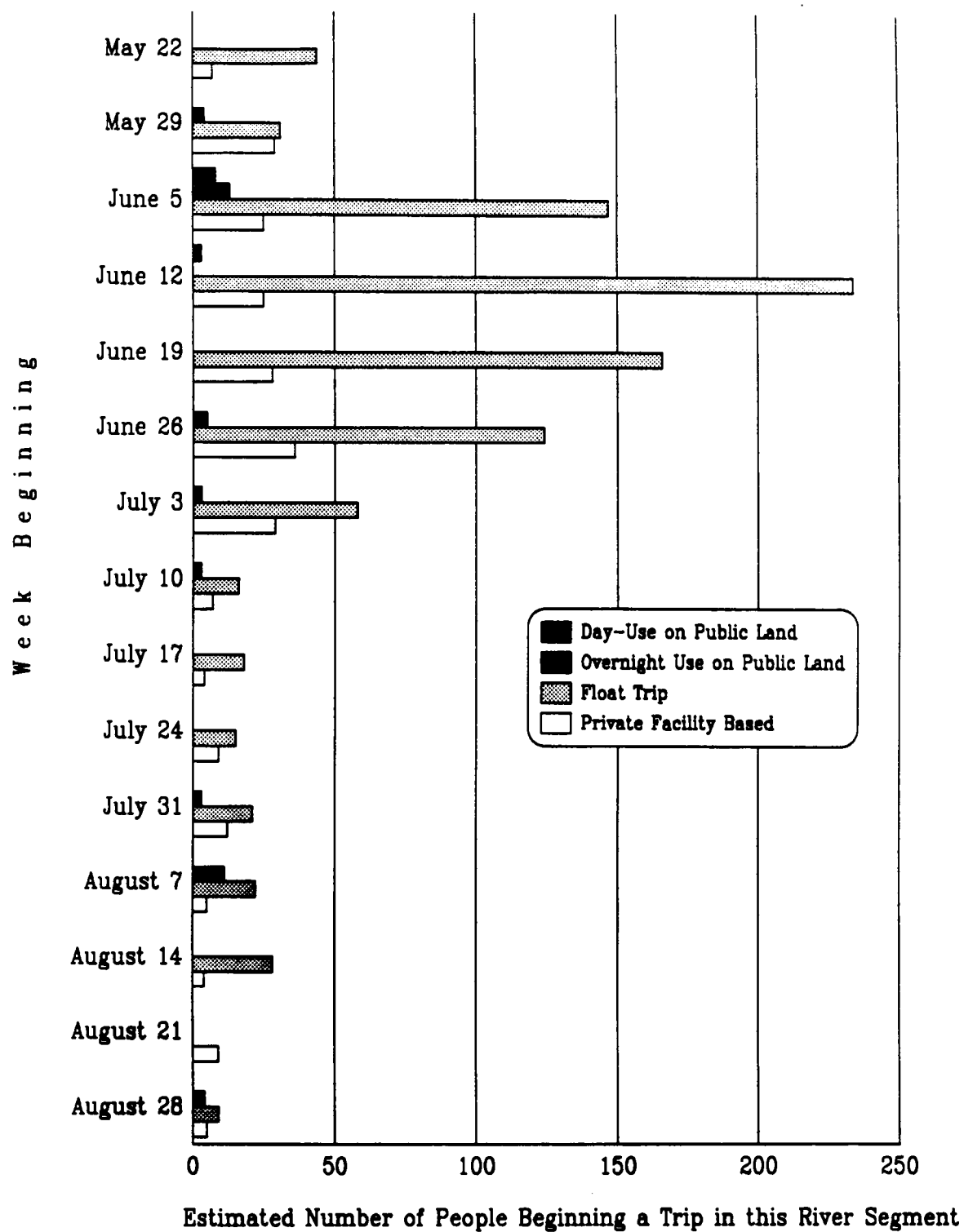
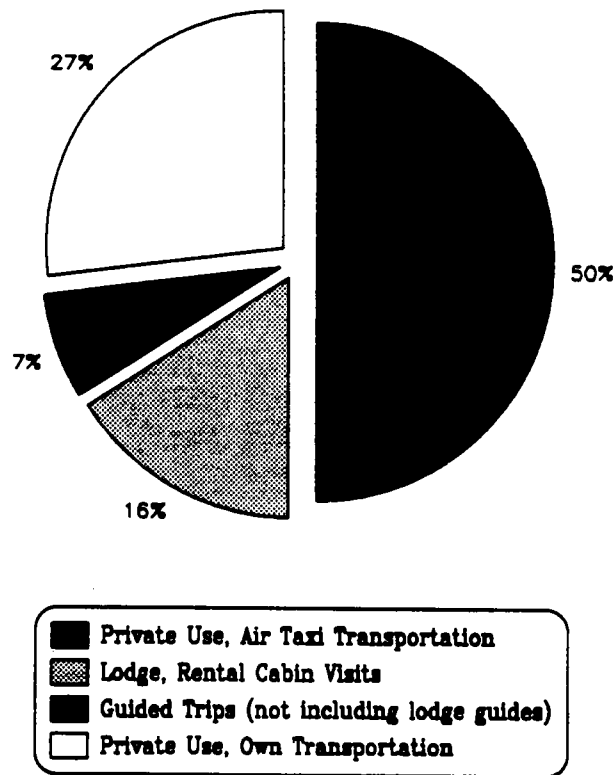


FIGURE ALEX-5. Proportions of Private and Commercial Recreation Use.



The data suggest two important conclusions:

- * Approximately three-fourths of total use is private. Of the private users, two-thirds are transported by air taxi operators and one-third are self-sufficient.
- * Approximately one-fourth of total use is dependent on commercial facilities or services such as lodges, rental cabins, or outfitter-guides.

Commercial Use

Table A-5 shows reported and estimated commercial use. Commercial use is separated into two categories; lodges and guided trips, as defined below:

Lodge and Rental Cabin visits include commercial lodge visits and visits to cabins owned by air taxi companies. It does not include visits by owners and their invited guests to private cabins.

Guided trips include all trips by charter boat, guided float trips, or any other recreation visit where the participants hired a guide to accompany them.

TABLE A-5. Reported and Estimated Commercial Recreation Use.

	Reported Use		Estimated Use	
	Visits	Person-Days	Visits	Person-Days
Lodges	1,572	4,925	1,572	4,925
Guided Trips	65	221	650	2,210
TOTAL	1,637	5,146	2,222	7,135

Private Recreation Use

Table A-6 gives reported and estimated private recreation use. Private recreation use is separated into two types as defined below:

Air taxi transportation refers to private users who hire an air taxi to take them to or from Alexander Creek. While on the river these users stay on public land and do not use any commercial guides or lodge services.

Private use, own transportation, refers to private users who are fully self-sufficient. They do not employ air taxi operators, river guides, or lodges for transportation or accommodations. Private users transport themselves to Alexander Creek and arrive by a variety of means. They fly their own planes, accompany other private pilots, or arrive via their own or a friend's boat. The most common launch site is Deshka Landing on the Susitna River, although some large boats cross Cook Inlet from Anchorage's small boat harbor.

TABLE A-6. Reported and Estimated Private Recreation Use.

	Reported Use		Estimated Use	
	Visits	Person-Days	Visits	Person-Days
Air Taxi	1,499	5,237	8,024	15,014
Own Transportation	4	15	2,138	8,017
TOTAL	1,503	5,288	10,162	23,031

END NOTES: ASSUMPTIONS AND METHODS

Background

The basis for the visitor use estimates presented here comes from two sources: visitor use reported during the 1989 season, obtained almost entirely from commercial sources, and Alaska Department of Fish and Game aerial counts. Lodges, air taxis, and guides reported a total of 907 separate trips to Alexander Creek, involving 3,192 people. Although these trip reports spanned the entire season, they represent only a portion of total recreation use. The Fish and Game aerial counts measure total use, but only for selected dates early in the season. Fish and Game counts were used to estimate the portion of the total visitor use that is contained in the reports and then adjusted to reflect the estimated total use throughout the season.

Although Fish and Game personnel counted boats, planes, anglers, and non-anglers during their aerial observations, only the boats and planes were used as a basis for estimating total use. Individual people could be easily missed, whereas boats and planes were readily seen and probably accurately counted. Since all summer visitors to Alexander Creek use a boat or plane for transportation, the number of these conveyances present should reflect the number of people present.

Assumptions About Aerial Counts

To use the aerial counts as representative of all people present on a given day, several assumptions were required. The aerial surveyor flew over at a specific time, yet our objective was to estimate how many people use the recreation river each day. At any given moment, not all users were on the river. Some had already departed, others had not yet arrived, and others were present but were at lodges or cabins rather than on the river. We estimated that approximately one-third of all recreation users who used the river each day were absent when the count was conducted. Boats and planes counted between the creek mouth and Gabbert's Camp, and the boats and planes (except rafts) counted between Gabbert's and the DFG weir at RM 12.7 were multiplied by a factor of 1.33. Counts above the weir were not increased, since there is little day-use above that point. Most of the users on Alexander Creek above the weir are rafters, who would have been present regardless of when the count was conducted.

Converting the adjusted count of boats and planes into an estimate of total use required calculating the number of people per craft. A 1984 survey of 8,600 boaters exiting at Susitna Landing revealed an average of 3.2 people per boat (Howe, 1985). We assumed that 3.2 people were present on each boat and plane on Alexander Creek and multiplied the adjusted counts by 3.2 to estimate the total number of people present.

Assumptions about Alexander Lake Use

The Department of Fish and Game counts covered the entire stream but stopped at the Alexander Lake outlet and did not count the users on Alexander Lake. To estimate Alexander Lake use, some assumptions had to be made about the two major user groups there, floaters and private facility users.

It was assumed that the rafts counted between Sucker Creek and Alexander Lake during the Department of Fish and Game flight were the same rafts that launched from Alexander Lake during the preceding two days. Total rafts counted in this stream subunit on each flight were thus divided by two to represent the launches for a single day. A factor of 2.3 people per raft was assumed for floating parties. Selection of this lower factor was based on the personal experience of one of the authors while floating Alexander Creek from June 12 to 16, 1989. It was observed that the majority of rafts contained two people and a few rafts had three people.

The final calculation of estimated number of floaters launching from Alexander Lake each day was as follows: The aerial count of rafts was divided by two to obtain the number of rafts launched on a single day. That number was then compared to the visitor reports for the appropriate day. The reports listed the number of people in each party, but not the number of rafts. To arrive at the estimated number of rafts reported as launching on a particular day, the number of reported people was divided by 2.3. This resulting number of reported rafts was compared to the Department of Fish and Game count. It was found that the reported number of rafts launching averaged 67.6 percent of the number generated from the Department of Fish and Game counts. To adjust reported use, the reported floaters launching from Alexander Lake each day were multiplied by a factor of 1.48 to arrive at a figure approximating the counts.

It was estimated that 75 percent of private facility use was reported. Commercial lodge use was reported, and air taxis reported dropping off some clients at private cabins or for day-use fishing. The non-floating use was multiplied by a factor to accommodate this missing 25 percent. Estimated floating and non-floating use were added together to arrive at total daily use at Alexander Lake for 16 separate dates on which aerial counts of Alexander Creek had been completed.

Correlating DFG Aerial Counts with Reported Use

A regression analysis was performed to test the correlation between the data sets and to establish a factor for adjusting reported use to arrive at an estimate of total use. In order to compare Alaska Department of Fish and Game counts on 16 days from May 28 through June 18, 1989, with reported use for those same dates a regression equation was developed. This does not apply to trips beginning at Alexander Lake where only Alaska Department of fish and Game counts were available.

The regression analysis supplied the formula for estimating total use from reported use:

$$y = 85.51 + 3.16x$$

where y is the total number of people present on a given day,
and x is the reported number of people present on that day.

Estimating Total Use

Since Alexander Lake use had so far been excluded, it now had to be factored back into the total use equation. The regression equation was performed on the reported use (minus Alexander Lake use) for the 16 dates for which aerial counts were available. Alexander Lake use was then

calculated for those same dates using the method described previously, and the two figures compared. The result obtained from applying the regression equation to reported use was multiplied by an average of 1.11 to account for the estimated Alexander Lake use. The final formula for calculating estimated total number of people per day on Alexander Creek became:

$$\text{total number of people present} = [(\text{those reported present} \times 3.16) + 85.51] \times 1.11$$

This formula was applied to all the use reports from Alexander Creek, exclusive of Alexander Lake. The results are shown in the seasonal overview graph, Figure ALEX-1.

Weekday/Weekend Variations

No adjustments were used to modify the data used to make Figure ALEX-2, depicting weekday/weekend variations in visitor numbers. It was generated by putting reported use through the equation given above. It is possible that reported use does not accurately reflect the difference between weekend and weekday use, because essentially all the reported use came from businesses, primarily lodges and air taxis. We estimated that 27 percent of use on Alexander Creek is from self-sufficient private parties who do not use any commercial lodging or transportation. Commercial use may be less subject to weekday/weekend fluctuations than is private use. Private use is presumed to account for a large percentage of total use. If private users are found to be highly weekend-oriented, it could change the overall pattern substantially.

Trip Starts from Lower Alexander Creek

Although the overall seasonal use estimate is considered reasonably accurate (+ or - 20 percent), there is no scientific basis for breaking this total into use categories. To produce the trip start estimates shown in Figures ALEX-3 and ALEX-4, assumptions were made about the relative amount of each type of use reported.

It was assumed for Figure ALEX-3 that a much lower percentage of day use and overnight public land use was reported compared to private facility use. Day use, however, was particularly under reported. The basis for this assumption was that the day-use figures for one of the largest air taxi companies were not included in the reported use, and all the lodge guests from the area's three establishments had been reported. Air taxi companies that owned rental cabins reported their use. Private users not commercially transported were not reported. Almost all private use would be either day use or overnight public land use, with some private cabin visits.

The following steps were taken to break down the estimated 30,166 total person-days for the season.

1. Divide estimated total person-days of 30,166 by 1.11, to remove the use originating at Alexander Lake. The result is 27,424 person-days.
2. Subtract the person-days spent by float parties between Alexander Lake and Lower Alexander Creek. The average float trip lasts five days. Assume that day one is at Alexander Lake, day five is on Lower Alexander Creek. Three days per person must be subtracted. With an estimated 968 people participating in float trips, a total of 2,904 person-days must be subtracted. $27,424 - 2,904 = 24,520$ person-days.

3. Subtract the lodge and rental cabin person-days: $24,520 - 3,659 = 20,861$ person-days generated by public land and private cabin visitors.
4. Determine reported person-days for each of the three activities: A reported 461 day-users visited Lower Alexander Creek, plus 355 overnight users and 86 private cabin visitors. Overnight visitors stayed an average of 3 days; private cabin visitors an average of 5 days; and of course, day-users spent 1 day. Total reported person-days are as follows: $461 + (355 \times 3) + (86 \times 5) = 1,956$ reported person-days.
5. Divide the estimated total person-days by the reported person-days, to get an overall factor: $20,861/1,956 = 10.67$.
6. Adjust factor to account for greater proportion of public land day use believed to be unreported:

$$(\text{day use} \times 16) + (\text{overnight use} \times 9) + (\text{cabin use} \times 9) = 20,831 \text{ person-days,}$$

which is approximately equal to estimated total person-days of 20,861.

$$(461 \times 16) + (1,065 \times 9) + (430 \times 9) = 20,831$$
7. Multiply the number of weekly trip starts in each category by the selected factor. The results were entered in Figure ALEX-3.

Trip Starts from Alexander Lake

Figure ALEX-4 displays trip starts from Alexander Lake. Reported float trip starts were multiplied by 1.48, based on the assumption that about 68 percent of float trips had been reported. As discussed above, this assumption is based on the number of rafts DFG personnel counted per day between Alexander Lake and Sucker Creek.

Reported public land day-use, public land overnight use, and private facility-based use were all multiplied by 1.33, based on the previously stated assumption that 75 percent of this use was reported.

Private and Commercial Use

The following steps were used to calculate the numbers used in Tables A-5 and A-6 and Figure ALEX-5.

1. Determine air taxi usage. Assume that one-half of the additional day-use and one-half of the additional public land overnight use (calculated for Figure ALEX-3) were transported by air taxi.
2. Determine guided use. Assume 10 times more use occurs than has been reported. Subtract the amount transported by air taxi from the air taxi figure to avoid double counting.
3. Add the reported lodge/rental cabin use; assume it represents actual use.

4. Add the total visitor days attributed to air taxis, guides, and rental accommodations. Subtract that total from the total estimated person-days of 30,166. Assume that the balance is private use, own transportation.

PROJECTING FUTURE USE

Estimates of use in subsequent years may be projected by combining data from these 1989 seasonal use estimates and previous DFG statewide angler surveys. Because the DFG statewide angler survey has been conducted annually since the mid-1970's, it is the best source for evaluating visitor use trends on the Talachulitna River. However, since the survey reports only the overall angling use estimates for each year our 1989 seasonal estimates may be used to distribute use over the June through September period.

We have projected use from June through September 1990 by using our 1989 seasonal use estimates and applying a growth rate derived from the statewide angler survey, as provided below.

The DFG estimates that total fishing use on Alexander Creek was on a general upward trend for the 12-year period of 1977 through 1988 (DNR, 1989c). Estimated growth, however, has not been steady. Some general conclusions from these data are:

- * Use has increased at an average rate of 19 percent per year. This suggests visitor use doubles every five years.
- * The average rate of increase in the last three years is approximately one percent.
- * Recreational use on Alexander Creek is 14 percent of the total recreational use on the six recreational rivers. The Deshka (23 percent) and the Little Susitna (30 percent) receive a considerably higher percentage of use. Lake Creek (12 percent) receives about the same percentage of use as Alexander Creek.
- * Using a 19 percent growth rate and the 1989 estimates as a base, projected use during the 1990 summer season would be approximately 36,500 person-days.

Considerations for Modeling Future Use Trends

A review of Fish and Game estimates shows visitor use to be unpredictable in any given year based on the previous year. For example, in the three seasons from 1986 through 1988, Fish and Game estimated that fishing use on Alexander Creek went from 19,113 angler days to 13,220, and then back up to 19,591. Factors which cause visitor use to fluctuate on Alexander Creek include the Alaska economy, the number of salmon returning, changes in fishing regulations, fishing opportunities on other rivers, and weather conditions.

Considerations for Modeling Seasonal Distribution of Use

Visitor use during the 1989 season was probably typical for general timing of the use peaks corresponding to the two salmon runs. However, the 1989 season included unusually adverse weather, believed to have caused August recreation use to be lower than it otherwise would have

been. Although the silver salmon run was strong, wet weather and high water curtailed or prevented many visits. According to the manager of a lodge at the mouth of Alexander Creek, there were "an unusual number of days . . . that have been unflyable," due to heavy, low clouds (Conklin, 1989). Poor weather conditions resulted in many canceled flights, for both wheel and floatplanes. As a result of abnormally high water, the airstrip at the mouth of Alexander Creek was underwater for most of August. When it finally did emerge, it was too soft and muddy to allow safe landing by wheeled planes.

The 1989 visitor use season could be characterized as "typical" through the last week of July, and use projections for future years can be made with some confidence. However, August 1989 use estimates are probably lower than normal; projections for that period may require adjustment.

CHAPTER 4

FISH & WILDLIFE

CHAPTER 4 - FISH & WILDLIFE

INTRODUCTION

The following chapter has been prepared by the Alaska Departments of Fish and Game, Habit and Sport Fish Divisions. The chapter is presented in four sections: wildlife resources; sport fisheries; fish periodicity; and locations of fish and wildlife management facilities.

The section on wildlife resources summarizes the distribution, habitat requirements, and food habits of important wildlife species found within the planning area. It also includes a description of trapping activities in the area. The section on sport fisheries summarizes fishing effort and harvest, angler characteristics and distribution, resident species fisheries, management and research activities, fish stocking, and fishing regulation authorities information on the corridors. Section three, fish periodicity, includes a series of charts that summarize, by river corridor, the seasonal presence of important fish species and their life phases. The last section illustrates the location of Cook Inlet Aquaculture Association and ADF&G facilities in or near the corridors.

Moose

General Distribution: Moose are widely distributed throughout the planning area with some of the highest densities recorded along the Susitna River, Kahiltna River, Alexander and Lake Creeks and other major tributary drainages. Moose distribution is mainly influenced by the availability of habitats that offer a mosaic of cover- and food-producing units.

Food Habits: Moose are browsers and feed primarily on trees and shrubs. Browse (deciduous woody plants) is the most important form of vegetation eaten by moose in southcentral Alaska and comprises 75-80% of the diet on normal winter range utilization of browse declines as herbaceous vegetation becomes more available in spring and summer (LeResche et al. 1974b).

In the Susitna valley, Chatelain (1951, 1952) found that willow, birch, cottonwood, and aspen, in decreasing order, comprised practically all the winter food of moose in this area. Based on a study of moose rumen samples collected between Willow and Talkeetna, Shepherd (1958) found that willow and birch comprised almost 90% of the total identifiable volume. Aspen, (Populus spp.), and highbush cranberry and 12 other plant species made up the remaining 10% volume. Spencer and Chatelain (1953) conducted spring browse surveys on the Kenai Peninsula and reported willow, birch, aspen and cottonwood supplied 95% of the winter forage for moose. LeResche and Davis (1973) described seasonal food habits of three semi-tame moose from the Kenai Peninsula. In early winter when snow depths were less than 30 cm (12 in), sedges (Carex spp.) were sought out in wetland areas. In late winter, birch (72%) and lowbush cranberry (21%) were the most important food items. In Denali National Park, willows were the major summer and winter foods along with dwarf birch and aspen (Murie 1944). Conifers are not an important component in moose diets, primarily because the two major species present, white spruce and black spruce, are considered unpalatable to moose (Murie 1944).

In addition to the previously mentioned browse species, moose utilize a variety of terrestrial and aquatic herbaceous plants. In early spring, newly emergent sedges, horsetail (Equisetum spp.), and pondweed (Potamogeton spp.) are consumed in boggy areas and lakes and ponds (LeResche and Davis 1973). Aquatic plants are eaten with decreasing frequency throughout the summer as palatability decreases (Peterson, 1955). Summer foods, as observed by Spencer and Chatelain (1953), were comprised of almost two-thirds birch leaves, one-fourth forbs, such as fireweeds (Epilobium angustifolium, and E. latifolium), lupine (Lupinus nootkatensis), and cloudberry

(Rubus chamaemorus). Mushrooms, grasses, sedges, and aquatics constituted the remainder of the diet. LeResche and Davis (1973) noted that in summer 65, 25, and 10% of all bites taken were parts of deciduous woody plants, forbs and a combination of grasses, sedges, and aquatics respectively.

Cushwa and Coady (1976) observed that snow conditions, particularly snow depth, can influence food availability and lead to variable patterns of food preferences. For example on the Kenai Peninsula, LeResche and Davis (1973) recognized the importance of lowbush cranberry, a nonbrowse food, especially when it becomes unavailable under the snow. During the winter of 1971-72, early snow covered all of the lowbrush cranberry resulting in an almost complete loss of calves. Dead calves were found with rumens full of birch and severely decreased body weights indicating that a lowering of diet diversity may limit moose densities.

Habitat Requirements: Moose habitat needs include a source of food, cover, and water interspersed evenly throughout the landscape. Forage and nutrient requirements are provided by a diverse mixture of deciduous trees and shrubs, aquatic and herbaceous vegetation and a source of mineral elements. Forest cover provides security from predation and shelter from severe winter conditions.

Calving Habitat

Calving habitat for moose consists typically of wet marshy lowland areas such as tidal flats, bogs, areas flooded by beavers, shallow partially filled lakes or lowlands associated with major rivers (Rausch 1967). Bailey and Bangs (1980) described the following characteristics of moose calving areas on the Kenai Peninsula: flat terrain, high water table with much surface water visible during the calving period, vegetation consisting of low-lying shrubs, mosses, grasses, and sedge interspersed with various sized stands of black spruce.

Many calving sites occur on islands in waterbodies, peninsulas, and lake shores. Modafferi (1984) found that pregnant female moose often moved to islands in the Susitna River to bear their young and avoid predation by bear, coyotes, and wolves. Leptich and Gilbert (1986) and Smith et al. (1988) described similar characteristics for calving areas in northern Maine and Ontario, respectively. Calving areas in the lower Susitna Basin often have openings with abundant early spring forage and are generally interspersed with dry upland islands of dense stands of shrubs and trees. Calves are usually born in the islands of dense cover.

Some of the more traditional calving areas found in the

planning area include some areas along the Little Susitna River, along the Susitna River and its mouth, Kahiltna River flats, and the muskeg bogs below Little Peters Hills.

Rutting Habitat

Rutting habitat includes a wide variety of habitats. Breeding groups of moose may concentrate in riparian habitats of the larger rivers and streams (Didrickson et al. 1977). Lent (1974) reported observations of breeding groups at or above timberline in the Alaska Range and on the edge of small clearings or bogs on the Kenai Peninsula.

Winter Habitat

Chatelain (1951) concluded that the most important limiting factor to moose in the Susitna River valley was the quantity and quality of winter range. In southcentral Alaska many studies have demonstrated the importance of riparian habitats for the winter survival of moose (Spencer and Hakala 1964, LeResche et al. 1974a, Modafferi 1984, Machida 1979, Albert and Shea 1986). Riparian willow stands provide most winter forage with maximum use of these areas occurring during periods of greatest snow depth. The value of these wintering areas is enhanced by adjacent upland coniferous forests that provide thermal cover and shallower snow depths.

LeResche et al. (1974a) and Modafferi (1984) recognized the importance of upland climax communities as winter habitat for moose. These communities are dominated by willow and/or shrub birch (Betula glandulosa) and are found at or near timberline. The availability and use of alpine wintering areas is likely governed by snow depths. In years of deep snow the loss of these wintering areas increases the importance of lowland wintering habitat as greater numbers of moose are forced to concentrate in lowland riparian habitats, or other areas of low snow depths.

Important lowland wintering areas have been identified in the planning area. These areas contain high densities of moose during winter and are essential to the moose populations in the area. During the winters of 1984 and 1985, the Department of Fish and Game conducted aerial surveys of selected river corridors in the Susitna Basin. These surveys were used to develop a technique to identify and characterize habitat, particularly moose winter range. The surveys indicated that during winter, moose prefer habitat that is available in the riparian corridors along the streams, and avoid other lowland habitat types. Riparian areas identified as important moose winter habitat include areas along the upper Kahiltna River, the Alexander Creek drainage, the lower portions of Lake Creek, upper and middle portions of Moose Creek and the main

portions of the Yentna, Skwentna and Susitna Rivers. Winter moose use of the riparian corridors is not limited to just these areas, because vegetation and other habitat characteristics are available in other riparian locations. However, these areas were identified as the most important use areas during the study period.

Because of the relative importance of these riparian corridors to moose during winter, it is imperative that the ability of these areas to support moose is not impacted by human activities. Potential sources of impacts in winter moose range would include winter recreational activities, increased road access, permanent year round lodges or other dwellings and changes in vegetation.

We recommend that these potential impacts be prohibited in known winter moose range. Winter snow machine activity can increase energy expenditures in wintering moose and may cause displacement of animals. Increased roading in winter habitat removes some vegetation and can lead to increased moose-vehicle collisions. Year round lodges in winter habitat can cause displacement of moose through increased winter recreational activities. Vegetation enhancement in moose winter range should only be conducted after vegetation surveys have been completed by DF&G and using methods that will enhance the desired vegetation.

These recommendations are crucial to the ability of the areas to maintain the habitat essential for wintering moose.

Habitat Diversity

Habitat diversity or the degree of interspersion of plant communities is an important component of high quality moose habitat. A diverse mixture of plant communities results in relatively large amounts of shrub-forest ecotones, along with shrub-sedge and shrub-aquatic ecotones. Because of the nature of the 1947 Kenai burn, LeResche et al (1974) found that the large number of stands, their irregular shapes, and the diversity of stand types and ages resulted in large amounts of edge ecotones which led to the high moose densities observed in the burn area. In northeastern Minnesota areas with the highest moose habitat potential consisted of highly diverse habitats with large amounts of edge (Peek et al. 1976).

Natural Mineral Licks

Natural mineral licks are used by moose to ingest water and/or earth containing high concentrations of mineral elements (Tankersley 1987). Licks are an important component of moose habitat because they can provide mineral elements essential to the health of a moose population. Large proportions of moose

populations are known to use mineral licks (Best et al. 1977, Tankersley and Gasaway 1983). Most lick use occurs in spring and early summer and is probably linked to the change in diet associated with the flush of green vegetation in early spring. Best et al. (1977) noted that moose in Alberta used licks from April to early June. Moose have been observed making excursions out of their normal home range to visit mineral licks (Best et al. 1977, Risenhoover and Peterson 1986).

Management Guidelines

As recreational use of the river corridors increases, the potential for disturbance and/or harassment of moose and other species increases. Recreational management of the corridor must consider guidelines that will minimize these disturbances. Moose are particularly susceptible to disturbance during winter. At this time, they are concentrated along the riparian wintering areas identified earlier and are subjected to significant stresses from the weather and the limited food supply. Any additional stress which causes energy loss during this period would be detrimental to their survival.

Additional planning considerations must include guidelines to: avoid disturbance to established moose movement patterns; protect important seasonal use areas and prevent disruption of seasonally important moose activities (e.g. calving, rutting etc); maintain moose migration routes; prevent unnecessary human disturbance and harassment of moose.

Suggested guidelines to prevent disturbance in known moose winter concentration areas include limiting recreational snow-machining. We also recommend that permanent roads through or adjacent to these winter areas be prohibited. Road construction would lead to increased human access and increased moose/vehicle collisions. Permanent facilities should not be located in moose winter range.

Increasing human activities in the recreational corridor during all seasons will create a number of impacts on wildlife species. These impacts will range from brief minor disturbances to loss of habitat and displacement of animals. One of the most observable recreational impacts will be increased noise, particularly from point sources. Airboats are a particularly noticeable source of noise in recreational settings.

A review of the available literature reveals that very little information has been published regarding the effect of airboat noise on wildlife. Available information indicated that repeated boat traffic and loud noises did disturb wildlife, especially waterfowl populations (Korschgen et al 1985, Sellers 1979), but except for one instance, (Campbell 1984)

this disturbance was generated by regular boat traffic.

Additional information specific to airboat disturbance of wildlife species will need to be compiled to determine the impact of this use on wildlife species.

Black Bear

General Distribution: Black bears are found throughout the planning area and its range coincides closely with the distribution of forests (Herrero 1978). Black bears generally prefer more "open" forests rather than heavy timber, with higher densities generally occurring in areas of broken habitat types. The general distribution is greatly influenced by the presence of these semi-open forest areas composed primarily of fruit-bearing pioneer shrub and herbs, lush grasses, and succulent forbs. Extensive open areas are general avoided by black bears.

In the Susitna River valley, black bears begin to frequent the lowlands and the river flats in early May. High spring densities have been observed in the flatlands around the mouth of the Susitna River and in the region between the Yentna and Susitna rivers.

Food Habits: Black bear dietary preferences specific to the planning area are not known. However, studies elsewhere show black bears to be omnivorous, but predominantly vegetarian. Typical spring foods include newly emerging grasses, sedges (Carex spp.), horsetails (Equisetum spp.), and carrion. On the northwestern Kenai Peninsula, particularly in certain mature deciduous stands, overwintered lowbush cranberry was consumed heavily in spring along with heavy use of fresh-ripened berries during late summer/fall (Smith 1984). Moose calves may be preyed on during late May and June (Franzmann et al. 1980).

During June and July, salmon begin to arrive in streams in the planning area and provide a significant portion of the diet in some areas. Black bears are known to frequent streams with spawning salmon during this period, and the stream corridors are sources of other important seasonal foods. However, no known black bear feeding concentrations areas have been identified in the planning corridors.

On the Kenai lowlands, in early August, bears will feed on blueberry, elderberry, bearberry, and crowberry. Devil's club is an important fall food and is generally associated with old growth forests, especially large cottonwood stands (Schwartz et al. 1983, Smith 1984).

Because black bears feed mainly on vegetation, it is generally assumed that food supplies rarely limit population size.

However, periodic food shortages can occur due to a decrease in plant species diversity, a shorter foraging season, or a summer berry crop failure. These food shortages can lead to poor body condition prior to bears entering winter dens, and can result in winter mortalities.

Habitat Requirements: Black bear habitat requirements have not yet been identified specifically for the planning area. However, several studies have been conducted in other parts of southcentral Alaska relatively close to the planning area, such as the Kenai Peninsula lowlands and an area just north of Talkeetna along the Susitna River.

Miller (1987) reported that most black bears utilized forested riparian cover types during July-August in the Susitna River study area just north of Talkeetna. Based on food habits data collected toward the end of this period and telemetry data, Miller concluded that the presence of ripening devils club berries, more than spawning salmon, had likely attracted bears to these cover types. Similar habitat use patterns were documented by Schwartz et al. (1983) on the Kenai Peninsula, where bears moved to mature upland forests containing devils club.

Mature timber cover types are used by bears as resting, escape, and security cover. Herrero (1972) reported black bear use of mixed coniferous-deciduous forest for resting cover and as travel corridors between feeding sites. Similarly, black bears in northern California used mixed-conifer forests for traveling, resting, and escape cover throughout the year (Kelleyhouse 1977).

The principal function of denning behavior is to allow bears to minimize energy losses due to unfavorable weather conditions and scarce food resources during winter (Tietje and Ruff 1980). The suitability of an area as denning habitat is dependent on local topography, soil types, and weather conditions (Schwartz et al. 1987). The physical characteristics of an area appear to influence the type of den site (e.g., excavated den, natural cavity, tree) selected by bears. Natural cavity dens were more common in steeper areas (upper Susitna River) compared to areas with deeper soils (Kenai Peninsula lowlands) that are suitable to construction of an excavated den. Schwartz et al. (1987) found that aspect was not a significant factor influencing southcentral Alaska black bears in their selection of den sites.

Data from the Kenai Peninsula indicate that 67% of all black bear dens were found in second-growth upland forest, 31% in mature upland forest, and 1% in black spruce bog (op. cit.). Bears did not den in grass-sedge openings and avoided bogs, because these habitats were low, tended to be wet, and were

subject to spring flooding. In the upper Susitna River area, 56% of all dens were in cover types dominated by alder, 32% in spruce, birch or mixed-deciduous stands, 9% in shrub or alpine tundra types, and 3% in tree dens in riparian cottonwood stands (Schwartz et al. 1987).

Management Guidelines:

Increases in human activity along the river corridors will likely have some impacts on the black bear population in the areas. Increases in recreational camping, and fishing may lead to increased bear/human encounters. Winter recreational activities may represent sufficient disturbance to black bears that would result in den abandonment. Increased road access would result in increased hunting vulnerability of black bears.

The DF&G recommends the following guidelines be incorporated in the planning effort to minimize impacts to black bears: minimize road construction and road access to river corridors; prohibit construction of permanent recreation facilities in areas of bear concentration (when identified); require all facility operators to follow refuse disposal guidelines to minimize attraction to bears; provide all developed campground facilities with bear proof garbage containers and regularly scheduled garbage removal.

Brown Bear

General Distribution: Brown bears occur throughout the planning area and are considered relatively abundant. Their distribution generally overlaps that of black bears but they usually frequent remote higher elevation, sub-alpine and alpine habitats more often than black bears.

Although precise data are lacking, brown bear numbers have been estimated at 100 bears in GMU 16A and 300 bears in GMU 16B (ADF&G 1984). The population appears to be stable.

Food Habits: An adequate food supply is essential to high reproductive success in brown bears. Brown bear dietary preferences specific to the planning area are not known. However, studies elsewhere indicate bears to be highly omnivorous. The opportunistic selection of food items permits brown bears to occupy a great variety of habitat types. In the planning area, as in other regions within their range, the utilization of available food items is dependent on both the seasonal and relative abundance of food items (Pearson 1975).

Brown bears are fully capable of predation on ungulates. Studies have shown that brown bear predation on neonatal moose in Alaska can be very significant. Ballard et al. (1981)

reported that 79% of all natural mortality of moose calves was attributed to brown bears in the Susitna River Basin.

Early spring food items appear to be relatively abundant with broad expanses of sedge meadows, grass flats and small ponds and potholes providing sources of early green plants. Carrion left from hunter and winter kills further supplements spring diets. Foods eaten in summer and fall are similar and include horsetail, grasses, and sedges along with berries (devil's club, crowberry, blueberry, highbush cranberry, and salmonberry), salmon and ungulates (when available) (Lefranc 1987).

Brown bears are known to feed on spawning salmon in the area, however there are no known concentration areas where bears congregate to catch and feed on salmon. The river corridors provide habitat for cover, travel, and food and are very important seasonal habitats for brown bears. Attempts will be made to identify and document feeding concentration areas.

Habitat Requirements:

Travel corridors are an important component of brown bear habitat. Corridors may not necessarily contain habitat amenities such as food, water, or denning habitat and may even include extensive human alterations of the landscape. However, corridors connect important bear habitat units, prevent the isolation of bears into "island populations", and enable bears to access important seasonal food sources (Jonkel 1987).

Denning habitat may be a limiting factor affecting brown bear survival in parts of the brown bear's range but Miller (1987) could not find any evidence for this in the upper Susitna River region. Brown bear den locations were found on all aspects but were most common on southernly aspects (Miller 1987). Selection of den sites were also found to be related to the availability of elevations; bears selected higher elevations when they were available. Brown bears preferred to excavate their dens (75 out of 96 dens in the upper Susitna River area where dug by brown bears). Brown bears tend to den in the same general area but do not have clearly defined traditional denning areas. Bears appear to concentrate their denning activity in areas with optimal site conditions such as high remote basins and sideslopes with deep soil and a vegetation mat for stability during the winter and with wind patterns that will be able to seal the den entrance with deep snow.

Roads increase access for hunters, poachers, and non-consumptive users, the probability of vehicle-bear collisions, the frequency of energy costly flight responses by

bears, and can lead to displacement of bears from valuable habitat (McLellan and Shackleton 1988). Elgmork (1978) documented bear avoidance of roads and areas with high road densities. Roads also provide bears with travel corridors into human developments and areas where bears will not be tolerated (Erickson 1977, cited in LeFranc et al. 1987).

Management Guidelines

Increases in recreational activity along the river corridors could result in impacts to the brown bear population in the area. To minimize these impacts, we recommend the following guidelines be implemented in development of the corridors: permanent facilities should not be located near brown bear activity centers such as travel corridors, feeding sites, denning areas or mesic (wet) meadow habitat types; maintain leave strips along road edges, for travel corridors between drainages, around known feeding areas, such as anadromous fish streams, and along heavily used bear trails; maintain escape, hiding and/or resting cover around the perimeter of wet areas and other open areas; minimize road access into or along riparian corridors; prohibit construction of permanent recreation facilities in bear concentration areas (when identified); require all facility operators to follow refuse disposal guidelines to minimize attraction to bears; provide all developed campground facilities with bear proof garbage containers and regularly scheduled garbage removal.

Furbearers

Furbearers known to occur in the planning area include beaver, muskrat, mink, river otter, marten, red fox, wolf, wolverine, lynx, coyote, weasel, marmot, red squirrel, northern flying squirrel and ground squirrel. Furbearers may be found in nearly all habitat types, although most species occur in riparian, forested, or wetland habitats. Marten, beaver, mink, and red fox are the primary furbearer species in the planning area based on numbers harvested and production of cash income (Stanek 1987).

The importance of habitat quality cannot be overemphasized as the ultimate factor determining the status of Alaskan furbearer populations over a long-term basis. Habitat loss has become the single most important threat to furbearer populations in southcentral Alaska. Unfortunately information describing how these species respond to habitat alterations and management guidelines to mitigate habitat losses are generally unavailable, especially for Alaska.

MARTEN

General Distribution: Marten are solitary, crepuscular carnivores inhabiting the coniferous and mixed

coniferous-deciduous forests of the planning area. In fact, the geographic distribution of marten in Alaska resembles the distribution of climax spruce forests (Hagmeier 1956, Manville and Young 1965). In other regions within the boreal forest zone, mature forests have been reported to be the most suitable habitat for marten (Marshall 1951, Lensink 1953, Francis and Stephenson 1972). Marten are primarily a local resident species but some elevation migrations may occur because of seasonal variations in food availability (Lensink 1953).

Food Habits: Marten usually forage along the forest floor where it can surprise its prey in dense low brush or windfalls. Marten consume a wide variety of food items throughout the year. In the upper Susitna Basin, Buskirk (1983) reported that microtine rodents (70% of total volume) were the most important food item during autumn, winter, and spring. Squirrels (9%), especially the red squirrel, fruits and berries (6%), and birds (5%) were other important food types. Lensink et al. (1955) noted that microtine rodents comprised 74% and 68% of the summer and winter diet respectively, in interior Alaska.

Habitat Requirements: Specific habitat requirements for marten in the planning area or southcentral Alaska in general are poorly understood. Thompson (1988) and Johnson (1981) have reviewed the literature on habitat use in other regions within the boreal forest zone.

Throughout their boreal forest range, marten have been reported to prefer mature forest types especially those dominated by conifers (Buskirk 1983, Lensink 1953, Marshall 1951, Koehler and Hornocker 1977). Considerable use of hardwood-dominated mixed deciduous-conifer stands has been observed in southern Ontario (Francis and Stephenson 1972).

Elimination or alteration of habitat types that support marten prey species will directly influence marten populations. Mech and Rogers (1977) reported that food availability is probably the most important factor affecting the distribution of marten. Clark and Campbell (1976) suggested that management activities that reduce the number of entry sites (e.g., deadfall, leaning trees, stumps, and other debris) enabling marten to hunt prey active under deep snow could restrict marten densities more than the actual number of rodent prey available. A lack of such debris may be one cause of the reduced use by marten of early successional stands. Douglass et al. (1983) concluded that marten in the Northwest Territories selected forested habitats on the basis of the availability and abundance of prey rather than habitat characteristics alone. In Idaho, Koehler and Hornocker (1977) noted that mesic (wet) cover types supported the greatest number rodents and understory plant species.

Marshall (1951) and Koehler et al. (1975) and a number of other researchers have reported that marten use open areas, meadows, rockslides and other habitats during the summer that they avoid during the winter.

The dispersion of suitable resting sites close to foraging areas may limit the distribution and abundance of marten in winter. In southcentral Alaska Buskirk (1984) reported that the use of active red squirrel middens as subnivean resting sites was a major component of marten winter habitat. However, the high use of old-growth stands of white spruce or mixtures of white spruce and paper birch for resting sites probably reflected red squirrel habitat preferences. Thus, a variety of large snags, stumps, logs, and other woody debris are an important requisite of high quality marten habitat. Other authors (Steventon and Major 1982, Hargis and McCullough 1984, Campbell 1979) have also documented the importance of debris as marten resting and den sites.

Human Use: Because there are no regulations requiring marten pelts to be sealed by trappers within the planning area, it is very difficult to estimate marten harvests. Marten harvest levels tend to fluctuate widely because of annual variations in weather conditions, marten densities, regulations, and fur prices. According to Stanek (1987), marten is one of the most sought after furbearer species in the planning area. In comparison to other parts of southcentral Alaska, the western Susitna Basin (most of the planning area) resulted in the highest average harvest of marten when surveyed in 1980-81 and 1981-82. Based on a survey of 44 households in the planning area, with approximately half of these attempting to harvest marten, 411 (1982) and 225 (1984) marten were trapped.

Management Guidelines: The following recommendations provide land managers with some basic management guidelines that would be appropriate for maintaining or enhancing marten habitat in the planning area. These guidelines were developed from a selective review of the available published literature.

- * Snags (>23 cm DBH) should be maintained in areas identified as suitable marten habitat (Burnett 1981). These snags provide potential denning and nesting sites for marten.
- * Maintain travel corridors of suitable habitat to connect islands of habitat with contiguous marten habitat. Forest cover on ridgelines and in drainage bottoms should be retained.
- * Maintain a natural diversity of vegetative communities to provide a variety of food sources.

General Distribution: Beavers are distributed throughout the planning area but are limited to freshwater aquatic habitats bordered by subclimax stages of tall and low shrub, deciduous forest, and mixed coniferous-deciduous forest habitats (Hakala 1952, Boyce 1974).

Food Habits: Summer forage includes the leaves and growing tips of willow, poplar, alder, cottonwood, and birch. When available, beaver will feed on aquatic and moist soil plants such as pondweed (Potamogeton spp.) (Hakala 1952), water lily (Nupha variegatum) (Aleksiuk 1970), duckweed (Lemna spp.), and herbaceous vegetation (Banfield 1974). Winter food include the bark of willow, poplar, and alder (Boyce 1974), and spruce needles (Hakala 1952).

Habitat Requirements: Preferred beaver habitat has the following characteristics:

- * seasonably stable water levels and adequate flows to permit damming (Slough and Sadleir 1977, Murray 1961)
- * high degree of stream sinuosity (streambed distance/straight line distance) increases food availability within short distances from the water (Boyce 1974)
- * low stream gradient (less than 4%) (Retzer et al. 1956)
- * narrow streams and/or lakes with dammable outlets (Slough and Sadleir 1977)
- * remoteness from human activities (Slough and Sadleir 1977)
- * aquatic vegetation for summer food resource (op. cit).
- * tree and/or shrub canopy closure ranging from 40-60% (Allen 1982).
- * stable banks for construction of bank burrows (Murray 1961)
- * shoreline vegetation width of at least 30 m to supply food and building materials, with areas up to 200 m from water acceptable (Hall 1960, Bradt 1938)

Because beaver cut most of their food within 30 m of shore, riparian areas are extremely important. Slough and Sadleir (1977) proposed that the amount of aspen present or the length of stream in wetlands with alder and willow along the shores were important habitat components.

Human Use: Beaver harvest levels tend to fluctuate widely because of annual variations in weather conditions, beaver densities, regulations, and fur prices. According to Stanek (1987), beaver, along with marten, is one of the most sought after furbearer species in the planning area. In comparison to other parts of southcentral Alaska, the western Susitna Basin (most of the planning area) resulted in the highest average harvest of beaver when surveyed in 1980-81 and 1981-82. Based on a survey of 44 households in the planning area, with approximately half of these attempting to harvest beaver, 322 (1982-83) and 176 (1983-84) beaver were trapped. These annual harvests were approximately 79% and 45%, respectively, of the total number of beaver sealed in Game Management Unit (GMU) 16 which includes the majority of the planning area. In the 1987-1988 trapping season, 367 beaver were harvested by 44 trappers in GMU 16.

Beaver, and their associated highly visible dams and houses, provide excellent viewing opportunities for all types of user groups. Interest in observing these animals is high and is obviously limited to the ice free season.

Management Guidelines: Management guidelines for maintaining beaver populations along the river corridors include:

- * Maintain suitable shoreline vegetation at least 30m wide to supply food and building materials
- * Maintain stable stream banks

LYNX

Because of small numbers of snowshoe hares, lynx have a limited distribution and are primarily found in the more northern portions of the planning areas. The most important factors affecting hare habitat quality are hardwood browse availability and density of cover. We could expect an increase in hare numbers, and therefore lynx numbers, on naturally regenerating sites, especially in the sapling and young tree stages (Thompson 1988).

Management Guidelines: Management guidelines for maintaining lynx populations along river corridors include:

- * Maintain hardwood browse availability, especially in earlier stages, to provide food and cover for hares, the main prey item for lynx.
- * Minimize road access to corridors.
- * Minimize development of permanent facilities in areas of habitat important to lynx.

LAND OTTER

Otter and beaver habitat requirements are similar, and the protection or improvement of beaver habitat should be favorable for otter populations. However, according to Mason and MacDonald (1986), otters are extremely sensitive to water quality and the level of human disturbance. Therefore, reductions in otter populations will occur if there is a deterioration of either of these factors through human activities or from increased access resulting in human use of lakes and rivers supporting otter populations.

Management Guidelines:

- * Minimize disturbance from human activities.
- * Maintain high water quality levels.
- * Maintain resident and anadromous fish stocks for otter food supply.
- * Minimize road access to corridors.

MINK

Mink are commonly found near streams, ponds, marshes, beaches, or muskegs. They are opportunistic feeders and eat a variety of small rodents, fish, and aquatic invertebrates. Buffer zones along lakes and streams will maintain the habitats for aquatic prey species important to mink. Johnson (1985) recommended a 60 m buffer strip for beach fringe timber be maintained to support mink. In Johnson's (1985) study, mink used old growth timber stands more than second growth with only minimal use of clearcuts. In the Yukon Delta, Burns (1964) found that disturbance from the operation of heavy equipment affected mink populations.

Management Guidelines:

- ° Maintain riparian vegetation buffers to provide habitat for cover and as a food source.
- ° Minimize road access to corridors.
- ° Minimize use of mechanized equipment in and adjacent to corridors.

Bald Eagle

General Distribution: Bald eagles are distributed throughout the lower Susitna Basin. Eagles nest along major inland waterways and lakes, with densities declining markedly in the

more interior portions of the planning area. Densities likely reflect the relatively greater concentration and abundance of available food sources such as waterfowl concentrations, and the larger fish runs that occur in more coastal areas (Mindell 1983). Based on surveys conducted along the Susitna River in 1981, Kessel et al. (1982) noted that the amount and suitability of eagle nesting habitat increased markedly downstream from the Indian River confluence. Most nest locations were concentrated in three sections of the Susitna River floodplain: 1) between Talkeetna and the Parks Highway bridge, 2) Kashwitna Lake to the Yentna River mouth, and 3) from Bell Island to the mouth of the Susitna River. A summary of a 1988 distribution and abundance survey conducted by the USFWS in the Susitna River valley is summarized in Appendix A.

In winter, most rivers in the planning area freeze over and sea ice covers upper Cook Inlet, forcing most eagles to move south or east to Prince William Sound. Although some birds may overwinter in the planning area, most are thought to migrate south to the coastal areas of British Columbia, Washington, and Oregon (Beebe 1974).

Food Habits: Throughout their range, bald eagles are highly opportunistic feeders and the composition of their diet can vary significantly. On the Kenai National Wildlife Refuge (KNWR), salmon comprised a major portion of the summer diet of bald eagles (Bangs et al. 1982). Eagles were also found to utilize streams where spawning rainbow trout and longnose suckers occurred. Bangs et al. (1982) observed eagles feeding on dead moose in winter and reported birds being often caught by trappers using exposed baits. Small mammals, seabirds, and invertebrates may also be included in the diet. Eagles often congregate in relatively large numbers along salmon spawning streams to feed on spawned-out fish and will search shorelines for stranded or dead fish. Live fish are occasionally taken from lakes and streams (Grubb 1977).

Habitat Requirements: Suitable nesting habitat is essential for successful reproduction in bald eagle populations. Bald eagles prefer to nest in large, dominant or codominant trees with overhead and surrounding foliage providing shelter from wind, rain, and sun. In a recent aerial survey of the planning area, most nests were observed in cottonwood trees and estimated to be within 60 ft (18 m) of the shoreline (Parker 1988). In western Washington, Grubb (1980) reported that 55% of a total of 218 nests were within 150 ft (45 m) of a shoreline.

Roosting sites are areas where eagles spend the night but are also used during daytime, especially during stressful weather conditions or during periods of food shortage and energy stress. Many communal roosting areas are traditionally used

year after year by wintering eagles. Roosting trees are critical to the overwinter survival of eagles. These sites generally share the following characteristics: a clear line of site to surrounding terrain, a favorable microclimate, stout perches high above the ground, and freedom from human disturbance (Hansen et al. 1984). Preferred winter roost site selection appears to depend more on the availability of protective landforms and coniferous cover than on proximity to water because of the obvious microclimatic advantages. In the Chilkat River valley, conifers were used extensively for communal roosting during mid- to late fall and winter (Hansen et al. 1984). As with nest trees, eagles use the largest and most mature trees in a stand for roost trees.

Wintering eagles in Washington and summering nonbreeding adults perch more than 90% of the daylight hours (Stalmaster 1981), Gerrard et al. 1980). Breeding birds perch less since much of their time involves parental care duties. Perching sites served the following functions: 1) site from which food can be obtained, 2) feeding location, 3) site used to attract potential mates during breeding season, 4) site used for defense of nest, and 5) exposed sites allow warming and drying of plumage by the sun. Perching sites are usually close to water and local food sources.

Foraging habitat suitability depends on the availability of an adequate food base to allow eagles to survive and reproduce. Typical feeding habitat in the planning area occurs in large open areas with a wide field of view closely associated with many of the larger rivers and creeks. Lakes with potential food supplies bordered with strips of mature timber and small knolls for observational sites are probably very attractive to foraging eagles (Bangs et al. 1982).

Management Guidelines: Bald and golden eagles are protected at the federal level by the Bald Eagle Protection Act that prohibits disturbance or harassment of eagles, and the Migratory Bird Treaty Act. In Alaska they are also protected by state regulations (see 11 AAC 95.120(d)) which state that a 330 foot buffer must be retained around each bald eagle nesting tree.

The following recommendations provide land managers with some basic management guidelines that would be appropriate for maintaining or enhancing bald eagle habitat in the planning area.

- * All recreation related activities shall be restricted within a concentric circle (primary zone) around a nest tree with a minimum radius of 100 m (330 ft). If the nest is active, a secondary or seasonal zone extending an additional 200 m (660 ft) from the nest tree where

activities should be restricted during the critical breeding season (March - July). The actual width would be determined on a site-specific basis.

- * In open areas without shielding vegetation, human presence should be restricted within a distance ranging from 250 m (820 ft) to 325 m (1,000 ft) of wintering eagles to protect perching habitat (Stalmaster and Newman 1978), Stalmaster et al. 1985).
- * In open areas, a buffer zone width of 250-400 m (820-1,320 ft) from the core zone of a roost area is recommended to protect roosting habitat (USFWS 1981), Stalmaster et al. 1985).
- * In open areas a buffer zone of at least 400 m (1,320 ft) is necessary to protect feeding habitat values (Stalmaster et al. 1985). Eagles feeding on the ground were the most sensitive to human disturbance or presence (Stalmaster and Newman 1978).
- * Buffer zones of natural vegetation 75-100 m (250-330 ft) should be maintained in winter use areas to obscure line-of-sight views of human activity from wintering bald eagles (Stalmaster and Newman 1978). Vegetation buffer zones should reduce the disturbance caused by human activities, provide perching and roosting trees, and allow a closer presence of human activities in eagle wintering areas.
- * Permanent human activity near eagle nests during the nesting season lowers nest productivity (Grubb 1980, Anthony and Isaacs 1981). All human activity should be restricted within 150 m (500 ft) of a nest, especially during the egg laying and incubation stages of nesting (April 1-June 1) (Stalmaster et al. 1985).

Trumpeter Swan

General Distribution: The trumpeter swan, once considered an endangered species, breeds mainly in southcentral Alaska but also can be found as far north as the Yukon River. Swans are distributed throughout the coastal plain from Yakutat to Cook Inlet, in the forested valleys of the Copper and Susitna river drainages, and on the Kenai Peninsula and western Cook Inlet. The distribution of swans is considered to be limited by the small number of lakes containing a suitable mixture of food and protective cover.

In the Cook Inlet area, swans begin to congregate in coastal ponds and marshes in late September and move south by mid-October. Most birds will winter in coastal British

Columbia and southeast Alaska. Swans return to the Susitna Basin in April with staging occurring in the intertidal marshes of western Cook Inlet. Nesting birds proceed to their nesting lakes at the first sign of open water and are generally incubating eggs by the time the ice disappears. Nesting pairs defend a territory around the nest that usually includes the entire pond. During late June and early July, breeding swans usually molt in the vicinity of their nesting territories. Swan broods hatch in June or July and the young begin to fly in mid-September.

Swans do not nest until they are three or more years old. The younger birds remain in flocks where pairing occurs. Newly formed pairs apparently spend one or more summers searching for suitable unclaimed nesting habitat, hold their territory through the summer, and return directly to it when they are ready to nest the following year. If nesting is successful, the same pair will use the same territory for 20 or more years. Loss of nest sites or the brood can cause desertion of that territory.

Food Habits: Trumpeter swans are primarily herbivores although some invertebrates may become important food items for newly hatched cygnets (Hansen et al. 1971). In southcentral Alaska, preferred foods include maretail (Hippuris spp.), horsetails (Equisetum spp.), sedges (Carex spp.), and buckbean (Menyanthes trifoliata). Most nest sites are associated with plant communities that include these food items. Pondweed (Potamogeton spp.) tubers are also used extensively as food (Hansen et al. 1971). Most feeding occurs in shallow water areas, although limited feeding or grazing by immature and adult swans may occur on land; cygnets feed solely in water (Banko 1960). Large lakes without emergent vegetation and unsuitable for breeding are often used by nonbreeding swans as feeding areas when pondweed is present (Hansen et al. 1971).

Habitat Requirements: In Alaska, trumpeter swans are generally considered a bird of the wilderness. A large proportion of the swan population is associated with areas of recent glaciation, using shallow ponds on outwash plains often almost to the toe of active glaciers as well as ponds resulting from the meandering of large rivers (King 1968). Swans build their nests in extensive areas of marsh vegetation. Specific requirements of swan breeding habitat have been identified by Banko (1960) and include the following:

- * stable waters without marked seasonal fluctuations
- * quiet lake, marsh, or slough waters not subject to obvious currents or constant wave action

- * shallow waters of a lake or open marsh that do not preclude digging and foraging for lower aquatic plant parts (roots, tubers, etc.)

Trumpeter swans in Alaska require a minimum of 140 and as much as 154 ice-free days to complete a reproductive cycle (Hansen et al. 1971). This requirement limits most breeding habitat to elevations below 500 ft (152 m) (King 1968, Hansen et al. 1971).

Swans prefer small ponds and lakes where erosive wave action and currents do not restrict growth of emergent or mat vegetation, thus 80% of all waterbodies used for nesting are less than 35 acres (14 ha) (Hansen et al. 1971). Most waterbodies have outlets that generally maintain stable water levels and are associated with beaver activities. Most nesting ponds have clear and shallow waters with extensive margins of emergent vegetation with shorelines lacking closely-surrounded timber. In southcentral Alaska nesting ponds, water depths ranged from 12 to 36 inches, and contained plant communities dominated by sedges and horsetails, the preferred food species (Hansen et al. 1971).

Hansen (1973) reported that swans required relatively large territories, freedom from competition with other trumpeters, and isolation from human disturbance. Multiple nesting by several pairs generally occurs only on large, heavily vegetated lakes offering isolated nest sites.

A small number of swans winter in southcentral Alaska. Wintering habitat consists of unfrozen ponds or freshwater outlets of lakes with adjacent level and open terrain allowing swans to loaf or fly without restriction of visibility or movement. Swans are not known to winter in the planning area.

Human Use: Trumpeter swans are a highly visible, highly desirable species for viewing. Viewing interest of these birds is highest during the summer months. However, because of their intolerance for disturbance, and the remoteness of their nesting sites relatively few individuals have viewing opportunity.

Impacts:

- * Trumpeter swans are especially intolerant of all forms of human disturbance in their nesting habitat. Hansen et al. (1971) concluded that human disturbance during the brood season was the greatest mortality factor on cygnets. The forced rapid overland movement of nestlings from one waterbody to another makes them more vulnerable to predation by raptors, coyotes, and other terrestrial predators (McKelvey et al. 1983).

- * Human disturbance during the nest-site search period of newly-formed pairs may cause rejection of what may actually be suitable nesting habitat.
- * Increased road access will likely lead to an increase in recreational use of potential swan habitat. In the Susitna Basin, there is evidence indicating that swans have left many larger lakes where they formerly nested due to human activity (Timm and Wojek 1978).

Management Guidelines: The following guidelines were originally conceived in the Susitna Area Plan and should be utilized to protect existing trumpeter swan habitat in the planning area:

- * Road construction and other activities should occur at least one mile distant from known swan nesting or brood-rearing lakes.
- * Airplane landings on lakes with nesting swans should be prohibited from May 1 to September 10. Airplane overflights below 1,500 ft should also be prohibited during this same period.
- * Permanent facilities should not be allowed on any known swan nesting or staging lakes.

Spruce Grouse

Spruce grouse inhabit the late successional stage habitats of the boreal coniferous and mixed forests. They prefer upland habitats with 30-90% of the forest stand composed of black and/or white spruce (Ellison and Weeden 1968). Understory vegetation in preferred white spruce-birch habitats consists of grasses, blueberry, cranberry, and Spirea spp., while in the black spruce type, the understory has blueberry, cranberry, and lichen. The presence of cranberry and blueberry is considered an indicator of good habitat, because they are important summer and fall foods; they are also used as display areas by males, and as cover for broods and nest sites (Ellison 1976, Ellison and Weeden 1968).

In the fall, birds of all age and sex classes are attracted to places with grit such as the the base of uprooted trees, along lake shores, stream banks, and gravel roads. During the period from November to April, spruce grouse feed exclusively on the needles of white and black spruce (Ellison 1966). The birds prefer to feed in white spruce trees rather than black spruce, partly because the densely growing black spruce needles make feeding more difficult.

Human Use: Spruce grouse are actively hunted in the fall along roads and in other suitable habitat. They are also hunted opportunistically by other hunters. Because of the cyclic nature of their populations, harvests levels change dramatically from year to year.

Human Use

The DF&G has divided the state into distinct geographical units, call uniform coding units (UCU's), to provide a basis for accurate reporting of annual wildlife harvest. These UCU's are based on river drainage patterns and each unit has a unique alpha numeric code number. Because the units are based on river drainages, there is use information for most of the river corridors. Limitations exist on specific information however, due to generalities in public reporting and the size of some of the units. Human use information for moose will be presented for each river corridor as available, and will include the number of total hunters, total harvest and total man-days hunted for 1986, 1987 and 1988. Bear harvest information will not include effort information. This information represents only that which has been reported by hunters on permit and harvest ticket returns. An additional amount of harvest occurs that is not reported, and therefore these data should be considered as minimum harvest levels. Each river course represents the main transportation corridor for hunters hunting within the units as well as travelling to other areas. Boat access in these corridors for hunting purposes is a valid use and should be maintained.

The non-hunting use of moose has not yet been measured but interest in this species occurs mainly during the summer (tourists) months. Viewing moose occurs incidentally to other recreational activities, but adds to those experiences. Increasing public interest in viewing breeding concentrations of moose has been observed in recent years. Commercial and amateur photographers and the general public have opportunities to view moose under quality conditions.

Talkeetna River - The harvest information presented for the Talkeetna River (Table 1) includes some data from areas adjacent to it, Sheep River and Iron Creek, as these units border the Talkeetna River unit.

Brown bear harvest along the Talkeetna River has remained relatively constant during 1986-88, with 7, 7 and 6 brown bears respectively, being reported as harvested. This harvest level is not expected to change. Black bear harvest in the same area occurs primarily in the spring with additional harvest occurring during the fall hunting period. The total reported harvest decreased in 1987 and 1988 because of a lower harvest rate on the main Talkeetna River.

Little Susitna River - Table 2 presents harvest information

for moose, black and brown bear on the Little Susitna River. Brown bear harvest is negligible, which is to be expected because of the available habitat, and the amount of development occurring adjacent to the river corridor. This development would displace most brown bear from the area. Black bear harvest however, remains consistent and relatively high. Available habitat is capable of supporting black bears, and interest in this species remains high.

As indicated in Table 2, moose hunting along the Little Susitna River is a very popular activity, with over 4000 man-days of effort expended in 1988. Total hunters participating increased somewhat in 1988, however the harvest has remained relatively constant, with a 3-year average harvest of 143 moose.

Moose/Kroto Creek - Black bear harvest in this drainage has remained stable during 1986-88 (Table 3). The 3-year average harvest is 14 bears and is expected to continue. The area contains good black bear habitat, is relatively close to population centers and provides good access for hunters.

Brown bear harvest is variable but low overall. Total brown bear population in this area is relatively low and is reflected in the harvest. This trend will probably continue.

Moose harvest in the Moose/Kroto Creek corridor is relatively high and shows an increasing trend during 1986-88. At least 288 hunters spent over 1770 days harvesting 93 moose during 1988. That represents more than a 100% increase in total harvest over 1986. Moose populations in this area are probably increasing, following several mild winters, and high public use will continue.

Alexander Creek - Both black bear and brown bear harvests in this corridor have remained stable during 1986-88, indicating relatively similar effort from year to year (Table 4). Populations of both species are thought to be stable or slightly increasing and should be able to withstand continued harvest at current levels.

Moose harvest and effort in the Alexander Creek drainage shows a slightly declining trend from 1986 to 1988. This drainage receives relatively high use overall and contributes significantly to the moose harvest in GMU 16B. Alexander Creek is noted for its high winter moose densities. The riparian vegetation along the corridor shows evidence of heavy winter browsing by moose.

Lake Creek - Black bear harvest along Lake Creek is low, with only 2, 2, and 4 bears reported harvested there in 1986, 1987 and 1988 respectively (Table 5). This may indicate a lack of

effort for this area, as it is farther away from population centers.

Brown bear harvest is similarly low and stable. It appears that most of the harvest occurs in the upper sections of the Lake Creek drainage near Chelatna Lake.

Moose harvest and effort in the corridor appears to be relatively stable. An average of 64 moose have been reported taken there over the last 3 years. Floating the river during hunting season is a popular method of hunting.

Talachulitna River - The UCU that includes the Talachulitna drainage also includes the major portion of the Skwentna River and several other drainages. Therefore, reported harvest figures for this UCU also include those animals that were taken in these other areas. Identification of harvest information applicable specifically to the Talachulitna drainage is beyond the scope of this effort. Estimates of the number of animals taken in the Talachulitna corridor will be made based on the best current information.

Black bear harvest has averaged almost 19 bears per year for this UCU during 1986-1988 (Table 6). It is estimated that about 1/3 of this harvest comes from the Talachulitna drainage. Better access and more recreational traffic occurs on the mainstream of the Skwentna, and therefore more harvest probably occurs there.

Brown bear harvest has ranged from 16 to 30 for this UCU during the 1986-1988. The remoteness of the Talachulitna and the adjacent mountainous habitat provide better habitat conditions for brown bears. It is estimated that from 1/3 to 1/2 of the brown bear harvest occurs in this corridor.

Reported moose harvest and effort have remained relatively stable in this UCU during 1986-1988. As noted earlier, more traffic and better access on the main Skwentna River probably account for the majority of this harvest (Table 6).

Table 1. Reported Human Use of Moose and Bear in Talkeetna River Corridor

	1986			1987			1988		
	Total Hunters	Total Harvest	Man Days	Total Hunters	Total Harvest	Man Days	Total Hunters	Total Harvest	Man Days
Moose	126	34	734	166	49	859	130	40	664
Black Bear	-	9	-	-	4	-	-	4	-
Brown Bear	-	7	-	-	7	-	-	6	-

Table 2. Reported Human Use of Moose and Bear in Little Susitna River Corridor.

	1986			1987			1988		
	Total Hunters	Total Harvest	Man Days	Total Hunters	Total Harvest	Man Days	Total Hunters	Total Harvest	Man Days
Moose	672	144	3330	620	138	3303	752	147	4087
Black Bear	-	31	-	-	22	-	-	23	-
Brown Bear	-	1	-	-	0	-	-	-	-

Table 3. Reported Human Use of Moose and Bear in Moose/Kroto Creek Corridor.

	1986			1987			1988		
	Total Hunters	Total Harvest	Man Days	Total Hunters	Total Harvest	Man Days	Total Hunters	Total Harvest	Man Days
Moose	187	45	1089	219	75	1476	288	93	1770
Black Bear	-	15	-	-	14	-	-	13	-
Brown Bear	-	1	-	-	4	-	-	0	-

Source: ADF&G statistical harvest reports

Table 4. Reported Human Use of Moose and Bear in Alexander Creek Corridor.

	1986			1987			1988		
	Total Hunters	Total Harvest	Man Days	Total Hunters	Total Harvest	Man Days	Total Hunters	Total Harvest	Man Days
Moose	137	73	708	111	35	625	108	44	622
Black Bear	-	11	-	-	13	-	-	11	-
Brown Bear	-	4	-	-	4	-	-	5	-

Table 5. Reported Human Use of Moose and Bear in Lake Creek Corridor

	1986			1987			1988		
	Total Hunters	Total Harvest	Man Days	Total Hunters	Total Harvest	Man Days	Total Hunters	Total Harvest	Man Days
Moose	161	66	815	142	66	667	149	60	760
Black Bear	-	2	-	-	2	-	-	4	-
Brown Bear	-	5	-	-	5	-	-	3	-

Table 6. Reported Human Use of Moose and Bear in Talachulitna River Corridor.

	1986			1987			1988		
	Total Hunters	Total Harvest	Man Days	Total Hunters	Total Harvest	Man Days	Total Hunters	Total Harvest	Man Days
Moose	210	70	1157	204	87	1042	232	84	1278
Black Bear	-	18	-	-	15	-	-	23	-
Brown Bear	-	17	-	-	30	-	-	16	-

Source: ADF&G statistical harvest reports

CHRONOLOGY OF REPORTED BLACK BEAR HARVEST FOR 1979-1989 ASSOCIATED WITH LITTLE SUSITNA RIVER*

MONTH	APRIL	MAY		JUNE		JULY	AUGUST	SEPT.	OCT.	NOV.	DEC.
DAY	ALL	1-15	16-30	1-15	16-30	ALL	ALL	ALL	ALL	ALL	ALL
HARVEST	1	9	21	20	19	12	5	31	2	0	1
SUBTOTALS	1	30		39		12	5	31	2	0	1

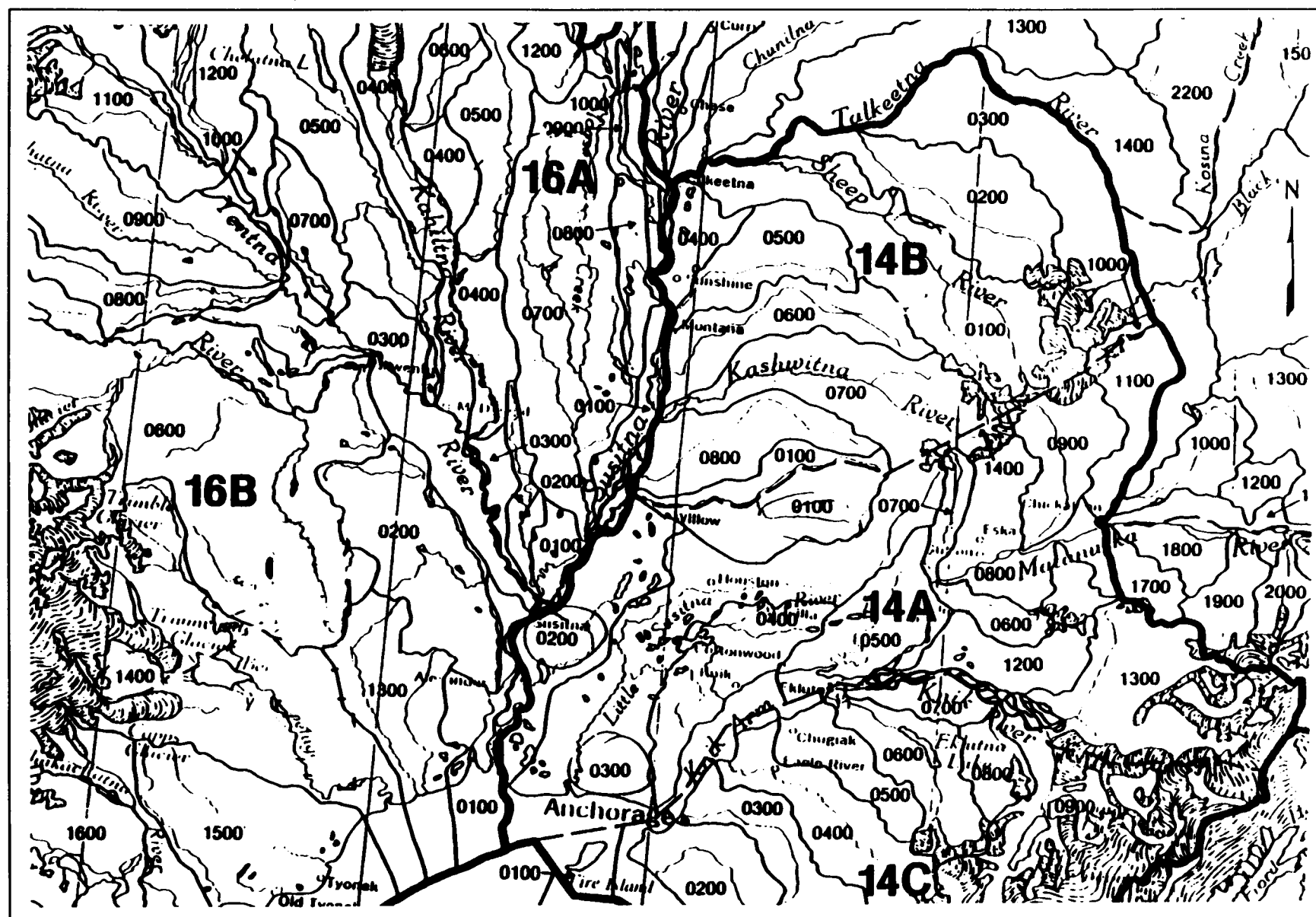
CHRONOLOGY OF BLACK BEAR HARVEST JUNE-JULY BY DAY (1979-1989)*
JUNE

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
HARVEST	2	1	3	0	0	0	0	3	3	1	0	0	0	2	2	0	0	1	1	2	0	1	3	1	3	0	0	3	1	3	0

JULY

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

* COMPUTERIZED DATA LISTING BY GMU, YEAR, SEASON AND UNIFORM CODE, ADF&G FILES.



Trapping

Trapping is considered one of the few economic mainstays for the residents in and adjacent to the study area and the Alexander Creek drainage has been identified as a subsistence use area by ADF&G. Most trapping operations are based out of cabins located on private land. While there are authorized trapping cabins on state lands adjacent to the corridors, there is only one trapping cabin authorized in the Recreation Rivers corridors. This is located on the Talkeetna River. There are, however, at least 14 trespass cabins located in the corridors. Some of these are used for trapping.

Grazing

There are no authorized grazing leases or permits within the river corridors. Although there is no documentation of livestock using the land in the Recreation Rivers in recent years, pack animals are occasionally used for recreation including riding, hunting, and fishing.

Literature Cited

- ADF&G. 1984. Fish and wildlife resources element for the Susitna area planning study. Prep. Alaska Dept. Fish and Game, Habitat Division, Anchorage. 236pp. + apps.
- Albert, S. W., and L.C. Shea. 1986. Moose winter habitat in the lower Susitna Valley, Alaska: Pilot project on habitat suitability assessment. ADF&G, Div. Habitat. Tech. Rept. No. 86-6. Juneau, Alaska. 105pp.
- Aleksiuk, M. 1970. The seasonal food regime of arctic beavers. Ecology 51:264-270.
- Allen, A. W. 1982. Habitat suitability index model: beaver. USFWS/OBS 82/10.30. 20pp.
- Anthony, R. G., and F. B. Isaacs. Characteristics of bald eagle nest sites in Oregon. Unpubl. draft. Oregon State Univ., Corvallis.
- Bailey, T. N., and E. E. Bangs. 1980. Moose calving areas and use on the Kenai National Moose Range, Alaska. Proc. N. Amer. Moose Conf. Workshop 16:289-313.
- Banfield, A.W.F. 1974. The mammals of Canada. Univ. Toronto Press. Pages 157-162.
- Bangs, E. E., T. N. Bailey, and V. D. Berns. 1982. Ecology of nesting bald eagles on the Kenai National Wildlife Refuge, Alaska. Pages 47-54 in W. N. Ladd and P. F. Schempff, eds. Proc. Symp. and Workshop on Raptor Manage. and Biology. USDI-USFWS. Alaska Reg. Office.
- Banko, W. E. 1960. The trumpeter swan. No. Amer. Fauna No. 63. USFWS, Washington, D. C. 214pp.
- Beebe, F. L. 1974. Field studies of the Falconiformes (vultures, eagles, hawks and falcons) of British Columbia. Occ. Papers of the Brit. Columbia Prov. Museum No. 17. 163pp.
- Best, D. A., G. M. Lynch, and O. J. Rongstad. 1977. Annual spring movements of moose to mineral licks in Swan Hills, Alberta. Proc. N. Am. Moose Conf. Workshop 13:215-228.
- Boyce, M. S. 1974. Beaver population ecology in interior Alaska. MS Thesis. Univ. Alaska, Fairbanks. 161 pp.
- Bradt, G. W. 1938. A study of beaver colonies in Michigan. J. Mammal. 19:139-162.

- Burns, J. J. 1964. Comparison of two populations of mink from Alaska. *Canad. J. Zool.* 42(6):1071-1079.
- Buskirk, S. W. 1983. The ecology of marten in southcentral Alaska. Ph.D. Thesis. Univ. Alaska, Fairbanks. 131pp.
- _____, S. W. 1984. Seasonal use of resting sites by marten in south-central Alaska. *J. Wildl. Manage.* 48:950-953.
- Campbell, B. 1984. Fall activity of airboats and aircraft on Coffee Point, Palmer Hay Flats and their impacts on waterfowl hunting. Draft unpublished report. Alaska Dept. of Fish and Game, Div. of Wildlife Conservation. Anchorage.
- Campbell, T. M. 1979. Short-term effects of timber harvests on pine marten ecology. MS Thesis. Colorado State Univ., Fort Collins. 71pp.
- Chatelain, E. F. 1951. Winter range problems of moose in the Susitna valley. *Proc. Alaska Science Conf.* 2:343-347.
- _____, E. F. 1952. Distribution and abundance of moose in Alaska. *Proc. Alaska Science Conf.* 3:134-136.
- Clark, T. W., and T. M. Campbell. 1977. Short-term effects of timber harvests on pine marten behavior and ecology. USDA-U.S. For. Serv. Terminal Rept. 60pp.
- Cushwa, C. T., and J. Coady. 1976. Food habits of moose (Alces alces) in Alaska: a preliminary study using rumen contents analysis. *Canad. Field-Nat.* 90(1):11-16.
- deVos, A. 1952. The ecology and management of fisher and marten in Ontario. *Ont. Dept. Lands and For. Tech. Bull.* 90pp.
- Didrickson, J. C., D. Cornelius, and J. Reynolds. 1977. Southcentral moose population studies. ADF&G, Fed. aid in Wildl. Rest. Proj. W-17-6, W-17-7, W-17-8, Jobs 1.17R, 1.18R, and 1.19R. 8pp.
- Douglass, R. J., L. G. Fisher, and M. Mair. 1983. Habitat selection and food habits of marten, (Marten americana) in the Northwest Territories. *Canad. Field-Nat.* 97:71-74).
- Elgmork, K. 1978. Human impact on a brown bear population (Ursus arctos L.). *Biol. Conserv.* 13(2):81-103.

- Ellison, L. N. 1966. Seasonal food and chemical analysis of winter diet of Alaskan spruce grouse. *J. Wildl. Manage.* 30(4):729-735.
- _____, L. N., and R. B. Weeden. 1968. Game bird report. ADF&G, Ann. Proj. segment Rept. Vol. 9. Fed. Aid in Wildl. Rest. Proj. W-13-R-2, and 3, Work Plan B, Job No. 1, 2, 6, 7, 8. 22pp.
- _____, L. N., 1976. Winter food selection by Alaskan spruce grouse. *J. Wildl. Manage.* 40(2):205-213.
- Fall, J. A., D. Foster, and R. T. Stanek. 1983. The use of moose and other wild resources in the Tyonek and upper Yentna areas: a background report. ADF&G, Div. of Subsistence Tech. Paper No. 74. 44pp.
- Faro, J. B. 1985. Black bear survey-inventory progress report. Pages 38-39 in B. Townsend, ed. Annual report of survey-inventory activities. Vol. 16, Part IV. Black bear. ADF&G. Fed. Aid in Wildl. Rest. Proj. W-22-4, Job 17.0. Juneau. 43pp.
- Francis, G. R., and A. B. Stephenson. 1972. Marten ranges and food habits in Algonquin Provincial Park, Ontario. Min. Nat. Res. Research Rept. (Wildlife) No. 91.
- Franzmann, A. W., C. C. Schwartz, and R. O. Peterson. 1980. Moose calf mortality in summer on the Kenai Peninsula, Alaska. *J. Wildl. Manage.* 44(3):764-768.
- Fyfe, R. W., and R. R. Olendorf. 1976. Minimizing the dangers of nesting studies to raptors and other sensitive species. *Canad. Wildl. Serv. Occa. Paper* No. 23. 14pp.
- Gerrard, J. M., Gerrard, P. N., and D. W. A. Whitfield. 1980. Behavior in a non-breeding bald eagle. *Canad. Field-Nat.* 94:391-397.
- Grubb, T. G. 1977. A summary of current bald eagle research in the northwest. USDA-U.S. Forest Serv. Prog. rept. 10pp.
- _____, T. G. 1980. An evaluation of bald eagle nesting in western Washington. Pages 87-103 in R.L. Knight et al., eds. *Proc. Washington Bald Eagle Symp.* Seattle, Washington.
- Hagmeier, E. D. 1956. Distribution of marten and fisher in North America. *Cand. Field-Nat.* 70:149-168.

- Hakala, J. B. 1952. The life history and general ecology of the beaver (Castor canadensis Kulh) in interior Alaska. MS Thesis. Univ. Alaska.
- Hall, J. G. 1960. Willow and aspen in the ecology of beaver on Sagehen Creek, California, Ecology 41:484-494.
- Hansen, A. J., E. L. Boeker, J. I. Hodges, and D. R. Cline. 1984. Bald eagles of the Chilkat Valley, Alaska: ecology, behavior, and management. New York. 27pp.
- _____, H. A. 1973. Trumpeter swan management. Wildfowl 24:27-32.
- _____, H. P., P. E. K. Shepherd, J. G. King, and W. A. Troyer. 1971. The trumpeter swan in Alaska. Wildl. Monogr. 26. 83pp.
- Hargis, C. D., and D. R. McCullough. 1984. Winter diet and habitat selection of marten in Yosemite National Park. J. Wildl. Manage. 48:140-146.
- Herrero, S. M. 1972. Aspects of evolution and adaptation in American black bears (Ursus americanus Pallas) and brown and grizzly bears (U. arctos Linne) of North America. Int. Conf. Bear Res. and Manage. 2:221-231.
- Johnson, C. B. 1985. Use of coastal habitat by mink on Prince of Wales Island, Alaska. MS Thesis. Univ. Alaska, Fairbanks. 179pp.
- Johnson, L. 1981. Otter and marten life history studies. ADF&G Final Rept. Fed. Aid in Wildl. Rest. Proj. W-17-10, W-17-11, and W-21-1, Job 7.10R. Juneau. 29pp.
- Jonkel, C. J. 1987. Brown bear. Pages 457-473 in Wild furbearer management and conservation in North America. M. Novak et al., eds. Ontario Ministry Natural Resources, Toronto.
- Kelleyhouse, D. G. 1977. Habitat utilization of black bears in northern California. Int. Conf. Bear Res. and Manage. 4:221-227.
- Kessel, B., D. D. Gibson, S. O. MacDonald, and B. A. Cooper, and K. C. Cooper. 1982. Avifauna of the lower Susitna River floodplain, Alaska. University of Alaska Museum, Fairbanks. Prepared for LGL Alaska Environmental Research Assoc., Ltd.
- King, J. G. 1968. Trumpeter swan survey, Alaska. USDI-Bur. Sport Fish and Wildl. Juneau.

- Koehler, G. M., W. R. Moore, A. R. Taylor. 1975. Preserving the pine marten: management guidelines for western forests. *Western Wildlands* 2(3):31-36.
- _____, G. M., and M. G. Hornocker. 1977. Fire effects on marten habitat in the Selway-Bitterroot Wilderness. *J. Wildl. Manage.* 41:500-505.
- Korschgen, C. E., L. S. George, and W. L. Green. 1985. Disturbance of diving ducks by boaters on a migrational staging area. *Wildl. Soc. Bull.* 13:290-296.
- LeFranc, M. N., Jr., M. B. Moss, K. A. Patnode, W.C. Sugg, III. 1987. Grizzly bear compendium. Prep. Nat. Wildl. Fed. for Interagency Grizzly Bear Comm. 540pp.
- Lensink, C. J. 1953. An investigation of the marten in Interior Alaska. MS Thesis. Univ. Alaska, Fairbanks. 89pp.
- Lent, P. C. 1974. A review of rutting behavior in moose. *Nat. Canad.* 101:117-130.
- Leptich, D. J., and J. R. Gilbert. 1986. Characteristics of moose calving sites in northern Maine as determined by multivariate analysis: a preliminary investigation. *Alces* 22:69-82.
- LeResche, R. E., R. H. Bishop, and J. W. Coady. 1974a. Distribution and habitats of moose in Alaska. *Naturaliste Canad.* 101:143-178.
- _____, R. E., J. L. Davis, P. D. Arneson, D. C. Johnson, and A. W. Franzmann. 1974b. Moose behavior studies. Final rept, Fed. Aid in Wildl. Rest. Projects W-17-2, W-17-3, W-17-4, W-17-5, and W-17-6. Job 1.2R.
- Machida, S. 1979. Differential use of willows by moose in Alaska. M. S. Thesis, Univ. Alaska, Fairbanks. 98pp.
- Manville, R. H., and S. P. Young. 1965. Distribution of Alaskan mammals. U.S. Fish Wildlife Serv., Bur. Sport Fisheries and Wildl. Circular 211. 74pp.
- Marshall, W. H. 1951. Pine marten as a forest product. *J. For.* 49:899-905
- Mason, C. F., and S. M. MacDonald. 1986. Otters: Ecology and Conservation. Cambridge Univ. Press. 236pp.
- McKlevey, R. W., M. C. Dennington, and D. Mossop. 1983. The status and distribution of trumpeter swans (Cygnus buccinator) in the Yukon. *Arctic* 36(1):76-81.

- McLellan, B. N., and D. M. Shackleton. 1988. Grizzly bears and resource-extraction industries: effects of roads on behaviour, habitat use and demography. *J. Appl. Ecol.* 25:451-460.
- Mech, L. D., and L. L. Rogers. 1977. Status, distribution, and movements of martens in northeastern Minnesota. USDA-For. Serv. Res. Pap. NC-143.
- Miller, S. D. 1987. Susitna hydroelectric project final report. Big game studies. Vol. VI. Black bear and brown bear. Submitted to Alaska Power Authority. 276pp.
- Mindell, D. P. 1983. Nesting raptors in Southwest Alaska: status, distribution, and aspects of biology. Bur. Land Manage., Alaska Tech. Rept. 8. Anchorage, Alaska. 59pp.
- Modafferi, R. D. 1984. Moose-downstream. ADF&G. Susitna Hydro. Project. Ann. Prog. Rept. Phase II: Big Game Studies. Vol. II. 116pp.
- Murie, A. 1944. The wolves of Mt. McKinley. U. S. Natl. Park. Serv., Fauna Ser. No. 5. 238pp.
- Murray, D. F. 1961. Some factors affecting the production and harvest of beaver in the upper Tanana River, Alaska. MS Thesis. Univ. Alaska, Fairbanks. 103pp.
- Parker, J. 1988. Susitna Valley bald eagle survey, 1988. USDI-USFWS. Ecol. Serv., Anchorage, Alaska. Unpubl. rept. 88 pp.+maps.
- Pearson, A. M. 1975. The northern interior grizzly bear (*Ursus arctos* L.) Canad. Wildl. Service., Rep. Ser. 34. 84pp.
- Peek, J. M., D. L. Ulrich, and R. J. Mackie. 1976. Moose habitat selection and relationships to forest management in northeastern Minnesota. Wildl. Monog. No. 48. 65pp.
- Peterson, R. L. 1955. North American moose. Univ. Toronto Press.
- Rausch, R. A. 1967. Report on 1965-66 moose studies. ADF&G, Fed. Aid in Wildl. Rest. Proj. W-15-R-1, Work Plan K.
- Retzer, J. L., H. M. Swope, J. D. Remington, and W. H. Rutherford. 1956. Suitability of physical factors for beaver management in the Rocky Mountains of Colorado. Colorado Game and Fish Dept., Tech. Bull. No. 2. 33pp.
- Risenhoover, K. L., and R. O. Peterson. 1986. Mineral licks as a sodium source for Isle Royal moose. *Oecologia* 71:121-126.

- Schwartz, C. C., A. W. Franzmann, and D. C. Johnson. 1983. Black bear predation on moose (bear ecology studies). Alaska Dept. Fish and Game. Fed. Aid in Wildl. Rest. Proj. W-17-10, W-17-11, W-21-1, W-21-2, W-22-1. Job 17.3R. Juneau. 135pp.
- _____, C. C., S. D. Miller and A. W. Franzmann. 1987. Denning ecology of three black bear populations in Alaska. Int. Conf. Bear Res. and Manage. 7:281-292.
- Sellers, R. 1979. Waterbird use of and management considerations for Cook Inlet State Game Refuges. Unpubl. Alaska Dept. of Fish and Game, Anchorage. 19pp.
- Shepherd, P. E. K. 1958. Food habits of railbelt moose. Job Completion Report 12(1):110-116. Fed. Aid in Wildl. Rest. Proj. W-3-R-12.
- Slough, B. G., and R. M. F. S. Sadleir. 1977. A land capability classification system for beaver (Castor canadensis Khul). Canad. J. Zool. 55:1324-1335.
- Smith, J. D., E. M. Addison, R. F. McLaughlin, D. J. H. Fraser, D. G. Joachim. 1988. Calving sites of moose (Alces alces). Can. J. Zool. (in prep).
- _____, P. A. 1984. Kenai black bears and cranberries: bear food habits and densities. M. S. Thesis. Univ. Alaska, Fairbanks. 143pp.
- Snyder, J. E., and J. A. Bissonette. 1987. Marten use of clearcuttings and residual forest stands in western Newfoundland. Canad. J. Zool. 65:169-174.
- Soutiere, E. C. 1979. Effects on timber harvesting on marten in Maine. J. Wildl. Manage. 43:850-860.
- Spencer, D. L., and J. B. Hakala. 1964. Moose and fire on the Kenai. Tall Timbers Fire Ecology Conf. Proc. 3:10-33.
- _____, D. L., and E. F. Chatelain. 1953. Progress in the management of the moose of southcentral Alaska. Trans. No. Amer. Wildl. Conf. 8:539-552.
- Stalmaster, M. V. 1981. Ecological energetics and foraging behavior of wintering bald eagles. Ph.D. Diss. Utah State Univ., Logan. 157pp.
- _____, M. V., and J. R. Newman. 1978. Behavioral responses of wintering bald eagles to human activity. J. Wildl. Manage. 42:506-513.

- _____, M. V., R. L. Knight, B. L. Holder, and R. J. Anderson. 1985. Bald Eagle. Pages 269-290 in E. R. Brown, ed. Management of wildlife and fish habitats in forests of Oregon and Washington. Part 1 - Chapter narratives. USDA-USFS Pacific Northwest Region Publication No. R6-F&WL-192-1985. 332pp.
- Stanek, R. T. 1987. Historical and contemporary trapping in the western Susitna basin. Alaska Dept. Fish and Game, Division of Subsistence. Tech. Pap. No. 134. 147pp.
- Steventon, J. D., and J. T. Major. 1982. Marten use of habitat in a commercially clearcut forest. J. Wildl. Manage. 46:175-182.
- Tankersley, N. G., and W. C. Gasaway. 1983. Mineral lick use by moose in Alaska. Can. J. Zool. 62:2242-2249.
- Taylor, M. E., and N. Abrey. 1982. Marten, (Martes americana), movements and habitat use in Algonquin Provincial Park, Ontario. Canad. Field-Nat. 96:439-447.
- Thompson, I. D. 1986. Diet choice, hunting behaviour, activity patterns and ecological energetics of marten in natural and logged areas. Ph.D. Thesis. Queen's Univ., Kingston, Ontario. 179pp.
- Tietje, W. D., and R. L. Ruff. 1980. Denning behavior of black bears in boreal forest of Alberta. J. Wildl. Manage. 44:858-870.
- Timm, D., and L. Wojek. 1978. Trumpeter swans. Fish Tails and Game Trails. ADF&G, Juneau. Nov. pp. 4-6.
- U. S. Fish and Wildlife Service. 1981. Bald eagle management guidelines for Oregon and Washington. Portland, OR. 10pp.

Sport Fisheries

Fishing Effort and Harvest

Fishery resources of northern Cook Inlet are among Alaska's most important recreational assets. Water bodies of this area provide more recreational fishing opportunity than any other geographic region in Alaska except the Kenai Peninsula. The Alaska Department of Fish and Game's (ADF&G) Statewide Harvest Survey estimates 517,414 angler days¹ of participation for northern Cook Inlet in 1988. An estimated 138,062 angler days of this participation occurred at the six recreation rivers.

Table 1 compares cumulative fishing effort for the recreation rivers to participation at selected sites within Alaska from 1977-1988. These data clearly illustrate the popularity and rapid increase in participation at the recreation rivers. Collective participation at the six rivers has increased 327% since 1977 which is more than three times the statewide rate of increase and a substantially faster growth rate than recorded for the Kenai River; the state's most popular fishery.

¹ Any part of a day spent fishing. For example, if someone fished 2 hours one day and 3 hours another day it would be recorded as 2 angler days. However, if someone fished 2 hours in the morning and 3 hours in the evening of the same day it would be considered 1 angler day.

Escalating fishing pressure at the six recreation rivers becomes even more notable in light of Alaska's declining human population. Healthy fish stocks and improving access are probable factors that draw fishermen to these fisheries in greater numbers each year. Sport fishing is without question the major recreational attraction at all six recreation rivers.

Closer examination of the six rivers reveals that the Little Susitna River consistently supports the greatest annual fishing effort whereas the Talachulitna River receives the least use from fishermen. Tables 2 and 7 depict participation and estimated harvests by species for the six rivers from 1977-1988. These data illustrate a steady increase in fishing participation at all rivers except the Talachulitna River where the magnitude of use fluctuates annually.

Seasonal Fishing Effort

Salmon are the primary target species of most anglers that visit the six rivers, however, rainbow trout may rival or exceed salmon in popularity at the Talachulitna River. Chinook and coho salmon are the most sought after salmon species. Peak fishing effort normally occurs at the Deshka River, Talkeetna River, Alexander Creek and Lake Creek during the height of the chinook salmon run to these streams. Chinook salmon run timing varies somewhat from year to year but as a rule Alexander Creek receives seasonal high fishing use from late May through mid June, Deshka River during

the first three weeks of June, Lake Creek mid June through early July and the Talkeetna River from late June until mid July. The Talachulitna River chinook run timing is similar to the Talkeetna River. Fishing participation for chinook salmon at the Little Susitna River peaks about mid June, however, the highest seasonal use normally occurs from late July through early August while fishermen are seeking coho salmon.

Seasonal salmon fishing effort at the six rivers can loosely be characterized as follows: 1) Chinook salmon fishing begins during late May and peaks sometime in June; 2) Fishing effort is sharply reduced during mid July; 3) Coho salmon fishing starts the latter part of July and peaks during early August; 4) Most salmon fishing is concluded by early September. This generalized use pattern differs according to a river's proximity to salt water and also within the various river reaches that comprise a drainage. Salmon, for example, arrive earlier at Alexander Creek than at the Talkeetna River because Alexander Creek is much closer to saltwater. Fishing effort, of course, peaks earliest at the terminal portion of a river because salmon must pass through this area before migrating upstream to spawn.

Chinook Salmon Harvest Effort, 1989

Chinook salmon harvest, effort and harvest per hour for selected northern Cook Inlet streams for 1986-1989 are shown in Table 8. These creel survey data reflect the magnitude of fishing effort

in hours at five of the recreation rivers as well as other major chinook salmon fisheries. Increasing participation in the chinook salmon fisheries closely parallels the trend previously noted by the Statewide Harvest Study for all species on an annual basis.

Angler Characteristics and Distribution

Distribution of fishing effort and miscellaneous demographic information for the 1989 chinook salmon fisheries are presented in Tables 9 - 23. Data for the Little Susitna and Talkeetna Rivers characterize anglers that exit these fisheries at the Burma road access site and the Talkeetna city boat launch, respectively. Demographic data for the Deshka River, Alexander Creek and Lake Creek were collected during boat and aerial surveys. These surveys were randomly performed five days each week between 5 am and 11 pm. As a rule the heaviest concentration of fishing effort for chinook salmon occurs near the mouths of the recreation rivers. At the Talkeetna River, however, about 80% of the effort occurs near the confluence of Clear Creek and Talkeetna River. Fishing effort at the Little Susitna River is heaviest near the Burma Road access site which is about 28 miles from the river's mouth. On a daily basis, weekend fishing effort is substantially greater than weekday effort at all chinook salmon fisheries.

Resident Species Fisheries

Rainbow trout, Arctic grayling and Dolly Varden are important fishes that attract substantial numbers of anglers to the recreation rivers. Rainbow trout, as previously noted, are a major target species at the Talachulitna River throughout the open water season. Resident fishes generally attract the largest number of fishermen during the fall after salmon abundance has declined. Late August through September usually receives the peak fishing effort for resident species, however, some anglers seek resident species throughout the spring and summer. Winter fishing through the ice is relatively modest or non-existent within most of the river corridors. Set line fishing for burbot at the mouth of the Deshka River, however, appears to be a developing winter fishery. Only a few anglers fish for other resident species through the ice. Northern pike, lake trout and several species of whitefish are also harvested from waters located within the river corridors. Hooligan (smelt) are sometimes dipnetted at mouths of the Deshka River, Alexander Creek and Lake Creek.

Management and Research Activities

The Alaska Department of Fish and Game has the responsibility of obtaining optimum sustained human benefits from the fishery resources of the six recreation rivers. The Division of Sport Fish of the ADF&G works closely with the fishing public, other

fishery divisions of the ADF&G and the Board of Fisheries to achieve continuing benefits from recreational fishery resources. The Division of Sport fish currently monitors harvest and fishing effort for chinook salmon by field creel survey at all recreation rivers except the Talachulitna River. Chinook salmon escapement trends are also measured annually at each of the six rivers. Biological features of these harvests and escapements are also evaluated. Coho salmon harvest and fishing effort are presently monitored by creel survey only at Lake Creek and the Little Susitna River. In the past, similar coho salmon harvest surveys have been conducted at the Deshka and Talkeetna Rivers. A weir at the Little Susitna River measures salmon escapement into that system. The contribution of hatchery coho salmon returning to the Little Susitna River is also evaluated by this weir. Rainbow trout life history research is presently being conducted at Lake Creek, Deshka River and Talachulitna River. Fishing effort and harvest by species, as previously discussed are estimated annually by the Statewide Harvest Survey; a mail questionnaire.

The above referenced research and management activities are subject to modification as human demands change or fish abundance fluctuates. Many additional fishery functions are also being performed that either directly or indirectly affect recreation river fish stocks. A few examples of such activities include: commercial test fishing and stock identification research in Cook Inlet marine waters, sonar and fishwheel evaluations of salmon

runs in the Yentna and Susitna Rivers, aquatic habitat protection, fishery law enforcement, etc.

Temporary field camps as well as research cabins are or have been used to billet fish and game staff at each of the recreation rivers. Salmon counting weirs or counting towers have been or are being employed at most of the recreation rivers. The need for these facilities or structures as well as related fish sampling devices is expected to grow as human demands on fish and fish habitat increase. Escalating human use of the recreation rivers will undoubtedly require more precise and timely in-season information for management decisions. The need for and locations of additional facilities will largely be determined by the magnitude and the distribution of future fishing pressure at the respective rivers.

Fish Stocking

From a recreational standpoint the need for or desirability of supplementing native stocks with hatchery fish will be determined by future angling pressures and public opinions. Lost or impaired aquatic habitat is yet another consideration that could influence future fish stocking decisions. Currently the ADF&G stocks both fingerling and smolt coho salmon in the Little Susitna River drainage. Chinook salmon smolt are also being proposed for this recreation river.

The Division of Sport Fish is developing, through the public review process, a statewide five year fish stocking plan for recreational fisheries for 1989-1993. The numbers of coho and chinook salmon proposed for stocking into the Little Susitna River drainage are presented in this plan. No additional recreation related fish stocking has been proposed or scheduled for the remaining recreation rivers.

Fishery Regulatory Authorities

Alaska's constitution states that fisheries will be utilized, developed and conserved for the maximum benefit of the people of the state. The Alaska Board of Fisheries has the responsibility of translating this constitutional mandate into regulation. Fishing regulations are essential because of the unique common property status of fish i.e. fish belong to no individual until harvested. An unregulated fishery therefore becomes subject to damage or depletion from the collective harvest efforts of individuals acting in their own best interest.

The two major responsibilities of the Board of Fisheries are to insure the conservation of fishery resources and to allocate harvestable fish surpluses among the users of these resources. The Department of Fish and Game serves as a technical advisor to the Board of Fisheries for conservation issues. During the fishing season, when the Board of Fisheries is not usually in session, certain regulatory management can be performed by the

ADF&G. In-season regulatory authority allows the ADF&G to open, close or modify seasons and to adjust harvest areas if unforeseen events threaten the biological welfare of a fishery resource. The emergency order is the primary tool of in-season regulatory management. Emergency orders are also employed by the ADF&G according to management plans formally adopted by the Board of Fisheries.

Emergency regulations which commonly address methods and means of harvest or bag limits have seldom been used by the ADF&G because of complexity of issuance, however, a recently enacted statute should clarify and streamline the process for future in-season use of emergency regulations. Waterways containing anadromous fish (fish that migrate from the sea to freshwater to spawn) are protected by the ADF&G by statute (16.05.870). A permit is required for many activities which affect such waterways. Permits are required for example, to construct a hydraulic project or use, divert, obstruct, pollute or change the natural flow or bed of an anadromous waterbody or to use wheeled, tracked or excavating equipment or log-dragging equipment in the bed of such a waterway. All six recreation rivers are identified as anadromous fish streams and therefore are subject to habitat protection processes and regulations.

An awareness of the respective authorities of the Board of Fisheries and the ADF&G is important to a full understanding of the management plans and regulations that presently govern the

harvests of recreation river fishes. It is further important to recognize that the Recreation River Act itself does not diminish or alter these authorities.

Harvest of salmon in Upper Cook Inlet, including salmon of recreation river origin, is presently managed according to the intent expressed in the Upper Cook Inlet Salmon Management Plan. This plan, which was adopted by the Board of Fisheries as a formal regulation in 1981, can be broken into the following allocative components:

1. Provide for the subsistence priority.
2. Manage the Susitna chinook salmon, early Russian River sockeye salmon, and early Kenai chinook salmon, which normally move through Upper Cook Inlet prior to June 30, primarily for recreational uses.
3. Manage those stocks moving through Upper Cook Inlet between July 1 and August 15 primarily for commercial uses.
4. After August 15, manage stocks moving to Kenai Peninsula drainages primarily for recreational uses.
5. Manages stocks other than those spawning in Kenai Peninsula drainages primarily for commercial uses.

6. Minimize the incidental commercial harvest of Susitna coho salmon, late Kenai chinook salmon, and early Kenai coho salmon stocks.

The wording of this plan clearly states that chinook salmon bound for recreation rivers are to be managed primarily for recreational uses because these fish stocks move through Cook Inlet prior to June 30. On the other hand, virtually all other recreation river salmon are to be managed primarily for commercial uses because these salmon species pass through Cook Inlet after June 30. The plan further states that the subsistence priority has preference over other uses for all applicable stocks. Language that directs the ADF&G to minimize the incidental commercial harvest of specific stocks such as Susitna coho salmon has created user confusion and controversy. Presently, Susitna coho salmon, of which many contribute to recreation river fisheries, are managed primarily for commercial uses.

This plan further notes that it is not the intent of the Board of Fisheries to establish exclusive uses of salmon stocks but rather to define primarily beneficial use while permitting secondary uses of specific stocks to the extent that such use is consistent with the requirements of the primary user group. The marine run timing for recreation river salmon stocks is shown in Figure 1.

Management concepts that apply to trout residing in the recreation rivers are addressed in the Rainbow/Steelhead Trout Management Policy for Cook Inlet Waters. This policy was adopted by the Board of Fisheries in 1986 to provide future Fisheries Boards, ADF&G managers and the sport fishing public with the following:

1. Management Policies and Implementation directives for Cook Inlet rainbow and steelhead trout fisheries.
2. A systematic approach to developing sport fishing regulations that includes a process for rational selection of waters for such special management as catch and release, trophy areas and high yield fisheries.
3. Recommended research objectives.

Fishery Management Concepts

Regulations that currently govern the harvest of recreation river fish stocks have evolved concomitant with increasing fishing pressure and/or because of changing public preferences. Board of Fisheries management plans and policies have guided the development of existing regulation both in the marine waters of Cook Inlet and in freshwaters of the Susitna River Basin. Regulatory strategies for the six recreation rivers differ from

one another in many aspects yet there are also numerous regulatory similarities among the rivers.

In general, sport fishing regulations are most liberal at locations and during seasonal periods where salmon are abundant. This is particularly true at the lower reaches or terminal areas of most rivers where the salmon are often in a near ocean fresh condition. Seasonal or river reach fishery closures are commonly enforced whenever spawning salmon are vulnerable to significant harvest. River reaches that are road accessible usually have the most restrictive salmon regulations.

Conservative regulations are also frequently in effect during seasonal periods or at locations where salmon are not abundant. Such regulations are directed toward protection of resident fishes such as trout, char and grayling. Conservative regulations usually restrict terminal gear to unbaited artificial lures and reduce bag limits. The Talachulitna River in its entirety, nearly all of Lake Creek, more than two-thirds of the Deshka River and a small drainage (Fish Creek) within the Talkeetna River system are single hook, unbaited artificial lure fisheries where all rainbow trout must be released. These "no kill" fisheries were selected and are managed according to criteria defined in the Rainbow Trout/Steelhead Policy for Cook Inlet.

Regulatory strategies currently enforce at most of the recreation rivers attempt to maximize harvest opportunities for salmon whereas the harvest of resident fishes is regulated much more conservatively. Management tactics for rainbow trout frequently attempt to promote diversified fishing opportunities and catch recycling rather than trout harvest. Regulatory actions currently in effect at the six recreation rivers include: creel restrictions or limits, fish size restrictions, seasons, stream reach fishing restrictions and lure requirements. The basic functions of these regulations are to preserve fish stocks and to provide an equitable distribution of fish among anglers.

Fisheries Enhancement - Chelatna Lake

Cook Inlet Aquaculture Associates (CIAA) presently has an active sockeye salmon enhancement project at Chelatna Lake within the Recreation Rivers. The intent of the Chelatna Lake project enhancement project is to increase sockeye salmon production through stocking of fry into a productive but under-utilized rearing habitat.

Development Schedule

The egg-take limit is 2.0 million eggs. During the first 5 years of this project eggs will be collected from adults which return to Chelatna Lake or from adults which return to a donor source. In subsequent years eggs will be secured from adult fish which return to Chelatna Lake. Approximately 1.5 million sockeye fry were released into Chelatna Lake in June 1991.

Broodstock

In years in which Judd Lake is utilized as a donor source, sockeye adults will be collected at temporary weirs established in spring-fed sloughs adjacent to the shore and in Talachulitna Creek (upstream from Judd Lake).

In years in which Chelatna Lake adults are utilized, sockeye will be collected at a temporary weir established in a spring-fed slough at the head of Chelatna Lake.

Sockeye returns to Chelatna Lake are expected to contribute to both set- and drift-gillnet fisheries in the Central District and the Northern District set-gillnet fishery. It is anticipated that Chelatna Lake sockeye run timing will coincide with all other Upper Cook Inlet salmon stocks, except chinook salmon.

The number of adult sockeye produced by a 2.0 million egg enhancement program at Chelatna Lake is projected to be 112,000. This number is sufficiently small, when compared to the total Susitna River sockeye run, that Commercial Fishery management decisions will not be affected by the presence of enhanced adults in the fishery. No "emergency openings" will occur as a result of the presence of enhanced adults in the fishery. Therefore, no increased harvest of wild coho, pink, sockeye or chum salmon is expected to occur as a result of the presence of enhanced Chelatna Lake adults in the fishery.

Sport fishing of the Chelatna Lake sockeye returns will occur in the Susitna and Yentna rivers, Chelatna Lake, and in Lake Creek, especially at its confluence with the Yentna.

Stocking - Little Susitna River

The Little Susitna River is the other recreational river undergoing fish enhancement. Because of the river's enormous popularity as a

salmon sport fishing area and relatively good access, the department has identified its coho and chinook salmon populations as priorities for enhancement.

The Alaska Department of Fish and Game released 466,016 and 358,478 coho salmon smolt into the Little Susitna River in 1988 and 1989, respectively. An additional 3,374,126 coho fingerlings were released in 1988 followed by 341,600 fingerlings in 1989. The department plans to continue releasing about 300,000 coho smolts annually. Fingerling releases will, however, be greatly reduced or eliminated because of poor survival of these small hatchery fish.

The department is considering releasing 200,000 chinook salmon smolts annually into the Little Susitna River but expanded hatchery production will be necessary before such a release can take place.

Table 1. Sport fishing effort* for selected Alaska fisheries, 1977-1988.

	Days Fished												1977-1988 Increase Percent
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	
Six Recreational Rivers	32,357	42,691	64,102	63,851	57,735	67,575	94,955	104,178	107,067	121,073	116,067	138,062	327
All other northern Cook Inlet fisheries	194,152	188,777	210,703	259,572	215,448	243,701	260,529	302,155	275,970	310,744	318,438	379,352	95
Total northern Cook Inlet fisheries**	226,509	231,468	274,805	323,423	273,183	311,276	355,484	406,333	383,037	431,815	436,479	517,414	128
Kenai River	122,138	164,264	178,485	171,803	178,716	231,948	229,228	270,422	322,230	335,051	289,165	374,259	206
Total statewide	1,198,486	1,285,063	1,364,739	1,448,962	1,420,172	1,623,092	1,732,528	1,866,837	1,943,069	2,071,412	2,152,886	2,320,808	94

* Data from Statewide Harvest Report.

** Includes all waters reported in the Statewide Harvest Report as Areas K, L,
Essentially the waters of the Matanuska-Susitna Borough and Municipality of Anchorage.

Table 2. Little Susitna River Harvest and Effort, 1977-1988.

Year	Days Fished	KS	SS	RS	PS	CS	RT	DV	LT	GR	NP	BB	Other
1977	11,063	0	3,415	888	1,208	131	843	645	0	190	0	6	77
1978	12,127	0	4,865	859	1,517	956	886	570	0	54	0	9	759
1979	21,301	800	3,382	1,478	618	364	1,391	1,191	0	36	0	55	291
1980	22,420	646	6,302	2,127	3,918	465	852	1,748	0	181	0	9	1,059
1981	26,162	920	5,940	1,619	709	278	2,692	2,529	0	153	0	29	690
1982	24,020	933	7,116	1,865	1,163	943	1,551	1,331	0	388	0	10	713
1983	35,477	847	2,835	2,787	251	450	1,290	1,227	31	199	0	52	136
1984	48,517	1,641	14,253	6,385	2,045	1,708	860	1,272	0	100	0	25	87
1985	41,643	1,365	7,764	2,894	590	382	1,294	1,791	0	191	0	35	587
1986	45,770	1,049	6,039	3,616	696	822	838	1,407	0	223	0	22	134
1987	35,659	1,864	13,003	3,513	217	534	447	380	0	217	0	54	0
1988	49,731	2,481	19,009	2,310	1,146	673	1,273	564	91	0	0	36	0
1989*													

*Harvest and effort data derived from the statewide questionnaire is not available for 1989.

Table 3. Deshka River Harvest and Effort, 1977-1988.

Year	Days Fished	KS	SS	RS	PS	CS	RT	DV	LT	GR	NP	BB	Other
1977	3,852	0	559	0	391	0	1,556	0	0	631	0	3	68
1978	9,111	0	1,798	0	697	0	3,634	0	0	579	0	0	72
1979	13,326	2,811	973	0	106	0	3,182	0	0	1,463	0	309	82
1980	19,364	3,685	2,290	0	689	0	4,305	0	0	1,917	0	224	69
1981	13,248	2,031	632	0	19	0	3,631	10	0	1,255	0	96	19
1982	18,391	3,165	2,463	0	377	0	3,804	0	0	1,457	0	252	115
1983	23,174	3,955	1,036	0	21	0	2,434	0	0	1,280	0	126	430
1984	20,561	4,452	1,646	125	748	87	2,120	25	0	1,110	0	237	212
1985	29,322	5,088	2,637	50	87	25	3,104	139	0	1,335	0	140	175
1986	29,739	4,457	4,256	11	882	34	2,513	78	0	938	0	257	257
1987	30,008	4,622	2,789	272	652	54	3,006	72	0	163	0	1,123	0
1988	32,160	388	7,458	146	800	164	4,075	273	0	1,164	0	36	0
1989*													

*Harvest and effort data derived from the statewide questionnaire is not available for 1989.

Table 4. Alexander Creek Harvest and Effort, 1977-1988.

Year	Days Fished	KS	SS	RS	PS	CS	RT	DV	LT	GR	NP	BB	Other
1977	5,991	0	1,562	349	1,263	30	1,251	53	0	280	0	0	59
1978	6,914	0	2,401	183	1,146	215	2,640	136	0	1,871	0	0	181
1979	8,284	712	1,560	79	236	45	1,182	182	0	745	0	36	145
1980	6,812	1,438	999	52	809	121	1,945	353	0	1,145	0	0	0
1981	6,892	843	891	67	57	10	2,290	287	0	1,130	0	29	0
1982	10,748	1,825	1,907	335	482	0	2,505	42	0	1,582	0	84	178
1983	9,425	1,039	408	69	126	0	608	136	0	483	0	0	21
1984	7,261	1,621	1,509	87	62	37	785	75	0	362	0	12	187
1985	12,884	2,077	1,455	261	112	12	1,318	0	0	98	17	0	35
1986	19,113	2,055	1,352	0	413	22	1,553	34	0	1,273	514	0	0
1987	13,220	2,020	1,539	72	91	127	978	0	0	1,050	254	18	31
1988	19,591	3,958	55	400	18	1,419	236	0	891	800	36	0	
1989*													

*Harvest and effort data derived from the statewide questionnaire is not available for 1989.

Table 5. Lake Creek Harvest and Effort, 1977-1988.

Year	Days Fished	KS	SS	RS	PS	CS	RT	DV	LT	GR	NP	BB	Other
1977	6,946	0	1,203	658	4,927	162	1,853	122	116	1,599	42	42	14
1978	8,767	0	2,212	254	2,833	1,015	2,721	154	36	2,115	9	45	18
1979	13,881	1,796	2,671	440	882	136	4,527	164	9	1,963	209	64	109
1980	8,325	775	2,351	267	2,101	69	2,144	121	0	1,972	103	0	0
1981	6,471	632	1,035	211	412	48	2,874	67	19	1,600	0	29	19
1982	8,649	1,289	1,603	252	398	199	3,134	482	0	1,955	52	0	63
1983	14,749	1,888	1,392	726	430	52	2,287	262	0	2,224	52	283	10
1984	14,739	2,270	2,432	374	636	249	3,080	125	0	2,257	50	100	137
1985	14,323	1,878	4,105	137	137	124	1,439	87	121	1,266	52	140	484
1986	15,626	1,799	1,575	547	670	212	961	0	0	983	0	67	145
1987	16,842	2,845	1,358	435	670	36	1,902	36	0	1,322	0	507	0
1988	16,007	2,509	2,110	291	491	346	1,146	91	36	637	36	327	0
1989*													

*Harvest and effort data derived from the statewide questionnaire is not available for 1989.

Table 6. Talkeetna River and Tributaries Harvest and Efforts, 1977-1988.

Year	Days Fished	KS	SS	RS	PS	CS	RT	DV	LT	GR	MP	BB	Other
1977a	3,163	0	1,070	334	1,314	146	450	379	0	486	0	0	23
1978	5,040	0	2,200	28	2,074	1,912	1,501	1,817	0	859	0	27	0
1979	5,125	312	1,248	31	645	355	1,373	827	0	1,045	0	9	64
1980	4,388	172	661	6	622	385	950	751	0	1,348	0	32	32
1981	3,584	287	422	29	19	57	1,226	1,418	0	996	0	0	38
1982	3,856	398	996	115	220	31	608	1,069	0	943	0	0	10
1983	7,564	682	836	534	73	650	1,836	1,962	0	1,553	0	84	126
1984b													
Clear Creek	7,964	997	1,334	599	611	337	910	1,521	0	1,335	0	0	49
Talkeetna River	1,288	125	175	37	25	0	162	499	25	449	0	62	0
Total	9,252	1,122	1,509	636	636	337	1,072	2,020	25	1,784	0	62	49
1985													
Clear Creek	6,502	568	707	478	120	229	832	1,248	0	1,613	0	0	105
Talkeetna River	711	30	40	30	0	30	104	104	0	52	0	0	0
Total	7,213	598	747	508	120	259	936	936	0	1,665	0	0	105
1986c	8,638	799	3,376	1,597	399	799	2,396	2,396	0	3,049	0	0	363
1987c	17,096	1,407	2,608	580	272	1,032	869	869	0	2,481	0	0	0
1988c	12,733	1,544	2,929	1,110	182	1,255	1,110	2,146	0	1,000	0	55	0
1989*													

a: From 1977 through 1983 the Statewide Harvest Report only measured effort and harvest from Clear Creek;
a tributary of the Talkeetna River.

b: During 1984 and 1985 Clear Creek and the remainder of the Talkeetna River were reported separately.

c: In 1986, 1987, and 1988 harvest and effort were reported for the entire Talkeetna River, including Clear Creek.

*Harvest and effort data derived from the statewide questionnaire is not available for 1989.

Table 7. Talachulitna River Harvest and Effort, 1977-1988.

Year	Days Fished	KS	SS	RS	PS	CS	RT	DV	LT	GR	NP	BB	Other
1977	1,342	0	346	457	539	37	0	252	0	832	0	0	0
1978	732	0	88	141	31	234	0	235	0	99	0	0	0
1979	2,185	0	125	47	100	55	0	155	0	664	0	0	45
1980	2,542	0	491	112	276	17	379	982	0	1,713	0	0	0
1981	1,378	0	240	172	29	0	0	10	0	479	0	0	0
1982	1,911	0	524	63	220	0	0	31	0	587	0	0	0
1983	4,566	273	84	41	0	0	0	105	0	3,178	0	0	0
1984	3,848	399	486	262	87	75	0	50	0	898	0	0	0
1985	1,682	199	224	50	0	0	0	87	0	434	0	0	0
1986	2,187	190	402	424	235	45	0	101	0	290	0	0	0
1987	3,242	116	235	240	0	0	0	0	0	272	0	0	0
1988	8,040	871	418	800	18	91	0	382	0	1128	0	0	0
1989*													

*Harvest and effort data derived from the statewide questionnaire is not available for 1989.

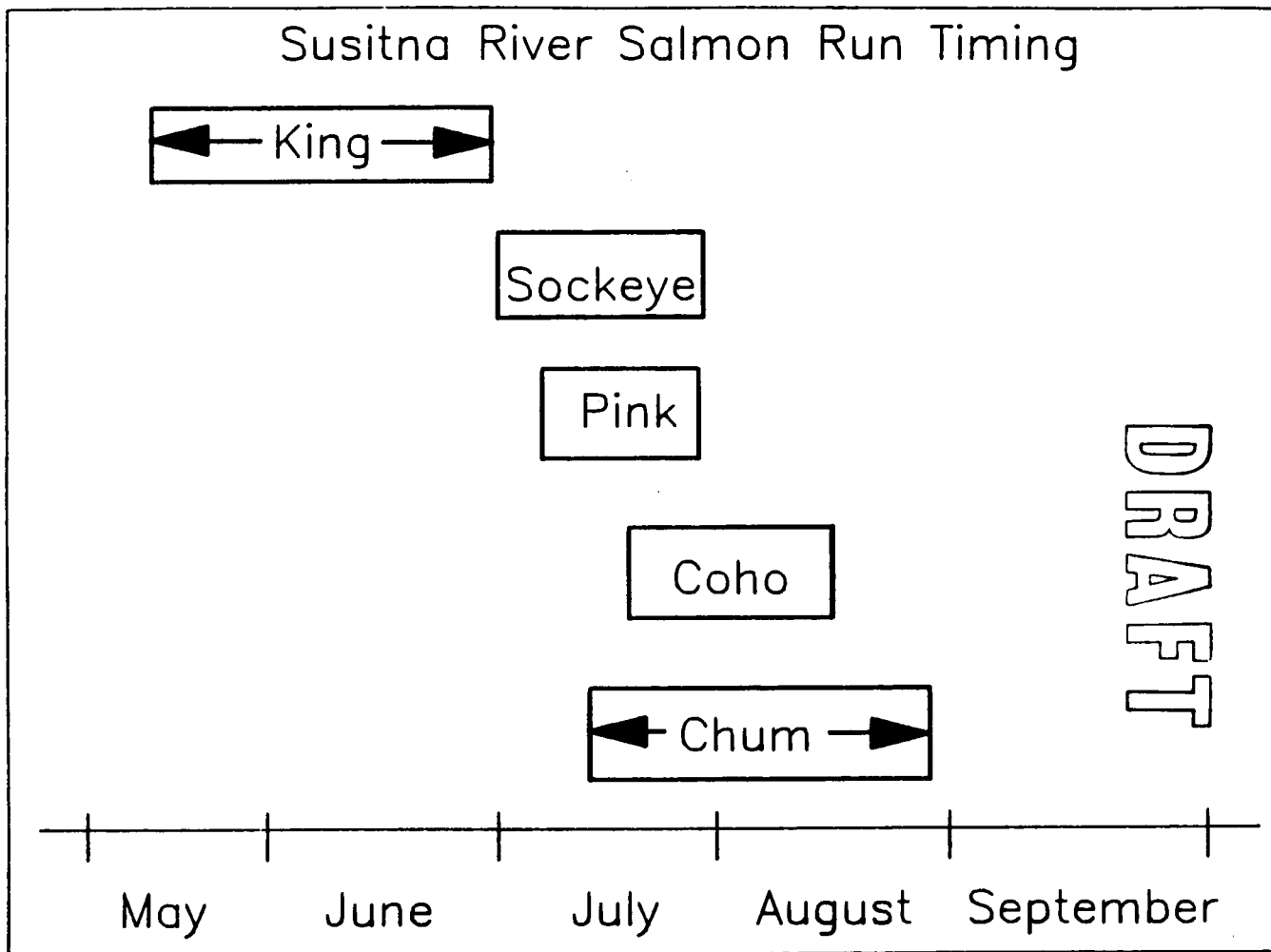
Table 8. Harvest and effort for Creel surveyed northern Cook Inlet chinook salmon fisheries, 1986-1989.

Stream	Effort 1/				Harvest				Harvest per hour			
	1986	1987	1988	1989	1986	1987	1988	1989	1986	1987	1988	1989
Deshka River	54,984	71,687	60,418	75,729	2,919	4,649	3,230	4,976	0.0531	0.0649	0.0535	0.0657
Alexander Creek	30,143	27,067	32,890	42,860	1,827	1,961	2,438	4,363	0.0606	0.0724	0.0741	0.1018
Lake Creek	30,824	33,509	38,778	33,231	3,094	2,149	2,631	2,363	0.1004	0.0641	0.0678	0.0711
Talkeetna River 2/	14,524	42,132	28,786	39,990	1,148	1,930	1,436	2,466	0.0790	0.0458	0.0499	0.0617
Montana Creek	18,613	16,550	14,604	25,326	1,820	1,032	919	2,221	0.0978	0.0624	0.0629	0.0877
Sheep Creek	16,698	16,054	22,101	15,138	1,069	1,077	1,776	855	0.0640	0.0671	0.0804	0.0565
Willow Creek	10,155	17,720	23,410	33,002	1,043	1,720	2,160	2,570	0.1027	0.0971	0.0923	0.0779
L. Susitna River	32,806	44,682	41,753	64,412	992	1,622	1,964	2,265	0.0302	0.0363	0.0470	0.0352
Total	208,747	269,401	262,740	329,688	13,912	16,140	16,554	22,079	0.0666	0.0599	0.0630	0.0670

1/ Angler effort in hours.

2/ Includes Clear Creek.

FIGURE 1 Marine Run Timing for Susitna River Salmon Stocks.



SPECIES PERIODICITY CHART FOR: Alexander Creek, reach A (Mouth to RM 16)

(to Sucker Creek)

Date: October 9, 1989

Initials: _____

USGS Maps: Tyonek B-2, C-2File name: PERALEXA.DRM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
CHINOOK SALMON												
Passage					XXXX	XXXX	XXXX	X				
Spawning							XX	XXXX				
Incubation	XXXX	XXXX	XXXX	XX			XX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
COHO SALMON												
Passage							XXXX	XXXX	XXXX			
Spawning								XXXX	XXXX	XX		
Incubation	XXXX	XXXX	XXXX	XX				XXXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
PINK SALMON												
Passage							XX	XXXX				
Spawning							XX	XXXX	XX			
Incubation	XXXX	XXXX	XXXX	XX			XX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing												
SOCKEYE SALMON												
Passage ?												
Spawning ?												
Incubation ?												
Rearing ?												
RAINBOW TROUT												
Spawning				??	????	??						
Incubation				??	????	????	????	??				
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
BURBOT												
Spawning	XXXX	XX										XXXX
Incubation	XXXX	XXXX	XXXX	?								XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
ARCTIC GRAYLING												
Spawning ?												
Incubation ?												
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Based on professional judgement of ADF&G biologists.

Incubation life phase includes period from egg deposition to fry emergence.

? - Data not available.

SPECIES PERIODICITY CHART FOR: Alexander Creek, reach B (RM 16 to RM 29.5)

Date: October 9, 1989 Initials: _____

USGS Maps: Tyonek C-2, C-3 Filename: PERALEXB.DRM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
CHINOOK SALMON												
Passage					XXX	XXXX	XXXX	XX				
Spawning							X	XXXX	X			
Incubation	XXXX	XXXX	XXXX	XXX			X	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
COHO SALMON												
Passage							XXX	XXXX	XXXX	X		
Spawning								XXX	XXXX	XXX		
Incubation	XXXX	XXXX	XXXX	XXX				XXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
PINK SALMON												
Passage							X	XXXX	X			
Spawning							X	XXXX	XXX			
Incubation	XXXX	XXXX	XXXX	XXX			X	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing												
SOCKEYE SALMON												
Passage	?											
Spawning	?											
Incubation	?											
Rearing	?											
RAINBOW TROUT												
Spawning				??	????	??						
Incubation				??	????	????	????	??				
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
BURBOT												
Spawning	XXXX	XX										XXXX
Incubation	XXXX	XXXX	XXXX	?								XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
ARCTIC GRAYLING												
Spawning	?											
Incubation	?											
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Based on professional judgement of ADF&G biologists.

Incubation life phase includes period from egg deposition to fry emergence.

? = Data not available.

SPECIES PERIODICITY CHART FOR: Alexander Creek, reach C (Lake) (29.5-31.5)Date: October 9, 1989 Initials: _____USGS Maps: Tyonek C-3, D-3 Filename: PERALEXC.DRM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
CHINOOK SALMON												
Passage					XXX	XXXX	XXXX	XX				
Spawning							X	XXXX	X			
Incubation	XXXX	XXXX	XXXX	XXX			X	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
COHO SALMON												
Passage							XXX	XXXX	XXXX	X		
Spawning								XXX	XXXX	XXX		
Incubation	XXXX	XXXX	XXXX	XXX				XXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
PINK SALMON												
Passage							X	XXXX	X			
Spawning							X	XXXX	XXX			
Incubation	XXXX	XXXX	XXXX	XXX			X	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing												
SOCKEYE SALMON												
Passage	?											
Spawning	?											
Incubation	?											
Rearing	?											
RAINBOW TROUT												
Spawning				??	????	??						
Incubation				??	????	????	????	??				
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
BURBOT												
Spawning	XXXX	XX										XXXX
Incubation	XXXX	XXXX	XXXX	?								XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
ARCTIC GRAYLING												
Spawning	?											
Incubation	?											
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Based on professional judgement of ADF&G biologists.

Incubation life phase includes period from egg deposition to fry emergence.

? - Data not available.

SPECIES PERIODICITY CHART FOR: Alexander Creek, reach D (Sucker Creek)

Date: October 9, 1989 Initials: _____

USGS Maps: Tyonek C-3, D-3 Filename: PERALEXD.DRM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
CHINOOK SALMON												
Passage					XXX	XXXX	XXXX	XX				
Spawning							X	XXXX	X			
Incubation	XXXX	XXXX	XXXX	XXX			X	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
COHO SALMON												
Passage							XXX	XXXX	XXXX	X		
Spawning								XXX	XXXX	XXX		
Incubation	XXXX	XXXX	XXXX	XXX				XXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
PINK SALMON												
Passage							X	XXXX	X			
Spawning							X	XXXX	XXX			
Incubation	XXXX	XXXX	XXXX	XXX			X	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
SOCKEYE SALMON												
Passage	?											
Spawning	?											
Incubation	?											
Rearing	?											
RAINBOW TROUT												
Spawning				??	????	??						
Incubation				??	????	????	????	??				
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
BURBOT												
Spawning	XXXX	XX										XXXX
Incubation	XXXX	XXXX	XXXX	?								XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
ARCTIC GRAYLING												
Spawning	?											
Incubation	?											
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Based on professional judgement of ADF&G biologists.

Incubation life phase includes period from egg deposition to fry emergence.

? = Data not available.

SPECIES PERIODICITY CHART FOR: Deshka River, reach A (0 to RM 22)

(Mouth to Neil Lake)

Date: October 9, 1989 Initials: _____

USGS Maps: Tyonek C-1, D-1, D-2 Filename: PERDESHA.DRM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
CHINOOK SALMON												
Passage					XXXX	XXXX	XXXX	X				
Spawning							XX	XXXX				
Incubation	XXXX	XXXX	XXXX	XX			XX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
COHO SALMON												
Passage							XXXX	XXXX	XXXX			
Spawning								XXXX	XXXX	XX		
Incubation	XXXX	XXXX	XXXX	XX				XXXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
PINK SALMON												
Passage							XX	XXXX				
Spawning							XX	XXXX	XX			
Incubation	XXXX	XXXX	XXXX	XX			XX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing												
SOCKEYE SALMON												
Passage	?											
Spawning	?											
Incubation	?											
Rearing	?											
RAINBOW TROUT												
Spawning				??	????	??						
Incubation				??	????	????	????	??				
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
BURBOT												
Spawning	XXXX	XX										XXXX
Incubation	XXXX	XXXX	XXXX	?								XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
ARCTIC GRAYLING												
Spawning	?											
Incubation	?											
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Based on professional judgement of ADF&G biologists.

Incubation life phase includes period from egg deposition to fry emergence.

? = Data not available.

SPECIES PERIODICITY CHART FOR: Deshka River, reach B (RM 22 to RM 27)
(Neil Lake to forks)

Date: October 9, 1989 Initials: _____

USGS Maps: Tyonek D-1, D-2 Filename: PERDESHB.DRM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
CHINOOK SALMON												
Passage					XXX	XXXX	XXXX	XX				
Spawning							X	XXXX	X			
Incubation	XXXX	XXXX	XXXX	XXX			X	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
COHO SALMON												
Passage							XXX	XXXX	XXXX	X		
Spawning								XXX	XXXX	XXX		
Incubation	XXXX	XXXX	XXXX	XXX				XXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
PINK SALMON												
Passage							X	XXXX	X			
Spawning							X	XXXX	XXX			
Incubation	XXXX	XXXX	XXXX	XXX			X	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
SOCKEYE SALMON												
Passage	?											
Spawning	?											
Incubation	?											
Rearing	?											
RAINBOW TROUT												
Spawning				??	????	??						
Incubation				??	????	????	????	??				
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
BURBOT												
Spawning	XXXX	XX										XXXX
Incubation	XXXX	XXXX	XXXX	?								XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
ARCTIC GRAYLING												
Spawning				XX	XXXX	XX						
Incubation				XX	XXXX	XXXX	XXXX	XX				
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Based on professional judgement of ADF&G biologists.

Incubation life phase includes period from egg deposition to fry emergence.

? = Data not available.

SPECIES PERIODICITY CHART FOR: Deshka River, reach C (RM 27 to 76 (end))
(Kroto Creek)

Date: October 9, 1989 Initials: _____

USGS Maps: Tyonek D-2, Talkeetna A-1, A-2, B-2 Filename: PERDESHC.DRM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
CHINOOK SALMON												
Passage					XXX	XXXX	XXXX	XX				
Spawning							X	XXXX	X			
Incubation	XXXX	XXXX	XXXX	XXX			X	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
COHO SALMON												
Passage							XXX	XXXX	XXXX	X		
Spawning								XXX	XXXX	XXX		
Incubation	XXXX	XXXX	XXXX	XXX				XXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
PINK SALMON												
Passage							X	XXXX	X			
Spawning							X	XXXX	XXX			
Incubation	XXXX	XXXX	XXXX	XXX			X	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
SOCKEYE SALMON												
Passage	?											
Spawning	?											
Incubation	?											
Rearing	?											
RAINBOW TROUT												
Spawning				??	????	??						
Incubation				??	????	????	????	??				
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
BURBOT												
Spawning	XXXX	XX										XXXX
Incubation	XXXX	XXXX	XXXX	?								XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
ARCTIC GRAYLING												
Spawning				XX	XXXX	XX						
Incubation				XX	XXXX	XXXX	XXXX	XX				
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Based on professional judgement of ADF&G biologists.

Incubation life phase includes period from egg deposition to fry emergence.

? = Data not available.

SPECIES PERIODICITY CHART FOR: Deshka River, reach D (RM 0 to 43.5 (end))
(Moose Creek)

Date: October 9, 1989 Initials: _____

USGS Maps: Tyonek D-2, Talkeetna A-1, B-1 Filename: PERDESHD.DRM

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

CHINOOK SALMON

Passage					XXX	XXXX	XXXX	XX				
Spawning							X	XXXX	X			
Incubation	XXXX	XXXX	XXXX	XXX			X	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

COHO SALMON

Passage							XXX	XXXX	XXXX	X		
Spawning								XXX	XXXX	XXX		
Incubation	XXXX	XXXX	XXXX	XXX				XXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

PINK SALMON

Passage							X	XXXX	X			
Spawning							X	XXXX	XXX			
Incubation	XXXX	XXXX	XXXX	XXX			X	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing												

SOCKEYE SALMON

Passage	?											
Spawning	?											
Incubation	?											
Rearing	?											

RAINBOW TROUT

Spawning				??	????	??						
Incubation				??	????	????	????	??				
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

BURBOT

Spawning	XXXX	XX										XXXX
Incubation	XXXX	XXXX	XXXX	?								XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

ARCTIC GRAYLING

Spawning				XX	XXXX	XX						
Incubation				XX	XXXX	XXXX	XXXX	XX				
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Based on professional judgement of ADF&G biologists.

Incubation life phase includes period from egg deposition to fry emergence.

? = Data not available.

SPECIES PERIODICITY CHART FOR: Lake Creek, reach A (RM 0 to RM 32.5)
(mouth to Home Creek)

Date: October 9, 1989 Initials: _____

USGS Maps: Tyonek D-3, Talkeetna A-2, A-3 Filename: PERLAKEA.DRM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
CHINOOK SALMON												
Passage							XXXX XXXX X					
Spawning							XXXX XXXX XXXX					
Incubation	XXXX XXXX XXXX XX					XXXX XXXX XXXX XXXX XXXX XXXX XXXX						
Rearing	XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX											
COHO SALMON												
Passage							XX XXXX XXXX					
Spawning							XX XXXX XXXX XX					
Incubation	XXXX XXXX XXXX XX						XX XXXX XXXX XXXX XXXX XXXX XXXX					
Rearing	XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX											
PINK SALMON												
Passage							XX XXXX					
Spawning							XX XXXX XX					
Incubation	XXXX XXXX XXXX XX						XX XXXX XXXX XXXX XXXX XXXX XXXX					
Rearing												
SOCKEYE SALMON												
Passage							XX XXXX XX					
Spawning												
Incubation												
Rearing												
CHUM SALMON												
Passage							XX XXXX					
Spawning							XX XXXX XX					
Incubation	XXXX XXXX XXXX XX						XXXX XXXX XXXX XXXX XXXX XXXX XXXX					
Rearing												
RAINBOW TROUT												
Spawning				?? ???? ??								
Incubation				?? ???? ???? ???? ??								
Rearing	XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX											
DOLLY VARDEN												
Spawning	?											
Incubation	?											
Rearing	?											
BURBOT												
Spawning	XXXX X?											??XX
Incubation	XXXX XXXX ???? ?											XXXX
Rearing												
ARCTIC GRAYLING												
Spawning	?											
Incubation	?											
Rearing	XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX											

Based on professional judgement of ADF&G biologists.
Incubation life phase includes period from egg deposition to fry emergence.
? = Data not available.

SPECIES PERIODICITY CHART FOR: Lake Creek, reach B (RM 32.5 to RM 49)Date: October 9, 1989

Initials: _____

USGS Maps: Talkeetna A-3, B-3Filename: PERLAKEB.DRM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
CHINOOK SALMON												
Passage						XXXX	XXXX	X				
Spawning						XXXX	XXXX	XXXX				
Incubation	XXXX	XXXX	XXXX	XX		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

COHO SALMON												
Passage							XX	XXXX	XXXX			
Spawning							XX	XXXX	XXXX	XX		
Incubation	XXXX	XXXX	XXXX	XX			XX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

PINK SALMON												
Passage							XX	XXXX				
Spawning							XX	XXXX	XX			
Incubation	XXXX	XXXX	XXXX	XX			XX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX								

SOCKEYE SALMON												
Passage							XX	XXXX	XX			
Spawning												
Incubation												
Rearing												

CHUM SALMON												
Passage							XX	XXXX				
Spawning							XX	XXXX	XX			
Incubation	XXXX	XXXX	XXXX	XX			XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing												

RAINBOW TROUT												
Spawning				??	????	??						
Incubation				??	????	????	????	??				
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

DOLLY VARDEN												
Spawning	?											
Incubation	?											
Rearing	?											

BURBOT												
Spawning	XXXX	X?									??XX	
Incubation	XXXX	XXXX	????	?							XXXX	
Rearing												

ARCTIC GRAYLING												
Spawning	?											
Incubation	?											
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

Based on professional judgement of ADF&G biologists.

Incubation life phase includes period from egg deposition to fry emergence.

? - Data not available.

SPECIES PERIODICITY CHART FOR: Little Susitna River, reach A (RM 0 to 54)

Date: October 9, 1989 Initials: _____

USGS Maps: Tyonek B-1, C-1 Anchorage C-8 Filename: PERLSUSA.DRM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
CHINOOK SALMON												
Passage						X	XXXX	XXXX	XX			
Spawning							XXXX	XXXX	X			
Incubation	XXXX	XXXX	XXXX	XX			XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
COHO SALMON												
Passage							XXXX	XXXX	XXXX	X		
Spawning								XXXX	XXXX	XXX		
Incubation	XXXX	XXXX	XXXX	XX				XXXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
PINK SALMON												
Passage							XXX	XXXX	X			
Spawning							XX	XXXX	XXX			
Incubation	XXXX	XXXX	XXXX	XXX			XX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing			XXXX	XXXX	X							
SOCKEYE SALMON												
Passage							XXXX	XXXX	XXXX	X		
Spawning ?												
Incubation ?												
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
CHUM SALMON												
Passage							XX	XXXX	XX			
Spawning							XX	XXXX	XXXX			
Incubation	XXXX	XXXX	XXXX	XX			XX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing			XXX	XXXX	XX							
RAINBOW TROUT												
Spawning			XXX	XXXX	XXXX	XX						
Incubation			XXX	XXXX	XXXX	XXXX	XXXX					
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
BURBOT												
Spawning ?												
Incubation ?												
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
ROUND AND HUMPBAC WHITEFISH												
Spawning ?												
Incubation ?												
Rearing ?												

Based on professional judgement of ADF&G biologists.
Incubation life phase includes period from egg deposition to fry emergence.
? = Data not available.

SPECIES PERIODICITY CHART FOR: Little Susitna River, reach B (RM 54 to 75)

Date: October 9, 1989 Initials: _____

USGS Maps: Anchorage C-8, C-7 Filename: PERLSUSB.DRM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
CHINOOK SALMON												
Passage						XXXX	XXXX	XXX				
Spawning							XXXX	XXXX				
Incubation	XXXX	XXXX	XXX				XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
COHO SALMON												
Passage							X	XXXX	XX			
Spawning									XXXX	XX		
Incubation	XXXX	XXXX	XXXX						XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
PINK SALMON												
Passage							XXX	XXXX				
Spawning							X	XXXX	X			
Incubation	XXXX	XXXX	XXXX				X	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing			XXXX	XXXX	X							
SOCKEYE SALMON												
Passage						XXXX	XXXX	XXXX	X			
Spawning	?					XX	XXXX					
Incubation	?	XXXX	XXXX	XXXX	XX	XX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
CHUM SALMON												
Passage							XX	XXXX				
Spawning							X	XXXX	X			
Incubation	XXXX	XXXX	XXXX				X	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing			XXX	XXXX	XX							
RAINBOW TROUT												
Spawning			XXX	XXXX	XXXX	XX						
Incubation			XXX	XXXX	XXXX	XXXX	XXXX					
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
BURBOT												
Spawning	?											
Incubation	?											
Rearing		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
ROUND AND HUMPBACK WHITEFISH												
Spawning	?											
Incubation	?											
Rearing	?											

Based on professional judgement of ADF&G biologists.

Incubation life phase includes period from egg deposition to fry emergence.

? = Data not available.

SPECIES PERIODICITY CHART FOR: Talachulitna River, reach A (RM 0 to RM 15.5)
(mouth to Friday Creek)

Date: October 9, 1989 Initials: _____

USGS Maps: Tyonek C-4, D-4 Filename: PERTALAA.DRM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
CHINOOK SALMON												
Passage						XXXX	XXXX	X				
Spawning						XXXX	XXXX	XXXX				
Incubation	XXXX	XXXX	XXXX	XX		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
COHO SALMON												
Passage							XX	XXXX	XXXX			
Spawning							XX	XXXX	XXXX	XX		
Incubation	XXXX	XXXX	XXXX	XX			XX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
PINK SALMON												
Passage							XX	XXXX				
Spawning							XX	XXXX	XX			
Incubation	XXXX	XXXX	XXXX	XX			XX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing												
SOCKEYE SALMON												
Passage							XX	XXXX	XX			
Spawning												
Incubation												
Rearing												
CHUM SALMON												
Passage							XX	XXXX				
Spawning							XX	XXXX	XX			
Incubation	XXXX	XXXX	XXXX	XX			XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing												
RAINBOW TROUT												
Spawning				??	????	??						
Incubation				??	????	????	????	??				
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
DOLLY VARDEN												
Spawning	?											
Incubation	?											
Rearing	?											
BURBOT												
Spawning	?											
Incubation	?											
Rearing	?											
ARCTIC GRAYLING												
Spawning	?											
Incubation	?											
Rearing	?											

Based on professional judgement of ADF&G biologists.

Incubation life phase includes period from egg deposition to fry emergence.

? - Data not available.

SPECIES PERIODICITY CHART FOR: Talachulitna River, reach B (RM 15.5 to 52)

Date: October 9, 1989 Initials: _____

USGS Maps: Tyonek B-4, C-4, C-5 Filename: PERTALAB.DRM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
CHINOOK SALMON												
Passage						XXXX	XXXX	X				
Spawning						XXXX	XXXX	XXXX				
Incubation	XXXX	XXXX	XXXX	XX		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
COHO SALMON												
Passage							XX	XXXX	XXXX			
Spawning							XX	XXXX	XXXX	XX		
Incubation	XXXX	XXXX	XXXX	XX			XX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
PINK SALMON												
Passage							XX	XXXX				
Spawning							XX	XXXX	XX			
Incubation	XXXX	XXXX	XXXX	XX			XX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing												
SOCKEYE SALMON												
Passage							XX	XXXX	XX			
Spawning												
Incubation												
Rearing												
CHUM SALMON												
Passage							XX	XXXX				
Spawning							XX	XXXX	XX			
Incubation	XXXX	XXXX	XXXX	XX			XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing												
RAINBOW TROUT												
Spawning				??	????	??						
Incubation				??	????	????	????	??				
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
DOLLY VARDEN												
Spawning	?											
Incubation	?											
Rearing	?											
BURBOT												
Spawning	?											
Incubation	?											
Rearing	?											
ARCTIC GRAYLING												
Spawning	?											
Incubation	?											
Rearing	?											

Based on professional judgement of ADF&G biologists.
Incubation life phase includes period from egg deposition to fry emergence.
? - Data not available.

SPECIES PERIODICITY CHART FOR: Talachulitna River, reach C (RM 0 to RM 12.5)
(Talachulitna Creek)

Date: October 9, 1989 Initials: _____

USGS Maps: Tyonek C-4, C-5 Filename: PERTALAC.DRM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
CHINOOK SALMON												
Passage						XXXX	XXXX	X				
Spawning						XXXX	XXXX	XXXX				
Incubation	XXXX	XXXX	XXXX	XX		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
COHO SALMON												
Passage							XX	XXXX	XXXX			
Spawning							XX	XXXX	XXXX	XX		
Incubation	XXXX	XXXX	XXXX	XX			XX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
PINK SALMON												
Passage							XX	XXXX				
Spawning							XX	XXXX	XX			
Incubation	XXXX	XXXX	XXXX	XX			XX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing												
SOCKEYE SALMON												
Passage							XX	XXXX	XX			
Spawning							XX	XXXX	XXXX			
Incubation	XXXX	XXXX	XXXX	XX			XX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing	?											
CHUM SALMON												
Passage							XX	XXXX				
Spawning							XX	XXXX	XX			
Incubation	XXXX	XXXX	XXXX	XX			XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing												
RAINBOW TROUT												
Spawning				??	????	??						
Incubation				??	????	????	????	??				
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
DOLLY VARDEN												
Spawning	?											
Incubation	?											
Rearing	?											
BURBOT												
Spawning	?											
Incubation	?											
Rearing	?											
ARCTIC GRAYLING												
Spawning	?											
Incubation	?											
Rearing	?											

Based on professional judgement of ADF&G biologists.

Incubation life phase includes period from egg deposition to fry emergence.

? - Data not available.

SPECIES PERIODICITY CHART FOR: Talkeetna River, reach A (RM 0 to RM 13.5)
(mouth to Sheep Creek)

Date: October 9, 1989 Initials: _____

USGS Maps: Talkeetna B-1, B-6 Filename: PERTALKA.DRM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
CHINOOK SALMON												
Passage						XX	XXXX	X				
Spawning ?												
Incubation ?												
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
COHO SALMON												
Passage							XX	XXXX	XXXX	X		
Spawning ?												
Incubation ?												
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
PINK SALMON												
Passage ?												
Spawning ?												
Incubation ?												
Rearing ?												
SOCKEYE SALMON												
Passage						X	XXXX	XXXX	X			
Spawning ?												
Incubation ?												
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
CHUM SALMON												
Passage							XX	XXXX	X			
Spawning								XXXX	XXXX			
Incubation	XXXX	XXXX	XXXX	XX				XXXX	XXXX	XXXX	XXXX	XXXX
Rearing		X	XXXX	XXXX	XXXX							
RAINBOW TROUT												
Spawning ?												
Incubation ?												
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
DOLLY VARDEN												
Spawning ?												
Incubation ?												
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
BURBOT												
Spawning	XXXX	XX										XXXX
Incubation	XXXX	XXXX	????	?								XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
ARCTIC GRAYLING												
Spawning ?												
Incubation ?												
Rearing ?												

Based on professional judgement of ADF&G biologists.
Incubation life phase includes period from egg deposition to fry emergence.
? = Data not available.

SPECIES PERIODICITY CHART FOR: Talkeetna River, reach B (RM 13.5 to end)

Date: October 9, 1989 Initials: _____

USGS Maps: Talkeetna B-6, Talkeetna Mts. B-5, C-5 Filename: PERTALKB.DRM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
CHINOOK SALMON												
Passage							XX	XXXX	X			
Spawning ?												
Incubation ?												
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
COHO SALMON												
Passage								XX	XXXX	XXXX	X	
Spawning ?												
Incubation ?												
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
PINK SALMON												
Passage ?												
Spawning ?												
Incubation ?												
Rearing ?												
SOCKEYE SALMON												
Passage							X	XXXX	XXXX	X		
Spawning ?												
Incubation ?												
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
CHUM SALMON												
Passage								XX	XXXX	X		
Spawning									XXXX	XXXX		
Incubation	XXXX	XXXX	XXXX	XX					XXXX	XXXX	XXXX	XXXX
Rearing				X	XXXX	XXXX	X					
RAINBOW TROUT												
Spawning ?												
Incubation ?												
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
DOLLY VARDEN												
Spawning ?												
Incubation ?												
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
BURBOT												
Spawning	XXXX	XX										XXXX
Incubation	XXXX	XXXX	????	?								XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
ARCTIC GRAYLING												
Spawning ?												
Incubation ?												
Rearing ?												

Based on professional judgement of ADF&G biologists.

Incubation life phase includes period from egg deposition to fry emergence.

? - Data not available.

SPECIES PERIODICITY CHART FOR: Talkeetna River, reach C - Clear CreekDate: October 9, 1989 Initials: _____USGS Maps: _____ Filename: PERTALKC.DRM

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
CHINOOK SALMON												
Passage						XX	XXXX	X				
Spawning							XXXX	XX				
Incubation	XXXX	XXXX	XXXX	X			XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
COHO SALMON												
Passage							XX	XXXX	XXXX	X		
Spawning								XXXX	XXXX	XX		
Incubation	XXXX	XXXX	XXXX	X				XXXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
PINK SALMON												
Passage	?											
Spawning	?											
Incubation	?											
Rearing	?											
SOCKEYE SALMON												
Passage					X	XXXX	XXXX	X				
Spawning						XXXX	XXXX	XXX				
Incubation	XXXX	XXXX	XXXX	XX		XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
CHUM SALMON												
Passage						XX	XXXX	X				
Spawning							XXXX	XXXX				
Incubation	XXXX	XXXX	XXXX	XX			XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Rearing			X	XXXX	XXXX	XXXX						
RAINBOW TROUT												
Spawning	?											
Incubation	?											
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
DOLLY VARDEN												
Spawning	?											
Incubation	?											
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
BURBOT												
Spawning	XXXX	XX										XXXX
Incubation	XXXX	XXXX	????	?								XXXX
Rearing	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
ARCTIC GRAYLING												
Spawning	?											
Incubation	?											
Rearing	?											

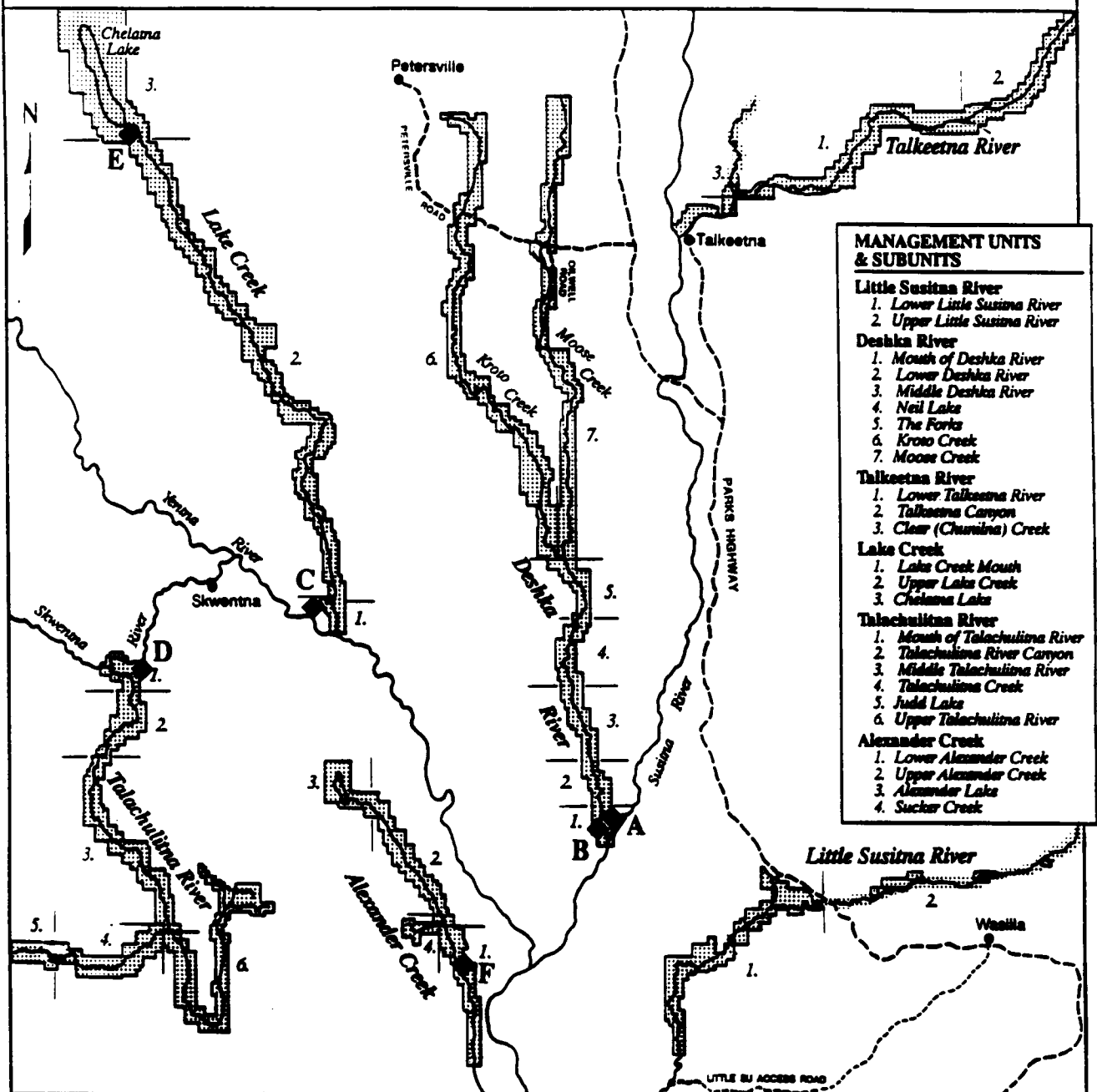
Based on professional judgement of ADF&G biologists.

Incubation life phase includes period from egg deposition to fry emergence.

? = Data not available.

SUSITNA BASIN RECREATION RIVERS MANAGEMENT PLAN

ADF&G, FWP, & CIAA Facilities



- A - ADF&G Sport Fish Division Cabin (1 1/2 acres ILMA)
 B - Fish & Wildlife Protection Cabin
 C - ADF&G Sport Division, 2 cabins (32 acres ILMA)
 D - ADF&G Sport Fish Division cabin used 1983 -1986 (no longer under ILMA.
 Interest in future use of cabin)
 E - Cook Inlet Aquaculture Association installation (under Land Use Permit)
 F - ADF&G fish weir

CHAPTER 5

DEVELOPMENT

CHAPTER 5 - DEVELOPMENT IN & ADJACENT TO THE CORRIDORS

INTRODUCTION

This chapter summarizes the levels of existing development on the six Recreation Rivers. Information on river corridors was gathered during May - September, 1989. This information came from a variety of sources. All the rivers were flown in May and major features were recorded. In June - September the National Park Service, Department of Natural Resources, and the Matanuska-Susitna Borough systematically inventoried the most heavily used sections of the rivers. Improvements that were visible from the river were noted. Interviews were also conducted along the rivers to document the location and uses and improvements. The U.S. Fish and Wildlife Service flew the rivers August 4 and 6 and produced 450 1" = 1,530 true-color photos of the corridors. All photos were reviewed and improvements noted. All information was recorded on USGS 1:63,360 maps. Background information was digitized into a GIS computer system. Approximately 2,000 points, lines, and polygons representing features in and adjacent to the corridors were recorded.

Following is a summary of this information which is summarized by subunit. There are 22 subunits that represent sections of the six corridors. These preliminary subunits are based on areas within the corridors that have relatively homogeneous use. Information is summarized by whether improvements are in the corridor or adjacent to them. "Adjacent" is defined in most cases as within 1.5 miles of the Recreation River boundary. The only exceptions to this are areas adjacent to Talkeetna, Houston, and along the upper Susitna River where only those improvements between the closest road and the river were counted.¹

Following is a summary and description of the types of improvements noted.

UPLAND STRUCTURES

Lodges

Since most lodges in the corridors are located adjacent to the rivers, they were noted during field trips. Others were originally identified as cabins and later determined lodges after interviews with local residents. Lodges were defined as structures that provide lodging for monetary compensation. All well-established lodges that serve a number of clients were noted. Some facilities that only served a few clients each year were noted and listed as cabins. These were noted as cabins.

Cabins and Associated Structures

Cabins were defined as clusters of structures around one primary structure which is usually a seasonal or year-round residence. One cluster of cabins typically included a primary building and associated woodsheds, equipment sheds, outhouses and other associated buildings.

¹ Improvements were so numerous in these areas that data-gathering was limited to documenting improvements immediately adjacent to the river.

Cabins not on Private Land and not under Permit

Many of the cabins of this type came from files from DNR and field inspections. These cabins were often located miles from the nearest private land. The legal status of many other cabins located on the edge of private property is difficult to determine without a field inspection. For the purposes of this inventory these cabins were assumed to be on private property.

WATER-DEPENDENT STRUCTURES

Buoys

Buoys were noted during field trips. Buoys were used primarily floatplane landing area markers or for boat moorings. In addition, the Alaska Boating Association maintains no-wake-zone buoys at the mouth of the Deshka River. Buoys also include tie-off buoys at the mouth of Lake Creek for fishing.

Docks

Docks were generally located on lakes or on the lower parts of rivers. These structures extended out over the water. Ramps or built-up areas of the river bank used for loading boats or planes were not noted.

Weirs

The only weirs or fish management structures noted were operated by the Alaska Department of Fish and Game or the Cook Inlet Aquaculture Association. These were noted on Chelatna Lake, the Upper Talachulitna Creek, Alexander Creek, and the Little Susitna River (in the wildlife refuge). Seasonal residences were also associated with these. In addition, ADF&G has seasonal cabins on the lower Deshka River, Talachulitna River, and Lake Creek.

Groins, Jetties, Bulkheads, and Gabions

Although common in some parts of the state, these are relatively uncommon on the recreation rivers. The only places where they were noted was at the twelve bridges which cross the recreation rivers. Because erosion control devices were mostly located at bridge crossings, they were noted only as bridges with associated improvements. Unlike the Kenai River, very few private property owners have constructed erosion control devices. Those noted were on the lower Deshka River (1), lower Talkeetna River (1), and upper Little Susitna River (1).

Bridges

There are twelve bridges in the corridors on Moose Creek (3), Kroto Creek (1), Talkeetna (1), and the Little Susitna River (7). There are a number of smaller bridges in the corridors that cross small tributaries and are used for accessing private land.

Steps or Ladders

Steps and Ladders were usually primitive structures associated with lodges and cabins along the river. There were, however some areas where steps were substantial at river mouths, including along the west bank of the Deshka River and the east bank of the Talachulitna River.

Boat and Equipment Storage Areas

Most boat and equipment storage areas are adjacent to developed private land.² Only boat or equipment storage areas not associated with private uplands were noted. Boat storage areas on public lands were usually at sites on rivers where users accessed the river by floatplane then travelled by boat to fishing areas or private lands. Major boat storage areas on public lands were documented at the mouth of the Deshka, middle Talachulitna River (just below the lodges), and Chelatna Airstrip. Equipment storage on public lands was also prevalent along the river where developed private lands were set back from the river or where the public or commercial users established seasonal camps. Boats stored for short periods of time were not recorded.

Developed Campgrounds

The only developed campgrounds are adjacent to the corridor in Houston, Talkeetna, and at the end of the Burma Road.

WATER AND WASTE FACILITIES

Dumps

Most private cabins and lodges (except those that are road accessible) have areas used for dumping household wastes. Private dumps were usually located at the end of short trails behind cabins and lodges and were screened by vegetation from the rivers. Dumping garbage down the banks of the rivers does not appear to be a common practice. Because dumps were seldom visible from the river and difficult to detect on aerial photos, they were not noted except where they were prominent. A list of authorized and unauthorized waste disposal areas is included elsewhere in this report. The largest visible dump in the corridor is located behind Alexander Lake Lodge. There is also one private parcel on the lower Talkeetna that has accumulated large volumes of junk and is visible from the air. On the upper Little Susitna River there are a large number of abandoned cars visible on both sides of the river at one location.

Effluent / Storm Pipe

None were noted on any of the rivers.

Drinking Water

Some lodges have drinking water intake pipes in the rivers. Water wells were not possible to document from aerial photos or field trips on the rivers. Water rights, however, are documented in another section of this report (to be written).

EXTRACTION ACTIVITIES

Mining Activity

Although there are valid mine claims in the corridors, there is no current large-scale mining activity taking place. Some historic mining areas that were visited during field trips were noted. There are several mining areas adjacent to the corridor on upper Lake Creek, the upper Talkeetna

² Boat storage adjacent to private land was often on public shorelands during the summer. Shorelands are lands below ordinary high water on navigable rivers and by law are public lands. During winter, boats were usually stored above ordinary high water on private land to avoid ice damage and flooding.

River, and upper Clear Creek. Mining activity is described in more detail elsewhere in this report.

Timber Harvest

There are no current timber sales in the corridor. Personal-use wood harvest and past sales were not visible from the rivers or the air. There were some areas where timber harvest was evident where large areas had been cleared for airstrips or homesteads. There are also some large agricultural areas adjacent to the corridor where clearing had taken place in the past. Agricultural clearings are located along the Moose Creek Road, Burma Road, and the upper Little Susitna River

Materials Extraction Site

There are only one or two active materials sites in the corridor. One is located on state land on a parcel in the upper Little Susitna River. There are also two large materials extraction sites at the junction of the Oilwell and Petersville Roads. One of these may be in the corridor.

TRANSPORTATION

Roads and Trails

Unpaved Road

Unpaved roads are defined as receiving some minimal level of maintenance, are usable in summer, and are capable of supporting large wheeled-vehicles on a regular basis. With few exceptions, most were connected with the railbelt road system.

Paved Road

The only paved roads in or near the corridor include the Fishhook Road, Schrock Road, Parks Highway, and Talkeetna Spur Road.

Tractor Trails

These were larger trails documented from aerial photos, USGS maps, field trips, or interviews. They showed evidence of use by caterpillars or large tracked vehicles. All six corridors had evidence of use by large tracked vehicles.

Alaska Railroad

The railroad crosses the middle Little Susitna and lower Talkeetna Rivers.

ORV (off-road-vehicle) Trail (summer)

Only those trails that were clearly evident from 1":1,530 photos were mapped. Trails that were not prominent on the photos were not mapped. There were some trails in the woods that were not visible on photos because of the forest canopy and could not be mapped. Prominent areas of ORV use includes Moose Creek, Kroto Creek, Middle Little Susitna River, and Upper Lake Creek, and Upper Alexander Creek.

Winter Access

Most trails visible in the summer were assumed to receive some use in the winter. Winter travel that followed rivers or trails that were not visible in the winter are noted in the narrative. Many

of these winter-use-only trails, particularly those that cross open swamps vary from year-to-year and therefore could not be accurately mapped. However, a vegetation map showing wetlands, tundra, and shrublands that may receive snow machining use was developed as part of the resource assessment.

Foot Path

Only foot trails that were visible from the river, visible from photos, or noted during field trips were documented. Foot trails in the immediate vicinity of dwellings or highly developed areas were not mapped.

Seismic or Section Lines

It was not always possible to distinguish between seismic and section lines. Most of these lines only receive winter use. However, when evidence of summer use was apparent, it was noted. All six rivers have evidence of these. The lower Little Susitna River in the wildlife refuge has the largest concentration of seismic lines.

Overhead Cables or Trams

Cables over the rivers were noted on the Talkeetna River, Lake Creek, Moose Creek, and Little Susitna River.

Transmission Lines

Two major transmission lines cross the recreation rivers. These include the Intertie across the Talkeetna and a powerline near Nancy Lake Creek. There are several small power and phone lines that cross the upper Little Susitna River.

Access Points

Airstrips and Landing Areas

Airstrips that had some improvements were visible from aerial photos. Landing areas on gravel bars were noted through field trips or interviews. Notation of airstrips and landing areas in this report indicates that they have been used in the past but is not an indication of their safety or current condition.

Floatplane Landing Areas

Most floatplane landing areas are located on lakes in or adjacent to the rivers. The remaining floatplane landing areas are located at the mouths of the six rivers. They were identified through interviews, evidence of use (docks on lakes) or the presence of floatplanes.

Boat Launches on Roads

Improved or unimproved boat launches for motorized or non-motorized craft are located adjacent to most of the twelve bridges that span the recreation rivers. There are also improved boat launches in or near Talkeetna and Houston.

EXISTING DEVELOPMENT WITHIN THE RECREATION RIVERS

River	Cabin in	Cabin adjacent	Trespass cabin in	Lodge in	Lodge adjacent	Long term camp in	Bridge in	Dock in	Dock adjacent	Boat storage in	Utility corridor in	Airstrip in	Airstrip adjacent	Floatplane landing area in	Floatplane landing area adjacent	Boatlaunch on road in
Little Su 1	1	6	0	0	0	0	0	0	1	0	1	0	0	0	3	0
Little Su 2	0	108	0	0	0	0	1	0	0	0	3	0	4	0	0	0
Deshka 1	9	2	0	3	0	11	0	5	0	4	0	4	0	3	0	0
Deshka 2	4	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0
Deshka 3	9	0	0	3	0	1	0	0	0	0	0	0	0	0	0	0
Deshka 4	8	0	0	3	0	0	0	5	0	0	0	0	0	1	0	0
Deshka 5	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Deshka 6	5	12	0	1	0	0	1	1	2	0	0	0	1	2	2	1
Deshka 7	41	13	1	0	0	0	3	3	0	0	0	0	0	3	2	2
Talkeetna 1	8	39	0	0	0	1	2	2	3	0	1	1	2	0	2	0
Talkeetna 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Talkeetna 3	0	9	0	1	0	0	0	0	0	0	0	0	3	0	2	0
Lake Creek 1	3	14	0	4	13	0	0	2	1	0	0	0	0	2	2	0
Lake Creek 2	9	14	0	0	0	0	0	4	4	0	0	1	2	8	8	0
Lake Creek 3	17	0	1	2	0	1	0	1	0	1	0	1	0	3	0	0
Talachulitna 1	1	0	0	5	0	0	0	1	0	3	0	2	0	0	0	0
Talachulitna 2	0	3	0	0	0	0	0	0	0	0	0	1	0	1	1	0
Talachulitna 3	0	0	0	3	0	0	0	0	0	1	0	2	0	3	0	0
Talachulitna 4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Talachulitna 5	4	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0
Talachulitna 6	0	0	4	0	0	0	0	1	0	0	0	0	1	0	0	0
Alexander Crk 1	11	9	0	0	0	0	0	1	4	0	0	1	0	0	4	0
Alexander Crk 2	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0
Alexander Crk 3	6	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0
Alexander Crk 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** Total ***	138	229	8	28	14	14	7	27	15	9	5	16	13	29	26	3

SUBUNIT DESCRIPTIONS

LOWER LITTLE SUSITNA RIVER SUBUNIT RM³ 33.2 to RM 68.2

Structures and Improvements

One cabin is located within the corridor. There are six cabins/homes adjacent to the corridor in the Houston area. A commercial campground is located in the Houston area at Miller's Reach, outside the corridor adjacent to RM 66.

Water Dependent Structures

A dock is located within the subunit on a lake at RM 39.5. There are no bridges in this subunit. There is one bridge just north of the subunit on Nancy Lake Creek. This bridge is used for launching boats and connects Lynx Lake with the Parks Highway.

Trails

This subunit is crisscrossed by many trails or seismic lines which could be used for accessing the area. Inside the subunit 19 seismic lines were noted, two of which receive year round use. Ten off-road-vehicle trails, two foot trails, and two tractor trails are also located within the subunit. Adjacent to the subunit there are nine off-road-vehicle trails, six seismic lines (one of which is year-round), five foot trails, and one tractor trail.

Winter Access

There are a number of winter trails in the subunit between Nancy Lakes, Houston, and Big Lake. These trails are used primarily for snowmachining and dog mushing. The trails follow seismic lines, powerlines, and wander through swamps west of the Parks Highway. Crossing public lands in most areas, they provide good access to the west of the Parks Highway. They also provide north-south access between Nancy Lake and Willow. Just north of the Burma Road access the Iditarod race trail crosses the Little Susitna River (just south of the subunit). The frozen Little Susitna River and Nancy Lake Creek are used for winter travel.

Airstrips and Floatplane Access

Three float plane landing areas are located adjacent to the subunit. Two are located in the same lake as the dock at RM 39.5. The third is located in Yohn Lake, approximately one mile east of RM 33, just outside the southern boundary of the subunit.

Extraction Activities

None noted.

Private Lands

None.

³ "RM" - river mile (beginning at 0 at the river mouth).

UPPER LITTLE SUSITNA RIVER SUBUNIT⁴ RM 68.2 to RM 101.2

Structures and Improvements

While there are no lodges or cabins within the subunit, there are at least 108 cabins and houses adjacent to the subunit. A commercial campground and a public campground are located in Houston, adjacent to the Parks Highway. A golf course is located on the uplands of the river, outside the subunit near RM 81.

This subunit is accessible from four paved, well-traveled roads, including the main north-south artery in the state, the George Parks Highway. Schrock Road, and the Fishhook Road are important routes between Wasilla and Palmer, and key residential areas in the Matanuska Valley. A series of unpaved roads parallel the river outside the subunit to the north and south, with many spur roads to access private residences.

Water-Dependent Structures

There are seven bridges crossing the river in this subunit. Only one of the seven bridges (upstream of the Schrock Road bridge) crosses an upland section of this subunit. The other six bridges span the Little Susitna shorelands at the Alaska Railroad bridge, Parks Highway, Schrock Road, Carney Road, Sushanna Road, Parks-Edgerton Road, and Willow Fishhook Road. Two major boat launches are located in the vicinity of the Parks Highway bridge. There are several more primitive boat launches used primarily by non-motorized boats upriver from Houston. These are located adjacent to bridges and areas where unpaved roads access the river. Some private property owners just upriver from the Parks Highway also launch motorized and non-motorized boats from their property.

Trails

There are fishing trails from the City of Houston campground to the Little Susitna River. Although there are several foot trails that have developed along the river near Houston, there is little public access along the river. There are two seismic trails crossing the subunit and two located adjacent to the subunit. There are six off-road-vehicle trails adjacent to the subunit. Three transmission lines cross this subunit.

Winter Access

Parts of the Little Susitna River bottom in this subunit are used for winter travel. Use of the four upland parcels in this subunit by winter travelers is unknown at this time.

Airstrip and Floatplane Access

There are four airstrips located adjacent to the subunit. No airstrips are located within the subunit.

Extraction Activities

There is a DOT/PF gravel pit located within the subunit at RM 84.5.

A dump is located near the subunit at RM 81 which contains several abandoned cars on both sides of the river.

⁴ This subunit only includes four small upland parcels and 33 miles of shorelands (river bottom below ordinary high water).

Private Lands

There is no private land in this subunit. This subunit consists of the Little Susitna River water column and shorelands and four upland parcels. Three of the upland parcels are patented state land, with a small university land holding. The fourth parcel is borough-selected land. Adjacent to the corridor, the land is primarily privately owned. Above RM 84, the adjacent lands are primarily borough owned.

MOUTH OF DESHKA RIVER SUBUNIT⁵ (1) RM 0 to RM 2

Structures and Improvements

There are three lodges and nine cabins in this subunit that are located along the Deshka and Susitna Rivers. Lodges include the Deshka River Lodge, Silver King Lodge, and Mike and Merte's. There are also two cabins just outside the boundary downstream on the Susitna River. The ADF&G field camp is located in this subunit at mile two. There are numerous long-term camps⁶ in this subunit primarily on the large bar on the east side of the Susitna River, on the islands in the Deshka, and along the east bank of the Deshka River. Most of these camps are located on borough land. However, a significant number are located on state land. Long-term camps are established in May as soon as ice leaves the river. These camps remain through the summer and many improvements are left through the winter. Short-term camps⁷ are also established in this area with their number peaking during king salmon season. Short-term camps are so numerous that many are located away from the river in less desirable places because of lack of space on the shoreline is literally. The same areas used for camps are used for boat and equipment storage. Many river users are flown to the mouth of the Deshka or charter larger boats to access the area and use smaller boats stored in the subunit to travel along the river. Some of the abandoned and stored debris is washed away by spring flooding. However, for the most part these storage areas are not flooded on a regular basis and abandoned boats and camps that have accumulated over years.

Water Dependent Structures

There are five docks near cabins and lodges in this subunit. In addition there are numerous stairways, particularly along the steep west banks of the river. Some of the long-term camps have also built less permanent ladders or steps. Some of the commercial camps also have signs visible from the river. There is a large stone wall in front of the Deshka River Lodge to reduce erosion. Many of the cabins and lodges have small shelters or storage areas adjacent to the river for equipment and gasoline. The Alaska Boating Association maintains buoys with "no-wake area" signs.

Trails

There are two seismic lines in this subunit. In addition there are a multitude of foot paths associated with public use especially along the east bank of the river. There are numerous paths associated with cabins and lodges. Short off-road vehicle trails associated with two of the lodges in the subunit.

⁵ (1) = Subunit number

⁶ "Long-term camps" are defined as being in the same location for more than 14 days.

⁷ "Short-term camps" are defined as being in the same location for less than 14 days.

Winter Access

The mouth is used extensively for winter travel by private property owners and recreation users. Snowmachines are the primary method of transportation but dog mushing is also common. One company is running commercial dog mushing trips up the river. Deshka Landing is the main access point from the road system. Some users also travel from Willow Creek. Alternate routes to the mouth of the Deshka include traveling from the Oilwell Road. Some also travel down the lower Kroto Creek from the Amber Lake trail or from Trapper Lake.

Airstrips and Floatplane Access

There are two landing areas and two airstrips in this subunit. The airstrips are associated with the Deshka River Lodge and the Silver King Lodge. Use of these airstrips is with the owners permission only. The two landing areas are on gravel bars. The first is on an island on the east side of the river near the mouth. It has been used by supercubs in the past. However, because of its uneven surface and dogleg in the middle, it has been used less frequently in recent years. There has been a number of crashes in the past at this landing area. The other landing area is on a large bar on the east side of the Susitna River. Pilots using the bar must use about to be transported across the Susitna to the Deshka. Some pilots store boats on the bar while others arrange to have boats at the mouth of the Deshka pick them up. Floatplanes land in the Susitna River, at the mouth of the Deshka, and above Deshka River Lodge. During periods of heavy use, landing and taxiing floatplanes can be hazardous because of the number of boats that are concentrated in the same area.

Extraction Activities

There has been some intensive small- scale timber cutting in the area to clear for the two airstrips and for firewood and houselogs. There is also extensive woodgathering by the public for campfires. There is one valid claim approximately one mile west of the mouth of Lake Creek on the north side of the Yentna River.

Private Lands

Several parcels of private land are located along the west bank of the river near the mouth. There is also private land on the east bank that includes Deshka River lodge. The ADF&G cabins are located on a site managed by the Department of Fish and Game through an interim land-management agreement with DNR.

LOWER DESHKA RIVER SUBUNIT (2) RM 2 to RM 6.9

Structures and Improvements

This unit has two cabins and one large homestead. Laub's homestead is also used for commercial recreation.

Water-Dependent Structures

None observed

Trails

There are two seismic lines. The one near the homestead is used year-round and is associated with the use of off-road-vehicles.

Winter Access

See mouth of Deshka River subunit for information on winter travel.

Airstrips and Floatplane Access

There are two airstrips associated with the homestead and one of the cabins in this subunit.

Extraction Activities

Clearing of timber for the two airstrips has occurred in the past.

Private Lands

Private lands are located along the river in the northern half of this subunit.

MIDDLE DESHKA RIVER SUBUNIT (3) RM 7.8 to RM 14.2

Structures and Improvements

There are nine cabins and three lodges in this subunit. All the cabins are located in the northern half of this subunit along the river. The lodges include the Sleeping Lady Lodge, and two unnamed lodges.

Water-Dependent Structures

None observed.

Trails

There is a tractor trail and seismic line used by vehicles at RM 10 on the west side of the river.

Winter Access

See mouth of Deshka River subunit for information on winter travel.

Airstrips and Floatplane Access

None observed.

Extraction Activities

None observed.

Private Lands

Private lands are located on both sides of the river in the northern half of the subunit.

NEIL LAKE SUBUNIT (4) RM 14.5 to RM 23.2

Structures and Improvements

Most of the cabins in this subunit are adjacent to Neil Lake. One is a lodge used commercially for airboat fishing trips. The other lodge, Northwind Lodge, is located at the south end of the subunit.

Water-Dependent Structures

There are five docks on Neil Lake near private cabins. There are also trail signs at the trail heads on both the river and on the lake.

Trails

There are foot trails between Neil Lake and both a slough of the river and the Deshka River. Neil Lake is a common take-out point for float trips and these trails are heavily used. There is a public easement between the lake and the river. Some of the existing trails used by the public vary from this easement and cross private land. There are also foot trails around the lake which access cabins. There is also a seismic line at RM 16.5 used by off-road vehicles.

Winter Access

See mouth of Deshka River subunit for information on winter travel.

Airstrips and Floatplane Access

Neil Lake is used as a floatplane pickup/dropoff point for cabin owners and river users. Floaters typically float Moose Creek from the Oilwell Road or Kroto Creek from Amber Lake and take out at Neil Lake. There is also an airstrip on the east side of the river at RM 16.5. The airstrip parallels the seismic line.

Extraction Activities

None observed.

Private Lands

Private lands are concentrated between RM 15 and 17 on the river and at Neil Lake. The only state land on Neil Lake is the southwest corner of the lake.

THE FORKS SUBUNIT (5) RM 23.2 to RM 30

Structures and Improvements

There is one cabin in this subunit on a lake east of the river at RM 26. In past years, long-term camps have been established at the forks which is a popular fishing spot and the northernmost area on the river where salmon can legally be harvested.

Water Dependent Structures

There is one dock adjacent in front of the cabin on the lake at RM 26.

Trails

There is one short off-road-vehicle trail at the east end of the small lake at RM 26. There is an east-west seismic line at RM 27.8 that is used in winter. There is another seismic line that parallels the subunit to the west which is used in winter.

Winter Access

The frozen river bottom is used as a thoroughfare during the winter. In addition, the two seismic lines in and adjacent to the subunit are used for winter access.

Airstrips and Floatplane Access

Two lakes at RM 26 are used by floatplanes. The smaller eastern lake is entirely in the subunit. The larger western lake is only partially in the subunit.

Extraction Activities

None

Private Lands

None along the river. There are only one or two parcels in the subunit on the small lake at RM 26

KROTO CREEK SUBUNIT (6) Deshka River RM 29.5 (Kroto Creek RM 0) to Kroto Creek RM 58⁸

Structures and Improvements

The one lodge in the subunit is located at Kroto Lake. This lodge is primarily used in the winter months for cross country skiing and other winter activities. There are only five cabins in this 58-mile-long river corridor. There are an additional 12 cabins immediately adjacent to the corridor.

Water-Dependent Structures

The Department of Transportation and Public Facilities recently built a new bridge across Kroto Creek on the Petersville Road. There is one dock inside the corridor on a lake at RM 51. There is also one dock on Amber Lake which is adjacent to but not in the corridor.

Trails

There are no major trails between Amber Lake and Kroto Creek. Floaters on Kroto Creek access Amber Lake by floatplane and float Amber Lake Creek for one mile before it joins Kroto Creek. The extension of the Oilwell Road accesses Amber Lake, crosses Kroto Creek and eventually parallels Lake Creek until it crosses the Yentna River. Because the bridge over Moose Creek has not yet been completed, this road is primarily used in winter. There is also a major trail south of the road that avoids a dogleg in the road where it crosses Kroto Creek. There are extensive off-road vehicle trails between RM 43 (just downriver from the Petersville Road) to Kroto Lake. Because of the combination of heavy use and extensive wetlands, this area has the most evidence of off-road vehicle use in the corridors. In several places there are dozens of parallel tracks. Most of this damage may be a result of one property owner near Safari Lake who uses a track vehicle to access the Petersville Road by passing through the Kroto Creek corridor. When the rivers were flown in spring 1989 most of the major ORV trails on upper Kroto Creek radiated from this one cabin. The nine seismic lines that cross the river do not appear to be receiving summer use.

Winter Access

Upper Kroto Creek includes extensive open bogs ideal for winter travel. There are a number of intertwining trails along the Creek above the Petersville Road. This area is extremely popular for snowmachining, dog mushing, and cross country skiing. Several Iditarod mushers train in the area. The lodge on Kroto Lake caters to winter ski tourers and other winter recreationist. There is also a winter trail from the uncompleted Moose Creek bridge to Schneider Lake that crosses Kroto Lake at RM 21.5. Winter use of the Kroto Creek bottom between the Petersville Road and the Amber Lake Road is unknown. There is extensive use of the trails in the Amber Lake area that connect the Oilwell Road and Skwentna. Below Amber Lake there are some seismic lines which cross the creek which are used for

⁸ Most river miles are numbered from the mouth to the headwaters. However, when there are major branches such as Kroto Creek from the Deshka River, they are numbered from their confluence with the main river to the tributaries headwaters.

winter travel. Some of the seismic lines and the Amber Lake Road are used in winter for transporting heavy equipment.

Airstrips and Floatplane Access

Within the corridor there is floatplane access to a lake west of the river at RM 51 and Lake 295' at RM 14. Amber Lake and Parker Lake (outside but adjacent to the corridor) are also used by floatplanes.

Extraction Activities

There has been some earth moving activities in the past at the Oilwell Road where it crosses Kroto Creek. This area may have been used for materials extraction.

Private Lands

Private lands in the corridor are concentrated just downriver from Amber Lake, near the Petersville Road, RM 51.5, and around Kroto Lake.

MOOSE CREEK SUBUNIT (7) RM 30 to RM 82

Structures and Improvements

The Moose Creek corridor near of the Oilwell Road and the Petersville Road is heavily developed because it includes both sides of the Oilwell Road and parts of the Petersville Road. There are 44 cabins in and 13 adjacent to the subunit. There are also businesses on the Petersville Road in the subunit including Moose Creek Lodge.

Water-Dependent Structures

There are three bridges across the river in this subunit. The Petersville Road bridge is heavily used in both summer and winter. The Oilwell Road bridge abutments have been completed but the span has yet to be built. Their bridge is capable of supporting small all-terrain vehicles and is located at RM 61.5. There are three docks in this subunit. They are located on a lake at the headwaters of Moose Creek.

Trails

The Petersville Road crosses this subunit at RM 68.5 and the Oilwell Road at RM 57.5. Most of the trails in the subunit are concentrated along the creek between Ninemile Creek (RM 51.5) and one mile north of the Petersville Road (RM 69). There is a major trail between the bridge at mile 61.5 and the Petersville Road that accesses several cabins on the west side of Moose Creek. In addition there are some minor trails that are used both in summer and winter at the headwaters. Seismic lines used in winter are located on lower Moose Creek.

Winter Access

Moose Creek is extensively used in winter by snowmachiners and dog mushers. Most of the use is focussed downriver along the Oilwell Road, the Moose Creek bottom, and a trail between Gate Creek and Moose Creek. Some users travel as far south as the mouth of the Deshka. In addition there are several seismic lines that cross Moose Creek that are used in winter. The Moose Creek Lodge on the Petersville Road in the past has been the focal point for these users. Snowmachine trail rides and dog mushing races (including the Moose Creek 200) pass through this subunit. Just above the Petersville Road. The corridor is heavily wooded and does not receive heavy winter use. There are several lakes and private land at the headwaters. These receive extensive use in the winter. There are major winter

trails between the headwater lakes and the Parks highway. It is not known if the Upper Moose Creek bottom is used for winter use.

Airstrips and Floatplane Access

There are three floatplane landing areas in this subunit and no airstrips. The floatplane landing areas are located on lakes at the headwaters (RM 82) and a lake at RM 43.5. The floatplane landing areas adjacent to subunit are located on lakes adjacent to the headwaters.

Extraction Activities

There are two major gravel extraction sites at the junction of the Petersville and Oilwell Road. These were used for the construction of these two roads. They are used today for general road maintenance and improvement. One of these may be in the corridor.

Private Lands

Private lands are concentrated around lakes at the headwaters, the Oilwell Road, Amber Lake Road, and Petersville Road.

LOWER TALKEETNA RIVER (1) RM 0 to RM 31 (excluding around the mouth of Clear Creek)

Structures and Improvements

In the corridor there is one cabin on the north side of the river by the railroad bridge. There are also some cabin ruins in this same area. All other cabins along the river in this subunit are adjacent to but not in the corridor. This includes cabins in Talkeetna, Chase, Talkeetna Bluffs Subdivision, and Talkeetna Bluffs addition. There are two public facilities adjacent to the subunit that cater to recreation users. This includes the Talkeetna boat launch/campground on the river and another campground on the west side of town. The Talkeetna sewage plant is also adjacent to, but not in, the corridor. In previous years the mouth of Larson Creek has been used by a fish guide for a long-term camp. A cabin in the Talkeetna Bluffs subdivision is now being used for this purpose.

Water-Dependent Structures

The railroad bridge is the only bridge within the corridor. The all-terrain vehicle bridge across Larson Creek is just outside the corridor. Some all-terrain vehicles do not use this bridge and cross the creek at its mouth which requires an ADF&G Title 16 permit. The bridge is not large enough to support larger vehicles which must also apply for a permit to cross the stream. There is also a dock at the mouth of Larson Creek. The mouth of Lawson Creek is the primary access point for residents in the subdivision, a commercial fish guiding operation, and the public. At the Talkeetna boat launch there has been some earth moving and burial of remains of railroad cars to create an area of slow water to launch boats. In addition, there are a number of railroad cars that were dropped off the bridge a number of years ago to reduce erosion of the railroad bridge. Although some of these have been removed, the remaining cars remain hazardous to boats during low water. In addition, there is one dock/area of riprap on the river used to control erosion and boats in front of a cabin at RM 4 on the River Road. USGS maintains a gauging station just upriver from Talkeetna. There is also a cable that crosses the river at this location.

Trails

The Talkeetna Spur Road and the Alaska Railroad provide the primary access to the mouth of the Talkeetna. There are a number of roads associated with private lands in town that parallel the river.

There is also a major road from the Bartlet Earth Station to Larson Creek. From there trails branch out to Larson Lake, Bald Mountain, and Sheep Creek. There are several branches of this main road that lead to cabins in the two major subdivisions in the area. The intertie transmission line also crosses this subunit.

Winter Access

The Talkeetna River bottom is used by a variety of users for snowmachining, dog mushing, and cross country skiing between Talkeetna and Sheep Creek. In addition, the Comsat-Talkeetna bluffs subdivision Road is heavily used to access private lands around the mouth of Larson Lake and Bald Mountain. The lodge at the mouth of Clear Creek is also open in winter and promotes winter ski touring. Winter use of the corridor above the mouth of Sheep Creek is not well documented at this time. The river and many of the summer trails are used in the winter by snowmachiners, dogmushers, and cross country skiers. The Talkeetna nordic ski trails are adjacent to, but not in, the Talkeetna River corridor. They were established by the Talkeetna Chamber of Commerce for recreation. They are located off the Talkeetna River Road and the Comsat Road and are heavily used by a variety of recreation users in both winter and summer. Some of the spur trails off the nordic trails connect with the Talkeetna River (in the subunit) which is used for overland access in winter.

Airstrips and Floatplane Access

There are no landing areas in this subunit. However, there are a number of companies located in Talkeetna that fly river users to upper Clear Creek and the Talkeetna River. In town there are two airstrips and two lakes that are heavily used for this purpose.

Extraction Activities

There are some materials extraction sites in Talkeetna adjacent to the subunit.

Private Lands

There are only a few private parcels in this subunit. They are all located below RM 20 (just above Sheep Creek). Most of the private land in the area is immediately adjacent to the corridor in Talkeetna, Chase, and the Talkeetna subdivisions.

TALKEETNA CANYON SUBUNIT (2) RM 31 to RM 44.5

Structures and Improvements

There are none in the subunit. There is one cabin at the mouth of Prairie Creek (upriver from the subunit) used by commercial float trips.

Water-Dependent Structures

None

Trails

There are a few short foot trails for scouting rapids in the subunit. There are a large number of mining related trails upriver from the subunit.

Winter Access

The canyon has open water all winter and is not passable in winter.

Airstrips and Floatplane Access

There are no airstrips or floatplane landing areas in the corridor. The float trips down the river typically begin at Yellow Jacket Creek where there is a landing area. Alternately, there are lakes used by floatplanes on upper Prairie Creek. There is infrequent use of the river by floatplanes at the mouth of Prairie Creek. There is also a primitive landing area for supercubs on a river bar (RM 48.5) downstream from the mouth of Prairie Creek that is rarely used.

CLEAR CREEK SUBUNIT (3) - Clear Creek RM 0 to RM 9.5

Structures and Improvements

This unit only includes a small amount of uplands at the mouth of Clear Creek. The remainder of the subunit is the Clear Creek bottom. For this reason there is only one cabin in the subunit, Clear Creek Lodge. There are, however, at least 10 cabins with one-half mile of the creek. They are scattered along the river and around Big Heart Lake. Most of these are not visible from the river.

Water-Dependent Structures

None

Trails

There is a foot trail from the mouth of Clear Creek to Fish Creek used by fishermen. Access along this trail is a problem because the lower east bank of Clear Creek is privately owned and Fish Creek is also on the east. Clear Creek is not easily navigated by boats. There are also trails along the west side of Clear Creek that connect private cabins with the railroad tracks north of Talkeetna.

Winter Access

Lower Clear Creek is used by winter travelers. Trails to private lands along the creek are also used. It is not known if the Clear Creek Canyon is used in winter.

Airstrips and Floatplane Access

There are three supercub strips and one large airstrip along Clear Creek. These are all above the river corridor. The largest strip at the Clear Creek headwaters is private. Only one of the supercub strips is occasionally used as an access point for floaters. Little Heart Lake (north of the subunit) is also used by floatplanes. However the trail to the creek is brushy and long and seldom used for access.

Extraction Activities

There are several valid mine claims along Clear Creek between RM 6 and 9.5. The majority of mine claims and tractor roads on Clear Creek are north of the subunit.

Private Lands

There are private parcels all along the river and nearby in Chase and around Mama Bear and Papa Bear Lakes.

LAKE CREEK MOUTH SUBUNIT (1) RM 0 to RM 3.5

Structures and Improvements

There are 4 lodges in the subunit and 13 lodges adjacent to it. In addition there are three cabins in the subunit and fourteen adjacent to it. Some of these cabins are used partially for business and have a few clients every year, and others are rental cabins for air services. ADF&G owns cabins up the Yentna River from the subunit.

Water-Dependent Structures

In the corridor there is one dock at the King Point Lodge and one on Bulchitna Lake. There are several docks just outside the corridor on Fish Lakes and along the Yentna River.

Trails

There are several local foot and three-wheeler trails associated with the lodges, cabins, and public use near the mouth of the river. There are also four section or seismic lines near the mouth. Only one of these appears to be used during the summer. There is also an old historic wagon road that goes north from McDougal which is located just east of the corridor and does not appear to be used.

Winter Access

The entire Lake Creek subunit receives ample snowcover during most years. The Iditarod race trail has been run on the Yentna River through this subunit in recent years. In addition, the Iditaski and Iron Dog Classic are also run on the Yentna River. Riversong lodge (adjacent to the subunit) is also used as a checkpoint for some of the races. There is extensive winter travel by snowmachine and dog teams during the winter months. The Yentna River is a highway for this type of travel for both local residents and recreation users coming from the a variety of points along the Parks Highway, Petersville Road, and Knik Road. In particular there are a series of seismic lines and tractor trails that connect with Shulin Lake, Amber Lake, and Trapper Lake. These have also been used in previous years for transporting heavy equipment. Private property owners and recreation users also travel up the lower part of Lake Creek.

Airstrips and Floatplane Access

Floatplane landing areas in the corridor include Bulchitna Lake and the Yentna River. Floatplanes are often moored along the section of the Yentna River that is in the subunit. There is one airstrip just upstream from the mouth of Lake Creek on a bar in the Yentna River (outside the corridor) in front of Lake Creek Lodge.

Extraction Activities

No major extraction activities have been documented. Harvest of wood for firewood and possibly houselogs is probably common within the subunit. There is one valid mine claim one mile upriver from the mouth of Lake Creek on the north side of the Yentna River.

Private Lands

Private lands in the subunit are located between Bulchitna Lake⁹ and Lake Creek, along the Lake Creek, and along the Yentna River.

⁹ The corridor only includes the water body and lake bottom of Bulchitna Lake. Only the eastern-most tip of the lake is in the corridor.

UPPER LAKE CREEK SUBUNIT (2) RM 3 to RM 51.8

Structures and Improvements

Most private lands in the subunit are downriver from Shovel Lake. In the subunit there are cabins on Lake 1,015' (RM 27), Quiet Lake, and just above Bulchitna Lake. The subunit also contains unauthorized cabins on Shovel Lake and at RM 46.2. There are also cabin ruins associated with an old mining operation at RM 8. There are long-term camps on the south end of Rock Lake (RM 45) and associated with mine claims along the river near Quiet Lake. During summer 1989 there were two long-term camps near Quiet Lake that were visible from the river and used for mining.

Water-Dependent Structures

There are two docks located on Quiet Lake and one on Lake 1,015' (RM 27).

Trails

There is an extensive system of off-road vehicle trails in the wetlands along the northeast side of the creek from RM 32 to RM 42. This appears to be associated with users from Shovel Lake during moose season. There is also evidence of trails in the wetlands near Rock Lake, Martana Lake, Lake 1,015', and Quiet Lake. Foot trails are also associated with these lakes. Two old tractor trails cross the river at RM 43 and RM 46. These trails are no longer used in summer. The tractor trail from the Petersville Road to Chelatna Lake Lodge used in spring 1989 is not visible because of extensive snowcover when the equipment was moved. There are a few airstrips associated with private cabins adjacent to the corridors but these are not used for activities associated with the creek. The Oilwell Road originating on Moose Creek parallels the corridor on the east side from RM 0-14. This road eventually connects with the Petersville Road and is used for access in the winter by snowmachines and cat trains. There are numerous seismic or section lines in and adjacent to the corridor downriver from RM 25. Only one of these (between RM 2 and RM 7 on the east side of the river) appears to receive significant summer use.

Winter Access

The upper portions of the river are less used for winter travel than the mouth. Private property owners in and adjacent to the river use snow machines during the winter months. There are extensive areas of open bogs adjacent to the corridor where snowmachines travel. Seismic lines along the lower 25 miles of river are also used in winter. In previous winters snowmachines were used for trapping in the area. Some recreation users travel from the Petersville Road via the Forks Roadhouse and Pickle Creek to access the upper Lake Creek and Chelatna Lake areas. Travel is dependent on overflow on the Kahiltna River. Snowmachining through the canyon is not possible during most years because of open water (confirm). During winter 1989 a cat train transported materials for cabins to the Chelatna Lake lodge. In previous years tractor trails have been used which cross the upper river to transport heavy equipment to the mining district on upper Sunflower and Camp creeks.

Airstrips and Floatplane Access

There is a seldom-used cub strip on a gravel bar at RM 39. There are also a number of lakes in the corridor that are used for floatplane access including Quiet Lake, Lake 1,015' (RM 25), Martana Lake (RM 26), and Rock Lake (RM 45). There is trail access to the river from these lakes. An unauthorized trail was built in summer 1989 from the river to Rock Lake. The trail is used by Chelatna Lake Lodge for transporting clients and equipment by four-wheeler to the lake to be flown back upriver. The four-wheeler and camp are stored at the Rock Lake. The Martana Lake trail has been used more frequently in the past than in current years as a pickup point. Although often noted as a river access point, the trail to Shovel Lake is too long to be used frequently for a takeout point.

Extraction Activities

There are approximately 130 valid mining claims in this subunit along the river near Quiet and Shovel lakes. There are also mine claims adjacent to the corridor on Upper Camp Creek near Collinsville. At this time only small-scale annual assessment work is being conducted at the Quiet Lake claims. There is activity at Collinsville which is outside the corridor. Mine claims within the corridor are located between mile 42 and mile 30. This is adjacent to Shovel lake and includes lower Camp Creek and lower Home Creek. Claims are also located between mile 21 and 16 adjacent to Quiet lake. There are also claims between mile 9.9 and 11.5. There are a number of valid claims on upper Sunflower Creek adjacent to Collinsville. These claims were active in summer 1989. Although in the past Collinsville was primarily accessible by tractor trails, it is now accessed by a 3,000' airstrip on upper Camp Creek. There is some evidence of historic mining activity at mile 7.5. This includes an old dredge and cables and a cabin ruin on the east side of the creek.

Private Lands

There are only a few private parcels in the corridor. These are located on Quiet lake, Lake 1,015", and Fish Lakes. Because of past state land disposals, there are a number of private parcels adjacent to the corridors including near Quiet Lake, Lake 1,015', Fish Lakes, southwest of Shovel Lake, and east of mile nine.

CHELATNA LAKE SUBUNIT (3) RM 51.8 to RM 64

Structures and Improvements

Most of the development in this subunit is concentrated at the south end of the lake. There are also some cabins scattered along the north and east shore. There are approximately 17 cabins with associated structures in the subunit including one unauthorized cabin on a mining claim on the north end of the lake. There are two lodges on the lake including Chelatna Lake Lodge and Chelatna Shores Resort.

Water-Dependent Structures

There is a boat storage area at the end of the airstrip that is used by private landowners and Chelatna Aquaculture Association staff. There are buoys established in front of the lodge and another private cabin for floatplane landing. The Chelatna Lake Lodge also has a dock where several boats are moored. Cook Inlet Aquaculture Association has a temporary camp at the outlet of the lake adjacent to an old cable that extends over the river. Minnow traps were attached to the cable during summer 1989. The camp was staffed by two or more staff for most of the summer.

Trails

Most trails are concentrated near the south end of the lake. The major trails connect with Collinsville and the Kahiltna River/Petersville Road. There are also a number of foot, off-road vehicle, and truck trails adjacent to the Chelatna Lake Lodge and nearby cabins. The slopes near the remainder of the lake are too steep and brush covered for construction of major trails. Access to the scattered cabins on the north and east side is by boat or floatplane.

Winter Access

See Upper Lake Creek subunit.

Airstrips and Floatplane Access

There is one airstrip in this unit which is on state-selected land. The primary floatplane landing areas are in front of the lodge and airstrip, the lagoon just below Chelatna Lake Lodge, and Coffee Creek. The first two are used as drop-off and pickup points for the lodge and the public. Coffee Creek is used as a stopover picnic area during Alaska Range flightseeing trips. There are lesser used areas for floatplanes associated with the use of private cabins and Chelatna Shores Resort.

Extraction Activities

Sand and gravel was moved at the south end of the lake for creation of the airstrip. In addition, there has been some recent earth moving associated with road/trail improvement on a point at the south end of the lake. There is one mining claim on the north end of the lake.

Private Lands

Private lands are concentrated on the south end of the lake. The largest parcel is a 160 acre Native allotment that is about to be conveyed by BLM. There are also scattered parcels on the east and north ends of the lake.

MOUTH OF TALACHULITNA RIVER SUBUNIT (1) RM 0 to RM 2.8

Structures and Improvements

Lodges at the mouth include the Talaview, Talachulitna River Lodge, Silvertip Lodge, Talstar Lodge, and Teke Tours. The latter two had few clients in 1989 and may not be running in 1990. There is an ADF&G cabin on the east side of the river near the mouth.

Water-Dependent Structures

There are various improvements along the river associated with the lodges. This includes steps, ramps, equipment storage, and platforms. This is particularly prevalent on the east side of the river where banks are steep and improvements were built to allow access to private lands located on benches above the river. USGS maintains a weir on the Skwentna River downriver from the mouth of the Talachulitna River. DNR has also installed a temporary river gauge in front of the Talaview Lodge. Boats are stored adjacent to each lodge. In addition, boats are stored by the public at the mouth of the Talachulitna River and at the mouth of Shell Creek. Floatplanes have established primitive tieups on a beach on the north side of the Skwentna River across from the USGS gauging station.

Trails

There are several local foot trails associated with the lodges including trails which connect all the lodges on both the east and west sides of the Talachulitna River.

Winter Access

The mouth of the creek is used primarily by local residents for snowmachining. Recreation use is limited because of its distance from Skwentna. Skwentna is usually as far as recreation users travel from the railbelt.

Airstrips and Floatplane Access

There is one private airstrip adjacent to the Talachulitna River Lodge. Some of the other lodges have permission to use this airstrip. The airstrip is not open to the public. The other landing area is on a bar

at the mouth of Shell Creek at low water. Floatplanes also land adjacent to the USGS gauging station on the Skwentna River. Some floatplanes also land near the mouth of the Talachulitna River in the same area where boaters and fishermen congregate during the salmon runs.

Extraction Activities

None documented except for clearing and earth moving associated with construction of the airstrip and lodges.

Private Lands

These are concentrated adjacent to the river between river RM 1 and 2.8.

TALACHULITNA RIVER CANYON SUBUNIT (2) RM 2.8 to RM 10.8

Structures and Improvements

There are no cabins or structures in this subunit. There are three cabins on Lake 430' (RM 3) just east of the subunit.

Water-Dependent Structures

None.

Trails

There is one off-road vehicle trail around Dog Lake (RM 5) in the corridor. There is also a foot trail from Lake 430' (RM 3) to the river at RM 2.8.

Winter Access

Winter access is primarily restricted to local residents. There is some trapping in the winter. Residents adjacent to the subunit on Hilina Lake use snowmachines.

Airstrips and Floatplane Access

Dog Lake (RM 5) may be used by floatplanes. Lake 430' (RM 3) which is adjacent to the corridor is used by floatplanes to access private cabins. There is a frequently used supercub strip at RM 7 adjacent to private land and the largest block of mine claims on the river.

Extraction Activities

There are three sets of valid mine claims in this subunit at RM 6, 9, and 11.

Private Lands

There is one private parcel in the subunit (RM 7). There is also some private land around lake 430' (RM 3) just outside the corridor.

MIDDLE TALACHULITNA RIVER SUBUNIT (3) RM 9.8 to RM 32.5

Structures and Improvements

Two lodges are located at the midpoint (RM 20), Bear Tracks and Talaheim. One lodge, Greybow, recently closed and may be for sale. There's also three private cabins at RM 20, one occupied by a year-round resident.

Water-Dependent Structures

The lodge and cabin owners store boats and boat-related equipment by the river. Talaheim lodge has a drinking water uptake pipe and filter in the river. Just below the forks is a dock that has been washed down from Judd Lake.

Trails

Most of the trails in the subunit are in the immediate vicinity of the existing lodges and cabins and are used to access the river, an airstrip, woodlots, and the adjacent cabins. There are also trails used in the winter by local residents that parallel the subunit to the east and west. Fishermen also walk up Friday Creek, Saturday Creek, and other tributaries on primitive trails or on river bars.

Winter Access

Winter access is mostly by local residents who live at the midpoint of the river. There is some trapping in the winter. Residents on adjacent lakes such as Trinity Lakes and Hiline Lake also use snowmachines. In the past there has been some transportation of heavy equipment to Coal, Friday, and Saturday Creeks.

Airstrips and Floatplane Access

Just downstream from the midpoint lodges is a floatplane landing area on the river (RM 19). Boats and floatplanes are stored at the south end of this area. Boats are used to shuttle clients and local residents upstream to the cabins and lodges. During highwater, floatplanes can taxi and land in front of the lodges. There is also a primitive landing area in a swamp behind the Talaheim lodge that is used by the owner of the lodge. In addition, Talaheim lodge has a helicopter that is stored in a clearing between the lodge and the river. At RM 32 there is a primitive landing area on a river bar. There may be other bars that are infrequently used by supercubs. Hiline Lake (adjacent to and east of the corridor) is used by floatplanes to access private land around the lake.

Extraction Activities

Timber has been harvested adjacent to all the cabins and the lodges at the midpoint for houselogs, firewood, and milled wood.

Private Lands

All private lands in the corridor are located on the east side of the river at RM 20. Talaheim Lodge (RM 20) on the west side of the river is on land leased from the state.

TALACHULITNA CREEK SUBUNIT (4) Talachulitna Creek RM 0 to RM 17

Structures and Improvements

The Cook Inlet Aquaculture camp and fisheries enhancement equipment is located on the south bank of the river at RM 17. There is an abandoned caterpillar on the south bank of the river at RM 6.8. This vehicle was being transported from upper Saturday or Friday Creek to upper Coal Creek when it became disabled. There is one cabin in this subunit on the north bank of the Creek at RM 6.8.

Water-Dependent Structures

There is fisheries equipment and a wall tent on the upper creek. This is owned by the Cook Inlet Aquaculture Association and used for their coho salmon enhancement project.

Trails

There are primitive trails that have developed from the public hiking the river bottom from the Silvertip Lodge downriver. Much of this walking is along the river bars and through the water during low water. The lodge has also cut a loop trail on the north side of the river. There are also some well-established off-road vehicle trails associated with the cabin at RM 6.8. There is evidence of heavy use between the cabin and the cabins on the east side of Trinity Lakes. There's also off-road vehicle trails between RM 6 and 9 that parallel the river on the north side.

Winter Access

Winter access is restricted to snowmachine use by residents at Trinity Lakes and Judd Lake. Beluga Mountain presents a major obstacle to recreation users travelling to the area from Alexander Creek in winter. There is some winter trapping in the area.

Airstrips and Floatplane Access

Because of the low volume of the river in this subunit and its meandering nature, there are no floatplane landing areas. There are, however, lakes used by floatplanes just outside the corridors on Movie, Trinity, and Kitty lakes.

Extraction Activities

None

Private Lands

There is only one parcel at RM 6.8 where a cabin is located.

JUDD LAKE SUBUNIT (5) - Talachulitna Creek RM 17 to RM 22

Structures and Improvements

There are four cabins around the lake. There is also remnants of a cabin that burned. Silvertip Lodge is located at the river outlet.

Water-Dependent Structures

Silvertip Lodge has a large dock and equipment storage shed near the outlet of the lake.

Trails

Silvertip Lodge has begun to cut a foot trail from the west end of the lake to Talachulitna Lakes. The lodge has also cut a loop trail that extends approximately two miles downriver. There are also foot trails around the lake associated with the private cabins and the lodge. There are also some short foot trails associated with the sandy area at the inlet to the lake. Although there are five lakes just south of the river used by floatplanes and several parcels of private land, there does not appear to be established trails between this cluster of private land and Judd Lake.

Winter Access

Winter access is restricted to snowmachine use by residents at Trinity Lakes and Judd Lake. Beluga Mountain presents a major obstacle to recreation users travelling to the area in winter. There is some trapping in the area.

Airstrips and Floatplane Access

The lake is heavily used by floatplanes to drop off people at the lodge and private cabins. Floaters are dropped off at the inlet to the lake or on the north side of the outlet. There are five lakes just south of this subunit used by floatplanes.

Extraction Activities

None

Private Lands

Several private parcels are located around the lake. There are also private parcels southwest of Judd Lake (outside the subunit) located around the perimeter of several lakes.

UPPER TALACHULITNA RIVER SUBUNIT (6) RM 32.2 to RM 64

Structures and Improvements

There are at least three unauthorized cabins on the upper Talachulitna River. These are located at approximately miles 36, 47, and 56.¹⁰ These are primarily used in winter for trapping.

Water-Dependent Structures

None

Trails

There are off-road vehicle trails between miles 46 and 54 on the east and south sides of the river. Wolf Lakes may be receiving off-road vehicle use in the fall.

Winter Access

This subunit receives use for snowmachining by a local trapper. There may also be some infrequent use by other residents to the west. To the east is the steep side of Beluga Mountain that prevents access from the east.

Airstrips and Floatplane Access

The largest Wolf Lake is used by floatplanes to drop off moose hunters in the fall.

Extraction Activities

None

Private Lands

None

¹⁰ The locations of the latter two are approximate.

LOWER ALEXANDER CREEK SUBUNIT (1) RM 0 to RM 16.3

Structures and Improvements

Most of the cabins and lodges on Alexander Creek are concentrated below near the mouth which is outside the corridor. There are three lodges at the mouth that serve recreation users. The subunit includes 11 cabins. Two of these cabins are used commercially. One is located just below Trail Creek at RM 10.5. Another is located at RM 15.5. In addition, there is one lodge just outside the subunit on the west side of the creek. This lodge uses river access by a trail and dock at RM 4.8. There are seven cabins adjacent to the corridor on Yensus Lakes, Lake 145' near Granite Creek, and near Dinglishna Hill.

Water-Dependent Structures

There is one dock at RM 4.5 used to access a cabin west of the river (outside the subunit). There are four docks on Yensus Lakes (just east of but adjacent to the corridor).

Trails

There's a prominent trail behind the cabins on RM 11 which parallels Trail Creek for at least one mile. The section line on the east side of the corridor and parallel to river appears to be receiving heavy summer use. This trail connects a block of private lands on the east side of the river at RM 5 with an airstrip and private lands at RM 5. The other seismic line in the corridor does not appear to be used in summer.

Winter Access

There is extensive winter travel along Alexander Creek below Sucker Creek. Snowmachine use is by both recreational users and private property owners. In addition, the Beluga gasoline is used as a truck road in winter. Some winters it is possible to drive from the Knik Road lands on Alexander Creek above Dinglishna Hill at RM 5. Snowmachiners also travel to lower Alexander Creek from the Iditarod race trail and from Deshka Landing down the Big Susitna River to the mouth of Alexander Creek.

Airstrips and Floatplane Access

There is one winter airstrip at mile 15.5 just below the Sucker Creek junction.

Extraction Activities

None

Private Lands

Most of the private land in this subunit is concentrated in the lower two miles of this subunit.

UPPER ALEXANDER CREEK SUBUNIT (2) RM 16.3 to RM 28

Structures and Improvements

There are two cabins on Lake 104' (RM 32.5) that may be in trespass on state land.¹¹ There is a cabin ruin at RM 31.

¹¹ These cabins may be on private land. The land status requires further investigation.

Water Dependent Structures

There are two docks on Lake 104' (RM 32.5).

Trails

There is a short trail between Lake 104' (RM 32.5) and the creek. The four seismic lines do not appear to be receiving summer use.

Winter Access

In past years the Iditarod race has been run along the creek through this subunit. In 1989 it followed the Yentna River and did not cross the Alexander Creek corridor. One of the primary reasons the race was moved to the Yentna was to avoid the dense moose concentrations along the creek bottom. This trail is still used by the Iditaski and snowmachiners. Seismic lines along the river are also used for winter access. There are extensive open bogs adjacent to the river that are used for snowmachining.

Airstrips and Floatplane Access

Lake 104' on the west side of the creek (RM 32.5) is used by floatplanes.

Extraction Activities

None

Private Lands

There are no private lands in this subunit.

ALEXANDER LAKE SUBUNIT (3) mile 28 to mile 32

Structures and Improvements

Alexander lake Lodge is located on the south end of the lake. There are a number of improvements associated with the lodge. There is a large dump that is located behind the lodge and is quite visible from the air. In addition, there are six cabins around the lake, most of them are located on the south end of the lake.

Water Dependent Structures

There is a primitive platform installed by air services on the south east end of the lake. This platform is used by floaters to inflate rafts. The platform was installed because there is little dry ground on public lands near the exit of the lake that is suitable for this purpose. There are also equipment storage and boat storage areas adjacent to the river used by the lodge.

Trails

There is a major off-road vehicle trail from the lodge along the east shore and the creek which drains into the lake. Most of this trail is on wetlands. Another trail used by the lodge is through the woods on the north side of the creek and is used to pickup clients who take a short float trip down the upper few miles of the creek. Seismic lines in this subunit do not appear to be heavily used in summer.

Winter Access

In previous years the Iditarod Race was run across the lake and north to Rabbit Lake. In 1989 this course was not used. However this route is used by the Iditaski and snowmachiners. There are also private property owners around the lake who use snowmachines.

Airstrips and Floatplane Access

Floater are usually dropped off at one of three sites on the lake by floatplane. The most commonly used landing area is at the southeast end of the lake near the lake exit where the previously mentioned platform is located. The other floatplane dropoff area is on the northeast side of the lake. This is more commonly used in late summer when the lake becomes clogged with weeds. Lodge clients are dropped off at the private Chelatna lake Lodge airstrip.

Extraction Activities

Logs were illegally cut in this subunit by the lodge in winter '88/'89 for cabin logs.

Private Lands

Most of the private lands are located on the south end of the lake. However some are located along the shoreline midway up the lake.

SUCKER CREEK SUBUNIT (4) RM 16.5

Structures and Improvements

There are none in the subunit. There are cabins and docks on Trail Lake adjacent to the corridor.

Water Dependent Structures

None

Trails

There is one foot trail from Trail Lake to Sucker Creek. This trail is used by floaters who carry their gear from the floatplane dropoff on Trail Lake to Sucker Creek. The trail is through wetlands making it difficult to carry heavy gear such as rafts.

Winter Access

There is only limited use of Alexander Creek near the mouth of Sucker Creek. Most of the snowmachining use is on the upper and lower river. There may be some use along Sucker Creek to access Trail Lake (confirm).

Airstrips and Floatplane Access

Trail Lake (outside the subunit) is used by floatplanes to access the lake and private lands and cabins around the lake.

Extraction Activities

None.

Private Lands

None

CHAPTER 6

COMMERCIAL
RECREATION ACTIVITIES

CHAPTER 6 - COMMERCIAL RECREATION ACTIVITIES

Introduction

Following is a list of commercial operations servicing the six Recreation Rivers in 1989. The table following the list summarizes, by river corridor, the number and type of commercial operations by river.

Commercial Services Located Within the River Corridors, 1989

Little Susitna River:	Lodges:	Little Susitna Lodge
	Guides:	Action Jackson Charters Scott's Quality Charters Andy Couch
	Other:	Burma Landing (DOPOR) Miller's Landing Houston Campground Little Susitna River Campground
Deshka River:	Lodges:	Silver-King Lodge Mike & Mert's Deshka River Lodge Sleeping Lady Lodge Deshka River Lodge Northward Bound Deshka River Lodge Real River Guided Fishing
	Air Services:	Rust's Flying Service Regal Air Willow Air Ketchum Air Service
	Guides/Boat Shuttles:	Tri-River Charters Riverover Ventures Susitna Riverboat Mike's Good Times Fishing (Charter) Charmin Charlie's Charters Mahay's Riverboat Service Wolverine Guides and Outfitters J & S Charters Viekoda Enterprises Rivers North Tom Rutter (Charter boat service?) River Benz

Talkeetna River:

Air: Talkeetna Air Taxi
Cliff Hudson
ERA Helicopters

Guides/Boat Shuttles:

Alaska Recreation Service
Tri-River Charters
Riverover Ventures
Charmin Charlie's Charters
Mahay's Riverboat Service
Denali Raft Adventures
Up the Creek
Osprey Expeditions
NOVA Riverrunners
Alaska Whitewater
Ouzel Expeditions
Alaska River & Ski Tour
Keystone Raft Adventures

Lodges: Clear Creek Lodge

Other: Deshka Landing (not in corridor)
Susitna Landing (not in corridor)

Lake Creek:

Air: Rust's Flying Service
Regal Air
Trail Ridge Air
Willow Air
Ketchum Air Service

Guides/Shuttles:

Tri-River Charters
Riverover Ventures
J & S Charters
Alaska River & Ski Tour

Lodges: Salmon-Run Lodge
McDougal Lodge
Riversong Lodge
King Point Lodge
Northwood Lodge (Fish Creek)
Swiss Camp Lodge (FTC Camp)
Chelatna Shores Resort
Lake Creek Lodge
Wilderness Place Lodge
Skwentna Roadhouse
Skwentna River Fishing Lodge
"Magic" Mike Pierce

Talachulitna River:

Air: Alaska Bush Carrier
 Bush Pilots
 Rust's Flying Service
 Willow Air
 Ketchum

Lodges: Talaview Lodge
 Talaheim Lodge
 Alaska River Tours (Teke Tours)
 Silvertip Lodges (two lodges)
 Bear Tracks Lodge
 Talachulitna River Lodge
 Talstar Lodge

Alexander Creek:

Air: Rust's Flying Service
 Regal Air
 Trail Ridge Air
 Ketchum Air Service
 Airlift Alaska
 Oney's Helicopters

Guides/Boat Shuttles:
 Tri-River Charters
 J & S Charters

Lodges: Gabbert's Fish Camp
 Black Fox Lodge
 Alexander Lake Lodge
 Osowski's Lodge

Commercial Services Operating within or Providing Services to the Recreation Rivers

River	Lodges	Fish Guides	Hunting Guides	Air	Boat Taxis	Equipment Shuttles	Rentals	Other¹
Little Susitna River	1	3	?	0	3	?	2	
Deshka River (Moose and Kroto Creeks)	6	12	?	4	12	?	2+	
Alexander Creek	4	3	?	5	3	?	?	
Talachulitna River	7	?	?	4+	?	?	?	
Talkeetna River	1	12	?	?	6?	?	?	
Lake Creek	11	?	4	5	4	?	?	

¹ This category includes commercial boat launches and other miscellaneous services such as helicopter sightseeing charters.

CHAPTER 7

TRANSPORTATION

CHAPTER 7 - TRANSPORTATION

Transportation Plans and Studies

Susitna Small-Scale Transportation Study, Alaska Department of Natural Resources, September, 1988. This report investigates the economic costs and benefits of building or upgrading 16 small-scale roads in the Susitna basin. These roads would provide or improve access to forest, recreation, agriculture, and mineral resources. The report did not review the costs and benefits of building expensive roads to big resource deposits like the Beluga coal fields.

Using a range of potential levels of resource development for each roadway, a computer evaluation model rated the road corridors by economic benefits. Four of these roadways intersect or reach the boundaries of the recreation river corridors. These four include the Chuitna, Hatcher Pass, Kroto Creek, and Oilwell roads. These six roadways are shown on the following map.

Matanuska-Susitna Borough Comprehensive Transportation Study, March, 1984. The borough here made projections of population growth and in turn the growth in the need for further access routes and improvements to existing routes. The study identified a number of near-term capital improvement projects to take to the legislature, in the "6-year plan". It also identified several future road corridors and roadway links in its "20-year plan". The study includes roads throughout the borough, with the natural concentration being in the immediate Palmer-Wasilla area. The following road alignments intersect the Recreation Rivers boundaries:

Borough 6-year plan:

Little Susitna Recreational Access. This existing road is heavily used by anglers seeking access to the lower reaches of the Little Susitna River. The improved boat launch, parking area, and campground were built in 1989. The Burma Road is the only access to the Little Susitna River west of Miller's Road.

Oilwell Road to Amber Lake Bridge. This is an agricultural project and recreational access corridor extending Oilwell Road across Moose Creek to Amber Lakes Subdivision. The corridor extends south between Moose Creek and Kroto Creek into an area with 7,000 to 10,000 acres of Class II and III agricultural soils. A bridge across Moose Creek has already been designed and is awaiting funding.

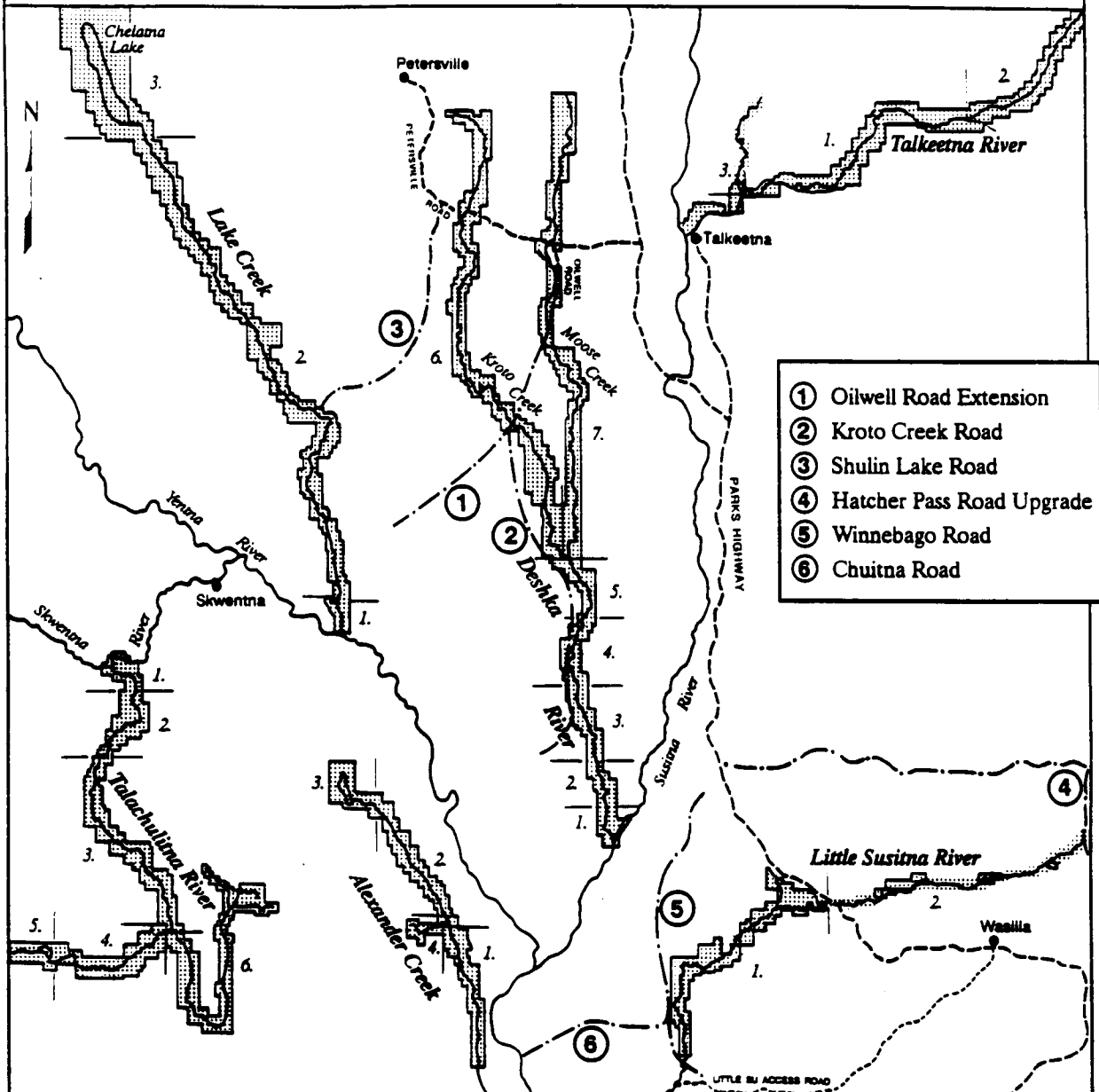
Sitze to Schrock Interconnect. This project will serve as a north and south approach to the new Little Susitna Bridge at the east end of Schrock Road. It will also serve as a link between the proposed Parks Highway to the Edgerton Park Road north of the Little Susitna River and the road system south of the Little Susitna River.

Borough 20-year plan:

Parks Highway to Edgerton Park Road Connector. This is a 20 mile east-west corridor north of the Little Susitna River. The alignment is from the end of Edgerton Parkway at

SUSITNA BASIN RECREATION RIVERS MANAGEMENT PLAN

Six Road Corridors Evaluated in the Susitna Small Scale Transportation Study



MANAGEMENT UNITS & SUBUNITS

Talachulitna River

1. Mouth of Talachulitna River
2. Talachulitna River Canyon
3. Middle Talachulitna River
4. Talachulitna Creek
5. Judd Lake
6. Upper Talachulitna River

Alexander Creek

1. Lower Alexander Creek
2. Upper Alexander Creek
3. Alexander Lake
4. Sucker Creek

Little Susitna River

1. Lower Little Susitna River
2. Upper Little Susitna River

Deshka River

1. Mouth of Deshka River
2. Lower Deshka River
3. Middle Deshka River
4. Neil Lake
5. The Forks
6. Koto Creek
7. Moose Creek

Talkeetna River

1. Lower Talkeetna River
2. Talkeetna Canyon
3. Clear (Chunina) Creek

Lake Creek

1. Lake Creek Mouth
2. Upper Lake Creek
3. Chelama Lake

the east side to Houston and the Parks Highway at the west side, running extensively along the Little Susitna River on the north side.

Fish Creek Agricultural Access. Located in Township 16 North, Range 5 West, Seward Meridian, this project would take off from the Little Susitna River Recreational Access and cross the Little Susitna River. It would provide access to borough and state agricultural, forestry, homesite, and recreational land (see Chapter I description of Fish Creek Management Plan).

Other Roads

Big Lake South Extension Road The Matanuska-Susitna Borough has begun designing and this road and applying for permits. The borough has also received funding to build the road from the legislature. The new road is a spur road of the Big Lake Road and will eventually cross the Little Susitna just south of Hock Lake. The purpose of the road is to access borough lands with potential for forestry, settlement, agriculture, and recreation.

Legal Access

Three common types of legal (public) access are granted: rights of way or easements, Revised Statute (RS) 2477 trails, and section line easements. They are explained in general terms below.

Rights-of-way may exist or be secured or reserved to achieve a variety of land management goals, including, but not limited to general transportation (such as highways), access to fish and game resources, recreation, historic preservation, settlement, or other resource development goals. Three types of right of way permit are granted by the state: public, private/non-exclusive, or private/exclusive. With respect to the recreation river corridors, there are a number of right of way permits that have been granted by the state for various purposes, most commonly for access to and from the river by private land owners.

Easements are generally reserved when property is sold. In the case of the recreation river corridors, there are a number of private land parcels adjacent to the rivers which have access easements along the banks, and a number that don't. We can generalize by saying that those parcels which were conveyed by the state have a 'pedestrian easement', generally 10 feet in width, above mean high water. These easements are spelled out in the Alaska State Land Surveys for each parcel.

U.S. Surveys and patents for the land acquired from the federal government, generally have no building setbacks or access easements along the rivers. For parcels right on the rivers, there is no legal access above ordinary high water.

RS 2477 trails were granted under Section 8 of the Homestead and Mining Laws of 1866. Revised Statute (RS) 2477 of the Homestead and Mining laws granted rights-of-way across public lands for the construction of highways and was revoked under the Federal Land and Policy Act of 1976. Roads and trails constructed across formerly unreserved federal lands qualify as RS 2477 trails; however, their validity must either be mutually consented upon by affected landowners or asserted through courts on an individual basis. It is important to distinguish that private citizens or other

parties also have the right to independently assert rights-of-way under RS 2477. Once RS 2477 rights of way are asserted and validated, determining who will have management responsibility of an RS 2477, particularly over non-state lands, is a concern of both the state and adjacent landowners. The state is working with the federal agencies and private landowners on the identification, assertion, and validation of these easements. A federal policy concerning these trails has recently been adopted.

Section Line Easements are implied rights of way along section lines over unreserved or formerly unreserved lands. These were also granted under the Homestead and Mining Laws of 1866 and were formally accepted by the territorial government in 1923 (Chapter 19 SLA). The provision for section line easements did not exist for a three-year period from 1949 through 1951 and was revoked for new section line easements on federal lands by the Federal Land and Policy Management Act of 1976. The state reserves 100-foot easements on section lines for all state land in accordance with AS 19.10.010. The management of section line easements on state land is the responsibility of the DNR Division of Land. The Department of Transportation and Public Facilities must also approve of any improvements within the section line easements.

OFF-ROAD VEHICLES (ORVs)

Off-road vehicle use in the Recreation Rivers is increasing. The public expressed concerns about damage occurring and inquired about the types of regulations used by other agencies for addressing this issue. This section provides background information on these two issues.

Denali Highway Study Impacts of ORV use was studied along the Denali Highway by the Bureau of Land Management. This included studying the effects on soil morphology, soil bulk density, changes in plant species composition, and plant injury. Researchers found that because of low temperatures, short growing seasons, and a lack of species diversity, tundra environments are sensitive to disturbance. Damaged soils recover slowly. Changes in soil morphology resulting from such traffic were most noticeable in soil horizons. Soil compaction, as indicated by bulk density, was significant on trails judged to have moderate and severe soil disturbance, not in trails having slight disturbance. Heavily used trails were completely denuded. On less-frequently used trails, tall shrubs were the most injured plants; sedges appeared to be the least susceptible to injury as a result of ORV traffic. Grasses and sedges were generally the first plants to revegetate abandoned trails. Greatest soil damage occurred in poorly drained areas or on slopes with loose, gravel-free soils that were highly susceptible to erosion. Soils in wet areas usually have a thick surface layer consisting of moss and under-composed organic materials. This organic layer insulates the soil against temperature extremes, absorbs water, and cushions the soil from the direct action of vehicle tires and tracks. However, repeated ORV traffic destroys this protective mat. The churning and crushing action of the vehicles causes physical grinding of the surface organic materials and mixing with underlying mineral soil. These soils often become saturated with water, which ponds on the surface, resulting in a quagmire. ORV drivers often try to circumvent these wet areas, gradually increasing the widths of the trails. The least damage occurred on soils containing high amounts of gravel or cobbles. The most important factors controlling the degree of plant injury were the amount of traffic, vegetative type, and soil stability.

Other studies showed that soils with a high ice content usually were more susceptible to damage than those with low ice content. ORV studies vary, however, because of the differences in

terrain, amount of use, type of vehicle, and type of trail construction. For example some research found that sloping soils on the North slope were damaged less than level soils because of better drainage. While others indicated that soils on erosion susceptible slopes of the Arctic Coastal plain can be severely damaged after ORV use. Studies generally found that trails that were bladed or continuously used were less likely to recover than trails where use ceased or where the soil was not bladed. Along the Denali Highway, researchers found that most ORV trails had not been planned and were formed by repeated use by users trying to find the shortest and easiest route between two points. They found that much of the damage could have been minimized had the trails been planned so as to avoid the areas most susceptible to disturbance. Such trails should follow ridge tops when possible. Boggy areas and highly erodible soils should be avoided.

Regulations in Other Areas

Regulations in western states and provinces applying to ORV use were reviewed. Regulations that were implemented by land management agencies generally fell into the following categories:

1. Restrictions of motorized activities to designated trails or travel corridors;
2. exclusion of motorized and non-motorized activities from sensitive areas within a zone. This form of protection may be applied in regard to wildlife and wildlife habitat, vegetation, soils, and watershed;
3. Authorization of motorized and/or non-motorized activities during certain seasons;
4. Complete exclusion of motorized and/or motorized activities, including certain recreational, industrial, and commercial activities.

In Alaska, ADF&G, DNR (particularly the Division of Parks and Outdoor Recreation), BLM, NPS, and USF&WS all have some types of ORV regulations. The level of control varies according to the resource values within the given area and the kinds of uses for which it is deemed best suited. The Alaska Board of Game has approved many regulations which apply to ORV use in order to control the methods and means of game harvest. Each agency has a different definition of the class of off-road vehicles. For example, in the Palmer Hay Flats Game Refuge, the use of a "wheeled, tracked, or other ground-effect motorized vehicle is not allowed except when a vehicle under 1000 pounds gross vehicle weight during the winter (November 10- March 31) except in certain areas and during the remainder of the year along posted corridors. Permits may be issued on a case-by-case basis when the "use fulfills a demonstrable need for which there is no feasible alternative."

CHAPTER 8

BOATING

CHAPTER 8 - BOATING

Pending Legislation

Alaska is the only state that does not have a recreational boating safety law. Consequently, this is the only state where the Coast Guard is responsible for registration and numbering of recreational vessels.¹ There has been legislation proposed in recent years ("Safe Boating Act" - SB 111) but no action has been taken. The Coast Guard does not have jurisdiction over waters of all waters of the state and there is no law applicable to many Alaskan boats. The proposed bill would require the Department of Public Safety to:

1. develop and present a boating safety and education program;
2. develop an accident reporting system;
3. develop a boat numbering system;
4. develop and maintain a record keeping system; and
5. promulgate regulations.

The implementation of this law would result in federal funding of approximately \$200 to \$250,000 to implement the program.² The remainder of the funds would come from the annual boat registration fee. The law, if passed would set up a boater safety education system in addition to requiring registering boats and certain equipment. This law would also allow the state to receive federal funds to assist in boating safety activities.

The law would require boats (excluding non-motorized boats) to carry the same equipment required by federal law. At present there is no state law requiring equipment such as red and green lights, fire extinguishers, and Coast Guard approved life-saving devices. The law would also require that all boats be registered. Registration numbers would have to be displayed. The law would also prohibit a person from operating a boat in a reckless or negligent manner so as to endanger the life or property of another person. The law also allows the Department of Public safety to promulgate additional boating safety regulations after extensive public involvement as long as they are not in conflict with existing Coast Guard regulations. The new law would allow the state to place speed limit signs, limit usage of public moorages, and erect aids to navigation on rivers and lakes. Regulations would be promulgated after this legislation is passed. Violators could be cited by designated peace officers. If this bill were adopted, uniformed officers would be required to patrol and enforce the state's laws and regulations regarding boating safety. The bill also requires in-service training for officers who are assigned to enforce this law. The Department of Public Safety estimated that the proposed law would require \$649,000 per year to implement. The matching federal funds along with a \$10 annual fee would cover these costs.

Boating-related Accidental Deaths

The state of Alaska has the highest boating death rate in the U.S. During 1987 a total of 46 people lost their lives in recreational boating accidents in Alaska. This was second only to motor

¹The Coast Guard currently only has one staff member in Juneau responsible for administering this program.

²This funding would come from the 1971 Federal Safe Boating Act.

vehicle fatalities as the largest category of accidental deaths. More lives were lost to boating-related deaths in 1984-1987 than either aircraft fatalities or fires. Seventy percent of these occurred on inland waters such as lakes, rivers, and sheltered waters. Alaska has a fatality rate 28 times the national average boating fatality rate. In 60% of the 1987 fatalities, either there was no personal flotation devices on board, or approved devices that were accessible were not used (Jackson, 1988). Boating-related fatalities in recent years include one on the lower Talachulitna River in 1989 (swamped powerboat), and one on the Little Susitna River in 1991 (canoe under sweeper). There was also a fatality of a kayaker (whitewater-related) on the Upper Little Susitna River in 1991 just above the Recreation River corridor.

Predominant factors in fatalities in boating fatalities on Interior waters in Alaska has been alcohol use, use of personal flotation devises, hypothermia, and vehicle factors. The first three factors are well known. Vehicle factors include the design of boats. The boat of choice on many of the Recreation Rivers is the johnboat, a small, light weight, flatbottom boat. These boats range from 16 to 28 feet long and 4 to 5 feet wide. Johnboats function in both deep and shallow waters, work well as utility boats, and are relatively inexpensive. The instability of the johnboat increases with the addition of persons, gear, and higher speeds.

Safety Programs

There are a number of safety programs currently in place in southcentral Alaska.

U.S. Coast Guard

The Coast Guard rarely patrols the recreation Rivers to enforce boater safety and other U.S. Coast Guard regulations. They also present educational programs through the Coast Guard Auxiliary.

Department of Health and Human Services

In cooperation with the Department of Public Safety, the University of Alaska Marine Advisory program and various private agencies offer an extensive marine safety and survival curriculum was developed along with volunteer marine safety instructors. The department has also developed a water safety curriculum for children.

Alaska Marine Safety Education Association

This association distributed a regular newsletter, has developed a number of education materials, and sponsors safety courses for students and instructors.

Alaska Boating Association

This organization has developed a boating safety course, has placed safety signs at boat access points, publishes a regular newsletter, and is involved in other boating-safety related activities.

Matanuska-Susitna Borough

The borough sponsors aquatics safety programs and distributes safety information at the mouth of the Deshka River.

Boating

Knik Canoers and Kayakers

This organization annually sponsors courses for canoers, kayakers, and rafters. They also distribute a newsletter containing safety information.

American Red Cross

This organization has developed boating and swimmer safety courses and offers regular instruction and distribution water safety information.

Existing State Boating Regulations

There are currently state laws that prohibit negligent operation of boats, and some safety equipment for some types of boats. There are also some requirements for reporting accidents.

There are regulations for powerboating³ on many of the state game and wildlife refuges. For example, the Palmer Hay Flats Refuge has some boating regulations. Rabbit Slough is closed on weekends from July 15 through August 15 to correspond with the opening of the Rabbit Slough weekend-only sport fishery. With the exception of the Knik River, Matanuska River, and Knik Arm, use of a motorboat is prohibited, except that from August 16 through March 31 a motorboat with an outboard motor of 20 horsepower or less may be used. The Commissioner of ADF&G may issue a permit on a case by case basis for exceptions to these regulations if the "use fulfills a demonstrable need for which there is no feasible alternative." The Alaska Board of Game has also limited the use of powerboats in some areas to regulate the methods and means of game harvest. The Kenai River Comprehensive Management Plan regulates powerboats to 35 horsepower. In addition, certain parts of the river are restricted to non-motorized boats.

Registration and Numbering

The U.S. Coast Guard requires that all undocumented vessels equipped with propulsion machinery must be registered in the state of principal use. The owner/operator of the vessel must carry a valid certificate of number whenever the vessel is in use. The registration numbers and a sticker must be permanently attached to both sides of the forward half of the vessel. Boats are registered by submitting an application to the U.S. Coast Guard in Juneau. The offices that process these permits is understaffed and there is a three to four month backlog in processing applications. Most power boats in the Alaska southcentral region are registered. However, a large percentage of the boats with registration numbers have not renewed their registration. Permits are valid for three years and cost six dollars. The Coast Guard may impose a penalty up to \$1,000 for the failure to comply with the numbering or equipment requirements; report a boating accident; or meet other federal regulations.⁴ If the proposed state boating law in it's current form passes the legislature, boat registration will be administered by the state Department of Public Safety.

³These regulations do not distinguish between motorboats and airboats. However some make a distinction based on horsepower.

⁴Pers com. with Coast Guard and Kenai River Special Management Area.

Operation of Boats

Negligent or grossly negligent operation of a vessel which endangers lives and property is prohibited by federal law. Grossly negligent operation is a criminal offense and an operator may be fined up to \$5,000, imprisoned for one year, or both. Failure to comply with the unified Inland Rules of the Road (Inland Navigation Rules of 1980) can result in a civil penalty up to \$5,000. Examples of actions that may constitute negligent or grossly negligent operation are: operating a boat while under the influence of alcohol or drugs; excessive speed in the vicinity of other boats or in dangerous waters or bow, seatback, gunwale, or transom riding. Alaska state law states that boats cannot be operated in a manner that results in reckless endangerment. It also states that operators cannot drink or be legally drunk while operating a boat. Unlike motor vehicle laws, open containers and passengers consuming alcohol while the boat is underway is not prohibited by state law.

Navigability

The U. S. Coast Guard maintains a list of those waters within the seventeenth district for which navigability determinations have been made. This list does not include any of the six Recreation Rivers. There is a USCG memo dated 1/8/70 (file # G-LMI) that designates "all drainages originating in the Tyonek and Talkeetna Mountains and draining into the Susitna River as navigable. However, this memo is not reflected in the current list of navigable waters. Furthermore, the term "Tyonek Mountains" are not an accepted term for any range in the region. The range does not appear on any map.⁵ However, the Big Susitna River has been determined navigable⁶. Virtually all boats using the four rivers west of the Susitna River must pass through these navigable waters and therefore USCG operator licenses or boat equipment regulations apply.

Streams can be added to the list of navigable waters by supplying additional information to the U.S Coast Guard. Requests for a determination should be accompanied by a detailed report which includes the physical characteristics of the waterway and the nature of its past, present and/or its potential for future use by the boating public. If the streams are clearly unsuitable for

⁵Correspondence from the U.S. Coast Guard (4/11/89) to DNR states that the Talkeetna and the Little Susitna Rivers are not navigable. The Coast guard could not locate the original memo referring to the Talkeetna and Tyonek Mountains. It also states that although the Coast Guard has not done a formal determination of the Talkeetna River, based on BLM's findings of the extensive use below Clear Creek, it would most likely find it navigable if it did a determination.

⁶Navigable waters of the United States are defined in Title 33 Code of Federal Regulations 2.05-25 as "(1) Territorial seas of the United States; (2) Internal waters of the United States that are subject to tidal influence; and (3) Internal waters of the United States not subject to tidal influence that: (i) Are or have been used, or are or have been susceptible to use, by themselves or in connection with other waters, as highways for substantial interstate or foreign commerce, notwithstanding substantial interstate or foreign commerce, notwithstanding natural or man-made obstructions that require a portage, or (ii) A governmental or non-governmental body, having expertise in waterway improvement, determines to be capable of improvement at a reasonable cost to provide, by themselves or in connection with other waters, highways for substantial interstate or foreign commerce."

past or present navigation (steep fall/mile, low discharge volumes, etc.) or conversely, if they are broad and well suited for navigation and/or within tidal influence, then only enough information to demonstrate these facts need be submitted. In cases that may be more difficult to determine, all information available should be submitted in order to ensure a well-informed decision. There is also a possibility that the state could develop a Memorandum of Understanding with the USCG on the navigability of these six rivers.

Equipment

US Coast Guard. A Coast Guard boarding officer who observes a boat being operated in an unsafe condition, specifically defined by law or regulation, and who determines that an especially hazardous condition exists, may direct the operator to take immediate steps to correct the condition, including returning to port. Termination of unsafe use may be imposed for the following:

- Insufficient number of USCG approved personal floatation devices (PFDs)
- Insufficient fire extinguishers
- Overloaded condition
- Improper navigation light display
- Fuel leakage
- Fuel in bilges
- Improper ventilation (inboards only - one intake and one exhaust vent)
- Manifestly unsafe voyage
- Lights

In addition to the above list, commercial operators with a six pack license are required to have the following:

- Alaska registration numbers on boat
- Operators license on boat
- Type I PFDs
- Type IV throwable floatation device (boats over 16 feet)
- B1 fire extinguisher (boats up to 26 feet)
- Two B1 or one B2 fire extinguishers (boats 26-40 feet)
- Signaling devices (boats 16 feet or longer)

State of Alaska. The State of Alaska only requires that all motorized boats have running lights and PFDs. The law does not require that PFDs be worn.

Alaska Department of Fish and Game. The Alaska Department of Fish and Game requires that operators who are involved in commercial fishing, including guiding sport fishermen in a boat, require a commercial vessel license. This license costs \$20 per year. This license requires that an AD&FG sticker (triangle) be attached to each vessel. Water taxi operators and commercial air taxis do not require this license.

Enforcement

The US Coast Guard periodically patrols these rivers and may board vessels. They check to see that commercial operators have the proper licenses, that boats have proper equipment, and that boats are being operated in a legal manner. In addition the U.S. Coast Guard auxiliary can do "courtesy checks" and "notice of violations" which are non-binding. The auxiliary currently conducts these checks in the Big Lake area. The Department of Public Safety, Division of Fish and Wildlife Protection officers and state troopers patrol rivers and have the authority to enforce state boating laws. The state does not enforce federal boating laws.⁷ The DNR Division of State Parks and Outdoor Recreation (DOPOR) has rangers that enforce all statewide boating regulations in park areas. There are other special regulations for individual park areas such as no-wake zones and horsepower restrictions. DOPOR parks enforces the requirement for permits for commercial operators.

Federal Operator Licensing

There are a number of different types of licenses required by the U. S. Coast Guard for commercial boat operators on navigable waters. Following is the summary of these licenses:

Operator of uninspected passenger vessel or "six-pack" license This is the most common type of license held by commercial boat operators in the Recreation Rivers. Any commercial operator carrying six or less paying passengers at a minimum needs this type license⁸. The license requires:

- 360 days of sea service including 90 days in the last three years
- Social Security card and birth certificate
- First aide and CPR certification (either American Red Cross or American Heart Association)
- Physical exam
- Passing three-part exam

The test for this type license is difficult, and although not required, most applicants take a preparation course. These courses are offered by private individuals or by companies⁹. There are two higher standards of six-pack licenses that have additional requirements: inland-operator license and near-coastal license. The first allows travel in Cook Inlet and Prince William Sound.

⁷In some areas, such as in the Kenai River Special Management Area, federal licenses for commercial operators are required to obtain a fish guiding license. For businesses that operate in state parks, a commercial permit is required. Having required federal licenses for boat and aircraft operation are required prerequisites for receiving these permits.

⁸This license is not required for commercial floatplane operators but is required for commercial jetboat operators.

⁹Charter industries from Chicago periodically offers a 4-5 day course. There is also a four week course offered at UAA.

The second allows operation within 100 miles of the coastline including the Gulf of Alaska. ¹⁰The six pack license is good for five years and only needs proof of one year's sea time and a physical to be renewed. Although the old licenses were restricted to certain areas of the state, the new licensees (and the old licenses upon request) are for all inland waters in the U.S.

Twenty five, fifty, or one-hundred ton license or "Master license" These licenses are required if more than six passengers are carried. The license requires that the vessel must be inspected. The number of passengers allowed depends on the inspection of the vessel. Very few operators on small inland rivers such as the Kenai River or the Recreation Rivers have this type license.

Buoys

The U.S. Coast Guard requires a permit to place any buoy in any waters in Alaska. This permit can be obtained through the USCG Juneau office. The purpose of the permit is to ensure that the buoy does not block navigation and that it complies with accepted standards. The approval of a permit does not certify the safety of the buoy or marker. The Alaska Boating Association has applied for permits for their no wake zones at the mouth of the Deshka. There are a number of other markers and buoys in the corridors that are not authorized by the USCG. Most of these mark floatplane landing areas (Chelatna Lake and the middle Deshka River) or hazardous rocks.

Other Permits

The state Division of Parks and Outdoor Recreation (DOPOR) requires a permit for commercial operation of boat shuttles, boat rentals, white water companies, and hunting guides, and outfitters. All of these require compliance with existing laws (including USCG regulations) and require a permit fee, insurance, accident notification, diligence in protecting public lands, repairs to damage, inspection and access, and revocation stipulations. There are specialized stipulations that pertain to all or some of the commercial classes. These include requirements such as first aide training, performance bonds, providing information to clients on rules and regulations in the area and basic safety information. River float and whitewater guide services must maintain the skills of the staff in whitewater rescue. Hunting guides must have a license from the Guide Licensing and Control Board. Outfitter licenses will also probably be required by state parks with the new outfitter law. For all commercial operations including boat rentals, a permit is required if the primary place of commercial operation is in association with a park area. Services that only incidentally use the area or rent boats that will be used in the area do not need a permit. For example, companies that rent boats that are rented in Anchorage or from the serviceman's clubs on the military bases do not need permits. Halibut charters in Kachemak Bay State Park are primarily passing through the park and fishing outside the park and do not need permits because boats are used in many non-park areas. However, tour boats that operate privately in a state park or transport people to the state park require permits.

¹⁰Current compliance levels on the Recreation Rivers is unknown. The only way to currently check which operators have licenses is to request that the USCG check individual files. The files are currently being automated in Washington D.C. and an list may be requested in the future. Violations for noncompliance is up to \$1,000 per day.

Effects of Boating on Other Resources

Following is a brief discussion of the potential effects of boating on other resources. The potential forces associated with water-based activities that the public has discussed on the recreation rivers includes wash, turbulence, propeller action (cutting effects), pollution, direct contact, and disturbance by sight and sound. These effects all interact and the final effect is difficult to quantify. The relative importance will also vary according to the dimensions and type of habitat involved.

Disturbance of Wildlife Resources

There is very little information documenting powerboat disturbance of wildlife. Airboat impacts on wildlife is limited primarily to noise disturbance, particularly of airboats with higher decibel levels on waterfowl during the sensitive periods. Noise impact on waterfowl has been recognized in other state planning efforts, with guidelines which apply to permitted activities developed in DNR area plans to protect swan nesting and rearing habitat. Disturbance results either in redistribution on, or movement away from, the water body. There are also guidelines in ADF&G plans for special areas. Although it has been suggested by observers that powerboats and particularly airboats (based on decibel levels) drive terrestrial animals from the riparian vegetative corridors, there is no documentation in the literature on these effects (Westlund, pers. com.)

Following is a summary of a review of the literature on the effects of recreation on freshwater environments (Liddle et. al. 1980)

Wash The power required to drive a boat must be dissipated in the surrounding water, which in turn directs it on the beds and banks of waterbodies and in some cases causing severe erosion. The energy transmitted by a boat's wash deepens, among other things, on the speed and power of the boat, the shape of the hull and its displacement. As the boat moves forward, water is piled up in front of it and the level of the stern falls. The size of the wash will depend upon both the speed and the design of the boat and the energy used to drive it along. The effect of the wash on the shoreline and plants is very dependent on a variety of factors such as the width of the river, the type of soil, the types of vegetation, and the natural forces of the river. Therefore even in areas where there is significant erosion and heavy boat traffic, it is difficult to desegregate the effects of boat erosion from the effects of natural flooding and ice scouring during breakup. To document this effect would require a long-term study of each river with heavy boat traffic.

Turbulence and Turbidity. Propeller action may create turbulence in the water and the extent of this will depend upon size, design, position in relation to the hull and horsepower. Although increases in turbidity as a result of boats have been reported, there is little quantitative evidence for this.

Propeller Action (cutting) the edges of propellers can act as a set of rotating knives, as demonstrated by the effect of the occasional collisions with swimmers and the mortality in sea manatees in Florida. However, there is no quantitative information in Alaska that propeller is a significant factor in mortality in fish or in disturbance to spawning beds.

Boating

Chemical Impacts Plants and animals are affected by changes in water quality produced by the introduction of chemicals. Boats introduce chemicals in the water column primarily in the form of unburnt fuel. The amount depends on several variables including such as fuel mixture, speed, tuning of the engine and design (size, design details, and presence of recycling apparatus). However, there is little quantitative information on what substances actually appear in the aquatic environment during the operation of outboard motors. No conclusive data has been obtained on the direct effects of outboard motors. Most researchers have found that increased litter or sewage (as a result of increased recreational use) is far more significant than pollution from outboards.

User Experience This section will be written after the results of the user survey conducted during summer 1989 are completed.

Effects of Powerboats on the Kenai and Recreation Rivers

The effects of power boats on bank erosion and stream sedimentation has not been documented for the Recreation Rivers. A study by Inghram (1985) of the Alaska Division of Geological and Geophysical Surveys, entitled "Kenai River Erosion," concluded that man's activities on the Kenai River had "small, and isolated" impacts on erosion rates of the river. Further, the report concluded that most of the ongoing erosion in the Kenai River is attributable to the natural, background rate of erosion.

Each stream is unique, however, and so are its uses. Increased bank erosion and siltation (above the natural, background rates) resulting from power boat activities is possible, especially in lower energy, meandering streams with silty banks. How much bank erosion and siltation on the Recreation Rivers is due to power boats and how much is a result of man's other activities or natural erosional processes is unknown. Property owners and river users on the Little Susitna River, Deshka River, Talkeetna River, and Alexander Creek in particular have commented on the effects power boats have on the stream banks. But again, there is no conclusive and long term data available to quantify these observations.

A conclusive, long term study is necessary to identify high use reaches of the Recreation Rivers, quantify background erosion rates, and establish the effects power boat activities, as well as man's other activities, have on bank erosion and stream siltation. Such a study would require field surveys of bank erosion, annual aerial photographs of critical river reaches, streamflow and sediment studies, interviews with the river users, and three to ten years of river observations.

Powerboat Use on the Recreation River

The tables on the following pages summarize powerboat use documented by the Alaska Department of Fish and Game in 1989 for the Little Susitna River, Deshka River, Talkeetna River, Lake Creek, and Alexander Creek. Numbers are based on creel censuses and aerial surveys.

References for Boating

Alaska Department of Natural Resources. Susitna Area Plan. 1985.

Alaska Department of Natural Resources. Willow Subbasin Area Plan. 1982.

Department of Public Health, Alaska Vital Statistics Annual Report, 1985, 1986, 1987.

Department of Law, Memorandum on Kenai River sport fishing guides from Attorney General Norman Gorsuch to Dave Stephens, Kenai River Plan Project Manager, 1985.

Department of Law, Memorandum on Kenai River sport fishing guide regulations from Attorney General Harold Brown to Commissioner Ester Wunnicke, File number 166-223-86. 1986.

Jackson, Christine M. An Analysis of factors in Water Related Fatalities in Interior Alaska: A Review of Literature. 1988

Liddle, M. J. and H.R. A. Scorgie. The effects of recreation on freshwater plants and animals: a review Biological Conservation 17 pp. 183-206, 1980

Matanuska-Susitna Borough. Matanuska-Susitna Borough Coastal Management Plan. 1983.

Westlund, John Wildlife Biologist, Division of Wildlife Conservation, Alaska Department of Fish and game, pers. comm. 1989.

Table 9. Creel census demographic data summary, Little Susitna River, below Burma landing, 1989.*

DATE	<-----Boats----->						Boats Total	Shore Anglers	Boat Anglers
	Hp 2-49	Hp 50-80	Hp >80	Inboard	Airboat	Raft			
27-May	2	3	3	0	0	0	8	19	20
28-May	19	6	6	0	0	0	31	24	76
29-May	37	3	4	0	0	0	44	42	111
30-May									
31-May									
01-Jun	4	2	0	0	0	0	5	17	13
02-Jun	8	0	0	0	0	0	8	18	20
03-Jun	13	3	0	0	0	0	16	20	40
04-Jun	17	1	0	0	0	0	18	34	45
05-Jun	10	1	0	0	0	0	11	22	29
06-Jun	10	0	1	0	0	0	11	20	26
07-Jun									
08-Jun									
09-Jun	16	0	3	0	0	0	18	37	46
10-Jun	25	0	0	0	0	0	25	34	62
11-Jun	18	2	0	0	0	0	20	44	49
12-Jun	9	2	0	0	0	0	10	22	26
13-Jun									
14-Jun									
15-Jun	6	0	2	0	0	0	8	32	20
16-Jun	6	0	1	0	0	0	7	32	19
17-Jun	24	0	1	0	0	0	25	44	62
18-Jun	12	3	1	0	0	0	17	26	41
19-Jun	8	0	0	0	0	0	8	50	21
20-Jun									
21-Jun									
22-Jun	4	0	1	0	0	0	5	25	13
23-Jun	5	1	0	0	0	0	6	14	15
24-Jun	5	1	0	0	0	0	6	29	14
25-Jun	9	7	0	0	0	0	16	17	39
26-Jun	2	2	0	0	0	0	5	4	12
27-Jun	2	0	0	0	0	0	2	26	6
28-Jun									
29-Jun									
30-Jun	2	3	0	0	0	0	5	6	11
01-Jul	4	0	0	0	0	0	4	10	11
02-Jul	6	0	0	0	0	0	6	14	14
03-Jul	0	0	0	0	0	0	0	5	0
04-Jul									
05-Jul									
06-Jul	0	0	0	0	0	0	0	2	0
07-Jul	0	0	0	0	0	0	0	6	0
08-Jul	0	0	0	0	0	0	0	3	0
09-Jul	0	0	0	0	0	0	0	9	0
Total	284	39	23	0	0	0	346	706	861
Percent	81.9%	11.4%	6.8%	0.0%	0.0%	0.0%	100.0%		

Data collected from fishermen exiting at Burma launch during creel census hours.

Table 10. Creel census demographic data summary, Little Susitna River, Burma landing to weir, 1989

DATE	<-----Boats----->						Boats Total	Shore Anglers	Boat Anglers
	Hp 2-49	Hp 50-80	Hp >80	Inboard	Airboat	Raft			
27-May	0	1	1	0	0	0	2	4	4
28-May	7	0	0	0	0	1	8	5	19
29-May	6	1	3	0	0	0	10	11	24
30-May									
31-May									
01-Jun	4	2	1	0	0	0	8	4	19
02-Jun	0	2	0	0	0	0	2	5	4
03-Jun	6	3	0	0	0	0	9	5	23
04-Jun	17	1	1	0	0	0	18	9	46
05-Jun	6	2	1	0	0	0	9	5	21
06-Jun	8	1	0	0	0	0	8	5	21
07-Jun									
08-Jun									
09-Jun	6	0	0	0	0	0	6	9	15
10-Jun	11	0	1	0	0	0	12	8	29
11-Jun	12	6	3	0	0	6	28	11	69
12-Jun	6	2	4	0	0	2	14	5	35
13-Jun									
14-Jun									
15-Jun	2	2	0	0	0	0	4	8	11
16-Jun	4	1	3	0	0	0	8	8	20
17-Jun	4	0	2	0	0	0	6	11	16
18-Jun	15	0	5	0	0	0	20	6	50
19-Jun	6	0	3	0	0	1	10	13	24
20-Jun									
21-Jun									
22-Jun	5	2	2	0	0	0	9	6	23
23-Jun	5	3	2	0	0	0	10	3	24
24-Jun	8	2	2	0	0	0	12	7	31
25-Jun	7	1	6	0	0	1	14	4	35
26-Jun	6	2	1	0	0	0	8	1	20
27-Jun	1	3	2	0	0	1	8	7	19
28-Jun									
29-Jun									
30-Jun	2	0	2	0	0	0	4	2	10
01-Jul	2	0	0	0	0	0	2	3	4
02-Jul	8	0	2	0	0	0	10	3	30
03-Jul	6	0	0	0	0	0	6	1	14
04-Jul									
05-Jul									
06-Jul	0	0	0	0	0	0	1	1	2
07-Jul	0	0	0	0	0	0	0	1	0
08-Jul	2	0	0	0	0	0	2	1	4
09-Jul	1	0	0	0	0	0	1	2	3
Total	174	36	46	0	0	11	267	174	669
Percent	65.2%	13.3%	17.2%	0.0%	0.0%	4.3%	100.0%		

* Data collected from fishermen exiting at Burma launch during creel census hours.

Table 11. Creel census demographic data summary, Little Sustina River, upstream of weir, 1989.*

DATE	<-----Boats----->						Boats			Shore		Boat
	HP 2-49	HP 50-80	HP >80	Inboard	Airboat	Raft	Total	Anglers	Anglers	Anglers	Anglers	
27-May	0	0	0	0	0	0	0	0	0	0	0	0
28-May	3	1	1	0	0	2	6	6	0	0	15	
29-May	0	0	0	0	0	1	1	0	0	0	2	
30-May												
31-May												
01-Jun	1	0	0	0	0	0	2	0	0	0	4	
02-Jun	3	0	0	0	0	0	3	0	0	0	7	
03-Jun	0	0	0	0	0	0	0	0	0	0	0	
04-Jun	0	0	1	0	0	0	1	0	0	0	3	
05-Jun	0	0	0	0	0	0	0	0	0	0	0	
06-Jun	2	0	0	0	0	0	2	0	0	0	4	
07-Jun												
08-Jun												
09-Jun	0	0	0	0	0	0	0	0	0	0	0	
10-Jun	1	0	0	0	0	0	1	0	0	0	2	
11-Jun	0	0	0	0	0	0	0	0	0	0	1	
12-Jun	2	0	0	0	0	0	3	0	0	0	7	
13-Jun												
14-Jun												
15-Jun	1	1	6	0	0	1	8	0	0	0	21	
16-Jun	0	1	0	0	0	0	1	0	0	0	2	
17-Jun	4	0	0	0	0	5	9	0	0	0	22	
18-Jun	4	0	1	0	0	4	8	0	0	0	21	
19-Jun	3	0	0	0	0	1	4	0	0	0	9	
20-Jun												
21-Jun												
22-Jun	2	0	0	0	0	2	3	0	0	0	8	
23-Jun	3	0	0	0	0	0	3	0	0	0	8	
24-Jun	6	2	0	0	0	1	10	0	0	0	21	
25-Jun	1	1	0	0	0	10	12	0	0	0	30	
26-Jun	3	0	1	0	0	0	4	0	0	0	9	
27-Jun	2	0	0	0	0	1	4	0	0	0	9	
28-Jun												
29-Jun												
30-Jun	0	0	1	0	0	0	1	0	0	0	2	
01-Jul	2	0	0	0	0	0	2	0	0	0	5	
02-Jul	4	1	0	0	0	1	5	0	0	0	13	
03-Jul	6	1	2	0	0	5	14	0	0	0	35	
04-Jul												
05-Jul												
06-Jul	0	0	0	0	0	0	0	0	0	0	0	
07-Jul	0	0	0	0	0	0	0	0	0	0	0	
08-Jul	0	0	0	0	0	0	0	0	0	0	0	
09-Jul	0	0	0	0	0	1	1	0	0	0	2	
Total	52	9	12	0	0	33	106	0	0	0	262	
Percent	49.4%	8.3%	11.3%	0.0%	0.0%	30.9%	100.0%					

*Data collected from fishermen exiting at Burma launch during creel census hours.

Table 12. Count survey summary, Deshka River, Downstream of ADF&G cabin.*

DATE	<-----Boats----->						Boats Total	People	Anglers	Aircraft
	Hp 2-49	Hp 50-80	Hp >80	Inboard	Airboat	Raft				
27-May	22	15	14	10	2	1	64	19	41	1
28-May	24	18	28	15	2	0	87	6	114	4
29-May	25	9	16	11	0	0	61	3	59	5
30-May										
31-May										
01-Jun	56	10	25	18	1	0	110	17	112	0
02-Jun	8	2	5	3	0	1	19	22	15	1
03-Jun	45	15	47	23	1	4	135	49	171	6
04-Jun	42	9	28	17	1	4	101	35	96	4
05-Jun	28	2	10	9	1	0	50	12	83	3
06-Jun	31	6	23	12	0	0	73	17	99	5
07-Jun										
08-Jun										
09-Jun	46	8	35	18	1	5	113	36	139	2
10-Jun	67	12	47	34	1	8	169	74	212	6
11-Jun	58	13	34	23	0	3	130	47	129	5
12-Jun	51	7	13	13	0	5	89	18	99	2
13-Jun										
14-Jun										
15-Jun	36	13	6	10	0	2	67	16	108	3
16-Jun	28	11	10	13	1	0	64	16	157	4
17-Jun	56	20	32	29	1	5	143	84	162	5
18-Jun	45	9	15	19	1	4	93	42	88	2
19-Jun	52	10	10	10	0	2	85	35	96	2
20-Jun										
21-Jun										
22-Jun	24	6	3	5	1	0	38	7	56	0
23-Jun	33	6	7	7	0	0	53	20	49	2
24-Jun	22	5	6	8	0	0	42	11	65	1
25-Jun	28	3	8	8	0	1	48	17	41	2
26-Jun										
27-Jun										
28-Jun	25	3	2	4	0	0	36	15	20	4
29-Jun	18	2	1	2	2	0	24	6	5	1
Total	869	215	425	321	17	47	1893	624	2216	70
Percent	45.9%	11.3%	22.5%	16.9%	0.9%	2.5%	100.0%			

* Values in table are means of data from three daily period counts.

Table 13. Aerial count summary, Deetka River, ADFg cabin to Loebbe, 1989.

DATE	Boats----->					Raft	Boats People Anglers Aircraft			
	HP 2-49	HP 50-60	HP >60	Inboard	Airboat		Total			
27-May										
28-May	0	2	3	0	0	8	13	19	2	0
29-May	2	3	2	4	0	0	11	16	3	0
30-May	0	2	0	0	0	0	2	0	0	0
31-May	2	1	1	0	0	0	4	5	4	0
01-Jun										
02-Jun										
03-Jun	0	7	5	10	1	1	24	39	14	0
04-Jun	0	2	5	6	1	2	16	19	9	0
05-Jun	0	5	3	1	1	4	14	8	10	0
06-Jun	0	4	4	1	2	0	11	4	2	0
07-Jun										
08-Jun										
09-Jun	0	7	3	3	0	2	15	22	8	1
10-Jun	2	19	1	3	1	0	26	31	5	0
11-Jun	0	15	10	7	2	2	36	4	4	0
12-Jun	0	5	7	2	0	3	17	5	15	0
13-Jun	2	1	4	4	0	9	20	21	24	1
14-Jun	1	4	1	1	0	2	9	0	6	0
15-Jun										
16-Jun										
17-Jun	1	10	10	14	1	3	39	27	43	0
18-Jun	1	14	8	9	2	3	37	17	6	0
19-Jun	5	13	0	8	1	8	35	16	10	1
20-Jun										
21-Jun										
22-Jun	1	4	8	5	1	0	19	12	30	1
23-Jun	2	3	0	5	0	0	10	9	6	0
24-Jun	3	4	2	7	0	1	17	29	16	0
25-Jun	0	2	1	4	0	0	7	4	10	0
26-Jun	2	0	1	1	0	0	4	14	0	0
27-Jun	2	0	1	0	0	1	4	2	2	1
28-Jun	3	0	0	1	0	0	4	2	9	0
29-Jun										
30-Jun										
01-Jul	0	2	5	3	2	0	12	20	7	0
02-Jul	3	2	5	3	0	1	14	19	3	0
03-Jul	2	1	3	1	1	1	9	15	3	0
04-Jul	2	0	4	0	1	1	8	16	0	0
05-Jul										
06-Jul	3	0	0	2	0	0	5	9	1	0
07-Jul	4	0	0	0	4	0	8	7	4	0
08-Jul	0	0	4	1	1	0	6	0	5	6
09-Jul	0	3	4	2	0	0	9	5	5	0
10-Jul	2	2	0	1	0	0	5	2	3	0
11-Jul	0	0	0	0	0	0	0	0	0	0
12-Jul										
13-Jul	0	0	1	0	0	0	1	0	4	0
Total	45	137	106	109	22	52	471	418	273	11
Percent	9.6%	29.1%	22.5%	23.1%	4.7%	11.0%	100.0%			

Table 14. Aerial count summary, Deshka River, Loebbs to Trapper Ck., 1989.

DATE	-----Boats----->					Raft	<-----			
	HP 2-49	HP 50-80	HP >80	Inboard	Airboat		Boats Total	People	Anglers	Aircraft
27-May										
28-May	0	0	0	0	0	0	0	0	0	0
29-May	0	2	0	0	1	0	3	0	1	1
30-May	0	2	0	0	0	0	2	0	0	1
31-May	3	2	0	0	0	0	5	4	0	0
01-Jun										
02-Jun										
03-Jun	0	2	5	2	11	1	21	40	20	1
04-Jun	0	4	4	3	10	0	21	35	12	2
05-Jun	0	3	2	1	1	0	7	4	2	0
06-Jun	0	2	3	0	1	4	10	7	2	0
07-Jun										
08-Jun										
09-Jun	0	6	2	1	3	5	17	12	8	1
10-Jun	3	14	0	0	10	6	33	32	6	1
11-Jun	0	4	8	2	9	8	31	0	1	0
12-Jun	0	5	3	0	2	15	25	19	12	1
13-Jun	0	2	4	0	3	7	16	12	11	0
14-Jun	1	1	3	0	1	6	12	0	1	0
15-Jun										
16-Jun										
17-Jun	2	3	10	8	9	2	34	33	20	1
18-Jun	0	6	5	1	10	0	22	2	4	0
19-Jun	3	6	0	4	2	4	19	11	4	1
20-Jun										
21-Jun										
22-Jun	3	4	3	0	4	1	15	2	12	1
23-Jun	2	4	2	1	0	2	11	6	2	0
24-Jun	1	1	1	2	1	2	8	12	3	0
25-Jun	0	4	3	0	1	0	8	6	2	1
26-Jun	5	3	0	0	0	0	8	8	2	1
27-Jun	0	0	4	0	3	1	8	4	2	0
28-Jun	2	2	1	0	1	2	8	4	2	1
29-Jun										
30-Jun										
01-Jul	0	9	0	2	6	5	22	22	9	0
02-Jul	2	4	3	2	8	1	20	5	6	2
03-Jul	1	1	1	1	4	0	8	14	0	1
04-Jul	1	4	1	0	6	0	12	13	2	0
05-Jul										
06-Jul	3	0	0	0	1	2	6	2	6	0
07-Jul	0	0	0	0	1	0	1	2	0	0
08-Jul	0	3	0	2	5	3	13	10	6	0
09-Jul	3	0	0	2	8	0	13	6	3	0
10-Jul	0	0	0	0	3	0	3	0	0	0
11-Jul	0	3	0	0	1	0	4	2	0	0
12-Jul										
13-Jul	0	0	3	6	1	1	11	3	0	0
Total	35	106	71	40	127	78	457	332	161	17
Percent	7.7%	23.2%	15.5%	8.8%	27.8%	17.1%	100.0%			

Table 15. Aerial count summary, Deshka River, Trapper Ck. to Neil Lk., 1989.

DATE	<-----Boats----->						Boats Total	People	Anglers	Aircraft
	Hp 2-49	Hp 50-80	Hp >80	Inboard	Airboat	Raft				
28-May	2	0	2	3	8	0	15	13	6	0
29-May	0	1	0	0	0	0	1	0	0	1
30-May	0	0	0	0	0	0	0	0	0	0
31-May	0	1	0	0	0	0	1	1	2	0
01-Jun										
02-Jun										
03-Jun	0	2	1	0	2	1	6	12	7	0
04-Jun	0	4	0	0	0	2	6	7	13	0
05-Jun	0	1	0	0	0	4	5	5	4	0
06-Jun	0	0	0	0	0	6	6	13	2	0
07-Jun										
08-Jun										
09-Jun	0	2	1	0	1	5	9	9	10	0
10-Jun	0	2	0	1	4	15	22	44	6	0
11-Jun	0	5	1	0	4	14	24	5	5	1
12-Jun	1	2	0	0	0	6	9	12	8	0
13-Jun	0	3	1	0	1	19	24	26	18	1
14-Jun	0	4	1	0	1	9	15	16	4	1
15-Jun										
16-Jun										
17-Jun	1	2	0	0	5	6	14	21	8	0
18-Jun	0	8	6	1	7	12	34	9	13	0
19-Jun	3	2	0	0	3	10	18	13	9	1
20-Jun										
21-Jun										
22-Jun	0	0	0	1	0	6	7	8	5	1
23-Jun	2	2	0	0	1	5	10	12	0	0
24-Jun	1	0	3	1	3	4	12	14	20	0
25-Jun	2	3	0	1	1	2	9	8	6	1
26-Jun	2	1	0	0	0	2	5	5	2	0
27-Jun	2	0	0	0	0	3	5	4	3	0
28-Jun	0	4	3	1	4	2	14	6	7	1
29-Jun										
30-Jun										
01-Jul	0	0	0	1	3	3	7	12	6	0
02-Jul	1	3	2	0	5	1	12	10	16	0
03-Jul	3	0	0	1	3	1	8	10	5	0
04-Jul	1	0	0	1	1	1	4	5	2	0
05-Jul										
06-Jul	0	0	0	0	0	2	2	5	0	0
07-Jul	0	0	0	0	0	0	0	0	1	0
08-Jul	0	2	0	0	0	2	4	2	2	0
09-Jul	1	1	0	0	0	1	3	3	8	0
10-Jul	0	0	1	0	1	2	4	3	0	0
11-Jul	1	0	0	0	0	2	3	1	2	0
12-Jul										
13-Jul	1	0	0	0	0	2	3	1	1	0
Total	24	55	22	12	58	150	321	315	201	8
Percent	7.5%	17.1%	6.9%	3.7%	18.1%	46.7%	100.0%			

Table 16. Aerial count summary, Deshka River, Neil Lk. to the forks, 1989.

DATE	<-----Boats----->						Boats Total	People	Anglers	Aircraft
	Hp 2-49	Hp 50-80	Hp >80	Inboard	Airboat	Raft				
27-May										
28-May	0	2	3	0	0	8	13	19	2	0
29-May	0	0	0	0	0	1	1	0	0	0
30-May	1	0	0	0	0	1	2	1	2	0
31-May	2	0	0	1	0	1	4	6	4	0
01-Jun										
02-Jun										
03-Jun	0	0	0	0	0	4	4	28	5	0
04-Jun	0	0	0	1	1	5	7	25	16	0
05-Jun	0	1	0	0	1	10	12	24	13	0
06-Jun	0	2	0	0	3	10	15	14	8	0
07-Jun										
08-Jun										
09-Jun	0	0	0	0	1	12	13	14	9	0
10-Jun	0	0	0	0	0	14	14	17	10	0
11-Jun	0	0	0	0	0	20	20	3	5	0
12-Jun	1	0	0	0	1	26	28	26	5	1
13-Jun	0	1	0	0	1	19	21	32	13	0
14-Jun	0	0	0	0	1	18	19	13	3	0
15-Jun										
16-Jun										
17-Jun	0	1	1	0	0	24	26	32	21	0
18-Jun	0	0	0	0	1	37	38	14	10	0
19-Jun	0	0	0	0	1	22	23	12	6	0
20-Jun										
21-Jun										
22-Jun	1	0	0	0	0	19	20	16	13	0
23-Jun	0	0	0	0	0	9	9	7	12	0
24-Jun	0	0	0	0	0	6	6	8	9	0
25-Jun	0	0	0	0	1	13	14	13	10	1
26-Jun	0	0	0	0	0	7	7	6	3	0
27-Jun	0	0	0	0	0	3	3	4	2	0
28-Jun	3	0	0	1	0	0	4	2	9	0
29-Jun										
30-Jun										
01-Jul	0	0	0	0	1	0	1	2	0	0
02-Jul	0	0	0	0	1	2	3	2	5	0
03-Jul	0	0	0	0	1	8	9	7	9	0
04-Jul	0	0	0	0	0	5	5	9	0	0
05-Jul										
06-Jul	1	0	0	0	0	2	3	5	2	0
07-Jul	0	0	0	0	0	1	1	2	0	0
08-Jul	0	0	0	0	1	1	2	0	2	0
09-Jul	0	0	0	0	0	0	0	0	0	0
10-Jul	0	0	0	0	0	1	1	2	0	0
11-Jul	0	0	0	1	0	0	1	0	0	0
12-Jul										
13-Jul	0	0	0	0	2	0	2	3	0	0
Total	9	7	4	4	18	309	349	368	208	2
Percent	2.6%	2.0%	1.1%	1.1%	5.2%	88.5%	100.0%			

Table 17. Count survey summary, Alexander Ck., Mouth to Gabberets, 1999.*

DATE	Boats----->						Boats People Anglers Aircraft			
	Hp 2-49	Hp 50-80	Hp >80	Inboard	Airboat	Raft	Total			
22-May	1	0	0	0	0	0	2	0	4	0
23-May	9	1	0	3	0	0	13	1	14	2
24-May	18	1	1	3	0	0	23	3	8	3
25-May										
26-May										
27-May	14	2	4	4	0	0	24	11	26	0
28-May	28	4	7	9	1	1	49	33	81	0
29-May	13	3	2	3	0	0	21	7	45	0
30-May	17	1	2	2	0	0	21	8	33	0
31-May	18	3	3	3	0	0	26	19	27	0
01-Jun										
02-Jun										
03-Jun	40	4	10	14	0	0	68	25	104	0
04-Jun	44	4	4	8	0	0	60	36	93	0
05-Jun	35	2	5	3	0	0	46	26	64	0
06-Jun	41	4	2	4	0	0	51	28	66	0
07-Jun										
08-Jun										
09-Jun	50	4	5	5	0	0	64	36	84	0
10-Jun	39	2	6	10	0	0	57	32	69	0
11-Jun	38	2	5	8	0	0	52	19	88	0
12-Jun	21	2	2	1	0	0	25	15	26	0
13-Jun	24	2	2	1	0	0	29	19	39	0
14-Jun	14	1	2	1	0	0	18	9	22	0
15-Jun										
16-Jun										
17-Jun	10	2	1	1	0	0	15	12	15	6
18-Jun	10	2	1	0	0	1	15	11	20	6
Total	484	46	62	82	1	2	676	349	928	17
Percent	71.6%	6.8%	9.1%	12.1%	0.1%	0.3%	100.0%			

* Values in table are means from three daily counts.

Table 18. Aerial count summary, Alexander Ck., Gabberts to weir, 1989.

DATE	<-----Boats----->						Boats Total	People	Anglers	Aircraft
	Hp 2-49	Hp 50-80	Hp >80	Inboard	Airboat	Raft				
27-May										
28-May	0	5	9	0	0	0	14	6	6	3
29-May	2	17	4	0	0	3	26	36	1	3
30-May	2	15	4	0	0	5	26	2	0	4
31-May	2	0	0	0	0	0	2	2	0	1
01-Jun										
02-Jun										
03-Jun	0	38	5	1	0	4	48	22	1	6
04-Jun	0	18	8	1	0	3	30	29	10	10
05-Jun	4	20	4	1	0	4	33	10	6	3
06-Jun	1	11	4	0	0	5	21	10	0	5
07-Jun										
08-Jun										
09-Jun	0	30	8	1	0	1	40	9	20	5
10-Jun	4	42	3	0	0	3	52	29	4	10
11-Jun	1	13	15	0	0	1	30	3	5	5
12-Jun	9	18	4	1	0	4	36	8	6	3
13-Jun	15	5	5	1	0	9	35	34	29	2
14-Jun	14	6	5	1	0	8	34	11	2	2
15-Jun										
16-Jun										
17-Jun	20	4	8	3	0	5	40	33	47	4
18-Jun	8	34	14	3	0	35	94	54	51	4
19-Jun	11	14	0	2	0	9	36	69	41	0
20-Jun										
21-Jun										
22-Jun	19	14	4	0	0	6	43	21	21	1
23-Jun	19	4	2	0	0	6	31	27	20	3
24-Jun	11	2	0	2	0	5	20	18	34	1
25-Jun	19	8	2	0	0	2	31	10	28	1
26-Jun	19	1	0	0	0	7	27	15	22	0
27-Jun	18	4	3	1	0	5	31	20	2	0
28-Jun	24	7	4	1	0	5	41	8	5	0
29-Jun										
30-Jun										
01-Jul	23	11	4	0	0	0	38	12	14	2
02-Jul	33	7	6	0	0	4	50	8	12	6
03-Jul	19	3	4	0	0	11	37	17	5	6
04-Jul	23	6	5	0	0	13	47	31	10	5
05-Jul										
06-Jul	7	1	1	0	0	3	12	13	5	0
07-Jul	9	0	1	0	0	3	13	12	0	0
08-Jul	19	4	3	1	0	1	28	5	3	1
09-Jul	12	3	4	0	0	1	20	3	2	1
10-Jul	8	4	3	1	0	0	16	0	4	0
11-Jul	4	2	1	0	0	0	7	1	0	2
12-Jul										
13-Jul	15	5	3	0	0	4	27	14	2	1
Total	394	376	150	21	0	175	1116	602	418	100
Percent	35.3%	33.7%	13.4%	1.9%	0.0%	15.7%	100.0%			

Table 19. Aerial count summary, Alexander Ck., weir to Sucker Ck., 1989.

DATE	<-----Boats----->						Boats Total	People	Anglers	Aircraft
	Hp 2-49	Hp 50-80	Hp >80	Inboard	Airboat	Raft				
27-May										
28-May	0	2	4	0	0	6	12	20	4	0
29-May	0	2	0	0	0	0	2	1	2	0
30-May	1	0	0	0	0	2	3	0	2	0
31-May	0	0	0	0	0	0	0	0	0	0
01-Jun										
02-Jun										
03-Jun	0	1	0	0	0	10	11	20	4	0
04-Jun	0	1	0	0	0	10	11	20	7	2
05-Jun	0	1	0	1	0	9	11	18	10	0
06-Jun	0	5	1	1	0	3	10	8	3	0
07-Jun										
08-Jun										
09-Jun	0	2	1	1	0	9	13	15	17	0
10-Jun	1	7	2	0	0	13	23	35	4	0
11-Jun	0	3	1	0	0	19	23	2	5	0
12-Jun	2	2	1	1	0	22	28	29	7	0
13-Jun	0	2	0	0	0	27	29	25	18	0
14-Jun	0	1	0	0	0	30	31	15	15	1
15-Jun										
16-Jun										
17-Jun	2	2	2	2	0	29	37	34	27	0
18-Jun	0	0	0	1	0	23	24	22	15	1
19-Jun	1	2	0	0	0	11	14	37	23	0
20-Jun										
21-Jun										
22-Jun	2	0	1	0	0	19	22	32	12	0
23-Jun	0	1	1	1	0	12	15	18	9	0
24-Jun	4	0	0	0	0	5	9	2	10	0
25-Jun	0	4	1	1	0	12	18	20	15	0
26-Jun	2	0	0	0	0	5	7	9	0	0
27-Jun	3	0	0	0	0	12	15	9	7	0
28-Jun	1	2	0	0	0	13	16	0	3	0
29-Jun										
30-Jun										
01-Jul	1	1	0	1	0	26	29	48	21	1
02-Jul	33	7	6	0	0	4	50	8	12	6
03-Jul	1	1	1	0	0	30	33	45	8	2
04-Jul	0	0	0	0	0	18	18	29	9	0
05-Jul										
06-Jul	0	0	0	0	0	0	0	0	0	0
07-Jul	0	0	0	0	0	4	4	11	0	0
08-Jul	0	1	0	0	0	6	7	10	7	0
09-Jul	0	0	0	0	0	8	8	0	0	0
10-Jul										
11-Jul	0	0	0	0	0	7	7	4	6	0
12-Jul										
13-Jul	0	0	0	0	0	1	1	2	0	0
Total	54	50	22	10	0	405	541	548	282	13
Percent	10.0%	9.2%	4.1%	1.8%	0.0%	74.9%	100.0%			

Table 20. Aerial count summary, Alexander Ck., Sucker Ck. to Alexander Lk., 1989.

DATE	<-----Boats----->					Raft	Boats Total	People	Anglers	Aircraft
	Hp 2-49	Hp 50-80	Hp >80	Inboard	Airboat					
27-May										
28-May	0	0	0	0	0	1	1	2	0	2
29-May	see weir to Sucker Ck.									
30-May	see weir to Sucker Ck.									
31-May	0	1	0	0	0	0	1	0	0	0
01-Jun										
02-Jun										
03-Jun	see weir to Sucker Ck.									
04-Jun	see weir to Sucker Ck.									
05-Jun	see weir to Sucker Ck.									
06-Jun	0	0	0	0	0	7	7	12	2	1
07-Jun										
08-Jun										
09-Jun	0	1	0	1	0	13	15	25	3	0
10-Jun	0	2	0	0	0	28	30	33	10	0
11-Jun	0	3	0	3	0	32	38	13	6	1
12-Jun	4	0	0	0	0	33	37	50	7	0
13-Jun	1	2	1	0	0	26	30	31	28	1
14-Jun	0	0	0	0	0	26	26	7	10	0
15-Jun										
16-Jun										
17-Jun	0	0	0	0	0	12	12	16	5	1
18-Jun	see weir to Sucker Ck.									
19-Jun	1	0	0	0	0	22	23	52	25	0
20-Jun										
21-Jun										
22-Jun	0	0	0	0	0	19	19	20	7	1
23-Jun	4	0	0	0	0	11	15	27	6	0
24-Jun	2	0	1	1	0	24	28	35	18	0
25-Jun	0	0	0	0	0	24	24	36	10	0
26-Jun	0	0	0	0	0	24	24	41	5	0
27-Jun	0	0	0	0	0	7	7	13	2	4
28-Jun	3	0	0	0	0	4	7	0	8	1
29-Jun										
30-Jun										
01-Jul	see weir to Sucker Ck.									
02-Jul	see weir to Sucker Ck.									
03-Jul	see weir to Sucker Ck.									
04-Jul	see weir to Sucker Ck.									
05-Jul										
06-Jul	0	0	0	0	0	13	13	22	6	0
07-Jul	0	0	0	0	0	5	5	14	1	0
08-Jul	3	0	0	0	0	7	10	19	5	0
09-Jul	3	0	0	0	0	4	7	13	7	0
10-Jul										
11-Jul	0	0	0	0	0	1	1	2	0	0
12-Jul										
13-Jul	0	0	0	0	0	1	1	2	0	0
Total	21	9	2	5	0	344	381	485	171	12
Percent	5.5%	2.4%	0.5%	1.3%	0.0%	90.3%	100.0%			

Table 21. Count survey summary, Lake Ck., Mouth, 1989.*

DATE	<-----Boats----->						Boats Total	People	Anglers	Aircraft
	Hp 2-49	Hp 50-80	Hp >80	Inboard	Airboat	Raft				
04-Jun	0	0	0	0	0	0	0	0	0	0
05-Jun	0	0	0	0	0	0	0	0	0	0
06-Jun										
07-Jun										
08-Jun	1	0	0	0	0	0	2	0	5	0
09-Jun	2	0	1	0	0	0	4	0	10	0
10-Jun	3	3	1	3	0	0	11	1	26	0
11-Jun	9	2	1	1	0	0	13	2	31	0
12-Jun										
13-Jun	11	1	0	1	0	0	13	2	38	1
14-Jun	7	0	0	1	0	0	8	0	26	1
15-Jun										
16-Jun										
17-Jun	13	2	0	3	0	0	18	4	63	0
18-Jun	21	0	2	1	0	0	25	7	68	1
19-Jun										
20-Jun										
21-Jun										
22-Jun										
23-Jun	13	1	2	4	0	1	21	5	63	1
24-Jun	13	3	3	2	0	0	21	4	72	2
25-Jun	15	1	1	1	0	0	17	7	59	1
26-Jun										
27-Jun										
28-Jun										
29-Jun	9	1	0	2	0	0	12	3	34	2
30-Jun	9	0	0	1	0	1	12	5	30	2
01-Jul										
02-Jul	4	0	1	1	0	0	7	3	21	1
03-Jul	4	1	1	1	0	0	7	2	19	1
04-Jul	2	1	0	1	0	0	5	2	11	0
05-Jul	2	0	0	0	0	0	2	0	6	0
06-Jul										
07-Jul										
08-Jul	1	1	0	0	0	0	3	0	7	0
09-Jul	1	1	0	0	0	0	3	0	6	0
10-Jul										
11-Jul	0	1	0	0	0	0	1	0	2	0
12-Jul	1	0	0	0	0	0	1	0	3	0
13-Jul	0	1	0	0	0	0	1	0	2	0
Total	144	20	14	25	0	4	207	50	604	13
Percent	69.5%	9.7%	6.6%	12.3%	0.2%	1.8%	100.0%			

* Values in table are means from five daily counts.

Table 22. Count survey summary, Lake Ck., Upstream, 1989.*

DATE	<-----Boats----->						Boats Total	People	Anglers	Aircraft
	Hp 2-49	Hp 50-80	Hp >80	Inboard	Airboat	Raft				
04-Jun	0	0	0	0	0	0	0	0	1	0
05-Jun	0	0	0	0	0	0	0	0	0	0
06-Jun										
07-Jun										
08-Jun	0	0	0	0	0	0	0	1	2	0
09-Jun	0	0	0	0	0	0	1	1	3	0
10-Jun	0	0	0	0	0	0	0	2	8	0
11-Jun	1	0	0	0	0	0	1	7	11	0
12-Jun										
13-Jun	1	0	0	0	0	0	1	3	2	0
14-Jun	1	0	0	0	0	0	1	2	5	0
15-Jun										
16-Jun										
17-Jun	3	1	0	1	0	0	5	21	20	0
18-Jun	3	0	1	1	0	0	5	23	26	0
19-Jun										
20-Jun										
21-Jun										
22-Jun										
23-Jun	4	0	0	2	0	1	7	16	28	0
24-Jun	3	0	0	1	0	1	6	13	28	0
25-Jun	4	1	0	0	0	0	5	22	26	0
26-Jun										
27-Jun										
28-Jun										
29-Jun	3	0	0	1	0	0	5	11	22	0
30-Jun	3	0	0	1	0	1	5	15	19	0
01-Jul										
02-Jul	3	3	1	1	0	0	7	10	15	0
03-Jul	2	1	1	1	0	0	5	12	16	0
04-Jul	2	1	0	1	0	1	4	12	10	0
05-Jul	2	0	0	0	0	0	3	5	12	0
06-Jul										
07-Jul										
08-Jul	1	2	1	1	0	0	6	6	8	0
09-Jul	2	2	0	0	0	0	5	10	7	0
10-Jul										
11-Jul	1	0	0	0	0	0	1	3	4	0
12-Jul	1	0	0	0	0	0	2	3	3	0
13-Jul	0	0	0	0	0	0	1	2	4	0
Total	41	14	6	12	0	4	78	199	277	0
Percent	52.3%	18.1%	8.2%	15.3%	0.5%	5.6%	100.0%			

* Values in table are means from five daily counts.

Table 23. Creel census demographic data summary, Talkeetna River, 1989.*

DATE	<-----Boats----->						Boats Total	People	Anglers	Aircraft
	Hp 2-49	Hp 50-80	Hp >80	Inboard	Airboat	Raft				
17-Jun	1	1	0	2	0	0	4	0	9	0
18-Jun	4	1	0	7	0	0	12	0	27	0
19-Jun	0	2	0	7	0	0	9	0	24	0
20-Jun	0	0	0	1	0	0	1	0	1	0
21-Jun	0	0	0	2	0	0	2	0	4	0
22-Jun										
23-Jun										
24-Jun	1	4	1	8	0	0	14	0	37	0
25-Jun	3	3	2	12	0	0	20	0	53	0
26-Jun										
27-Jun										
28-Jun	0	0	5	26	0	0	31	0	94	0
29-Jun	0	1	5	31	0	0	37	0	81	0
30-Jun	2	1	4	14	0	0	21	0	49	0
01-Jul	3	9	3	26	0	0	41	0	116	0
02-Jul	0	6	8	26	0	0	40	0	119	0
03-Jul	5	6	2	25	0	0	38	0	100	0
04-Jul	3	14	7	29	0	0	53	0	152	0
05-Jul	2	1	0	18	0	0	21	0	49	0
06-Jul										
07-Jul										
08-Jul	3	5	2	17	0	0	27	0	82	0
09-Jul	3	4	10	46	0	2	65	0	194	0
10-Jul	0	0	0	2	0	0	2	0	5	0
11-Jul	4	1	0	22	0	0	27	0	75	0
12-Jul	0	3	2	20	0	0	25	0	81	0
13-Jul	0	2	0	10	0	0	12	0	35	0
Total	34	64	51	351	0	2	502	0	1387	0
Percent	6.8%	12.7%	10.2%	69.9%	0.0%	0.4%	100.0%			

* Data collected from boaters exiting at Talkeetna River boat Launch

CHAPTER 9

SUBSURFACE RESOURCES

CHAPTER 9 - SUBSURFACE RESOURCES

Introduction

The following sections were prepared by the DNR Division of Mining, Division of Oil and Gas, and Division of Land and Water Management staff. The sections describe the subsurface resources and activities within the Recreation Rivers.

These reports cover:

- 1) Past and present mining activities and mineral resources,
- 2) Existing material sales and potential sites, and
- 3) Oil and natural gas leasing activity and potential.

MINERAL RESOURCES

Introduction

The six Recreational Rivers drain the Yentna and Willow Creek Mining districts. Placer gold was discovered in the Cook Inlet-Susitna region in the late 19th century, and mining has been continuous since the early 1900's. Total placer gold production from the region probably has been in excess of 600,000 fine ounces. Gold and silver have been recovered from lodes in many parts of the Cook Inlet-Susitna region, but the only large-scale production was from the Willow Creek District gold-bearing quartz veins in the southern border zone of the Talkeetna batholith. These deposits were the source of about 611,833 troy ounces of gold.

Little Susitna River

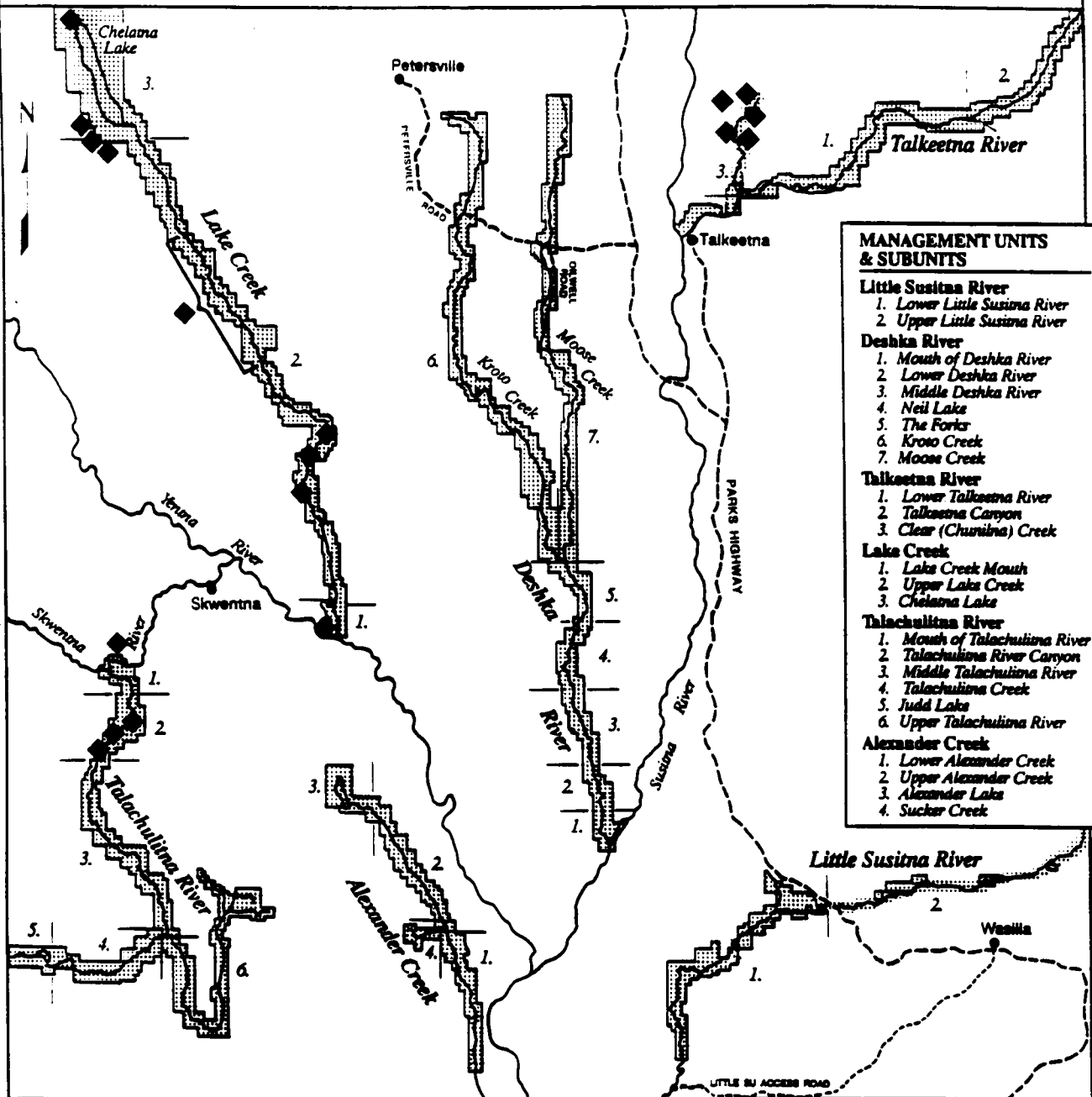
The lower Little Susitna River flows across the piedmont plain extending west and northward from the north shore of Cook Inlet to the base of the Alaska Range. These lowlands are partly flooded by tertiary sedimentary rocks and have been overridden by a glacier that descended Susitna Valley and Cook Inlet and was fed by glaciers in the Alaska Range and Talkeetna Mountains. This reach of the Little Susitna River does not have a history of mineral exploration or development and presently no active claims are located within this reach.

The Upper Little Susitna River (Subunit 2) drains the Willow Creek mining district. The original discovery of gold within the Willow Creek mining district is credited to M. J. Morris and L. Herndon, who in 1897 discovered placer gold on Willow Creek near the mouth of Grubstake Gulch. Placer mining on a small scale continued sporadically over the years. With the discovery of the lode gold occurrences beginning in 1909, interest in the placer deposits waned. It was not until the late 30's that any substantial additional placer production occurred.

Several attempts at placer mining have been recorded on Willow Creek and the Little Susitna River below the mouth of Fishhook Creek. These activities were uniformly unsuccessful because of the distributive nature of the gold in the gravels, the small gold particle size, and in the case of the Little Susitna River, the tremendous amount and size of boulders involved.

SUSITNA BASIN RECREATION RIVERS MANAGEMENT PLAN

Mining Claims



MANAGEMENT UNITS & SUBUNITS

Little Susitna River

1. Lower Little Susitna River
2. Upper Little Susitna River

Deshka River

1. Mouth of Deshka River
2. Lower Deshka River
3. Middle Deshka River
4. Neil Lake
5. The Forks
6. Kroto Creek
7. Moose Creek

Talkeetna River

1. Lower Talkeetna River
2. Talkeetna Canyon
3. Clear (Chunilna) Creek

Lake Creek

1. Lake Creek Mouth
2. Upper Lake Creek
3. Chelama Lake

Talachulitna River

1. Mouth of Talachulitna River
2. Talachulitna River Canyon
3. Middle Talachulitna River
4. Talachulitna Creek
5. Judd Lake
6. Upper Talachulitna River

Alexander Creek

1. Lower Alexander Creek
2. Upper Alexander Creek
3. Alexander Lake
4. Sucker Creek

◆ Blocks of State and Federal Mining Claims in and Adjacent to the Recreation River Corridors, 1989.

▨ Recreation Rivers Corridors

With the dramatic increase in the gold in the late 1970's, considerable renewed interest was also shown in both the Willow Creek and the Little Susitna River. Many claims have been staked and several mining attempts have been, but the only viable operating placer mines are on Willow Creek.

Much of the Little Susitna River and Reed Creek (upstream of the Little Susitna Recreation River Corridor) have been staked for placer mining purposes. Although flour gold can be consistently panned along these two streams, the boulderous character of the gravels make a viable placer mining operation a high risk venture. The level of mining activity occurring on active claims within the upper reach of the Little Susitna River consists of recreational mining with small suction dredges, sluices, rocker boxes, and gold pans.

Deshka River

The Deshka River from its confluence with the Susitna River to the upper point of the Forks (Subunit 5) flows through surficial deposits of the Susitna lowland. These deposits consist of glacial silt, accumulations of outwash gravels, glacio-fluvatile deposits and the more recent stream gravels. The recent gravels occur as deposits within the present stream beds and as remnant alluvial deposits on benches adjacent to the stream courses.

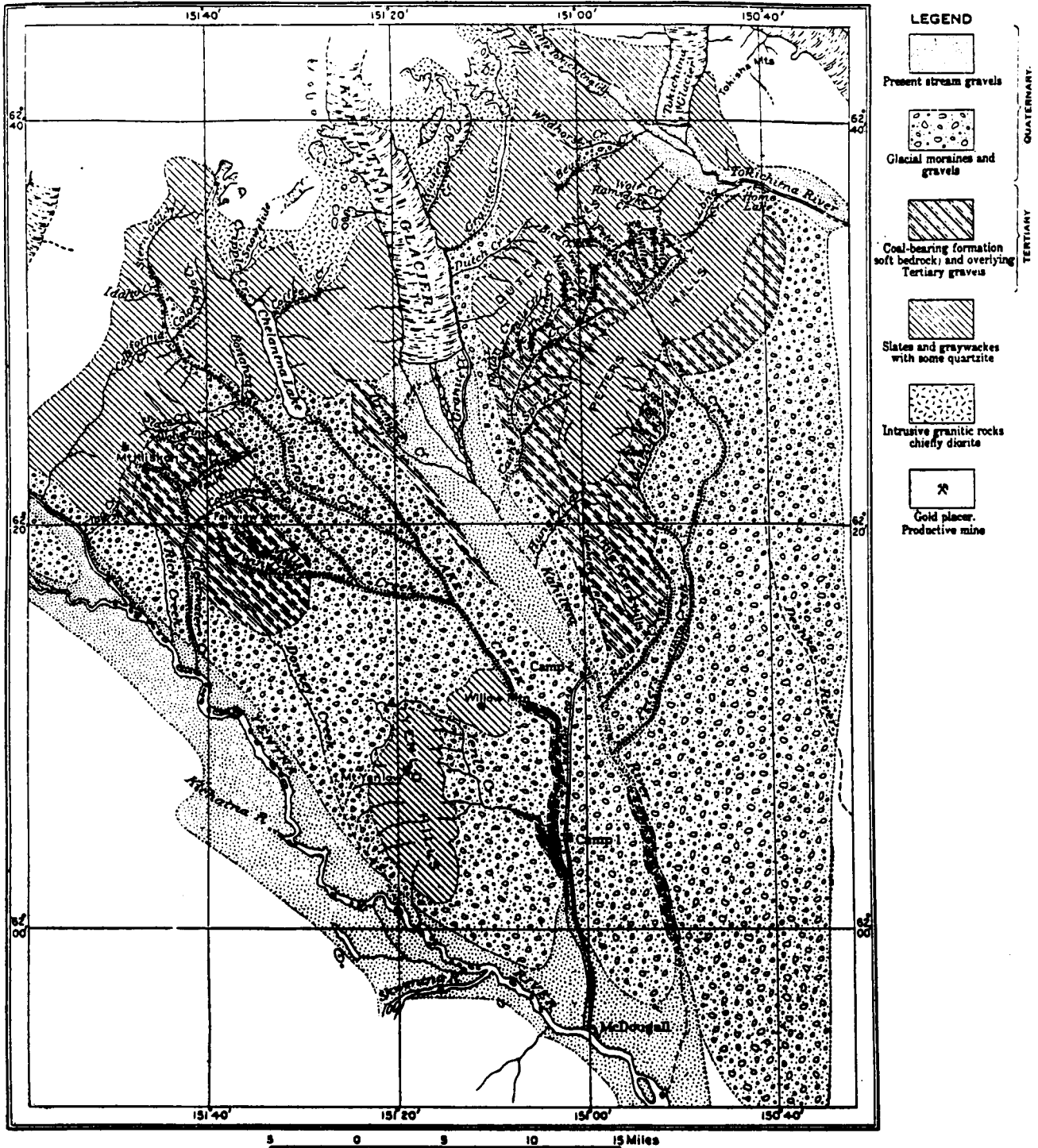
Flowing northward from the Forks (Subunit 5) Kroto Creek (Subunit 6), and Moose Creek (Subunit 7) have their headwaters in low hills east of the Peters Hills. These reaches of the Deshka are underlain by tertiary-aged sediments recognized in two units: the lower unit consists of lightly indurated sands, silts and pebble conglomerates containing discontinuous coal seams; at the upper unit is a considerable thickness of conglomerate; gray and competent to yellowish and rotten depending on the locality. Overlying the tertiary sediments are glacial silts, outwash gravels, glacio-fluvatile deposits and recent stream gravels.

The Deshka River drains the Yentna Mining District. Virtually all of the stream gravels within the Yentna mining district are gold-bearing to some degree. However, with minor exceptions, the productive streams have been those originating within the southerly foothills of the Dutch and Peters hills. The Deshka River and its tributaries have not been extensively explored or developed for placer gold deposits. Presently no active mining claims occur within the river corridor.

Lake Creek

The Yentna mining district is a roughly triangular area in the northern Susitna Basin including the areas between the Yenlo Hills, Collinsville, and Petersville. This is an area drained by several major stream systems which head in the Alaska Range. These stream systems occupy broad glacial-carved valleys of less than 1000 feet in elevation except Lake Creek. Lake Creek occupies a sinuous southward trending canyon until the lowlands of the Yentna River are reached. Above the Lake Creek canyon, Lake Creek and Camp Creek flow over an elevated plateau between the Kahiltna and Yentna rivers.

The oldest rocks in the area are a series of slates and graywackes of Juro-Cretaceous age. These rocks are intruded by a series of altered igneous dikes and small plutons with associated border alterations, quartz veins, and local quartz-calcite veinlets. Deposited upon the erosional surface of the slates and graywackes are Tertiary-aged sediments recognized in two units; the lower unit consists of highly indurated sands, silts and pebble conglomerates containing discontinuous coal seams; the upper unit is a considerable thickness of conglomerate. Overlying these Tertiary sediments are surficial deposits of



GEOLOGIC SKETCH MAP OF YENTNA MINING DISTRICT.

glacial till, accumulations of outwash gravels, glacio-fluvatile deposits, and more recent stream gravels. The initial gold discoveries were nearly all made within stream valleys at points where the bedrock changes from slate to the tertiary sediments. Virtually all of the stream gravels within the Yentna mining district are gold-bearing to some degree. However, with minor exceptions, the productive streams have been those originating within the southerly foothills of the Dutch Hills, and in particular the southerly flowing tributary streams of Cache and Peters Creeks. The work on the Cache Creek tributaries has demonstrated that, beyond a certain point upstream of the soft/hard bedrock contact, the streams become non-productive. Over the years a theory has been developed that the southerly foothills of the Dutch Hills contain a buried pre-glacial stream course intercepted by the present-day tributaries. Below the point of interception rich placers exist, while to the north, they do not. This condition also is believed to exist at the headwaters of Peters Creek (also including Long Creek, tributary to the Tokositna River) and at Fairview Mountain. A similar relationship is also believed to exist on the Kichatna and Nakochna Rivers, to the west of the Yentna River.

The apparent exceptions to this general theory are manifested in the placer occurrences at Petersville and along lower Lake Creek and the Kahiltna River; but are accounted for as downstream accumulations of gold derived from the headwaters sources. The deposits on Lake Creek are similar to those of the Kahiltna.

Associated with the gold throughout the district is a small but persistent amount of platinum identified in two distinct modes of occurrence: one consists of minute scales of silver-gray metal composed primarily of metallic platinum and the second as minute angular grains of brassy colored osmium-iridium. Nowhere has the percentage of platinum-to-gold exceeded more than a fraction of one percent.

Gold was first discovered on Lake Creek in 1906 in the stream gravels as a pay streak 10-30 feet in width with a depth of 2-5 feet. Gold can be found in the gravel bars of all 3 river reaches of Lake Creek. There are numerous claims in Subunit 2 of Lake Creek.

Extensive reserves of known gold-bearing gravels exist within the Yentna mining district. Due to changes in mining methods and improved recovery, it is likely that tailings from prior operations can be reworked; large volumes of material are represented by the benches on Cache Creek and throughout the lower Kahiltna River. Large reserves are also likely within the upper basin of Peters Creek, on Lake Creek in the Mt. Fairview vicinity. No estimate is available as to the total volume which may be represented other than that it is likely to represent several hundred million cubic yards.

Initial access into the Yentna mining district was controlled by the navigable river system. Following the initial discoveries, Susitna Station on the Susitna River below the confluence of the Yentna, became the main marshalling point. Small sea-going vessels from Tyonek or Seldovia would off-load at Susitna Station and shallower draft vessels were then used to transport men and material either up the Yentna to Youngstown Bend, or up the Susitna, Chulitna, and Tokositna Rivers to Home Lake. A well established trail extended across the northerly areas of the mining district connecting the various mining camps, and was continuous between Youngstown and Home Lake. As operations became more centered within the Cache Creek drainage, alternative access was needed. It was found that the larger vessels were capable of reaching the mouth of Lake Creek on the Yentna River and resulted in the establishment of the community of McDougal at that site. By 1912, a well established wagon road existed from McDougal northward, up the east bank of Lake Creek, and across country to the Kahiltna River at a point about 2 miles above the mouth of Peters Creek. Two interim camps were located along this 26-mile road. Camp No. 1 was the jumping-off spot for travel along Lake Creek and into the Fairview area. Camp

No. 2, also known as Kahiltna City, became established on the west banks of the Kahiltna River at the crossing point on that River. Bridges were erected across the Kahiltna, but because of the yearly passage of ice, had to be rebuilt nearly every year.

Talkeetna River

The Talkeetna River flows in a westerly direction from the upper limits of Subunit 2 to its confluence with the Big Susitna River at Talkeetna. This river system drains the eastern portion of the Yentna mining district.

Mining activity began in this region in 1916, with 20 groups of claims being staked on gold and copper bearing lodes in the basin of Iron Creek, a tributary of the Talkeetna River from the southeast. This area has continued to hold exploration interest and may see development in the future.

The town of Talkeetna was a staging and jump-off point for miners traveling to the Cache Creek area. A wagon road connected the Yentna mining district with Talkeetna. The Talkeetna River has not had development of placer mines along its water course. Mining claims activity along the Talkeetna River has been historically low and presently there are no active mining claims.

Chunilna Creek (Clear Creek) in Subunit 3 has been the main tributary where placer mine development has occurred. Forty-one patented mining claims contained in U.S. Mineral Surveys #2244 and 2252 occur on upper Chunilna Creek. These claims were located on 1961 and have been worked periodically since then. Numerous other claim groups have been located on Chunilna Creek and extend into the upper portion of Subunit 3. The activity associated with these claim groups has been sporadic and of a small scale, involving suction dredges. Access to mining claims along Chunilna Creek has been via trail system from Chase or Gold Creek. Aircraft access is also used in the upper portion of Chunilna Creek.

Talachulitna River/Alexander Creek

The Talachulitna River and Alexander Creek drain the southern portion of the Yentna mining district. This area is underlain by graywacke and finer clastic rocks, predominantly Mesozoic in age. Tertiary continental rocks that may include auriferous conglomerates occur in Subunits 2 and 3 of the Talachulitna river.

This area has not been heavily prospected for precious metals. This may be due to difficult access problems and earlier discoveries in other parts of the Susitna Basin. Presently no active mining claims exist on Alexander Creek. On the Talachulitna River there are a few mining claims on the lower reaches. The level of activity on these claims is minimal and appears to be recreational.

MATERIALS

The Recreation Rivers legislation authorizes negotiated material sales of under 25,000 cubic yards per year for personal use, for use incidental to the construction of access, or for habitat enhancement.¹

Currently there are three active materials sales within the planning area. All extraction within the corridors is being conducted by the Department of Transportation and Public Facilities. These sites include: a 90-acre site within the Little Susitna Recreation River near Palmer Fishhook Road; 200-acre site on the Petersville Road (Deshka Recreation River), and a 1.3-acre site on the Oilwell Road where it crosses Kroto Creek (Deshka Recreation River). The Little Susitna site is authorized for material exploration under an Interagency Land Management Agreement. The Kroto Creek site authorizes removal of 10,000 cubic yards of material for work on the Kroto Creek Bridge. The Petersville Road site is authorized under a Division of Land permit for exploration of material to provide 400,000 cubic yards of gravel for maintenance of the Petersville Road. The Matanuska-Susitna Borough has submitted an application to extract 100,000 cubic yards of gravel over five years from a site on the Petersville Road.

The potential for locating significant sources of gravel along the rivers and within their corridors is good. Deep layers of high quality gravel were deposited as bluffs and ridges throughout the Susitna Basin during the glacial retreats at the end of the last ice age. These deposits may be large enough to supply materials for negotiated or free-use sales within the Recreation Rivers. Even if allowed by the plan, with the exception of the Talkeetna River, it is unlikely that active gravel bars in the Recreation Rivers contain sufficient material for major road building or access projects. A detailed analysis of existing soils data is necessary to locate and assess specific material sale sites.

Demand for future material sites will likely occur adjacent to private property, lodges, and existing and proposed road systems. The largest potential demand will be for road gravel. A 1988 Susitna Basin Small Scale Transportation Study prepared by DNR and DOT identifies five proposed roads within the planning area that could utilize material sites within the river corridors; the extension of the Oilwell Road from Moose Creek to Kroto Creek; the Kroto Creek Road paralleling the Deshka River from the Oilwell Road to approximately three miles below the confluence with Trapper Creek; and the Big Lake to Susitna Station Road, the Winnebago Road and the Chuitna Road-Chuitna right-of-way, all three of which intersect with the Little Susitna Recreation River.

¹ Free use sites for agencies and government entities such as the Matanuska-Susitna Borough are not prohibited or restricted in volume by the legislation.

OIL & NATURAL GAS

LEASING ACTIVITY AND POTENTIAL

The planning area has a long and active history of oil and gas leasing. Lands within the recreational rivers corridors have been leased since 1961; although no active leases remain at present. The state issued the last lease in what later became part of the recreational rivers area through Oil and Gas Lease Sale 40, held on September 28, 1983. The lease has since terminated.

The Susitna sedimentary basin was explored for oil and gas in the 1960's and 1970's. Explorationists performed extensive geophysical surveys and drilled several exploratory wells but did not discover commercial reserves. All wells were abandoned. Geologists rate the basin as having low to moderate potential for the discovery of commercial quantities of oil or natural gas.

OIL AND NATURAL GAS THE LEASE SALE PROCESS

LEASING STRATEGY

By leasing its lands for petroleum exploration and development, Alaska seeks to generate revenue and contribute to the United States' energy security. In determining whether an oil and gas lease sale is in the state's best interest, DNR balances various interests, some of which can be incompatible. The State of Alaska is interested both in oil and gas exploration and development and in protecting the environment. In its leasing program, DNR balances those interests, recognizing that increasing the level of oil and gas activity will bring both economic benefits and environmental risk.

Administration of the state's leasing program is guided by the following objectives:

1. To adhere to an oil and gas leasing schedule, as required by statute, that is predictable and dependable, so that the petroleum industry, the public, and the federal, state and local governments may efficiently plan oil and gas related activities and fiscal expenditures.
2. To coordinate leasing with nearby owners of subsurface rights, particularly the federal government, so that: (a) state-wide oil and gas leasing activities are cohesive regardless of land ownership; (b) geologic and environmental data may be shared, if possible; (c) drainage of commonly owned petroleum reservoirs may be equitable; and (d) oil, gas and other mineral exploration and development may continue while ownership disputes are being resolved.
3. To collect resource information adequate to estimate a fair return to the state when developing leasing procedures and terms of sales and for long-term fiscal planning.
4. To obtain the maximum economic return to the state and its citizens from the sale of state-owned oil and gas resources by using an optimal mix of bidding methods and by encouraging competition.
5. To lease first in the most prospective areas and near areas in which development has been or is taking place so that potential additional development may take advantage of existing facilities wherever possible.
6. To avoid hindering development or unduly restricting industry by fairly and expeditiously administering necessary regulations.
7. To work with local communities, special interest groups, other government agencies and interested members of the public when selecting areas for leasing, designing the terms of lease sales, and when processing permits.
8. To encourage the petroleum industry to provide local training programs and to hire local people for available jobs.
9. To protect the integrity of affected cultures, the environment, and fish and wildlife resources through the terms of plans of operations, lease and permit stipulations, and subsequent monitoring of lessees' and permittees' operations.

LEASING PROCESS

The planning and execution of an oil and gas lease sale is a lengthy process, beginning before the sale area is included in the state's proposed five-year oil and gas leasing program. It involves the participation of a number of state agencies, with the Department of Natural Resources as the lead agency. It also involves federal agencies, industry, the public and local communities.

Aside from statutory requirements, there are important reasons for starting the leasing process far in advance of the actual lease sale. The early announcement of a proposed sale provides the time required to gather all the information (geological/geophysical, environmental, socioeconomic, etc.) relevant to the proposed lease sale. This information is used by the department to configure the sale, to design measures which protect the environment and interests of local residents and to select a bidding method which maximizes the economic return for the state from leasing its land.

The department believes that public involvement in the leasing process is especially important. To ensure that the public is informed and is provided the opportunity to comment, the department will issue calls for comments and hold public meetings or teleconferences in affected communities before scheduled sales. Calls for comments for each proposed sale will be issued three times prior to holding a sale. The first call will be issued when the proposed sale is first considered for inclusion in the leasing schedule. For example, this call was issued on August 29, 1988 for the current leasing schedule. The second call will be issued approximately 36 months before the sale, and the third, about 18 months before the sale. The three calls are designed to provide adequate notice to local communities concerning a proposed sale, and to provide ample opportunity for affected communities to prepare for sale-related development. Comments received in response to the calls will be summarized and included in the preliminary best interest finding which the department prepares for each sale.

In addition to the three calls for comments, public meetings or teleconferences may be conducted in affected communities following publication of the preliminary best interest finding for each sale. The preliminary finding, which describes the proposed sale and its potential effects, will be published approximately five to six months before the sale. The department will also encourage public comment on the preliminary finding and the proposed terms of sale. These comments, in turn, will be used to develop the director's final finding and decision for each sale. Public and agency comments received on the preliminary finding will be summarized and included in the final finding. (The reader is referred to the Appendix for a summary of comments received to date for all sales on the current leasing schedule.)

Under AS 38.05.180, the department is required to conduct a pre-sale analysis prior to each sale. The purpose of the pre-sale analysis is to determine the socioeconomic and environmental effects of the sale, and to determine the area's petroleum potential by investigating the area's specific geological and geophysical parameters. The results of this analysis are used to develop lease stipulations and to design mitigation measures to protect the environment. The analysis also is used to select the bidding system and lease terms designed to yield the state a maximum return for the leasing of its petroleum resources. The analysis uses extensive environmental and social information, and relies upon detailed interpretation of geophysical, geological, engineering and economic data.

The Department of Natural Resources' sale analysis begins once a sale is added to the state's leasing schedule. At that time, the department begins to acquire regional information, including environmental, socioeconomic, geophysical and geological data. The department's evaluation gradually moves from regional to basin-specific to a tract-specific analysis. This refinement in the department's analysis permits the assessment of potential trade-offs associated with tract deletions that may be suggested for reasons of environmental concern. Without tract-specific resource information, the department could unknowingly delete high potential tracts.

Much of the environmental and socioeconomic information for each sale is obtained as a consequence of the various departmental requests for comments described above. The balance of this information is obtained by staff research. Geophysical and geological information is obtained by staff field work, by purchase of this information from industry, or by requiring industry to submit copies of its seismic data obtained from exploration of state lands. Together, this information permits the department to assess the relative environmental and socioeconomic effects of proposed sales in relationship to each area's petroleum potential.

The steps which the Department of Natural Resources follows for each sale are set out on the next page. For "exempt" sales--those exempted from the five-year program requirement by AS 38.05.180(d)--most of these same steps are followed, but they are compressed into a shorter period of time.

OIL AND GAS LEASE SALE TIMELINE

TIMEFRAME (prior to sale)	ACTION TAKEN
30-66 months	Industry is requested to identify areas of interest for oil and gas exploration and development. The areas are reviewed based on a regional assessment of the area's oil and gas potential, industry interest and comments received during local, state and federal agency review.
28-64 months	A new proposed sale area is identified by the department. A proposed sale area map is published and sent to potentially affected communities to use in planning for the proposed sale. State agencies are also invited to review the proposed sale area boundaries. Comments are invited on the proposed sale area from the public, agencies and officials of potentially affected communities.
24-60 months	Additions and revisions to the leasing schedule are outlined in the five-year oil and gas leasing program presented to the Alaska Legislature each year in January.
24-36 months	DNR requests comments from local, state and federal agencies, the oil industry, and the public on the proposed sale area. During this period, DNR gathers available seismic data, and compiles surface and subsurface geological information on the proposed sale area.
22-34 months	Comments submitted by local, state and federal agencies, the oil industry, and the public are analyzed. Based on this information, areas of concern are identified and changes may be made to the proposed sale area.
19-20 months	A preliminary land status check of the proposed lease sale area is conducted. Revisions to the proposed sale area may be made reflecting the results of the review of land status.
18-20 months	Final selections of geophysical data are made. During the next 8 to 12 months, the geophysical data, along with geological information, are processed and interpreted. If necessary, geological field work is scheduled in the proposed sale area to fill in any identified data gaps.
12-18 months	Based upon the earlier request for comments, DNR will identify areas of concern and request more specific environmental and socioeconomic information from other state agencies, affected communities and the public. State agencies are asked to provide DNR with a list of recommended mitigation measures to reduce potential adverse impacts of oil and gas development within the proposed sale area.
10-12 months	The preliminary geological analysis of the proposed sale area is completed, and estimates of anticipated reservoir parameters in the area are established.
6-8 months	DNR initiates final land status research to determine acreage available for leasing, and begins an economic analysis of the proposed lease sale.

5-7 months	The proposed sale area boundaries may be revised based on environmental and socioeconomic information submitted by local, state and federal agencies, comments received from agencies and the public, available geological and geophysical information and land status. A preliminary tract map of the sale area is prepared. The geological analysis is completed. A preliminary assessment of bidding methods to be used in the proposed sale is started.
5-6 months	A preliminary finding that sets out the issues and facts regarding the proposed sale is prepared and made available for public review and comment. Also, if the sale is in the coastal zone, a consistency analysis is conducted. Advertisements are published in area newspapers advising the public of the availability of the preliminary finding and consistency analysis, if applicable, for the proposed sale and inviting public response.
4-5 months	If the sale is in the coastal zone, a proposed determination of the sale's consistency with the Alaska Coastal Management Program (ACMP) and any approved local district plans is issued. If the resource agencies fail to achieve concurrence about the sale's consistency, outstanding issues are elevated, first to the directors and then to the commissioners of the resource agencies.
3-4 months	Based on geophysical and geological information, a confidential prospect map of the proposed sale area is prepared. The required pre-sale economic analysis is completed, and the bidding method to be used for the specific sale is selected. Public meetings or teleconferences are held in affected communities within or near the proposed sale area.
3-4 months	Following public review, and any elevation that may have been required, a conclusive consistency determination is rendered. If issues have been elevated, the conclusive determination will reflect the resolution of those issues.
2-3 months	Based on comments received on the preliminary finding from state and federal agencies, the general public and communities within the proposed sale area, DNR makes the final determination on whether the sale will be held, which tracts will be offered, and which mitigation measures will be imposed on the lessees. The final tract map is prepared. The final best interests finding and decision is prepared and made available to the public. A final public notice of the sale terms is issued and a copy of the notice is sent to affected communities.
1-2 months	A final land status check and identification of third-party interests is conducted.
Day zero	The lease sale is held on its scheduled date.
1-10 days after sale	The apparent high bids are analyzed, and the Commissioner decides whether or not to accept the high bids. The winning bidders are notified.

NOTIFICATION PROCESS FOR OIL & GAS LEASE SALES

Call for nominations is sent to the oil and gas industry to identify areas of interest.



The first call for comments is issued when a proposed sale is first considered for inclusion in the leasing schedule.



The second call for comments on a proposed sale is issued about 36 months before the sale. Local, state, and federal agencies, oil industry, and the public are notified. Comments identify areas of concern and adjust the sale boundaries.



The third call for comments is issued about 18 months before the sale and requests more specific environmental and socioeconomic information from state agencies, affected communities and the public. State agencies also provide mitigating measures to reduce potential impacts generated by the sale.



The preliminary best interest finding is issued about 6 months before the proposed sale date. The report includes the preliminary coastal zone management consistency determination and encompasses all the comments received to date. The notice that announces the preliminary finding's availability is widely distributed and is published in two newspapers.



Division of Oil and Gas conducts public meetings or teleconferences in affected communities three to four months before the sale.



The final best interest determination is issued two to three months before the sale and is based on comments received on the preliminary analysis. The final notice of sale is sent to affected communities and published in two newspapers. A municipality or native corporation may call for a hearing before the commissioner.

SEISMIC OPERATIONS PERMITTING PROCESS

The Division of Oil and Gas administers permits for seismic operations. A company wishing to perform a survey submits an permit application to the division. The application must include a brief description of the general area of the proposed activity and the name of the contractor who will do the survey or the client or group of clients for whom the survey is being performed. The exact line locations, which are submitted for review by the state agencies, are kept confidential. A seismic operations permit is valid for one year.

Other permits may be required before a company can proceed with a seismic program. If the applicant is going to provide camp facilities, they will have to apply to the Department of Environmental Conservation for food service and waste disposal permits. If the survey is within a game refuge or critical habitat, permits will have to be granted from the Department of Fish and Game. The company may also be required to get permits from federal agencies.

If the survey area lies within the coastal management zone and the project requires a federal permit or two or more state permits, the operator must complete an Alaska Coastal Management Program (ACMP) questionnaire. The ACMP permit process includes a multi-agency review of the application to determine if the project is consistent with the approved coastal management plan for the area.

SEISMIC OPERATIONS

Geophysical surveys help identify potential structures for hydrocarbon accumulation and help to pinpoint likely locations to drill. Seismic exploration techniques do not discover oil and gas; only drilling can establish the presence of petroleum.

A typical seismic survey that might be proposed in the Susitna Basin would take place in the winter and use helicopter portable equipment. Helicopter operations allow the program to be completed quickly with minimal impact on environmental, cultural and human resources in the area and comply with applicable local, state, and federal laws, regulations and stipulations.

Depending upon how remote the survey area is, a seismic exploration program may be completely staged out of the nearest large community or may require establishment of several bases of operation. A field office will be required as the site of the primary planning, communications coordinating and reporting activities. An expediting base will handle the storage and distribution of food, equipment, fuel and explosives to the staging base closer to the study area as well as dispose of wastes generated by the crews and serve as a communications center to support aircraft and crews. The location of the expediting base, staging areas and landing zones are all approved as part of the permit review process.

DESCRIPTION OF A SEISMIC EXPLORATION PROGRAM

A seismic exploration program may involve the establishment of a limited number of temporary field bases where personnel, facilities, equipment and supplies will be housed during the conduct of the proposed activities. The temporary field bases may include: a staging base and landing zones spotted along the proposed seismic lines. The facilities, equipment and supplies that could be stationed at the staging base and landing zones in a typical onshore seismic survey and how the operations are conducted are described below.

A. Facilities

The staging base usually remains at a fixed location throughout the seismic exploration operations. The facilities associated with the staging base include an office, sleepers for workers, kitchen and utility units, fire equipment, drinking and waste water treatment units, incinerator, propane and heating fuel storage areas, and an aircraft landing, maintenance and refueling area. In the Susitna area a staging base would most often be an existing commercial camp or lodge. If no existing facilities are available in the area, a company may set up temporary facilities at an approved site. Figure 1 represents an example of a staging base.

The staging base's electrical power needs would be satisfied by generators which would be linked to the offshore facilities by a grid of electrical power dropcords. Heat for the facilities may be provided by diesel-fired stoves that would be fueled by 55-gallon bladdered drums of diesel located beside the tents. Cooking stoves in the kitchen would be powered by propane that would be stored in pressurized steel tanks which would be positioned near the kitchen and utility tents.

The main fuel storage area may consist of bladders holding helicopter fuel and fixed-wing aircraft fuel which would be accessible by hoses to the aircraft maintenance and fueling area. All of the fuel storage bladders would be designed to prevent the loss of fuel to the environment. Further protection would be provided by a surveillance and inspection program and the fact that every bladder would be placed within a diapered (i.e., an impervious liner topped by an absorbent material), snow-diked area designed to hold at least 115 percent of the bladder's capacity (see Figure 2).

Drinking and cooking water would be drawn from an approved source or flown to the base. Wash water may be pumped from a lake or stream and filtered and purified prior to human contact. Grey water and kitchen waste water would be filtered and chlorinated pumped to a grey water disposal area. Sanitary wastes and solid waste debris would be incinerated at the staging base, and the residue would be packaged and flown (along with separately packaged and non-incinerated kitchen garbage) for disposal at an approved site.

A number of landing zones may be established in the survey area to be used for stocking equipment and supplies (i.e., stakes, flagging, seismic cables and geophones, etc.) that would be needed by seismic crews as they conduct the seismic program. Materials from these equipment caches would be moved by helicopter and "spotted" along the line in advance of the seismic crew.

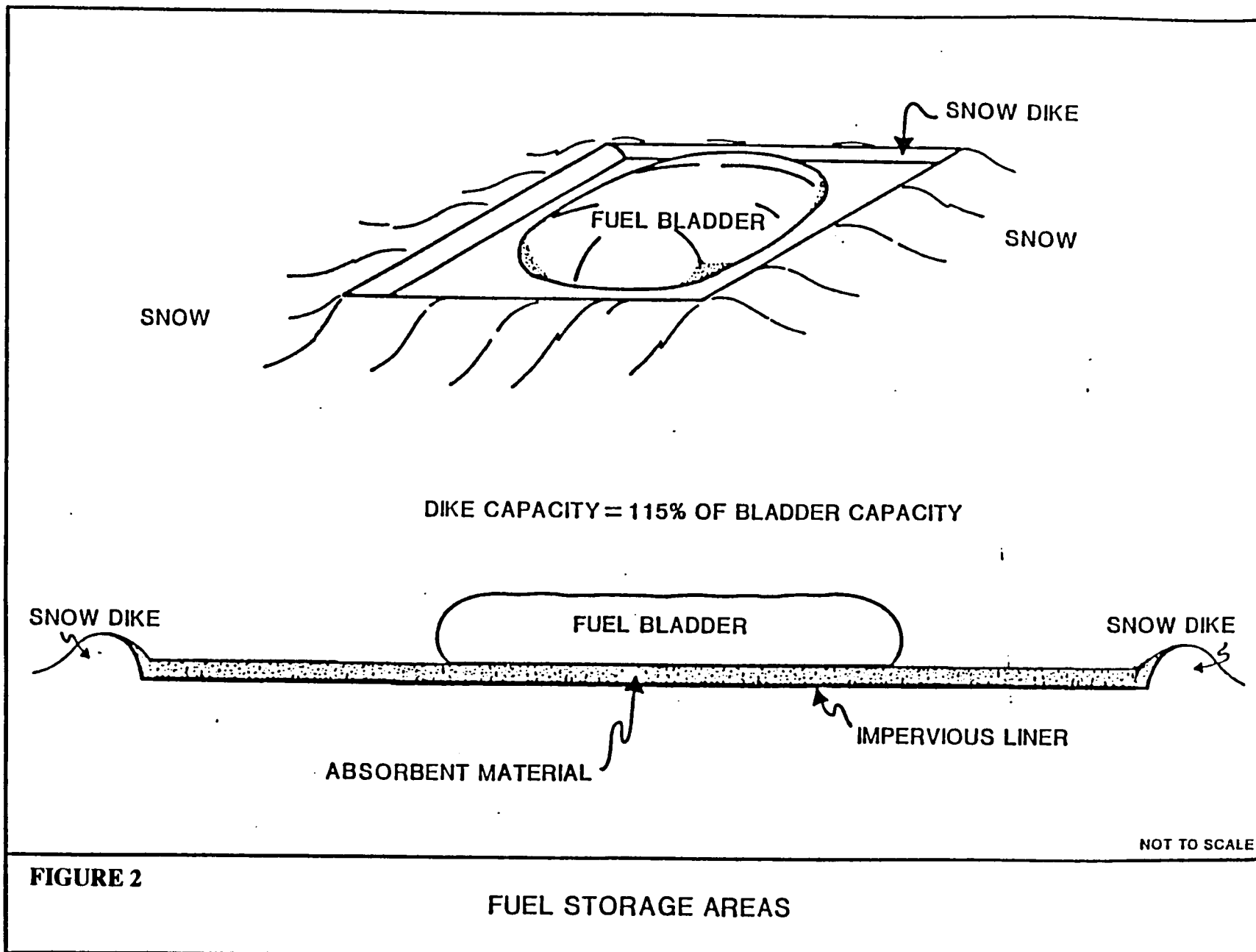
B. Operations

Equipment and supplies would be transported to Alaska by barge and trucked to the expediting base and stored until shipment to the staging base. Airlift operations would be carried out by aircraft which would move the equipment, fuel, explosives, food and water supplies, and personnel to the staging base as required.

Once the staging base is established, the aircraft would move equipment and supplies out to the landing zones near the survey area. Once the initial landing zones are established, the seismic exploration operations would begin.

Each day, the aircraft would be used to move the seismic crews and supplies to and from the survey area. Helicopters would be used to shuttle equipment and crews as work progresses along the seismic line.





C. Seismic Methods

Most recent seismic surveys in the Susitna Basin have used either the poultter or the mini hole method to produce a seismic source. Both techniques use an array of explosive charges as the source for seismic energy. The poultter technique uses explosives placed on stakes and detonated approximately four to six feet above the ground. In the mini hole technique, back pack drills are used to drill an array of 5 ft. holes which are loaded with a 1/3 lb. charge of dynamite. Other than the method to produce a source, these methods use the same procedures for conducting the survey. In both methods, ground personnel operate on foot, and the seismic recording instruments are transported by helicopter.

The line would be surveyed and marked by a survey crew operating on foot in advance of the seismic crew. Each day, the seismic crew would advance on foot along the surveyed line setting up and operating the seismic equipment.

The seismic cables and geophones, which would be coiled and placed in canvas bags, would be "spotted" by helicopter at predetermined intervals along the line. The ground crew would remove the cables and geophones from the bags, connect them, and "plant" the geophones in the ground. The geophones have either a small spike on the bottom or a snow cap for stabilization.

A helicopter also would be used to "spot" explosives at intervals along the line. The shooting crew would remove the explosives from the canvas storage bags, distribute the explosives along the line and place the explosives on the stakes or in the hole.

The line of explosives would be offset approximately 20 to 30 feet from the line of geophones and cables in order to protect both personnel and equipment. Also, the line of charges may move from side-to-side along the line of geophones as the actual surface terrain dictates.

Once the line of explosives is set, the recording equipment, which would be housed in helicopter portable cabs, would be flown in, attached to the line and integrated into the seismic geophones and cables. A crew member would be flown up and down the line to correct any electrical problems that the recorder detects.

The shooting operation would follow. Final connections would be made to the explosive array and detonated by a signal sent from recording equipment located inside the helicopter portable cabs.

Before any detonation occurs, the area would be secured and a signal would be used to warn personnel of the impending explosion. When the signal sounds, all noise producing active activities would cease.

ENVIRONMENTAL IMPACTS AND MITIGATING MEASURES

Seismic exploration operations are designed to avoid or minimize impacts on the environment.

A. Impact to Ground Cover and Vegetation

The Poulter seismic technique, under which the explosive charges are set off four to six feet above the ground, would cause little or no damage to the surrounding surface area. The detonation of the explosives four to six feet above the ground creates about a 30-inch (radius) "blast zone" in which vegetation is temporarily defoliated. If operations occur during the foliage's winter dormant period, the damage is minimal. Blast effects can be minimized further by the proper positioning of staked charges.

The mini hole technique causes a slight amount of surface damage from the actual auger stem and trammelling the surrounding area by the drill crew. In addition, vegetation may have to be cleared from the immediate vicinity of the drill hole to allow setup of the drill.

B. Wildlife Disturbances

The noise caused by the operations (i.e., helicopters, blasting operations, etc.) may cause wildlife to temporarily move away from the area of activities. However, given the small size of the area of activities in comparison to the enormous size of comparable available habitat, the temporary nature of the activities, wildlife avoidance responses, and the fact that wildlife concentrations are low in area during winter, any impacts to wildlife should be short lived and negligible.

C. Cultural Resources

Known cultural resource sites would be avoided. An operator is required to avoid any suspected cultural resources or sites suspected of containing such resources that might be discovered during the course of the program, and to report such sites to the Department of Natural Resources.

ALASKA DEPARTMENT OF NATURAL RESOURCES

Reference: Seismic Stipulations - Winter Season Operations

Under 11 AAC 96.040 the following stipulations are attached to and made a part of the terms and conditions of the miscellaneous land use permit:

- 1) The permittee shall notify and obtain approval from the Division of Oil and Gas at least fifteen (15) days in advance of any activities which significantly deviate from the approved plan. Any action taken by the permittee or his agent which increases the overall scope of the project or which negates, alters, or minimizes the implied intent of any stipulation contained in this permit will be considered a significant deviation from the approved plan. Notification must include the date and the specific nature of the proposed operation, the reasons why the operation is different, and a map showing the location of the operation. Significant deviations from the approved plan are permitted without prior notice to protect human safety or living resources; however, any such 'emergency deviation' must be reported to the Director, Division of Oil and Gas within 48 hours.
- 2) The permittee shall provide the Alaska Department of Natural Resources with the name of a contact person who shall be familiar with the daily location and operating status of the seismic crew(s). The contact person shall provide this information to the Department of Natural Resources when requested by an authorized representative of the Department.
- 3) No holes may be drilled in excess of 150 ft. below the land surface unless specifically permitted. All drilled holes must be backfilled with sand, gravel, drilling mud, or cuttings.
- 4) Should any hydrocarbons (excluding coal) be encountered during the drilling of shot holes, all operations must be discontinued; and the Alaska Oil and Gas Conservation Commission notified, (907)279-1433.
- 5) If flowing or artesian water is encountered during the drilling of shot holes, the district office of the Division of Land and Water Management shall be contacted. The hole must be plugged to the satisfaction of the Director, Division of Land and Water Management.
- 6) The use of ground contact vehicles for off-road travel must be limited to those areas which have adequate ground frost and snow cover to prevent damage to the ground surface.
- 7) After April 15, the use of ground contact vehicles in wetlands and other areas of weak soil conditions (eg., North Slope tundra) will be subject to termination within seventy-two (72) hours of written notification from the Director, Division of Oil and Gas.
- 8) Support vehicles must be operated in a manner such that the vegetative mat of the tundra is not disturbed. Blading or removal of tundra is strictly prohibited, except as approved by the Director of the Division of Land and Water Management or his designee. Filling of low spots and smoothing by the use of snow and ice is allowed.
- 9) In forested areas, clearing of vegetation will be minimized. Existing roads, trails, and natural clearings must be used wherever possible.
- 10) On the North Slope, movement of equipment through willow (Salix) stands must be avoided wherever possible.

- 11) Equipment, other than vessels, must not enter open water areas of a watercourse during winter. Ice or snow bridges constructed at stream crossings must not contain extraneous material (i.e., soil, rock, wood, or vegetation) and must be removed or breeched before spring breakup. Alterations of the banks of a watercourse are prohibited.
- 12) Prior to crossing or working in any stream, river or lake specified as being important for the migration, spawning or rearing of anadromous fish, the applicant shall obtain an Alaska Department of Fish and Game Habitat Protection Permit pursuant to AS 16.05.870. Any structure (eg., culverts, dams) placed in any stream containing fish requires an ADF&G Habitat Protection Permit under AS 16.05.840. Operations conducted within lands designated as State Game Refuges, State Critical Habitat Areas, and State Game Sanctuaries also require permits from ADF&G. For information regarding these areas and their permitting requirements the applicant should contact the Habitat Division, Alaska Department of Fish and Game at 452-1531 (Fairbanks/North Slope and Interior) or 344-0541 (Anchorage/Southcentral).
- 13) Compaction or removal of the insulating snowcover from deep water pools of rivers known to harbor overwintering fish must be avoided. To prevent additional freeze down of these pools, watercourses must be crossed at shallow riffle areas from point bar to point bar wherever possible.
- 14) Stationary fuel storage facilities must not be placed within the annual floodplain of a watercourse or closer than 100 ft. to a waterbody. All storage facilities must be placed within an impermeable barrier providing 110 percent capacity of the enclosed fuel storage containers.
- 15) All fuel drums must be marked with the contractor's name and dated.
- 16) Refueling of vehicles must not occur on an annual flood plain of a watercourse.
- 17) Fuel spills must be reported and cleaned up per 18 AAC 75.080. The telephone number to report spills is Zenith 9300.
- 18) Sorbent material in sufficient quantity to handle operational spills must be on hand at all times for use in the event of an oil or fuel spill.
- 19) Unless specifically permitted, the use of explosives is prohibited. If authorization has been obtained, the following minimum conditions will apply:
 - a) To protect fish and other aquatic fauna, explosives must not be detonated within, beneath, or in close proximity to fish-bearing waters unless the waterbody, including its substrate, is solidly frozen. The minimum acceptable offset from unfrozen fish-bearing waters for various size explosive charges is:

1-2 pound charge	--	80 feet
5 pound charge	--	120 feet
10 pound charge	--	170 feet
25 pound charge	--	270 feet
100 pound charge	--	530 feet

Note: Minimum offsets are based upon the use of explosives with detonation delays of 8 milliseconds or greater occurring between each charge such that no explosion or combination of explosions will produce an instantaneous pressure in fish bearing waters which exceeds 2 psi.

- b) All vehicles used to carry explosives must be clearly marked with the word "EXPLOSIVES".
 - c) All shot wire must be removed from the area.
-
- 23) Permittees shall abide by the provisions of Alaska's wildlife feeding regulation, 5 AAC 81.218. This regulation provides that it is unlawful to deliberately feed bears, wolves, foxes or wolverines or to deliberately leave human food or garbage in such a manner that it attracts such animals.
 - 24) The provisions of the Federal and State Endangered Species Acts and the Federal Marine Mammal Protection Act must be adhered to at all times. The Endangered Species Acts provide that there will be no activity permitted that jeopardizes the continued existence of an endangered species or results in the destruction or adverse modification of habitat of such species. Endangered species known to occur in Alaska include peregrine falcon, Aleutian Canada goose, short-tailed albatross, Eskimo curlew, and humpback, fin, grey, blue, and bowhead whales. The applicant is advised to contact the Anchorage U.S. Fish and Wildlife Service, Endangered Species Office (786-3542) for additional information on endangered species. The Marine Mammal Protection Act provides that there will be no intentional disturbance, harassment, catching, or killing of marine mammals. However, a 1981 amendment to the Marine Mammal Protection Act authorizes the Secretary, Department of Interior or the Secretary, Department of Commerce, under certain conditions, to allow U.S. citizens to take small numbers of marine mammals from non-depleted stock incidentally, but not intentionally, in specified areas. The Alaska Department of Natural Resources recommends that this authorization be obtained by the permittee before conducting any operations in or near coastal areas. The Department of Interior, U.S. Fish and Wildlife Service (USFWS) has jurisdiction over sea otter, polar bear, and walrus. The Department of Commerce, National Marine Fisheries Service (NMFS) has jurisdiction over all other Alaskan marine mammals including seals, sea lions, whales, and porpoise. For further information, the applicant is urged to contact the Anchorage offices of USFWS (786-3542) and NMFS (271-5006).
 - 25) On the North Slope, operators shall not disrupt denning polar bears. Polar bears are known to den predominately within 25 miles of the coastline in deeply drifted areas (6 ft. or greater) adjacent to the cutbank of drainages, coastlines or natural islands. Routes of travel must be selected to avoid suspected denning habitat areas.
 - 26) To avoid disturbing wildlife, aircraft must maintain a minimum altitude of 1500 feet above ground level except during take offs and landings. Operations at lower altitudes may be allowed upon approval of the Department of Natural Resources after consultation with the Department of Fish and Game. Human safety will take precedence over aircraft restrictions.
 - 27) In areas of subsistence harvest, the permittee will coordinate survey activity with local subsistence users to prevent unnecessary conflicts.
 - 28) The permittee shall make a good-faith attempt to coordinate survey activities in the vicinity of trap-lines with the owners, if they are known. Care must be taken to avoid disturbance to trap-lines within the survey area.

- 36) The Alaskan Historic Preservation Act (AS 41.35) prohibits the appropriation, excavation, removal, injury or destruction, without a permit from the Commissioner of the Department of Natural Resources, of any historic, prehistoric or archeological site, either active or abandoned. Permittees are encouraged to consult the Alaska Heritage Resources Survey to determine the location of known archeological sites in the project area. Should any sites be discovered during the course of field operations, the Commissioner shall be promptly notified.
- 29) The Department of Natural Resources may require that an authorized representative of the Department be on-site during any operations conducted under this permit.
- 30) A copy of the permit and stipulations must be posted in a prominent location in the operator's camp.
- 31) The placing of campsites or storage areas and the stockpiling of material on surface ice of lakes, ponds, or rivers is prohibited.
- 32) A completion report must be submitted within fifteen (15) days after termination of permit activities. This report must contain the following information:
- a) Dates when work was actually performed and the number of line miles actually surveyed.
 - b) A U.S.G.S. topographic map showing the actual location of all camps, shot lines and routes of travel.
 - c) A list of vehicles used for any off-road travel associated with the permittees activities.
 - d) A statement of cleanup activities.
 - e) A report of the time spent in each campsite.
 - f) A description of the methods of disposal of garbage and other camp debris.
- 33) The Director, Division of Oil and Gas has the right at any time to amend or modify any provisions of this permit.
- 34) The permit authorizes access across and exploration activity upon lands owned by the State of Alaska. If only the sub-surface rights are owned by the State, the permittee shall not enter upon such land until a good-faith attempt has been made to agree with the surface owner or lessee on settlement of damages that may be caused by this activity. If an agreement can not be reached, the Director of the Division of Oil and Gas has the authority to approve the activity, provided adequate provisions have been made with the State to pay for any damages the surface owner may suffer.
- 35) The seismic exploration activities granted under this permit must not diminish the use and enjoyment of lands encompassed within a native allotment. Before entering a pending or approved native allotment, the permittee shall contact the Bureau of Indian Affairs and Bureau of Land Management and comply with applicable federal law.

Revised: January 18, 1985

ALASKA DEPARTMENT OF NATURAL RESOURCES

Reference: Seismic Stipulations - Summer Uplands Operations

Under 11 AAC 96.040 the following stipulations are attached to and made a part of the terms and conditions of the miscellaneous land use permit:

- 1) The Permittee shall notify and obtain approval from the Division of Oil and Gas at least 15 days in advance of any activities which significantly deviate from the approved plan. Any action taken by the permittee or his agent which increases the overall scope of the project or which negates, alters, or minimizes the implied intent of any stipulation contained in this permit will be considered a significant deviation from the approved plan. Notification must include the date and the specific nature of the proposed operation, the reasons why the operation is different, and a map showing the location of the operation. Significant deviations from the approved plan are permitted without prior notice to protect human safety or living resources; however, any such 'emergency deviation' must be reported to the Director, Division of Oil and Gas within 48 hours.
- 2) The permittee shall provide the Department of Natural Resources with the name of a contact person who shall be familiar with the daily location and operating status of the seismic crew(s). The contact person shall provide this information to the Department of Natural Resources when requested by an authorized representative of the Department.
- 3) No holes may be drilled in excess of 150 ft below the land surface unless specifically permitted. All drilled holes must be backfilled with sand, gravel, drilling mud, or cuttings.
- 4) Should any hydrocarbons (excluding coal) be encountered during the drilling of shot holes, all operations must be discontinued; and the Alaska Oil and Gas Conservation Commission notified, (907)279-1433.
- 5) If flowing or artesian water is encountered during the drilling of shot holes, the district office of the Division of Land and Water Management shall be contacted. The hole must be plugged to the satisfaction of the Director, Division of Land and Water Management.
- 6) The use of ground contact vehicles for off-road travel is restricted. Only those vehicles that have been approved by the Director of the Division of Oil and Gas for off-road travel may be utilized. Permittees are advised that in all cases involving untested equipment, a test of the vehicle will be required before final approval for surface travel is given. If the vehicle causes an unreasonable level

of surface damage, the vehicle will be rejected for summer tundra travel. If logistics prevent a ground test before operations commence, an on-site inspection will occur. In all cases, the permittee will be responsible for any reclamation that may be required due to damage caused by the permittees activities.

- 7) The use of ground contact vehicles in wetlands and other areas of weak soil conditions (eg., North Slope tundra) will be subject to immediate termination by the Director of the Division of Oil and Gas if an unreasonable level of surface damage is being caused by the vehicle.
- 8) All vehicles must be operated in a manner such that the vegetative mat of the tundra is not significantly disturbed. Blading or removal of tundra is strictly prohibited, except as approved by the Director of the Division of Land and Water Management or his designee.
- 9) All vehicles must be equipped with a vehicle drive which provides an indirect linkage between the drive train and the drive wheel(s) or track(s). Roller driven vehicles and hydraulic driven vehicles are acceptable. In lieu of the indirect drive, the vehicle must be equipped with an internally set throttle-governing device to prevent 'jackrabbit starts' or over torquing of the drive wheels.
- 10) All vehicles must be equipped with non-aggressive tires or tracks. Tires must be low pressure and non-lugged. Tracks must be flat with no detent Cleats, if approved, must be low profile.
- 11) The maximum surface pressure of the fully loaded vehicle must not exceed 4 psi at 0" penetration.
- 12) No more than three vehicle passes will be allowed on the exact same track. Subject to the maximum of three vehicle passes on any one specific track, repeated trips may be conducted by offsetting each pass and by distributing vehicle travel as much as possible to each side of the seismic line. All vehicle travel must be for the purpose of conducting the permitted activity; side-trips for sightseeing purposes are prohibited. In designated critical habitat areas and at stream crossings, vehicle travel will be restricted to a narrow corridor adjacent to the seismic line. In these areas, additional vehicle passes will be allowed on the same track. Clearing of vegetation will be restricted. Helicopter support will be necessary for operations not capable of meeting this travel requirement or for operations occurring in areas where extensive clearing of vegetation would be required.
- 13) Track-vehicles which initiate turning by locking one track are not acceptable. All track-driven vehicles must turn by slowing one track relative to the other.
- 14) All vehicles must be designed to prevent the release of oil, lubrication fluids, grease, or other hydrocarbons into waterbodies.

- 15) In forested areas, clearing of vegetation will be minimized. Existing roads, trails, and natural clearings must be used wherever possible.
- 16) Movement of equipment through willow (Salix) stands must be avoided wherever possible.
- 17) Prior to crossing or working in any stream, river, or lake specified as being important for the migration, spawning, or rearing of anadromous fish, the applicant shall obtain an Alaska Department of Fish and Game Habitat Protection Permit pursuant to AS 16.05.870. Any structure (eg. culverts, dams) placed in any stream containing fish requires an ADF&G Habitat Protection Permit under A.S. 16.05.840. Operations conducted within lands designated as State Game Refuges, State Critical Habitat Areas, and State Game Sanctuaries also require permits from ADF&G. For information regarding these areas and their permitting requirements the applicant should contract the Habitat Division, Alaska Department of Fish and Game at 452-1531 (Fairbanks/North Slope and Interior) or 344-0541 (Anchorage/Southcentral).
- 18) Alterations of the banks of a watercourse are prohibited.
- 19) Stationary fuel storage facilities must not be placed within the annual floodplain of a watercourse or closer than 100 ft to a waterbody. All storage facilities must be placed within an impermeable barrier providing 110 percent capacity of the enclosed fuel storage containers.
- 20) Fuel spills must be reported and cleaned up per 18 AAC 75.080. The telephone number to report spills is Zenith 9300.
- 21) Sorbent material in sufficient quantity to handle operational spills must be on hand at all times for use in the event of an oil or fuel spill.
- 22) All fuel drums must be marked with the contractor's name and dated.
- 23) Refueling of vehicles must not occur on an annual flood plain of a watercourse.
- 24) Unless specifically permitted, the use of explosives is prohibited. If authorization has been obtained, the following minimum conditions will apply:
 - a) To protect fish and other aquatic fauna, explosives must not be detonated within, beneath, or in close proximity to fish-bearing waters unless the waterbody, including its substrate, is solidly frozen. The minimum acceptable offset from unfrozen fish-bearing waters for various size explosive charges is:

1-2 pound charge	--	80 feet
5 pound charge	--	120 feet
10 pound charge	--	170 feet
25 pound charge	--	270 feet
100 pound charge	--	530 feet

Note: Minimum offsets are based upon the use of explosives with detonation delays of 8 milliseconds or greater occurring between each charge such that no explosion or combination of explosions will produce an instantaneous pressure in fish bearing waters which exceeds 2 psi.

- b) All vehicles used to carry explosives must be clearly marked with the word "EXPLOSIVES".
 - c) All shot wire must be removed from the area.
- 25) Trails and campsites must be kept clean. All solid wastes including incinerator residue must be backhauled to a solid waste disposal site approved by the Alaska Department of Environmental Conservation.
- 26) All wastewater must be disposed of in a manner acceptable to the Alaska Department of Environmental Conservation. Acceptable methods of disposal include the following:
- a) Treatment of the entire wastewater stream through a sewage treatment plant capable of producing an effluent which meets secondary treatment standards (30 mg/l BOD, 30 mg/l S.S., and 200 coliform per 100 milliliters). Secondary treated effluent may be discharged to the surface of the land or water of the state subject to a wastewater permit issued by the Department of Environmental Conservation.
 - b) The wastestream may be split into blackwater and greywater with the blackwater (sewage) being incinerated in electric or propane incinerating toilets, and the greywater (laundry, shower, and kitchen effluent) being filtered and disinfected prior to discharge. The plans for such a greywater system must be reviewed and approved by the Department of Environmental Conservation.
- 27) Drinking water must meet Alaska drinking water standards. Minimum treatment must consist of filtration to remove 10 micron sized particles and disinfection.
- 28) Permittees shall abide by the provisions of Alaska's wildlife feeding regulation, 5 AAC 81.218. This regulation provides that it is unlawful to deliberately feed bears, wolves, foxes or wolverines or to deliberately leave human food or garbage in such a manner that it attracts such animals.
- 29) The provisions of the Federal and State Endangered Species Acts and the Federal Marine Mammal Protection Act must be adhered to at all times. The Endangered Species Acts provide that there will be no activity permitted that jeopardizes the continued existence of an endangered species or results in the destruction or adverse modification of habitat of such species. Endangered species known to occur in Alaska include

peregrine falcon, Aleutian Canada goose, short-tailed albatross, Eskimo curlew, and humpback, fin, grey, blue and bowhead whales. The applicant is advised to contact the Anchorage U.S. Fish and Wildlife Service, Endangered Species Office (276-3800) for additional information on endangered species. The Marine Mammal Protection Act provides that there will be no intentional disturbance, harassment, catching, or killing of marine mammals. However, a 1981 amendment to the Marine Mammal Protection Act authorizes the Secretary, Department of Interior or the Secretary, Department of Commerce, under certain conditions, to allow U.S. citizens to take small numbers of marine mammals from non-depleted stock incidentally, but not intentionally, in specified areas. The Alaska Department of Natural Resources recommends that this authorization be obtained by the permittee before conducting any operations in or near coastal areas. The Department of Interior, U.S. Fish and Wildlife Service (USFWS) has jurisdiction over sea otter, polar bear and walrus. The Department of Commerce, National Marine Fisheries Service (NMFS) has jurisdiction over all other Alaskan marine mammals including seals, sea lions, whales and porpoise. For further information, the applicant is urged to contact the Anchorage offices of USFWS (276-3800) and NMFS (271-5006).

- 30) All aircraft associated with the seismic program must maintain a minimum altitude of 1500 feet above ground level and one mile horizontal distance from all shoreline cliffs, bluffs, and rocky outcrops (excluding take offs and landings). Operations at lower altitudes may be allowed upon approval of the Department of Natural Resources after consultation with the Department of Fish and Game. Human safety will take precedence over aircraft restrictions.
- 31) In areas of subsistence harvest, the permittee will coordinate survey activity with local subsistence users to prevent unnecessary conflicts.
- 32) All operations must be conducted in a manner that will assure minimum conflict with other users of the area.
- 33) A completion report must be submitted within fifteen (15) days after termination of permit activities. This report must contain the following information:
 - a) Dates when work was actually performed and the number of line miles actually surveyed.
 - b) A U.S.G.S. topographic map showing the actual location of all camps, shot lines and routes of travel.
 - c) A list of vehicles used for any off-road travel associated with the permittees activities.
 - d) A statement of cleanup activities.
 - e) A report of the time spent in each campsite.

- f) A description of the methods of disposal of garbage and other camp debris.
- 34) The Director, Division of Oil and Gas has the right at any time to amend or modify any provisions of this permit.
- 35) The permit authorizes access across and exploration activity upon lands owned by the State of Alaska. If only the sub-surface rights are owned by the State, the permittee shall not enter upon such land until a good-faith attempt has been made to agree with the surface owner or lessee on settlement of damages that may be caused by this activity. If an agreement can not be reached, the Director of the Division of Oil and Gas has the authority to approve the activity, provided adequate provisions have been made with the State to pay for any damages the surface owner may suffer.
- 36) The seismic exploration activities granted under this permit must not diminish the use and enjoyment of lands encompassed within a native allotment. Before entering a pending or approved native allotment, the permittee shall contact the Bureau of Indian Affairs and Bureau of Land Management and comply with applicable federal law.
- 37) The Department of Natural Resources may require that an authorized representative of the department be on-site during any operations conducted under this permit.
- 38) A copy of the permit and stipulations must be posted in a prominent location at the base camp.
- 39) If seismic work is required within the boundaries of a designated State Game Refuge, State Critical Habitat Area or State Game Sanctuary, the permittee shall obtain prior approval from the Alaska Department of Fish and Game. For approval to conduct these operations, the permittee should contact the Anchorage Habitat Division office (344-0541). In addition, any work in National Wildlife Refuges, National Parks, National Monuments and National Wilderness Areas requires the authorization of the appropriate federal surface manager. The permittee is urged to contact the Anchorage offices of the U.S. Fish and Wildlife Service (276-3800), the National Park Service (271-4366) or the National Forest Service if (279-5541) proposed on-shore operations require a special permit from these agencies.

CHAPTER 10

WATER & SOLID WASTE

CHAPTER 10 - WATER & SOLID WASTE

The following reports addresses hydrology, floodplains, wetlands, water quality, and solid waste in the planning area. Information on hydrology and floodplains was developed by the DNR Division of Water. The hydrology section summarizes the specific stream hydrology of each of the rivers and the subunits. This section also includes general information on wetlands. Water quality is addressed in a table listing the status of drinking water sources and wastewater systems for lodges located within the planning area. The water quality section was developed from information supplied by the Department of Environmental Conservation, Environmental Quality Division. The DNR, Division of Land contributed the wetlands section. This section covers wetlands identification, inventory and classification, agency responsibilities for management, and priorities for acquisition. The section on solid waste was compiled by the Division of Land from information provided by the Matanuska-Susitna Borough and the Department of Environmental Conservation.

HYDROLOGY

Five of the six Recreation Rivers, the Deshka River, Talkeetna River, Lake Creek, Talachulitna River, and Alexander Creek are part of the Susitna River drainage basin, while the Little Susitna River drains directly into Cook Inlet. Elevations for the Recreation Rivers range from sea level to 8000 ft, and three of the streams, the Talkeetna River, Lake Creek, and Little Susitna River contain glaciers within their drainage basins. In general, stream gradients are relatively steep, 50-150 ft/mi, near the headwaters, but gradients moderate rapidly to less than 50 ft/mi as the streams approach either the Susitna River or Cook Inlet.

The climate in the recreation rivers area is primarily of the transitional type, with temperature extremes similar to, but not as great as, interior Alaska; precipitation is variable with amounts generally less than coastal Alaska, but greater than the interior. Mean annual precipitation ranges from approximately 15 in. at lower elevations to 100 in. in the mountains (Selkregg, 1974).

The maximum discharge for all six streams normally occurs from late May to late July during seasonal snowmelt. A secondary high discharge can take place in late summer or early fall when rainfall typically peaks. Annual low flows occur at the end of winter, from mid-February to mid-April.

Specific Stream Hydrology by River and by Subunit

Little Susitna River

Total length: 110 mi River corridor length: 80 mi
Channel width: 75-200 ft (tides affect width from the mouth to mile 15)
Channel gradient: mile 0-82, 4.9 ft/mi; mile 82-110, 109 ft/mi
Drainage basin area: 400 sq mi

The Little Susitna River heads at the Mint Glacier in the Talkeetna Mountains and discharges into upper Cook Inlet. Throughout the upper 10 miles of the recreational river corridor the stream contains vegetated and non-vegetated mid-channel bars and occasionally divides into two or three streamflow conveying channels. For the remainder of the length of the Little Susitna River, the single channel meanders across

its floodplain with typical point bar and cutbank morphology. Summer streamflow depths can range from less than 1 ft to 6 ft, depending on snowmelt or rainfall conditions and location along the stream. During periods of low flow, exposed or submerged riffles and gravel bars can make river navigation difficult for prop-driven boats.

The average streamflow for the Little Susitna River at the Fishhook Road crossing is 211 cubic feet per second (cfs), with winter low flows typically less than 50 cfs and summer high flows near 1000 cfs. During October of 1986, a flood flow of 1880 cfs was measured at the Fishhook Road site, while downstream at the Parks Highway the discharge was 3600 cfs. The highest flow ever recorded on the Little Susitna River was 7840 cfs on August 10, 1971 at Fishhook Road. According to the Soil Conservation Service (S.C.S.) (1980), a 100-year flood at the Parks Highway would produce a flow of approximately 15,200 cfs; downstream near the mouth of the river the 100-year flood would yield a flow of approximately 24,200 cfs. The calculated 100-year flood flow depths range from 14.5 ft at the Parks Highway bridge, to 34.6 ft at a site 5 mi upstream of the Burma Road access; the width of flooded terrain adjacent to the channel would vary from 1200 ft to 4000 ft.

Following are more detailed descriptions of the hydrology for the Little Susitna River subunits:

Subunit 1. Lower Little Susitna River: 100-year floodplain width: 500 ft-4000 ft; stream depth: 12 ft-35 ft; approximate area inundated by 100-year flood: 16,000 acres. Damage potential: property and structures in Houston that are within approximately 1500 ft of the stream channel depending on floodwater level and elevation of structure.

Subunit 2. Upper Little Susitna River: 100-year floodplain width: 500 ft-2000 ft; stream depth: 8 ft-16 ft; approximate area inundated by 100-year flood: 2000 acres. Damage potential to property, structures, roads, and bridges adjacent to the stream.

Deshka River (Moose and Kroto Creeks)

Total length--Deshka River: 27 mi

Kroto Creek: 49 mi

Moose Creek: 44 mi

Channel width--Deshka River: 100-400 ft

Kroto Creek: 40-150 ft

Moose Creek: 40-125 ft

Channel gradient: 5-20 ft/mi

Drainage basin area: 635 sq mi

Moose Creek and Kroto Creek originate in small lakes north of the Petersville Road and flow south to form the Deshka River that, in turn, flows into the Susitna River. The channels of all three streams meander, and mid-channel bars and riffles are present throughout. Large, forested islands are present in the Deshka River. Summer streamflow depths range from 1 ft to 6 ft on Moose Creek and Kroto Creek, while Deshka River depths are usually 2 ft to 8 ft. During low summer flows, exposed or submerged riffles or gravel bars make river navigation difficult for prop-driven boats above mile 5.5.

The average streamflow for the Deshka River near the mouth is 892 cfs. Winter low flows in February and March are typically 200 cfs to 300 cfs, and summer flows are normally 600 cfs to 1500 cfs. The

estimated discharge during the flood of October 1986, was 48,000 cfs (U.S.G.S., 1988), a flow approximately equivalent to 1.3 times the projected 100-year flood for the Deshka River. The S.C.S. (1982) estimated 100-year flood water depths of 6 ft to 12 ft for Moose Creek and Deshka Creek, and depths of 10 ft to 18 ft for the Deshka River. Floodwaters during a 100-year flood would cover a width adjacent to the stream channel of 300 ft and up to 1.5 mi, depending on location.

Following are more detailed descriptions of the hydrology for the Deshka River subunits:

Subunit 1. Mouth of Deshka River: 100-year floodplain width: up to 1.5 mi on the east side of the river, possibly meeting floodwaters of the Susitna River; stream depth: 15 ft-20 ft. Deshka River floodwaters mixed with Susitna River floodwaters would result in widespread flooding and damage potential to property and structures on the east side of the channel, with increased erosion to the high banks on the west side of the channel

Subunits 2-5. Lower Deshka River to The Forks: 100-year floodplain width: 1000 ft-6000 ft; stream depth: 7 ft-12 ft. Large areas of inundation from Neil Lake to Trapper Creek. Property and dwellings at low elevations are subject to severe flooding and subsequent potential damage from a 100-year flood.

Subunits 6-7. Kroto Creek and Moose Creek: 100-year floodplain width: 800 ft-4000 ft; stream depth: 5 ft-10 ft. Floodwaters of a 100-year flood are not as widespread in the upper reaches of the Deshka River system, although the damage potential to bridges and dwellings on Petersville Road and Oilwell Road is high.

The estimated total area inundated by the 100-year flood for the Deshka River system is 7,660 acres.

Talkeetna River

Total length: 97 mi River corridor length: 41 mi

Channel width: 200-500 ft

Channel gradient: mile 0-63, 23 ft/mi; mile 63-84, 124 ft/mi

Drainage basin area: 2015 sq mi

The Talkeetna River originates at the Talkeetna Glacier and flows west to the Susitna River. Iron Creek, Sheep River, and Clear Creek are major tributaries. The Talkeetna River is a typical glacial river that carries a high sediment load and exhibits a braided channel form with numerous forested islands and gravel bars. Glacial streams are very dynamic, constantly depositing sand and gravel in some places while, at the same time, eroding new channels elsewhere. Summer streamflow depths vary considerably, from 1 ft to 6 ft, and depend on spring snowmelt runoff, rainfall, and glacier melt. The silty glacial water and shifting gravel bars make river navigation difficult for the inexperienced boater. Upstream boat passage on the Talkeetna River stops at mile 30, near the Iron Creek confluence, where the channel narrows to a canyon with Class IV and V rapids.

The mean annual streamflow for the Talkeetna River is 4047 cfs; March is the month with the lowest average flow, 509 cfs, while June and July have the highest average flows at nearly 11,000 cfs. The highest flow ever recorded on the Talkeetna River was 75,700 cfs during the October 1986 floods, a discharge approximately equivalent to a 40-year flood (U.S.G.S., 1988). In 1972, the Army Corps of Engineers estimated that the 100-year flood would have a discharge of 121,000 cfs with streamflow depths ranging from 10-20 ft in the lower river. A flood of that magnitude would inundate the town of

Talkeetna with 0.5 to 4 ft of water, and cover an area 1 mi wide just upstream of town.

Following are more detailed descriptions of the hydrology for the Talkeetna River subunits:

Subunit 1. Lower Talkeetna River: 100-year floodplain width: 3000 ft-6000 ft; stream depth: 10 ft-20 ft. Widespread and severe flooding would occur at Talkeetna and at low bank property upstream to Sheep River; increased bank erosion, log jams, and major channel shifts would intensify the results of a 100-year flood.

Subunit 2. Talkeetna Canyon: No significant property damage is likely. Increased sediment deposition, bank erosion, channel shifting, and log jam formation could alter the rafting and kayaking experience.

Subunit 3. Clear (Chunilna) River: Potential flood damage has not been documented. Widespread flooding and channel changes can be expected in the lower 2 mi-3 mi of the stream, with damage occurring to property and buildings at the river mouth.

Lake Creek

Total length: 50 mi

Channel width: 150 ft to 250 ft

Channel gradient: 25 ft/mi

Drainage basin area: 410 sq mi

Lake Creek begins at Chelatna Lake and flows southeast to the Yentna River. Primarily a meandering stream, Lake Creek has a point bar and cutbank channel, with occasional channel bars and riffles. Summer streamflow depths typically range from 2 ft to 6 ft, but low water reduces depths over some riffles to 1 ft or less, limiting upstream boat passage to mile 4 to 6, depending on boat type and power.

No gaging data is available for Lake Creek. Streamflow measurements made in April and June 1989 by Alaska Division of Geological and Geophysical Surveys (A.D.G.G.S.) hydrologists yielded discharges of 49 cfs and 900 cfs, respectively. A.D.G.G.S. began a summer gaging program on Lake Creek in 1989. Winter flows most likely fall between 50 cfs and 200 cfs, while summer flows probably range between 600 cfs and 2000 cfs. Flood data for Lake Creek is also unavailable. Most overbank flow from a 100-year flood would occur downstream of mile 12.5, the outlet of the Lake Creek canyon.

Following are more detailed descriptions of the hydrology for the Lake Creek subunits:

Subunit 1. Lake Creek Mouth: No flood data or publications are available. Extensive flooding is expected in the lower 2 mi of the stream, both from Lake Creek and Yentna River flooding. Increased bank erosion, channel shifts, and property damage is likely near the mouth of Lake Creek.

Subunit 2-3 Upper Lake Creek to Chelatna Lake: Chelatna Lake would act as a storage reservoir for floodwaters, so the effects of a 100-year flood along these two reaches or subunits would be reduced. The highest potential for damage exist near the lake outlet and at the confluence of tributaries to Lake Creek.

Talachulitna River

Total length: 52 mi

Channel width: 100 ft to 300 ft
Channel gradient: 42 ft/mi
Drainage basin area: 430 sq mi

The Talachulitna River heads on the south side of Beluga Mountain, joins the major tributary Talachulitna Creek, and flows to the Skwentna River. The channel of the Talachulitna River meanders throughout its length, and gravel bars and riffles are common. River depths vary dramatically with location and season, from less than 1 ft over riffles in upstream reaches, to 10 ft in pools near the mouth. Upstream power boat passage is restricted by steep channel gradients in small canyons from mile 3 to mile 17.

Until June 1989, when A.D.G.G.S. established a summer gaging program on the Talachulitna River, no stream gaging data was available for the stream. A flow of 92 cfs was measured in April 1989, and in mid-June a streamflow of 2890 cfs was measured at the same site. Winter low flows should range between 70 cfs and 400 cfs, while in the summer flows should fall between 1500 and 3500 cfs. The S.C.S. (1982) did a floodplain study on the lower 8 miles of the Talachulitna River, and estimated a 100-year flow of 19,010 cfs, with the width of flooding ranging from 400 ft to 1500 ft. No depths of flooding were calculated for the report.

Following are more detailed descriptions of the hydrology for the Talachulitna River subunits:

1. Mouth of Talachulitna River: 100-year floodplain width: 500 ft-1500 ft; stream depth: not calculated. The channel in this reach is more confined, so the effected area is smaller than similar reaches on other streams. Active and increased channel erosion and accompanying channel changes would constitute the major result of a 100-year flood. Property and structures on the south side of the channel could be severely impacted; the north side (or right bank looking downstream) is generally higher and flood effects would be reduced.

2-6. Talachulitna River Canyon to Upper Talachulitna River: No flood data is available for these reaches. Increased bank erosion, channel changes, and log jams are expected to take place. Floodwaters could effect property and structures at the Judd Lake outlet and along the Middle Talachulitna River.

Alexander Creek

Total length: 30 mi
Channel width: mile 0-4, 250-500 ft; mile 4-30, 50-200 ft
Channel gradient: 3.5 ft/mi
Drainage basin area: 325 sq mi

Alexander Creek is a slow, meandering stream that originates in Alexander Lake and flows south to the Susitna River. Point bars and riffles are common above mile 10, the approximate limit of upstream backwater effects from the Susitna River. Channel streamflow depths are commonly between 1 ft and 5 ft. Power boats can run upstream 16 miles to Lower Sucker Creek depending on boat type and water depth.

A discharge of 271 cfs was measured in mid-July by A.D.G.G.S. hydrologists, but no other gaging data is available. In addition, no flood information is documented for Alexander Creek; however, local residents recall widespread flooding in October 1986, both in the upper and lower reaches of Alexander Creek.

Following are more detailed descriptions of the hydrology for the Alexander Creek subunits:

Subunits 1-4. Lower Alexander Creek to Sucker Creek: Flood data is also unavailable for Alexander Creek. Because the land surrounding the creek is relatively flat, the 100-year floodplain is expected to cover a large area, up to an estimated 1 mi in width. Flood damage to property and structures along any low banks is highly likely. Additionally, high water from the Susitna River combined with floodwaters from Alexander Creek would cause significant flood depths near the mouth of the stream, resulting in potential property damage.

FLOODPLAINS

Various definitions of "floodplain" exist, depending on the discipline using the word. For planning and engineering purposes the definition most commonly used is: the floodplain is the area adjacent to a stream channel or waterbody that is subject to flooding. Floodplains are often described using the estimated frequency of flooding that would be necessary to inundate the area of interest. For example, the 100-year floodplain refers to the land area that would be inundated by a 100-year flood, a flood that could be expected to occur on the average once every 100 years or have a one percent chance of being equalled or exceeded in any given year. The 100-year flood and floodplain is of particular interest because of the flood insurance programs that are based on that level of flooding.

It is beyond the scope of this Resource Assessment to discuss the techniques of flood frequency estimates and floodplain mapping. One of the purposes of the Recreation Rivers Management Plan, however, is to provide floodplain management guidelines for reducing potential flood damage to property and structures. The following discussion presents a brief summary of floodplain information for each stream based on management subunit. The summary includes estimates of the width of land across the floodplain that could be inundated by a 100-year flood (controlled by channel shape and surrounding topography), as well as estimates of depth of floodwaters from the channel bottom. Much of the data for this section was derived from S.C.S. (1972, 1982) and Army Corps of Engineers (1972) floodplain reports on the Little Susitna River, Deshka River (Moose and Kroto Creeks), Talkeetna River, and Talachulitna River. No floodplain data is published for Lake Creek and Alexander Creek.

A map of the floodplains in the Recreation Rivers was produced as an appendix to the Recreation Rivers Management Plan.

WETLANDS

The following section describes the definition, agency responsibilities, inventory, protection mechanisms, and acquisition priorities for wetlands. A map of the wetlands in the corridors are shown in an appendix to the Recreation Rivers Management Plan.

Wetlands provide valuable habitat for many wildlife species, absorb large amounts of water thereby averting destructive floods and erosion, help to purify polluted waters, provide opportunities for wildlife observation, hunting, and other recreation opportunities, and can serve as visually pleasing open space and winter transportation corridors.

Identifying Wetlands

Results of wetlands identification mapping and planning may include: 1) the identification of wetland priorities for acquisition and conservation of resource values, 2) identification of wetlands suitable for enhancement or development, 3) better delineation of wetlands so that applicants know in advance whether and what types of permits are required, 4) advance awareness of mitigating measures, and 5) expediting issuance of general permits for similar types of proposed developments.

Agency Responsibility

Several agencies have jurisdiction over wetlands in the Recreation River Corridors. A brief description of the agencies' responsibilities follows:

- *The U.S. Fish and Wildlife Service* has responsibilities to review Corps of Engineers (COE) and Environmental Protection Agency permits under the Fish and Wildlife Coordination Act, and operates the National Wetland Inventory and related information bases.
- *The Environmental Protection Agency*, under the Clean Water Act, sets guidelines and standards for federal wetlands protection, including the COE Section 10/404 permit process, and reviews and comments on those permit applications. The EPA itself seldom restricts wetlands uses directly, but may restrict uses of wetlands which have an unacceptable adverse effect on municipal water supplies, and fishery areas, wildlife or recreation areas.
- *The U.S. Army Corps of Engineers* is responsible for regulating the placement of dredged or fill material into the waters of the United States including wetlands. Wetland protection is limited, however, in that not all activities which destroy wetlands are regulated under the Corps program. For those activities which are regulated, protection has been provided through 1) modification of proposals for permits, 2) special conditions to permits, 3) requiring mitigation for some unavoidable losses, and 4) denial of permit proposals.
- *The National Marine Fisheries Service (NMFS)*, as a cooperating agency under the Fish and Wildlife Coordination Act, reviews and comments on Corps permit applications for wetland fill. NMFS is the federal agency responsible for marine estuarine and anadromous fisheries and their habitat.
- *The State Division of Governmental Coordination (DGC)* implements the Alaska Coastal Management Program (ACMP). The ACMP has specific management standards for wetland habitat (6 AAC 80.130). Proposed projects within the state's coastal zone must be found consistent with these standards before federal or state permits may be issued. DGC coordinates the ACMP consistency review. Participating review agencies include the Alaska Department of Natural Resources, Alaska Department of Fish and Game, Alaska Department of Environmental Conservation, and Alaska Department of Transportation and Public Facilities.
- *The Matanuska-Susitna Borough* coastal zone management district also participates in the consistency review process. District policies may supplement the state standards. Proposed projects in the district must be found consistent with district policies and the state standards before permits may be issued.

- *The Alaska Department of Fish and Game* is responsible for protecting wetland habitats on special areas (state game refuges, critical habitat areas, and game sanctuaries) and for issuing permits in designated anadromous fish habitat, including wetlands. The ADF&G reviews Corps of Engineers permits under the Fish and Wildlife Coordination Act. ADF&G also assists coastal districts in the development of coastal district programs and makes recommendations regarding the consistency of wetlands projects under the Alaska coastal Management Program.
- *The Alaska Department of Environmental Conservation (ADEC)* reviews proposed projects requiring a Corps permit for compliance with Section 401 of the Clean Waters Act. Section 401 requires applicants for a Section 404 dredge and fill permit to obtain a certification from the State that the discharge will comply with State water quality standards and other applicable state laws and regulations. Denial of an Alaska Certificate of Reasonable Assurance would require denial of the 404 permit. ADEC's water quality standards are also incorporated into the Alaska Coastal Management Program.
- *The Alaska Department of Natural Resources* has developed policies for the protection, management, and use of wetlands through the Susitna Area Plan which provides protective status for wetlands within legislatively designated areas such as the Recreation Rivers Corridor.

Inventory and Classification

The U.S. Fish and Wildlife Service (FWS) estimates that 170 million acres of wetlands are located in Alaska. This accounts for approximately 63 percent of the wetland acreage in the United States. All six River Corridors include land that has extensive areas of wetlands. Bogs, lakes, and riparian areas are a conspicuous feature of the landscape in the corridors.

In order to obtain more reliable data on wetland extent and distribution, the FWS initiated the Alaska Wetland Acreage Analysis in 1984. Regional and statewide estimates of the acreage of 12 wetland categories and two deep water habitat types are being produced. Not all wetlands are created equal, some being less productive than adjacent uplands. The FWS is particularly concerned about those wetland types that may be limited in extent, but that serve as important habitat for fish and wildlife species.

The most comprehensive wetland mapping effort in the state is being conducted by the FWS's National Wetland Inventory (NWI). As of August 1989, this program had produced wetlands maps for all of the Tyonek and Anchorage quads and some of the Talkeetna and Talkeetna Mountains quads. Most of the NWI maps are produced at a scale of 1: 63,600.

Several wetland definitions have been used by government agencies and private groups in Alaska for wetland inventory purposes. However, differences in boundary determinations have not been significant. Although the FWS and the Corps employ separate wetland definitions, there have been few conflicts between the two agencies in the application of these definitions in Alaska. As part of the NWPP, consideration should be given to merging the definitions. Concurrence is often the exception in other regions of the United States.

When classifying wetlands for inventory or regulatory objectives, both the FWS and the Corps use the FWS's *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979). Many other public agencies, private industry, and private groups in Alaska utilize this system for

describing the physical characteristics of wetlands. The FWS wetland classification system will serve as the foundation for discussions of wetland types in the wetland planning component for the recreation rivers planning process.

Wetland losses in the corridors so far have been fairly small and represent less than a one percent loss. Elsewhere in Alaska, urban development and construction of transportation systems account for the greatest loss of wetlands that has occurred in Alaska.

Protection Mechanisms

Several methods of protecting wetlands are available and currently in use in Alaska:

- ° education of land owners (and future land owners) regarding the flood control, habitat, recreational, and aesthetic values of wetlands;
- ° advanced identification of areas suitable and unsuitable for the discharge of fill material such as the EPA and the Corps are presently doing in Juneau and the Colville River delta;
- ° project consistency review under 6 AAC 50 conducted by regulatory agencies can result in the modification or denial of a permit for a project proposed in the coastal zone due to unacceptable impacts to important wetlands. Specific regulatory mechanisms include: 1) the COE Section 404 and Section 10 permit programs including the EPA guidelines and coordination requirements, 2) the NPDES and other water quality permit programs, and 3) ADF&G Title 16 permits (both anadromous fish stream permit and special area permit;
- ° mitigation of wetland loss in one area through provision of enhancement or protective status in another area;
- ° planning and zoning including: 1) local ordinances and permit requirements, such as those in Anchorage; 2) the CAM plans and policies; 3) purposes and regulations of legislatively designated federal refuges, parks and forests, and state parks, forests, and special areas; and 4) special conditions and stipulations on state and federal leases, special use permits, and area-wide land management plans;
- ° acquisitional programs including: 1) Land and Water Conservation Fund grants; 2) Migratory Bird Conservation Fund (federal duck stamp) purchases; 3) agricultural land acquisitions under the Food Security Act of 1985; 4) Pittman-Robertson and Dingell-Johnson federal aid funds to states; 5) Alaska Waterfowl Conservation Stamp funds; 6) Ducks Unlimited, Nature Conservancy, and other private grant programs; 7) mitigation funds for specific development projects; 8) local water quality bonds and other municipal programs; 9) state and federal land trades with private owners; 10) a variety of fee easement possibilities such as a life estate by which owners may continue to reside on their property for the rest of their lives; and 11) cooperative management agreements between agencies or with private land owners, such as Native Corporations, such as those under Section 907 (Alaska Land Bank) of ANILCA. The Division of Parks and Outdoor Recreation and the City of Kenai are presently cooperating on the inclusion of the ninth most critical wetland in the USA in the Kenai River Special Management Area to protect 2,000 acres of wetlands at the mouth of the Kenai River used by snow geese as a resting area during their migration to and from Wrangell Island in Siberia.

Priorities for Acquisition

The 1987 wetlands addendum to the Statewide Comprehensive Outdoor Recreation Plan set forth a process for prioritizing wetland acquisition in Alaska was based on 1) interagency and public input through a nomination process, 2) qualifications of candidate wetlands established in the evaluation process which will be based on the "guidance for estimating wetlands losses, threats and values thresholds," and 3) assessment of the efficiency of acquisition among the variety of available wetlands protection and acquisition programs. In general, priority consideration was given:

1. to wetlands whose public values and benefits cannot be maintained or realized, except through acquisition, especially those in and near population centers where the greatest loss of wetlands is most likely to occur;
2. to interests in wetlands (acquisition methods) that are the most cost-effective available while fully and permanently allowing for protection and/or improvement of the public values provided by the wetland. Fee title, perpetual easements, leases, deed restrictions, land donations and exchanges or other methods may be employed;
3. to wetlands which can be acquired from willing sellers;
4. to wetland sites having minimal operation and maintenance requirements; and
5. to qualified wetlands on inholdings within the boundaries of state conservation areas (parks, wildlife refuges, critical habitat areas), and municipal parks, areas meriting special attention under the coastal management program (AMSAS) or other locally protected areas.

WATER QUALITY

The following table summarizes DEC drinking water supplies and wastewater systems approvals for commercial facilities within or adjacent to the Recreation Rivers in 1989. The status of permits may have changed since that time.

<u>River Corridor</u>	<u>Lodge Name</u>	<u>Drinking Water System</u>	<u>Wastewater System</u>
Little Susitna	Little Susitna	Not Approved	Not Approved
	Houston Access	Not Approved	Not Approved
Talkeetna	Talkeetna River	Not Approved	Not Approved
Deshka	Deshka River	Not Approved	Not Approved
	Silver-King	Approved	Approved
Lake Creek	Lake Creek	Not Approved	Not Approved
	King's Point	Not Approved	Not Approved
	Wilderness Place	Not Approved	Not Approved
	Swiss Camp	Not Approved	Not Approved
	Chelatna Lake	Not Approved	Not Approved
	Chelatna Shores Resort	Not Approved	Not Approved
Talachulitna	Silvertip	Not Approved	Not Approved
	Teke Tours	Not Approved	Approved
	Talaview	Approved	Approved
	Talastar	Not Approved	Not Approved
	Silvertip (Judd Lake)	Not Approved	Approved
Alexander	Alexander Lake	Approved	Not Approved
	Gabbert's Fish Camp	Not Approved	Not Approved
Adjacent to Corridors	Riversong	Not Approved	Not Approved
	McDougall	Not Approved	Not Approved
	Cottonwood	Approved	Approved

The above chart is not a complete description of the status of each lodge or facility in 1989. Some of the lodges have been issued Notices of Violation for the use of unapproved public water and wastewater systems. Other lodges are in the process of compliance but have not yet received final approval.

Those lodges or facilities missing from the DEC's chart are listed below by river corridor:

<u>River Corridor</u>	<u>Lodge Name</u>
Deshka	Sleeping Lady Mike and Mert's Northward Bound Veikoda Enterprises ¹
Talachulitna	Bear Tracks Talaheim ²

There are some guide and private camps located throughout the corridors, primarily near the mouth of the Deshka River. All commercial guide camps are required to meet DEC regulations for drinking water supplies and wastewater systems. DEC wastewater requirements for temporary facilities are less strict than for permanent facilities. Requirements for drinking water sources are the same for both permanent and temporary facilities. For more information, refer to DEC regulations.

Information on potential new water sources is not available. Areas where the need to develop reliable sources of good water have been identified by the public include: the mouths of Clear Creek, the Deshka River, Lake Creek, the Talachulitna River, and Alexander Creek. These are areas that receive high public use but have no safe sources of drinking water.

SOLID WASTE

The volume and type of waste generated in the Recreation Rivers is difficult to assess quantitatively. Major sources of solid waste produced include household wastes, waste oils, litter and human waste. Other sources of waste probably include products remaining from soil stabilization efforts, pesticides, and miscellaneous substances collected from past construction sites. If these secondary waste products occur within the corridors they are probably found in low concentrations.

Two types of waste accumulation problems have been identified within the corridors; those which accumulate at recreational use sites such as river mouths, stream junctions, and campsites; and those from residences, lodges, and commercial camps that accumulate in many small dumps.

The proliferation of unregulated dump sites within the corridors is a potential public safety hazard. Bears and other nuisance animals have reportedly been a problem around lodge dumps sites and in heavily utilized public use areas. The extent of the bear problem is, however, anecdotal, and difficult to assess. Other potential issues resulting from unregulated waste disposal are the leaching of contaminants into the

¹Veikoda Enterprises operated a temporary guide camp at the mouth of the Deshka under a state land use permit. In 1989 Veikoda received approvals for both its drinking water supply and wastewater system.

²Under state lease.

water column, and accidents (and liability) resulting from improperly secured sites.

Household Waste

Household wastes generated on site by a private property owner may be disposed of on site without a DEC permit. Commercial operations, however, must dispose of wastes in DEC approved sites only. Commercial operations within the corridors that generate waste include: lodges, fish guide camps, and rental cabins operated by air taxis.

No permitted landfills occur within the river corridors. All commercially generated waste within the corridors and all oily and hazardous wastes must be disposed of outside the corridors.³

Active, permitted landfills within the Matanuska Susitna Borough are listed below:

<u>Facility Name</u>	<u>Permittee's Name</u>	<u>Expiration Date</u>
Big Lake	Matanuska Susitna Borough	7/31/90
Houston Landfill	City of Houston	2/28/93
Sunshine	Matanuska Susitna Borough	5/31/91
Talkeetna	Matanuska Susitna Borough	5/31/91
Wasilla-Palmer Central Landfill	Matanuska Susitna Borough	11/30/91

The Houston landfills is available to Houston residents, only.

Because of the high cost of operating public landfills, the Matanuska-Susitna Master Plan calls for the conversion of four of the five presently operating landfill to waste transfer sites at the expiration of their current authorizations. The first conversion will be the Big Lake landfill, which is anticipated to begin operating as a transfer site.

Illegal active (open) dumps have been identified in Skwentna and along Alexander Creek below Sucker Creek.

³DEC distinguishes between active and inactive, as well as between open and closed solid waste disposal sites. Permitted active sites are open; i.e., uncovered and exposed to the air. Inactive sites are closed, covered with dirt, and revegetated.

The following chart identifies, by river corridor, authorized waste transfer facilities and landfills close to the river corridors. Some of these sites, however, may be privately maintained and not available for public use. Users should check with facility operators before using these sites:

<u>River Corridor</u>	<u>Facility/Type⁴</u>	<u>Access</u>
Little Susitna River		
Lower river	Burma Rd. (tf)	boat
middle river	Houston (lf)	boat
upper river	Schrock Rd. (tf)	boat
Deshka River		
upper Moose Creek	Trapper Creek (tf)	boat
lower mouth area	Deshka Landing (tf)	boat
Talkeetna River	Talkeetna (lf)	air/boat
Lake Creek	Deshka Landing (tf)	boat
	Talkeetna (lf)	boat/air
	Willow (tf)	air
Alexander Creek	Deshka Landing (tf)	boat
	Anchorage (lf/tf)	air/boat
	Willow (tf)	air
Talachulitna River	Deshka Landing (tf)	boat
	Anchorage (lf/tf)	boat/air
	Willow (tf)	air

Some of the road and boat accessible commercial facilities currently transport solid wastes to authorized landfills and transfer facilities. Others transport wastes on backhaul flights. Facilities on Lake Creek, Alexander Creek, and the Talachulitna River are the furthest from authorized waste facilities. While development of authorized landfills at Skwentna and Alexander would reduce these distances significantly, DEC advises that it is more cost effective to have generators practice volume reduction techniques such as burning paper, etc., and fly waste to a well-managed facility, than to authorize and operate new disposal sites.

Waste Oil

Major sources of waste oils in the corridors are from household generators and heavy equipment. Waste oil may be either recycled or disposed of by approved methods. Although some recycling of waste oil does occur in Alaska, removal of waste oil from Alaska to an approved collection facility is currently the preferred management method because rerefining/reprocessing is not yet a viable industry in Alaska. Clean waste oil is a DEC approved energy source under certain circumstances. There are DEC/EPA approved laboratories in Alaska which will test waste oils. A list of these businesses is available for DEC. The maintenance of oil logs by facilities within the corridors that generate waste oils could prevent

⁴lf = landfill; tf = transfer site

illegal dumping of waste oil and the contamination of the water column.

Because of logistics and costs involved, small quantities of hazardous and other waste are seldom shipped from their source for treatment or storage and so tend to accumulate in local, illegal dumping sites where they are potential health hazards.

Other Waste

The present accumulations of litter and human waste detract from the public's enjoyment in the heavily utilized public use areas within the corridors and pose a potential health threat to users. These waste problems originate in part from the absence of public facilities to dispose of litter and human waste. the root of the problem, however, remains the reluctance of a small percentage of the corridors' users to practice a common sense wilderness ethic, successfully employed elsewhere, of packing/flying out what is packed/flown in, until public facilities are developed.

In addition to an overall litter problem, the following have been identified as major litter problem areas: the mouth of the Deshka River, the Burma Road access, the mouth of Lake Creek, mouth of Clear Creek, and the Oilwell Road. Currently, there are no state or borough maintained litter barrels, so all waste must be hauled out to disposal facilities listed above. With few exceptions, there has been no organized effort to remove litter and other wastes from heavily impacted areas. Commercial operators are generally conscientious about keeping their sites and the areas in which they operate clean. Individuals and user groups have also voluntarily organized cleanup projects at the mouth of the Deshka River and other heavily used areas. For more information on sites with litter accumulation, see Chapter 2.

REFERENCES

(Hydrology Section Only)

- Inghram, Mark, 1985, Kenai River erosion; Alaska Division of Geological and Geophysical Surveys, Public-Data File 85-37, 11 p.
- U.S. Army Corps of Engineers, 1972, Flood plain information, Talkeetna River, Susitna River, and Chulitna River, Talkeetna, Alaska: prepared for the Matanuska-Susitna Borough, 26 p.
- U.S. Soil Conservation Service, 1982, Flood hazard study, Kroto, Rabideux, Trapper, and Peters Creek, Matanuska-Susitna Borough, Alaska: Alaska rivers cooperative study, 256 p.
- _____, 1982, Flood plain management study, Beluga subbasin streams, Matanuska-Susitna Borough: Alaska rivers cooperative study, 35 p.
- _____, 1980, Flood plain inventory report, lower Little Susitna River and Willow Creek, Susitna River basin, Willow subbasin, Matanuska-Susitna Borough: Alaska rivers cooperative study, 20 p.
- Vaill, J.E., Still, P.J., Lamke, R.D., Bigelow, B.B., Van Maanen, J.L., 1988, Water resources data Alaska, water year 1987, U.S. Geological Survey Water-Data Report Ak-87-1, 284 p.

CHAPTER 11

FORESTRY

CHAPTER 11 - FORESTRY

Introduction

The information in this packet was developed by the Department of Natural Resources, Division of Forestry to answer questions concerning the volumes and location of forest resources within the Recreation River Corridors. The volumes were developed by the geoprocessing unit of the Department of Natural Resources, using the Susitna Basin inventory data. Volumes in this informational packet are reported in cubic feet, cunits, and Board Feet. A cunit is a unit of wood equaling 100 cubic feet. The data located in the Susitna Basin Study is in cubic feet. A conversion factor of 3.0 board feet per cubic foot was used in this packet.

The act that established the six Recreation Rivers closed the corridors along all the rivers to commercial harvesting. This closure can not be overturned by the planning effort currently underway. Before commercial timber harvest can occur the legislature will have to amend the Recreation River law. The current law allows for personal use harvest, harvest incidental to access development, and harvest for wildlife habitat development and maintenance.

All estimates of commercial harvest potential are based on the volumes and locations of forest resources within individual subunits. Generally, the remote forest lands were considered to have commercial potential only if volumes were relatively high. In these situations, the timing of the potential harvest was expected to be in the late 1990's or after 2000.

The term Biological Annual Allowable Cut (BAAC) used in this packet refers to the volume of forest products that could be harvested from these corridors on a sustained yield basis. This considers only the impacts of the harvest on the forest. It does not consider the political implications of harvest along the rivers. When computing the Annual Allowable Cut, both the biological impacts and the political impacts must be considered. The Annual Allowable Cut will usually be the lower of the two values. Since this packet was designed to answer questions concerning the volume and locations of the forest resources within the corridors, only the Biological Annual Allowable Cut was reported.

The attached map displays the locations of the subunits along each river.

Forestry Potential & Interest

LITTLE SUSITNA RIVER The Little Susitna River Recreation River corridor contains about 17,679 acres. The state owns about 13,239 acres including about 6,938 acres of forested lands. There is an estimated 5,255,200 cubic feet (52,552 cunits) of wood for all species on these lands. Chart 4 displays the volume of wood by subunit.

The Division of Forestry considers the Upper Little Susitna River subunit to have the highest potential for commercial forestry activities. However, due to the demand for personal use wood in the Palmer-Wasilla-Houston area, these lands would be managed to meet that demand. If this subunit was available for this use, activities could begin in two to four years.

DESHKA RIVER The Deshka River Recreation River corridor contains approximately 73,694 acres, of which the state owns about 62,117 acres. The 62,117 acres of state-owned lands include about 33,996 acres of forested lands. These forest lands contain an estimated 28,292,000 cubic feet (282,920 cunits) of wood for all species. Volume of wood per subunit is shown on Chart 2.

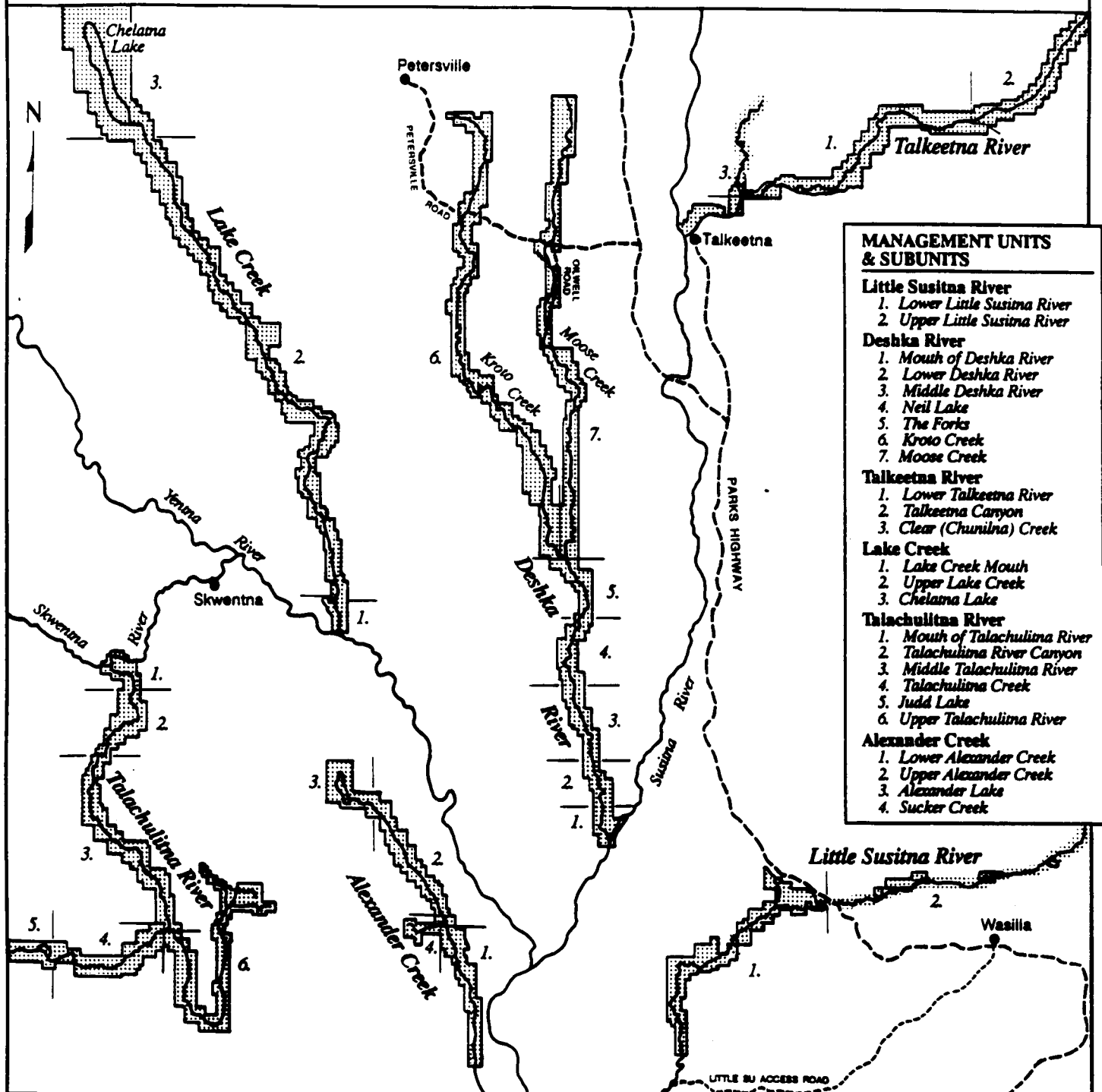
The Division of Forestry considers the Neil Lake, Forks, Kroto Creek, and Moose Creek subunits to have the highest potential for commercial forestry activity. If commercial forestry activity were allowed within these subunits, operations could begin within three to five years.

TALKEETNA RIVER The Talkeetna River Recreation River corridor contains about 30,295 acres, of which 28,798 acres are state owned. The state owned lands include about 9,945 acres of forested lands. These lands contain around 8,194,100 cubic feet (81,941 cunits) of wood for all species. Chart 6 displays the volume by river subunit.

Only the Lower Talkeetna River subunit has commercial forestry potential. If commercial harvest is allowed in this subunit, operations would likely begin within the next five to ten years.

SUSITNA BASIN RECREATION RIVERS MANAGEMENT PLAN

PLAN UNITS & SUBUNITS



LAKE CREEK The Lake Creek Recreation River corridor contains about 64,340 acres. The State of Alaska owns approximately 63,817 acres including about 18,214 acres of forested lands. These forested lands contain around 17,311,400 cubic feet (173,114 cunits) of wood for all species. Chart 3 graphically displays the volume of wood by subunit.

The Division of Forestry considers the Mouth, and the Upper Lake Creek subunits to have the highest potential for commercial forestry activities within this corridor. If commercial forestry activities were allowed, operations would not begin until after 2000.

TALACHULITNA RIVER The Talachulitna River Recreation River corridor contains about 51,276 acres of which the state owns approximately 50,258 acres. About 15,978 acres in state ownership is forested. These forested lands contain an estimated 13,243,900 cubic feet (132,439 cunits) of wood for all species. Chart 5 displays the volume by subunit.

Due to the values of the forest and other resources, and the location of this corridor, commercial harvest, if allowed, would not occur until after 2000.

ALEXANDER CREEK The Alexander Creek Recreation River corridor contains 22,536 acres. Of this about 19,995 acres is owned by the State of Alaska. The 19,995 acres of state lands includes about 11,109 acres of forested lands which contain approximately 9,803,900 cubic feet (98,039 cunits) of wood of all species. Volume of wood per subunit is shown on Chart 1.

The Division of Forestry considers the Upper Alexander, Alexander Lake, and Sucker Creek subunits to have the highest potential for commercial forestry operations. Due to lack of access, it is unlikely that the Alaska Department of Natural Resources, Division of Forestry would layout sales in these subunits until after 1999 or 2000, even if the legislature allows commercial timber harvest in the corridors.

Summary

Of the 25 subunits in the six Recreation River corridors, eleven are suitable for commercial forestry activities. These eleven subunits contain an estimated 54,200,400 cubic feet (542,004 cunits) of wood on approximately 57,681 forested acres. This equals about 940 cubic feet or 10.4 cords per acre. The Biological Annual Allowable Cut (BAAC) for these areas would approach 677,505 cubic feet per year.

VOLUME & VALUE - ALL SPECIES

RIVER	STRETCH	Forest	Volumes (cunits)	MBF/Cunit	Volume (MBF)	Total VALUE
ALEXANDER CK.	Upper Alexander Creek	4,503	47,058	0.3	14,117	\$261,056
	Alexander Lake	823	8,824	0.3	2,647	\$49,085
	Sucker Creek	728	7,822	0.3	2,347	\$43,525
DESHKA RIVER	Neil Lake	1,580	15,694	0.3	4,708	\$86,564
	The Forks	1,976	20,865	0.3	6,260	\$115,883
	Kroto Creek	13,982	105,798	0.3	31,739	\$555,180
	Moose Creek	12,148	123,207	0.3	36,962	\$684,320
LAKE CREEK	Lake Creek Mouth	954	10,251	0.3	3,075	\$57,042
	Upper Lake Creek	17,260	162,863	0.3	48,859	\$896,344
LITTLE SUSITNA	Upper Little Susitna River	1,628	20,939	0.3	6,282	\$80,560
TALKEETNA	Lower Talkeetna River	2,099	18,683	0.3	5,605	\$72,198
TOTALS		57,681	542,004		162,601	\$2,901,757

VOLUME & VALUE - OTHER SPECIES

RIVER	STRETCH	Forest	Volumes (cunits)	MBF/Cunit	Volume (MBF)	Stumpage	Value
ALEXANDER CK.	Upper Alexander Creek	4,503	3,401	0.3	1,020	\$10.00	\$10,203
	Alexander Lake	823	545	0.3	164	\$10.00	\$1,635
	Sucker Creek	728	477	0.3	143	\$10.00	\$1,431
DESHKA RIVER	Neil Lake	1,580	1,336	0.3	401	\$10.00	\$4,008
	The Forks	1,976	1,419	0.3	426	\$10.00	\$4,257
	Kroto Creek	13,982	5,104	0.3	1,531	\$10.00	\$15,312
	Moose Creek	12,148	8,315	0.3	2,495	\$10.00	\$24,945
LAKE CREEK	Lake Creek Mouth	954	625	0.3	188	\$10.00	\$1,875
	Upper Lake Creek	17,260	14,046	0.3	4,214	\$10.00	\$42,138
LITTLE SUSITNA	Upper Little Susitna River	1,628	14,470	0.3	4,341	\$10.00	\$43,410
TALKEETNA RIVER	Lower Talkeetna River	2,099	12,670	0.3	3,801	\$10.00	\$38,010
TOTALS		57,681	62,408		18,722		\$187,224

VOLUME & VALUE - WHITE SPRUCE

River	Stretch	Forest	Volume (cunits)	MBF/Cunit	Volume (MBF)	Stumpage	Value
ALEXANDER CK.	Upper Alexander Creek	4,503	13,437	0.3	4,031	\$15.00	\$60,467
	Alexander Lake	823	2,612	0.3	784	\$15.00	\$11,754
	Sucker Creek	728	2,322	0.3	697	\$15.00	\$10,449
DESHKA RIVER	Neil Lake	1,580	4,392	0.3	1,318	\$15.00	\$19,764
	The Forks	1,976	6,047	0.3	1,814	\$15.00	\$27,212
	Kroto Creek	13,982	52,506	0.3	15,752	\$15.00	\$236,277
LAKE CREEK	Moose Creek	12,148	35,803	0.3	10,741	\$15.00	\$161,114
	Lake Creek Mouth	954	3,043	0.3	913	\$15.00	\$13,694
	Upper Lake Creek	17,260	46,301	0.3	13,890	\$15.00	\$208,355
LITTLE SUSITNA	Upper Little Susitna River	1,628	2,003	0.3	601	\$15.00	\$9,014
TALKEETNA RIVER	Lower Talkeetna	2,099	2,049	0.3	615	\$15.00	\$9,221
TOTALS		57,681	170,515		51,155		\$767,318

PAPER BIRCH

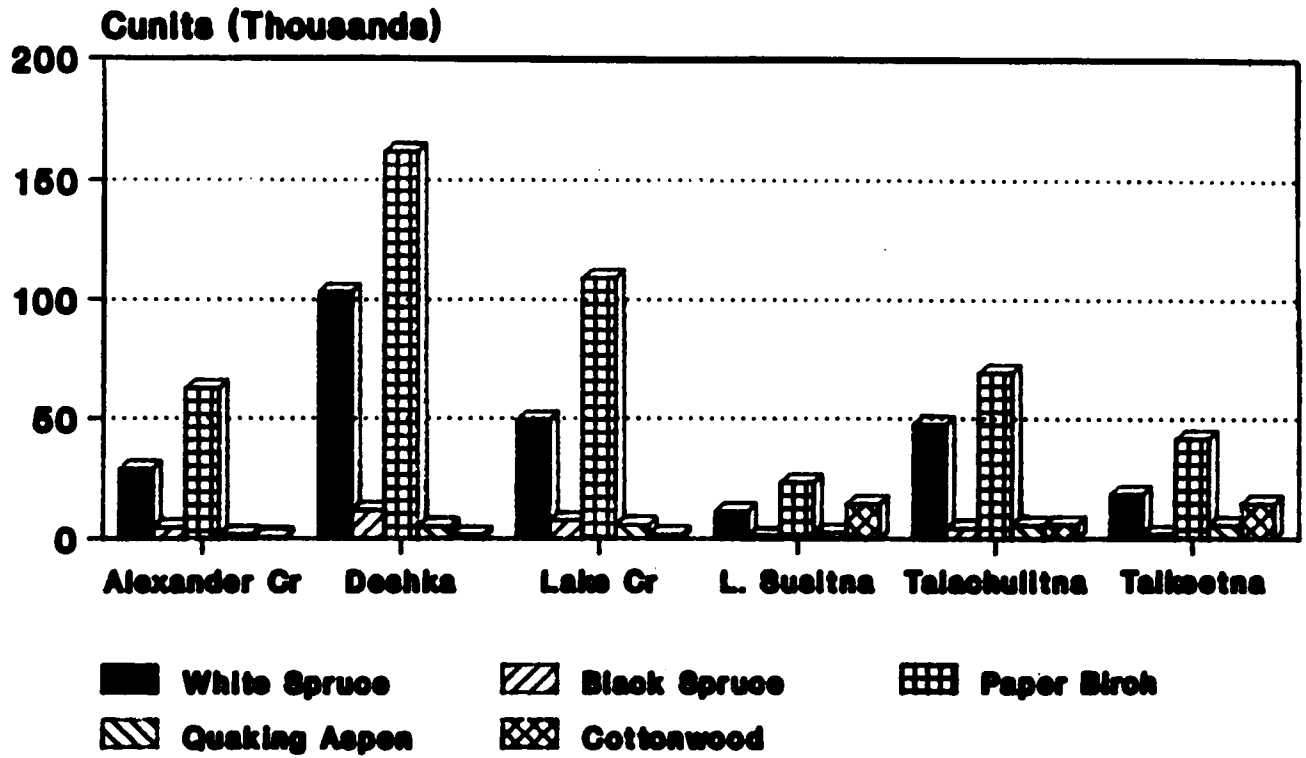
RIVER	Stretch	Forest	Vol. (cunits)	MBF/Cunit	Volume (MBF)	Stumpage	Value
ALEXANDER CK.	Upper Alexander Creek	4,503	30,220	0.3	9,066	\$21.00	\$190,386
	Alexander Lake	823	5,666	0.3	1,700	\$21.00	\$35,696
	Sucker Creek	728	5,023	0.3	1,507	\$21.00	\$31,645
DESHKA RIVER	Neil Lake	1,580	9,967	0.3	2,990	\$21.00	\$62,792
	The Forks	1,976	13,399	0.3	4,020	\$21.00	\$84,414
	Kroto Creek	13,982	48,189	0.3	14,457	\$21.00	\$303,591
LAKE CREEK	Moose Creek	12,148	79,089	0.3	23,727	\$21.00	\$498,261
	Lake Creek Mouth	954	6,583	0.3	1,975	\$21.00	\$41,473
	Upper Lake Creek	17,260	102,516	0.3	30,755	\$21.00	\$645,851
LITTLE SUSITNA	Upper Little Susitna River	1,628	4,466	0.3	1,340	\$21.00	\$28,136
TALKEETNA RIVER	Lower Talkeetna River	2,099	3,963	0.3	1,189	\$21.00	\$24,967
TOTALS		57,681	309,081		92,724		\$1,947,210

BIOLOGICAL ANNUAL ALLOWABLE CUT

RIVER	SPECIES	FOREST	VOLUME (MBF)	ROTATION	BAAC (MMBF)
ALEXANDER CK.	White Spruce		5,512	120	0.05
	Paper Birch		12,273	80	0.15
	Other		19,111	60	0.32
	ALL	6,054	36,896		
DESHKA RIVER	White Spruce		29,625	120	0.25
	Paper Birch		45,194	80	0.56
	Other		79,669	60	1.33
	ALL	29,686	154,488		
LAKE CREEK	White Spruce		14,803	120	0.12
	Paper Birch		32,730	80	0.41
	Other		51,934	60	0.87
	ALL	18,214	99,467		
LITTLE SUSITNA	White Spruce		601	120	0.01
	Paper Birch		1,340	80	0.02
	Other		6,282	60	0.10
	ALL	1,628	8,223		
TALKEETNA RIVER	White Spruce		615	120	0.01
	Paper Birch		1,189	80	0.01
	Other		5,605	60	0.09
	ALL	2,099	7,409		
TOTALS		57,681	306,483		4.30

RECREATION RIVERS

NET VOLUME



State owned

LITTLE SUSITNA RIVER

VOLUME & ACRES BY STRETCH

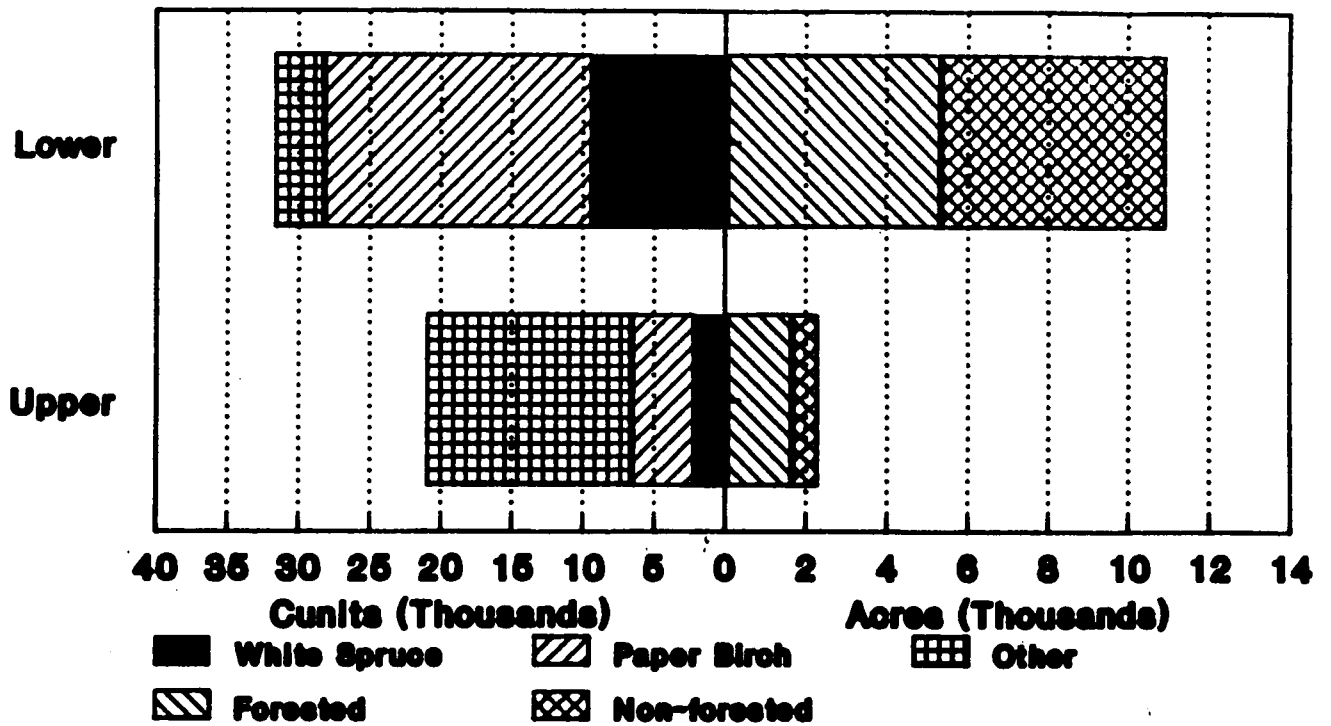
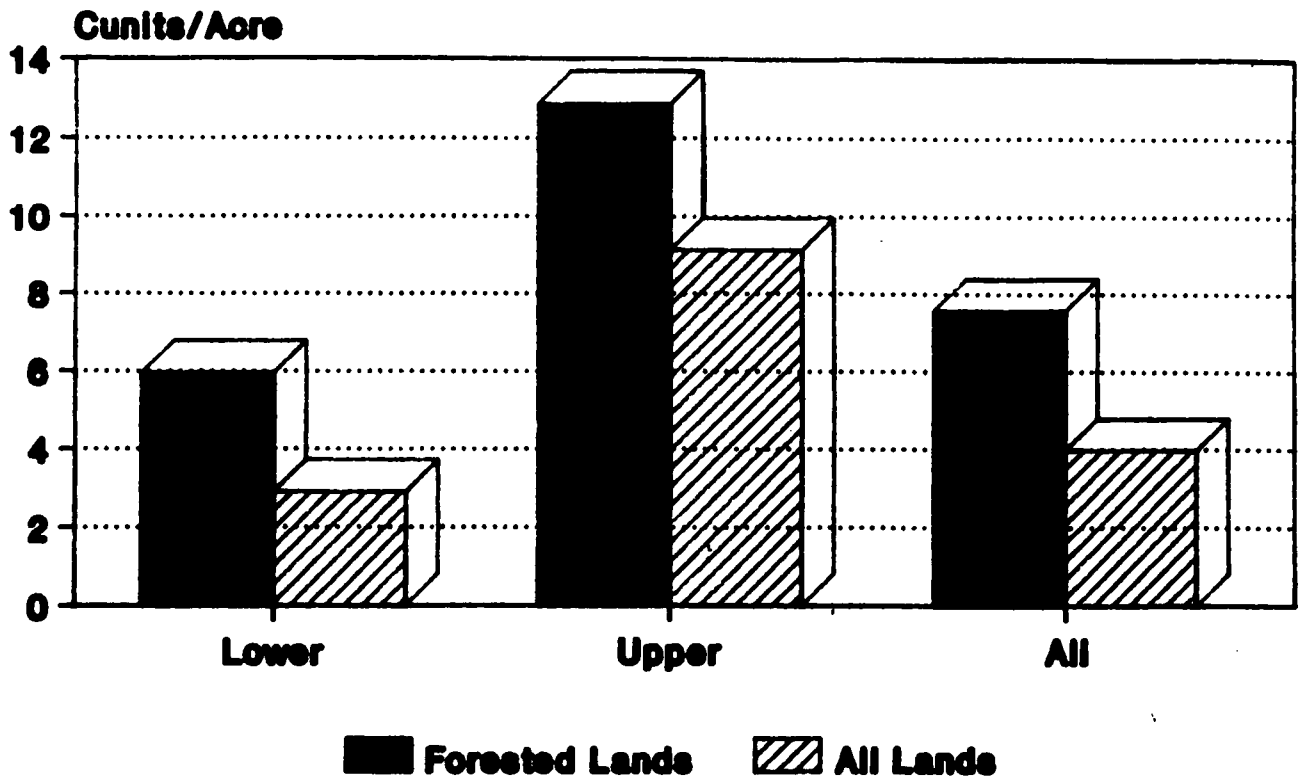


Chart 4

LITTLE SUSITNA RIVER

VOLUME PER ACRE



State Owned

DESHKA RIVER

VOLUME & ACRES BY STRETCH

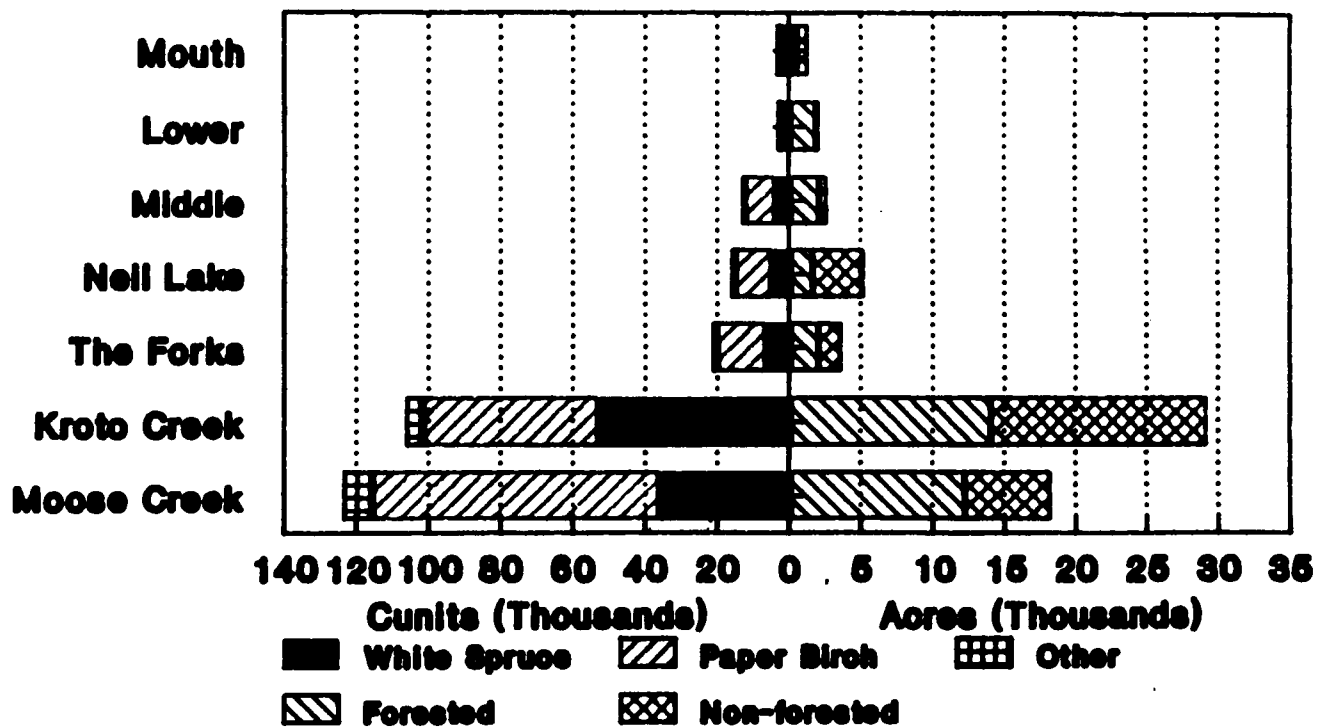
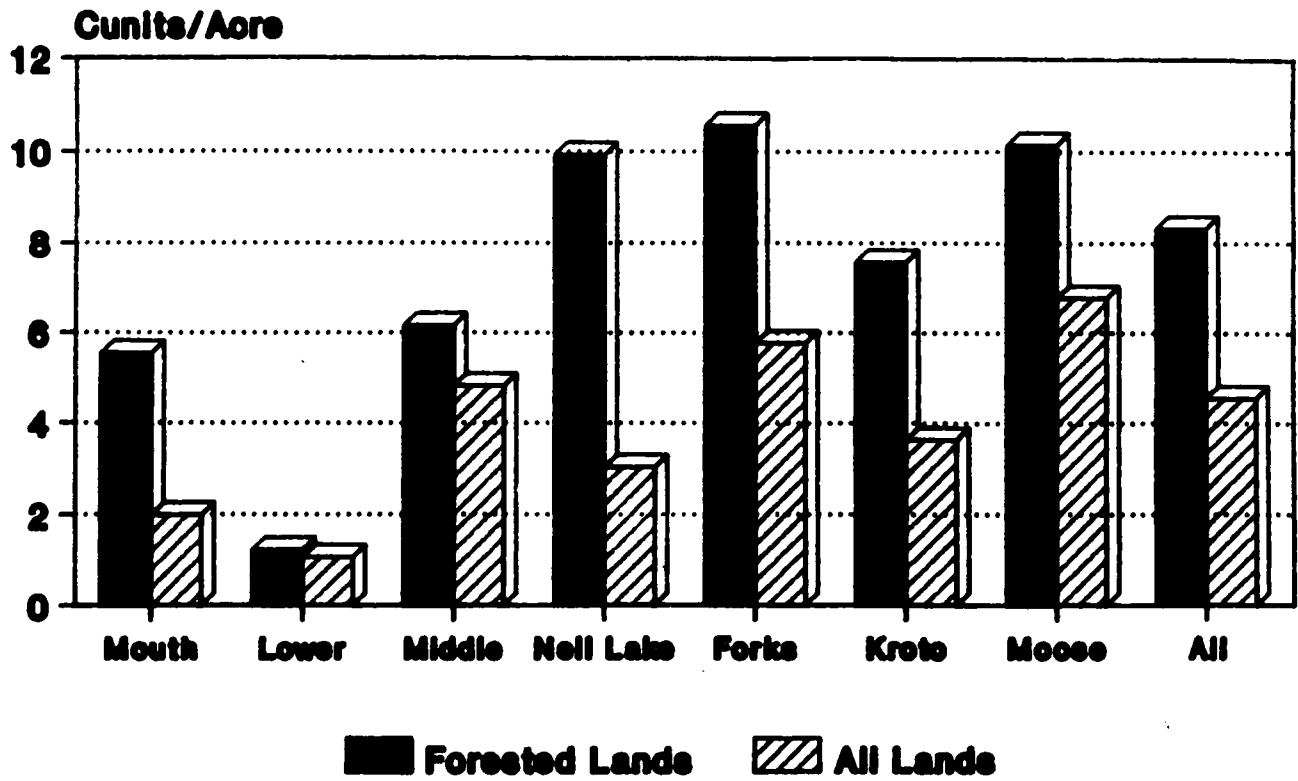


Chart 2

DESHKA RIVER

VOLUME PER ACRE



State Owned

TALKEETNA RIVER

VOLUME & ACRES BY STRETCH

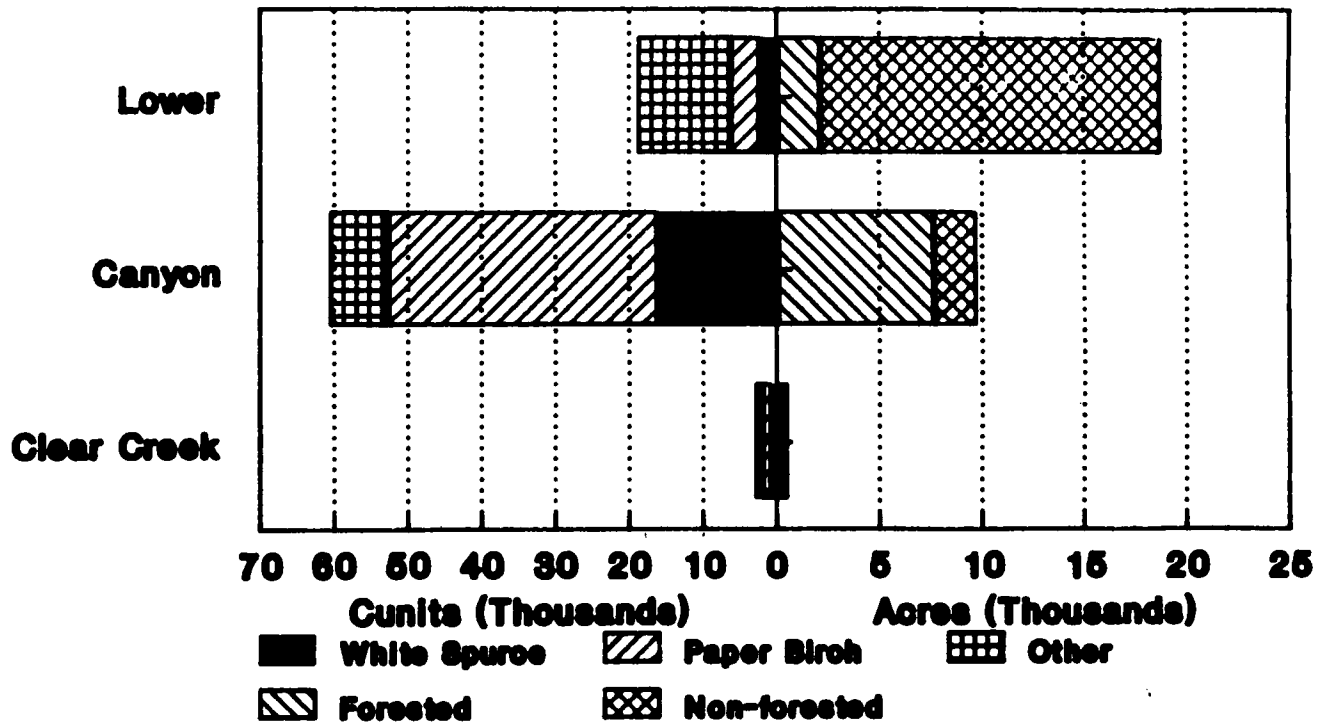
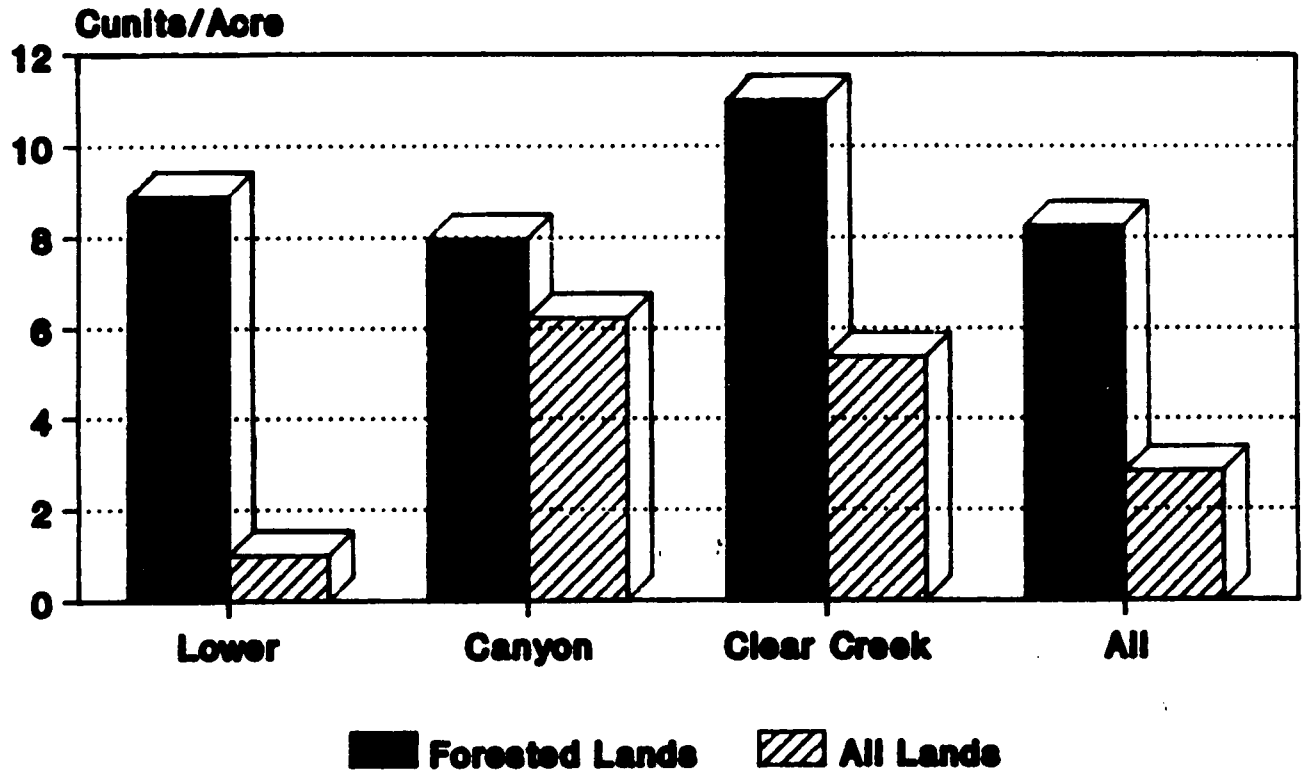


Chart 6

TALKEETNA RIVER

VOLUME PER ACRE



State Owned

LAKE CREEK

VOLUME & ACRES BY STRETCH

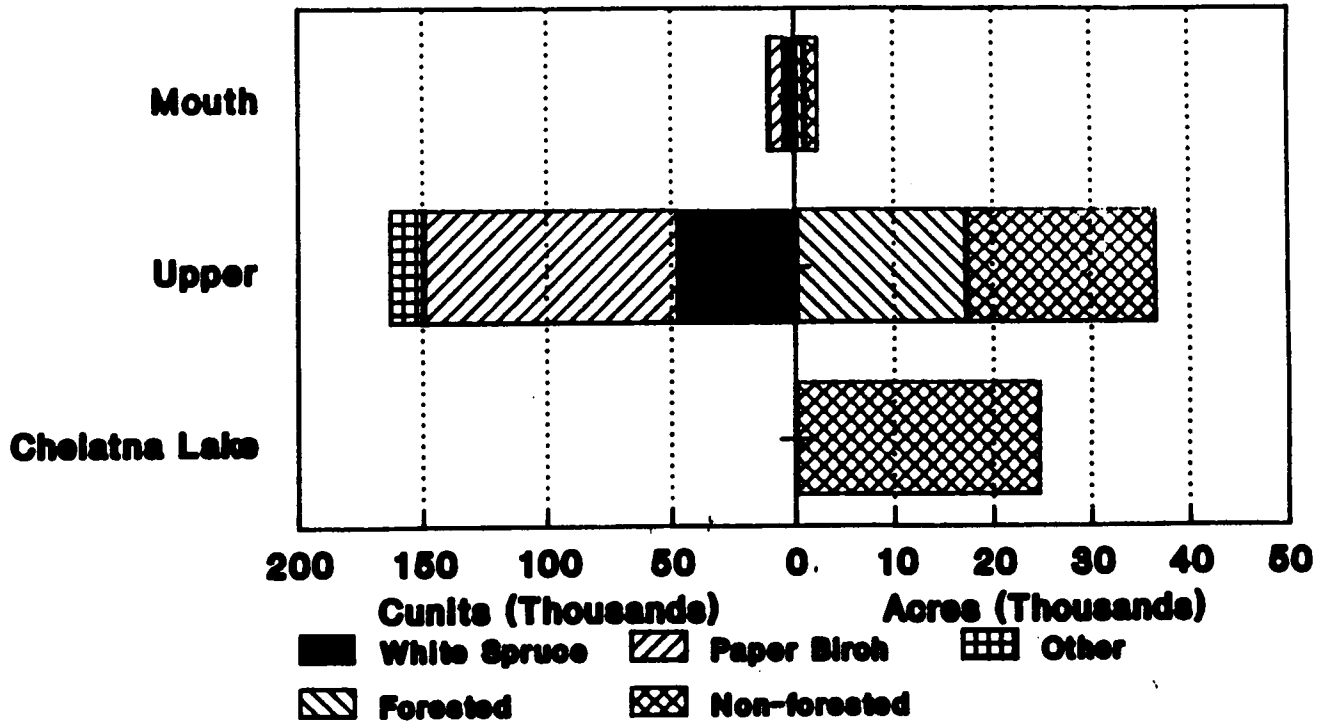
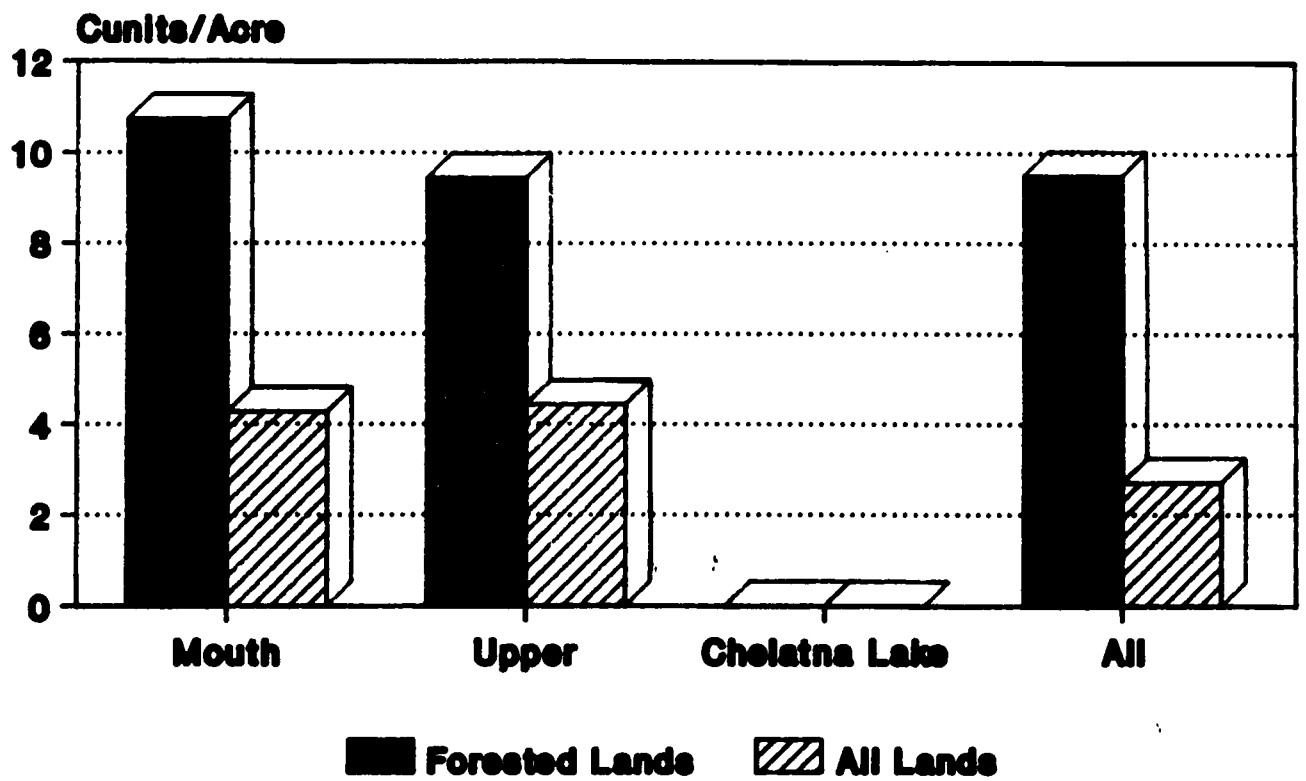


Chart 3

LAKE CREEK

VOLUME PER ACRE



State Owned

TALACHULITNA RIVER

VOLUME & ACRES BY STRETCH

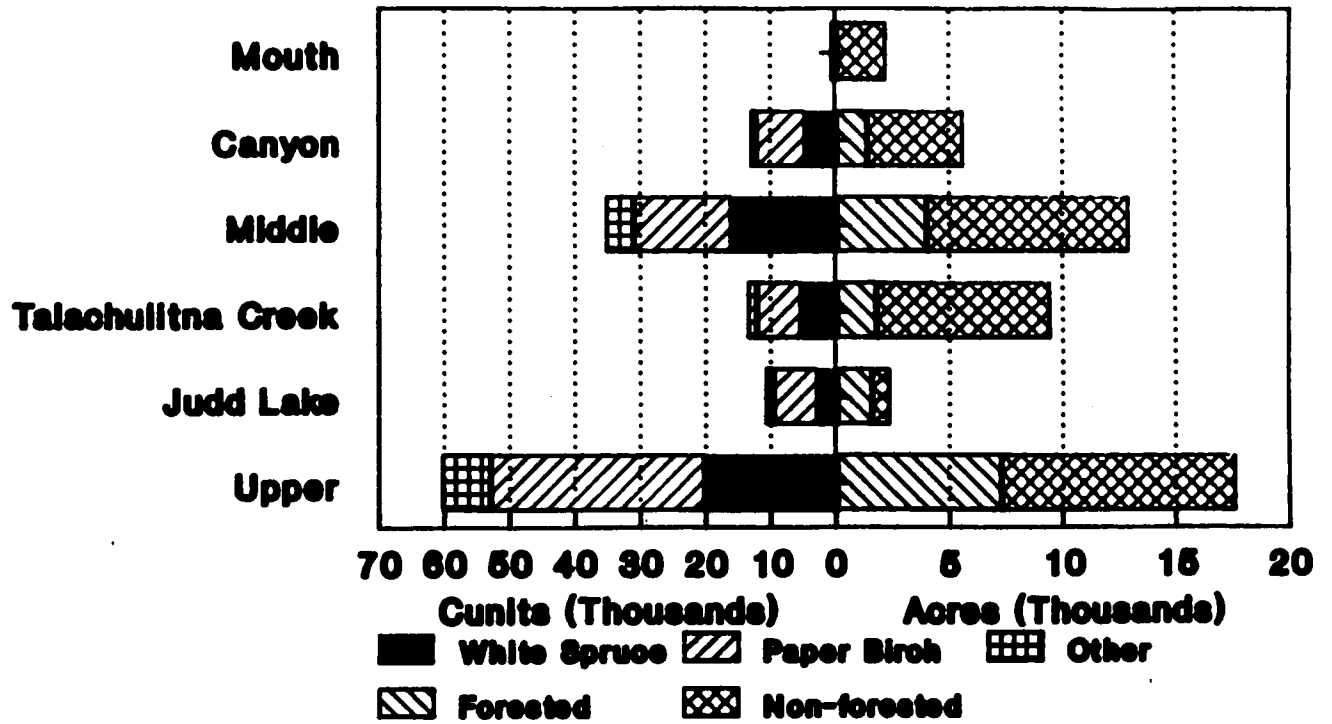
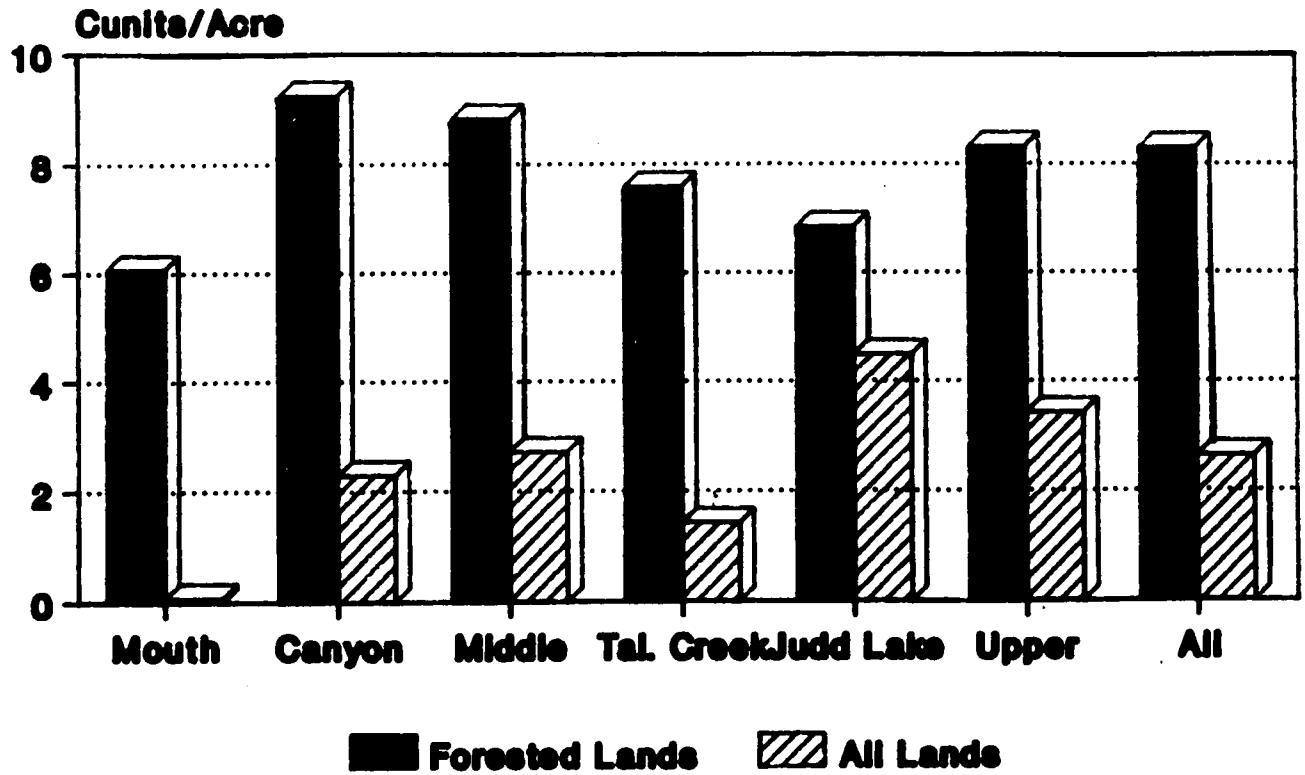


Chart 5

TALACHULITNA RIVER

VOLUME PER ACRE



State Owned

ALEXANDER CREEK

VOLUME & ACRES BY STRETCH

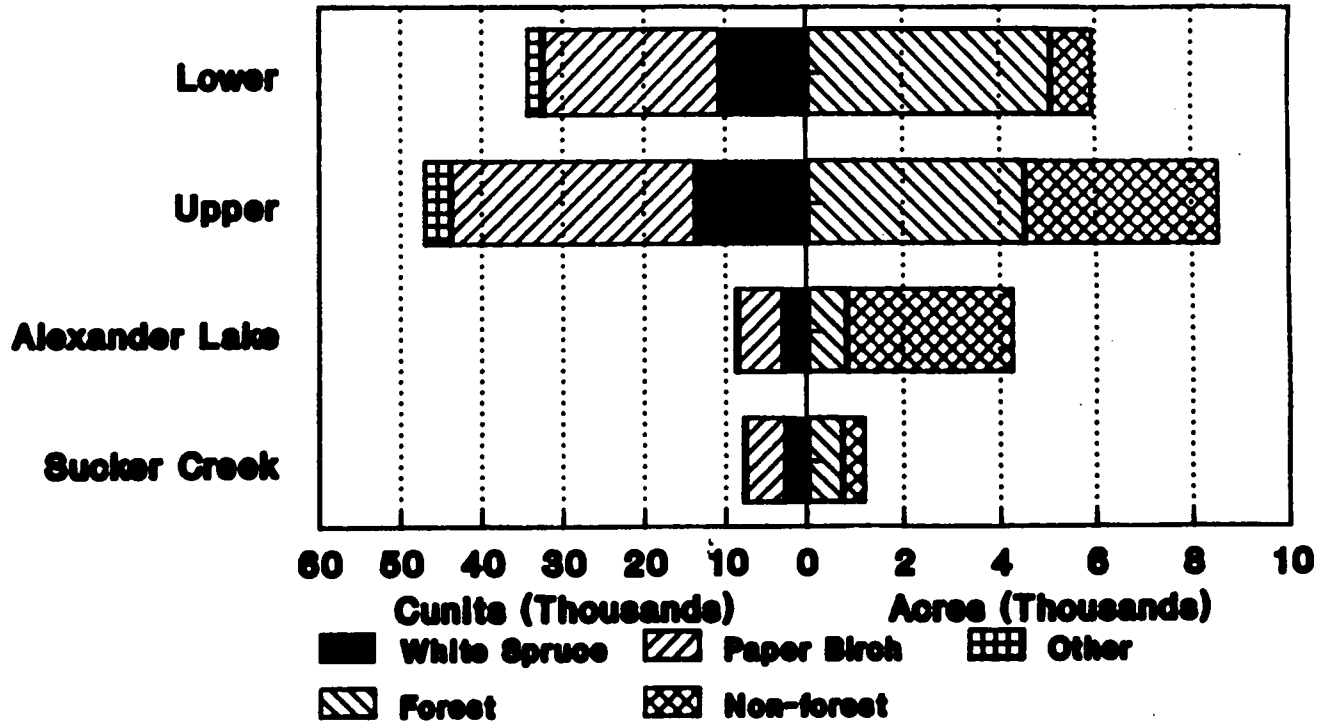
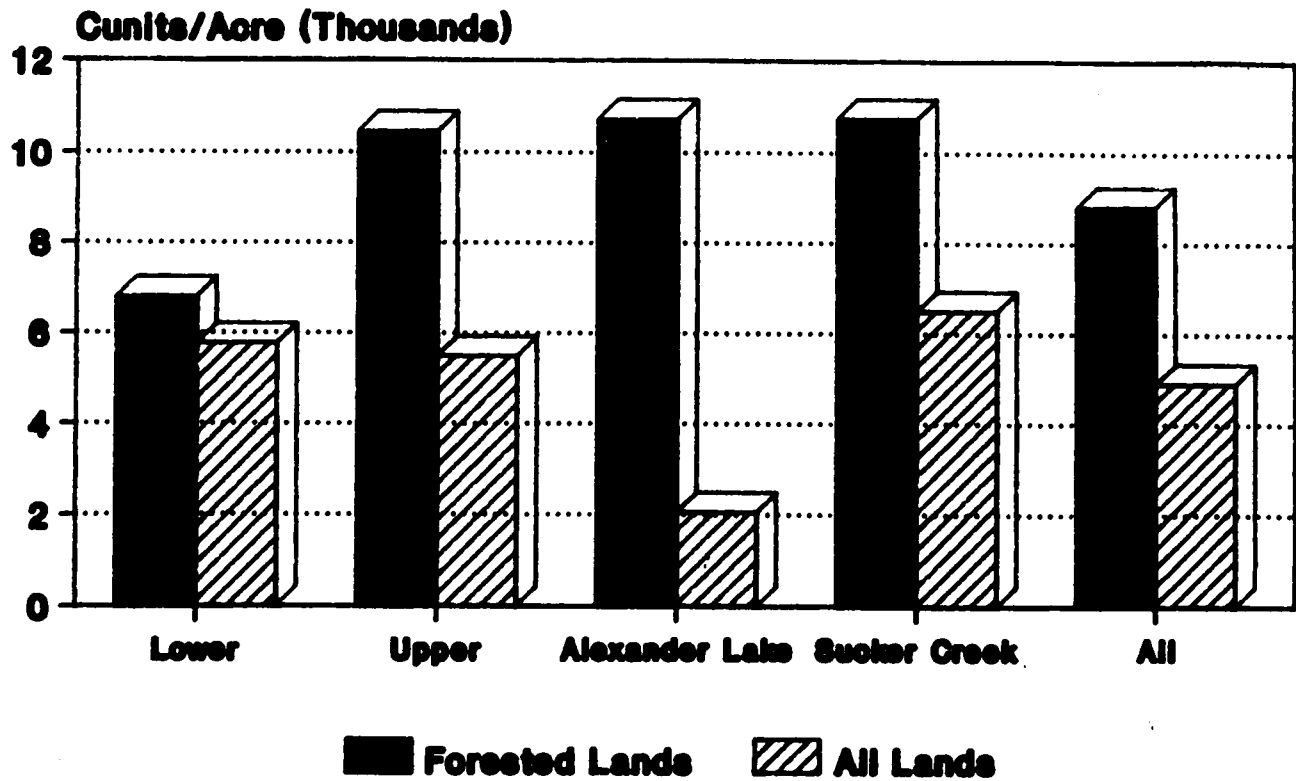


Chart 1

ALEXANDER CREEK

VOLUME PER ACRE



State Owned

CHAPTER 12

HERITAGE RESOURCES

CHAPTER 12 - HERITAGE RESOURCES

Summary of Heritage Use of the Area

Background

The history for human use in the Upper Cook Inlet basin has been fragmentarily documented to have begun an estimated 8,000 to 10,000 years ago. Economic activities developed from the predominate hunting of large terrestrial animals to a combination of hunting and fishing. During the later historic period, natural resource extraction, such as gold mining, was the primary economic activity.

Prehistory

The prehistory for the planning area has been extrapolated from sites and sequences excavated outside the immediate area. The oldest expected remains date from 8,000 to 10,000 years ago. Sites of that time range have been excavated in the upper Susitna drainage and near Anchorage. No sites of that time have been identified in the planning area but can be expected particularly near the higher elevations. Sites from that period contain the stone remains of tools which reflect close ties with Interior and Maritime hunters and gatherers from Siberia and western Alaska.

The second oldest time period is from 8,000 to about 4,000 years ago. That time range is partially represented by remains in the upper Susitna and Talkeetna drainages. Distinctive notched base stone points have been found mainly in the upper elevations. They were related to hunting of large land animals such as caribou and moose.

Artifacts and sites representing the period from 4,000 to 2,500 years ago found along the Cook Inlet coast reflect cultural contacts with people from Kodiak and Bristol Bay. Sites related to coastal cultures elsewhere contain artifacts of ground slate as well as chipped stone projectile points. More interior sites should reflect artifact finds from interior areas such as the upper Susitna River and mountainous areas. Interior related artifacts and sites of this period commonly are hunting camps containing various forms of projectile points. Village locations have not yet been investigated.

The period 2,500 years ago to 1,000 years ago witnessed expansion of coastal cultures from the lower Cook Inlet area and Bristol Bay to include the upper Cook Inlet coastal area. Artifacts including ground slate implements, ground stone oil lamps, stone net weights, and a variety of barbed bone projectile points indicate intensive use of fish and land animals. Major villages were located near good fishing locations with seasonal sites along salmon streams. Interior oriented sites have not yet been investigated.

Evidence has been found which suggests major influences in the Susitna drainage were coming from the Copper River country during the past 1,000 years. Different forms of underground food caches and implements made of copper from the Copper River area have been widely documented. This is the time period during which most of the widely occurring semi-subterranean houses and caches were established. Most of the known prehistoric sites of the planning area date to this time period.

Athapaskan Tanaina Indians were the occupants of the land when the first Europeans led by Captain James Cook arrived in the Upper Cook Inlet region during the summer of 1778. The Tanaina are closely related to other Indian groups found in the interior parts of Alaska and Canada. Their culture and economic lifestyle reflect an interior origin with adaptations to a more maritime environment.

History

The historic period in Upper Cook Inlet began with the appearance of Captain James Cook in May 1778. English explorers, Portlock and Dixon, briefly visited the Tyonek vicinity in 1786. By 1794, when George Vancouver visited the shores of Knik Arm and the Tyonek area, a Russian fort and trading post had been established at Kenai. Russian fur traders traveled in the upper Cook Inlet area from Kenai and ultimately established posts near Tyonek, on the lower Susitna River, and on Knik Arm.

Russia sold Alaska to the United States in 1867. Sale of Russian American Company holdings to American owners accompanied the territorial change. Successors of the Russian American Company included, at a later time, the Alaska Commercial Company, which had stores at Knik, Tyonek, and Susitna. Stores at those locations provided focal points for Native activities during the latter part of the 19th and early 20th centuries. Additional stores were established at the mouth of Beluga River and at Talkeetna during the early 20th Century. Government explorations during 1898 by Spurr along the Susitna, Yentna, and Skwentna Rivers and Eldridge up the main Susitna River documented the Susitna basin for the federal government for the first time.

The first decade of the 20th Century witnessed an influx of gold miners who concentrated their efforts near the headwaters of Lake Creek, Cache Creek, and Peters Creek. Cache Creek was the main focus of activity and access to the mining area was improved by a road built from McDougal, on Yentna River, to Cache Creek. By 1922, construction of the Alaska Railroad and road access from Talkeetna to the Cache Creek/Peters Creek area prompted the government to cease maintenance of the trails from McDougal to Cache Creek.

Establishment of the Iditarod Trail up Yentna River, past Skwentna, and through Rainy Pass was the other significant trail building activity in the western part of the study area. Trail development began in 1910 and remained the active route to the Kuskokwim drainage for the next 20 years. Other trails, such as that from Tyonek to Skwentna which was followed by Brooks during his geologic explorations in 1902, crossed the study area but remained undeveloped for travel with heavy loads.

Summary of Known, Reported, and Potential Sites

Traditional, Native, activities which are noted by informants to have taken place in this region include fishing, trapping, bear hunting, birch bark gathering, trade, and travel. While resource availability and procurement would most often be the primary consideration in choice of site location, defensive or concealed locations were sometimes selected. Preferred village, camp, and activity sites would have been at the confluences of streams with significant anadromous fish runs (especially at the confluence of clear tributaries with turbid streams and rivers), at the outlets of lakes with significant resident and anadromous fish populations, at good fishing locations on lake shores and stream banks, on relict stream and lake terraces, on prominent hills, ridges, and overlooks, in areas of particular game concentrations, near margins of wetland areas, and along natural travel ways (waterways, portages, and passes). Additional factors of consideration would have been level ground, good drainage, an adequate supply of firewood, and the presence of fresh water. Many of these factors are the same factors which would be used to make recreation decisions today. Evidence of past Native activities would include villages, camps, storage areas, caribou fences, hunting blinds, fish traps and weirs, lithic scatters, and trails.

Historic Euroamerican (and Euroamerican-inspired Native) activities in this region included exploration, mining, trapping, and trading. Evidence of these activities, which did not become significant until the

1890s, would include bridges, barns, roadhouses, cabins, camps, old airfields, and trails.

Summary of Management Guidelines

Procedures to be followed for activities proposed along various segments of the Susitna Basin Recreation Rivers should be addressed according to the potential for encountering sites in the segment. The utility of assigning areas archaeological potential is to guide planners and managers about procedures to follow in some activities and to allow adequate time in budgeting for necessary archaeological activities.

Probability assignments cover very large areas which contain smaller areas of varying potential. Therefore review by knowledgeable OHA staff is necessary at some stage of project planning or permitting. Generally, a high probability of site occurrence means that any activities in the segment should be reviewed at an early concept level for conflicts with cultural resources and should continue to be reviewed as plans become more specific. Moderate potential should trigger review by OHA staff at a point when planning defines what areas in a segment are suitable for a type of activity. These two levels of site potential, high and moderate, will generally require some field examination. Low potential segments need to be reviewed by OHA staff after specific activity localities and alternate sites are selected.

HERITAGE SITE POTENTIAL BY SUBUNIT

River Corridor Management Units and Subunits

Estimated Site Potential

Little Susitna River

- | | |
|-------------------------------|----------------|
| 1. Lower Little Susitna River | High Potential |
| 2. Upper Little Susitna River | High Potential |

Deshka River (Kroto Creek-Moose Creek)

- | | |
|--------------------------|--------------------|
| 1. Mouth of Deshka River | High Potential |
| 2. Lower Deshka River | High Potential |
| 3. Middle Deshka River | High Potential |
| 4. Neil Lake | Moderate Potential |
| 5. The Forks | Moderate Potential |
| 6. Kroto Creek | Lower Potential |
| 7. Moose Creek | Lower Potential |

Talkeetna River

- | | |
|---------------------------|--------------------|
| 1. Lower Talkeetna River | High Potential |
| 2. Talkeetna Canyon | Moderate Potential |
| 3. Clear (Chunilna) Creek | High Potential |

Lake Creek

- | | |
|----------------------|----------------|
| 1. Lake Creek Mouth | High Potential |
| 2. Middle Lake Creek | High Potential |
| 3. Chelatna Lake | High Potential |

Talachulitna River

- | | |
|--------------------------------|--------------------|
| 1. Mouth of Talachulitna River | High Potential |
| 2. Talachulitna River Canyon | Moderate Potential |
| 3. Middle Talachulitna River | High Potential |
| 4. Talachulitna Creek | High Potential |
| 5. Judd Lake | High Potential |
| 6. Upper Talachulitna River | Moderate Potential |

Alexander Creek

- | | |
|--------------------------|--------------------|
| 1. Lower Alexander Creek | High Potential |
| 2. Upper Alexander Creek | High Potential |
| 3. Alexander Lake | High Potential |
| 4. Sucker Creek | Moderate Potential |

High potential = Known sites, reported but unverified sites, and/or a relatively high probability that cultural resources are present in the subunit.

Moderate potential = There is a reasonable expectation that cultural resources may be present in the subunit, but the area is archaeologically unknown and sites are probably not in high concentrations.

Lower potential = Subunit is less likely to contain significant cultural resources, and, while cultural resources may be present, they are likely to be in lower concentrations.

HERITAGE RESOURCES BY SUBUNIT

LITTLE SUSITNA RIVER

Heritage Use of the Area

Traditional, Native, activities which are noted by informants to have taken place in this area include fishing, trapping, bear hunting, caribou hunting in the adjacent hills, birch bark gathering, and travel. Early historic, Euroamerican, use of the area, for the most part, related to travel along the Iditarod Trail, which passed along the southern boundary of the management unit, and perhaps some mining activity near its northern boundary.

Summary of Known, Reported, and Potential Sites

1. Lower Little Susitna River TYO B1/C1 High Potential

TYO-017 The Little Susitna Roadhouse was located on the Iditarod Trail, some 14 miles out of Knik. Also known as the Halfway Roadhouse, it was operated for many years by Lee and Grace Exelson after they left the Happy River Roadhouse (TYO-023). The structure may have been washed away by the river.

TYO-084 The Iditarod Trail was the winter route used to transport mail and supplies from Seward to Nome (via Iditarod) during the early mining period. Although in use earlier, the trail was surveyed and blazed by the Alaska Road Commission during the 1900s. The trail actually consisted of a number of alternate and connecting trails in use since the 1880s in the case of mining, but also during the Russian period and, presumably, prehistorically. After completion of the Alaska Railroad in 1923, portions of the trail fell into disuse. The designated route of the "Iditarod National Historic Trail" is somewhat arbitrary.

ANC-245 Several cache pits were noted here on the terrace above the creek mouth. Limited testing did not reveal any subsurface remains.

ANC-085 The Little Susitna railroad bridge consists of one 80' through-girder that was fabricated by the American Bridge Company and was erected during construction of the Alaska Railroad.

An informant reported that many small lakes in the Nancy Lake area were used by the Tanaina Athapaskans. He had used the general area for trapping and noted that the ridge south of Cow Lake was noted for its good birch bark and was also part of an intersecting trail system. A number of known prehistoric and historic sites (cabin, cache pit, and cemetery areas) on lakes and streams in the general vicinity of this subunit attest to the relatively heavy Native use of this area.

2. Upper Little Susitna River ANC C6/C7/C8 High Potential

ANC-012 Reported location of two lithic scrapers and one flake that were found during construction of a silo. Reportedly the site area was completely dozed over in 1972.

ANC-123 Although the Willow Creek Mining District is normally associated with the Willow Creek, Fishhook Creek, Craigie Creek, and Archangel Creek drainages, the headwaters of Little Susitna River are within the general boundary of the district. By 1898, placer gold claims had been staked in the district and by 1910 over 60 lode mining claims were present.

DESHKA RIVER (KROTO CREEK-MOOSE CREEK)

Heritage Use of the Area

Informants report that the lower section of Kroto Creek (Deshka River) was heavily utilized, with winter houses on the bluffs, fish camps along the stream, and many graves scattered along its length. Activities that reportedly took place in this general area included fishing, trapping, hunting, gathering, and travel. Known historic use of the area included the Talkeetna to Cache Creek Road, which crossed the headwaters of this drainage.

Summary of Known, Reported, and Potential Sites

1. Mouth of Deshka River TYO C1 High Potential

TYO-001 Kroto is the site of a former Tanaina Indian village first reported by Robert Muldrow (Eldridge, G.H. 1900:map 3), USGS. Several site loci, consisting of cache pits and large amounts of fire cracked rock eroding from the bank, have been reported along the bluff. It was additionally reported that "further upstream there are three old cabin remains with pits nearby."

TYO-078 This site consists of 8-10 small pits, about 1m in diameter, located on the west bluff.

TYO-079 This site consists of one large house pit (measuring 12m x 7m overall) and seven small pits (1-2m in diameter).

In addition to archaeologically and historically known sites, informants reported butchering sites, gathering areas, fish trap and fence and set net sites, and smokehouse locations.

2. Lower Deshka River TYO C1/D1 High Potential

TYO-077 This site consists of three large apparent house pits, about 10m x 10m in size. One of the pits is very well defined.

TYO-051 Located adjacent to a natural spring and a modern campsite, this site consists of one large depression, measuring 4.5m x 4.3m with a tunnel entrance, and four small depressions measuring 1.5-2m in diameter.

TYO-074 This site consists of five depressions located near a modern campsite. The largest pit measures 5.1m x 5m and has a 12" in diameter tree growing in its center. The smaller depressions measure approximately 1-2m in diameter.

TYO-075 This site consists of 25, 1-2m in diameter depressions on a ridge running

east-west, perpendicular to the river.

TYO-082 This site consists of approximately eight 1m in diameter pits near the river's edge and south of a small tributary. [This site may be related to TYO-009.]

TYO-009 Three house pits are reportedly located here. One house pit is being eroded by the stream and being potted by fisherman from a nearby camping area. The features vary from distinct to indistinct, are rectangular with smaller attached rooms, and measure about 6m x 7m in size and .2m to 1m in depth. A trade bead was found in the house pit in the best condition.

TYO-036 Five house pits and over 150 cache pits were located along a 1/2 mile long bluff, from the bluff edge to 100m back. The house pits measure approximately 5m x 6m x 1m deep. The cache pits, which measure from 1.5m to 2m across and 1m deep, are frequently arranged in pairs and multiple pairs, including one consisting of 10 pits arranged in five pairs in a row.

TYO-076 This site is located on either side of a draw, apparently cut by a spring-fed creek. Thirteen scattered depressions line the north side and 20 depressions are located on the south side.

TYO-080 This site consists of eight large house pits and 19 small pits scattered along the bluff, 4-30m from its edge. Two of the large depressions exceed 10m x 10m in size. Six of the smaller depressions appear "trench-like," measuring 3m x 1m. A test near the wall of one of the house pits revealed decaying logs at a depth of 55cm below ground surface.

TYO-081 This site consists of one 3m x 3m x .5m deep depression and 16 small (1-2m in diameter) depressions spaced .5-1.5m apart and extending in an east-west line approximately 50m from the edge of a high bluff.

TYO-012 About 200 cache pits are reportedly located along 1/2 mile of a ridge. Some measure 2m x 6m and 1-1.5m deep, most are 1.5m x 1.5m to 2m x 3m in size.

In addition to archaeologically known sites, various informants reported sites, cemetery areas, and fishing locales along this subunit.

- | | | |
|----|---|---------------------------|
| 3. | Middle Deshka River TYO D1/D2 | <u>High Potential</u> |
| | Informants reported a site along the river and a defensive village and cache site located on a hill back from the stream. | |
| 4. | Neil Lake TYO D1/D2 | <u>Moderate Potential</u> |
| 5. | The Forks TYO D1/D2 | <u>Moderate Potential</u> |
| 6. | Kroto Creek TAL A1/A2/B2 | <u>Lower Potential</u> |

Kroto Creek is crossed by the Alaska Road Commission's Petersville (Talkeetna to Cache Creek) Road (circa 1918-1920s).

7. Moose Creek TAL A1/B1 Lower Potential

Moose Creek Camp was the circa 1920s Alaska Road Commission camp on the Petersville Road.

TALKEETNA RIVER

Heritage Use of the Area

Aboriginal use of this focused on caribou hunting, fishing, and travel. Historically, the impact of the construction of the Alaska Railroad was significant.

Summary of Known, Reported, and Potential Sites

1. Lower Talkeetna River TAL B1; TLM B6 High Potential

TAL-015 The Talkeetna River railroad bridge was fabricated by American Bridge Company and erected over Talkeetna River during construction of the Alaska Railroad.

The historic town of Talkeetna was probably established by 1910, when the Alaska Commercial Company established steamer service to the trading post located there, perhaps on or across from the site of an earlier Tanaina settlement. The town was an important headquarters during the 1915-1923 construction of the Alaska Railroad.

2. Talkeetna Canyon TLM B5/C5 Moderate Potential

An historic source reported that several settlements were located in the upper reaches of Talkeetna River, apparently in the general region of Stephan Lake, but their exact locations are unknown.

3. Clear (Chunilna) Creek TAL B1; TLM B6 High Potential

Sources report that the mouth of Chunilna Creek was a main summer camp of a Mountain People family, which maintained a fish fence and trap and a smokehouse there. The locality was reportedly used for a base for caribou hunting. In 1900 it was noted that the spot was a favorite rendezvous, with a cache and many frames for stretching skins.

LAKE CREEK

Heritage Use of the Area

Aboriginal activity in the area primarily centered on fishing, caribou hunting, and travel. Early historic use related to mining activity, both along Yentna River and in the Cache Creek district.

Summary of Known, Reported, and Potential Sites

1. Lake Creek Mouth TYO D3 High Potential

Although archaeologically unknown, there have been reports of sites on nearby Fish Creek. Remains associated with the historic town of McDougal are located on Yentna River, about 1 mile downstream of the confluence of Lake Creek. Several important trails (both Euroamerican and Native) are reported to have been utilized in the Lake Creek area. One of the historic trails was noted to have ascended the left bank of the creek, from its mouth to the Peters Hills, apparently a portion of the McDougal to Cache Creek wagon trail. The Cache Creek Mining Company enhanced the trail (which was probably used aboriginally) in 1909, building structures at about 15 mile intervals. The trail was abandoned in the early 1920s.

2. Middle Lake Creek TYO D3; TAL A2/A3/B3 High Potential

Camp 1 of the McDougal to Cache Creek Trail was reported to be located opposite the mouth of Yenlo Creek.

3. Chelatna Lake TAL B3/C3/C4 High Potential

TAL-021 Originally a J2F-6 Duck (Navy # BuNo 32769), this aircraft was one of eight transferred to the U.S. Air Force circa 1940s. As an OA-12 Duck (AF Serial # 48-563), while serving with the 10th Air Rescue Squadron out of Elmendorf AFB, it crashed on 25 August 1948. In May of 1949 the Air Force wrote the aircraft off its books.

Reportedly Chelatna Lake was the locale of aboriginal caribou hunting. Associated with the Yentna-Cache Creek Trail, a trapper's/Alaska Road Commission shelter cabin is reported to have been located on the lake and a cable tram crossing of the creek is reported to have been located near the lake's outlet. Some mining activity may also have taken place here.

TALACHULITNA RIVER

Heritage Use of the Area

Informants do not mention much specifically concerning settlements along Talachulitna River, except for Hiline Lake. The general area was used for fishing, large and small mammal hunting, trapping, and travel. Known historic use in the general vicinity included the Iditarod Trail and the Skwentna Roadhouse, which was located on Skwentna River about 4 miles downriver from the mouth of Talachulitna River.

Summary of Known, Reported, and Potential Sites

1. Mouth of Talachulitna River TYO D4 High Potential

TYO-054 Twenty-three depressions, ranging from 3-14' in diameter and up to 5' deep, are located in front of the Silvertip Lodge and at least 20 additional depressions are located approximately 200 yards to the west. Tests in two of the depressions produced no artifacts.
2. Talachulitna River Canyon TYO D4 Moderate Potential
3. Middle Talachulitna River TYO C4/D4 High Potential
4. Talachulitna Creek TYO C4/C5 High Potential

TYO-052 Fifty depressions of a variety of shapes and sizes were located on a 35' bluff on the south bank of Talachulitna Creek, just east of the confluence of the stream locally known as Kelly Creek. The features range from circular to oval to rectangular and from less than 2' in diameter to 15' x 15' in size. No testing was conducted.
5. Judd Lake TYO C5 High Potential

TYO-053 A roughly 12' x 13' x 16" deep depression and five circular to sub-circular depressions, averaging 3' in diameter and 2-3' deep, were located on a grassy bench about 20' above and 150' from the shore of Judd Lake. A test of the larger feature revealed carbonaceous soil, burned bone, fire cracked rock, six waste flakes, and a piece of chipped and ground slate. A test in one of the smaller depressions revealed a fire cracked rock and a waste flake.
6. Upper Talachulitna River TYO B4/C3/C4 Moderate Potential

The general Upper Talachulitna River area was noted for its caribou and bear hunting.

ALEXANDER CREEK

Heritage Use of the Area

Alexander Creek was noted as a major fishing stream, with winter houses located all along it. Its headwaters were also noted as moose range.

Summary of Known, Reported, and Potential Sites

1. Lower Alexander Creek TYO B2/C2 High Potential

The area around the mouth of Alexander Creek was noted to be very rich, with salmon, trout, spruce hen, rabbits, beaver, and berries in abundance. The aboriginal Tanaina of this particular area were reported to be relatively sedentary, the most important historically known site being the village of Alexander (TYO-013), at the mouth of the creek. A heavily used trail reportedly ran from the mouth of Pierce Creek to Mount Susitna.

2. Upper Alexander Creek TYO C2/C3

High Potential

TYO-084 The Iditarod Trail was the winter route used to transport mail and supplies from Seward to Nome (via Iditarod) during the early mining period. Although in use earlier, the trail was surveyed and blazed by the Alaska Road Commission during the 1900s. The trail actually consisted of a number of alternate and connecting trails in use since the 1880s in the case of mining, but also during the Russian period and, presumably, prehistorically. After completion of the Alaska Railroad in 1923, portions of the trail fell into disuse. The designated route of the "Iditarod National Historic Trail" is somewhat arbitrary.

TYO-019 The Alexander Roadhouse, located on the Iditarod Trail, was probably abandoned by 1923 but was shown on a 1923 American Geographical Society map as being halfway between Susitna and the Lakeview Roadhouse. [See also Keller's Roadhouse (TYO-049) and Lakeview Roadhouse (TYO-020) for a great deal of confusion.]

TYO-049 Keller's Roadhouse, located on the Iditarod Trail, was identified by Tom Krause, a long-time resident of Sucker Lake. [See also TYO-019 and TYO-020 for possible confusion or duplication.]

3. Alexander Lake TYO C3/D3

High Potential

An informant has reported that several winter houses were located on Alexander Lake.

4. Sucker Creek TYO C2

Moderate Potential

Sucker Creek was reportedly trapped until the early 1930s. Further upriver, at Sucker Lake, winter houses and fishing areas reportedly existed.

APPENDIX

Background

State and federal laws, regulations, policies, and guidelines protect the historic and prehistoric cultural resources of Alaska from loss, desecration, and destruction. The Department of Natural Resources (DNR) is responsible for administering the Alaska Historic Preservation Act, the primary law guiding management of historic resources on state lands. Within DNR, two divisions share that responsibility - the divisions of Lands and Water Management (DLWM) and Parks and Outdoor Recreation (DPOR). The DPOR Office of History and Archaeology (OHA) reviews state actions and assesses their probable effects on heritage resources. The OHA Survey Section performs archaeological surveys based on recommendations by the DPOR Review Section. The Survey Section also conducts noncompliance cultural resource surveys on state land for inventory and research purposes. This chapter outlines how DNR manages cultural or heritage resources and administers appropriate laws. Expected future management and public uses of these resources are also discussed.

HERITAGE RESOURCE MANAGEMENT

Background

The Alaska Historic Preservation Act (A.S. 41.35) and various federal laws help identify the cultural resources of the state and preserve that information. DPOR reviews state and federal actions that might adversely affect cultural resources and recommends actions to mitigate those effects.

DPOR reviews all state licensed, permitted, or funded actions to determine if there may be adverse effects on cultural resources. The division researches the project location to determine whether a cultural site is known to exist in the area or if there is a high probability that one might occur. DPOR then makes recommendations to prevent damage to the resource or mitigate a projects' adverse effects. These recommendations take several forms. Examples are:

- relocating the project to avoid a cultural resource,
- establishing buffers to screen the project,
- developing an educational program to sensitize workers to the value of the resource, or
- doing a preproject archaeological survey.

Alaska Heritage Resources Survey

The Alaska Heritage Resources Survey (AHRS) is an inventory of all reported historic and prehistoric sites within the State of Alaska. It is maintained by the Office of History and Archaeology, Division of Parks and Outdoor Recreation. This inventory of cultural resources includes objects, structures, buildings, sites, districts, and travel ways, with a general provision that they be over 50 years old. New listings are added to the AHRS when a new cultural site is located during a cultural resource survey or when interested local parties provide new information.

Each site on the AHRS is designated by a trigraph for the quadrangle in which it is located and a unique sequential number within that quadrangle, such as TYO-017 for the 17th site recorded within Tyonek quadrangle. The AHRS consists of maps and documentation of each known site. The maps are USGS

topographic maps at the 1:250,000 and 1:63,360 scales. The site documentation system consists of files that contain basic information on the sites such as location, age (if known), cultural affiliation, bibliographic reference, etc. Sites range in age from thousands of years old to quite recent. An example within the planning area is the Iditarod Trail, a designated National Historic Trail.

Surveys

The DNR Division of Parks and Outdoor Recreation is the state agency responsible for conducting archaeological surveys. This agency conducts cultural resource surveys which are requested and funded by state agencies which undertake a project. If state personnel are not available to do a particular survey, the agency undertaking the project may contract with private sector or university archaeologists to have the work done. These surveys expand the information on known heritage sites and document previously unknown sites.

Cultural resource investigation is an ongoing process all over the state. In addition to DPOR archaeologists, university specialists, federal archaeologists, and private contractors conduct surveys. The State of Alaska supports these activities on state land through permits, matching grants, cooperative funding, contractual services, and donation of services. The State Historic Preservation Office (SHPO) has a small yearly grant program for survey and inventory. Grants also are available from the Economic Development Administration, the Community Development Block Grant Program, and the Alaska Historic District Revolving Loan Fund (administered by the state Department of Commerce and Economic Development).

When a cultural resource is discovered through preproject survey, or when a known site is found to be in conflict with a project, it is important to evaluate that site for its significance in terms of its research and preservation potential. At this time there are over 15,000 sites recorded on the AHRS. Very few of them have been evaluated because limited staff and funding do not allow DPOR to thoroughly investigate every site.

Guidelines

The Alaska Historic Preservation Act established some guidelines for evaluating sites on a case-by-case, as-needed basis. Others are found in the National Historic Preservation Act. The federal law is applicable when any federal involvement exists with the project. These guidelines help DPOR evaluate a site for its overall importance to area, regional, and state prehistory or history. For example, if a state project is proposed in a town that started in the Klondike goldrush era, DPOR might recommend that the historic mining resources of the community be evaluated. The town may have been an important economic center for mining since early in this century. After the evaluation, DPOR might recommend mitigating measures to avoid or minimize the project's effects on those resources.

Mitigation

There are other methods for protecting significant historic and prehistoric cultural resources. Depending on the type of project and its location, stipulations can be attached requiring excavation of a cultural site or photographing or drawing the site and its artifacts. Redesigning or relocating the project can avoid all damage to the site. For example, after DPOR reviews proposed land disposals, DLWM may delete identified cultural sites from the disposals. DPOR has recommended archaeological surveys on many disposals and transportation sites to ensure that irreplaceable heritage sites are not sold into private hands.

or destroyed. For example, the Department of Transportation and Public Facilities has surveyed new airport sites prior to construction. Avoiding a cultural site can be cost effective and is often the preferred option for the project manager and the permitting agency.

Cooperative Agreements

Another way to protect sites is to develop cooperative agreements with agencies and groups. These agreements delineate which actions do not require full agency review. Typically, these are actions that have predictable results and little effect on cultural resources. Cooperative agreements can streamline project review and provide guidelines which protect cultural sites that may be affected by a project. They ensure that certain steps will be initiated when a project is undertaken. For example, a cooperative agreement with the USDI Bureau of Land Management (BLM) requires consultation with the SHPO if a BLM survey finds cultural resource sites.

Enforcement

The Alaska Historic Preservation Act is another way of protecting cultural sites on state land. The Act states that it is unlawful to "appropriate, excavate, remove, injure, or destroy, without a permit from the commissioner, any historic, prehistoric or archaeological resources of the state" (Sec. 41.35.200a). It provides for penalties for violations of these prohibitions. This act is difficult to enforce because of the millions of acres each designated peace officer must patrol. In addition, many people do not know the Act exists. Because it is difficult to enforce, many state-managed cultural sites have been damaged or destroyed by unlawful excavation. In remote areas, the state often depends on interested local people to report looting of cultural sites.

CURRENT AND PROJECTED USE AND MANAGEMENT

Current Use

At the present time, the state does not have the funding or staff to actively monitor or manage cultural sites in the planning area on a regular basis. There are only a few locations in Alaska where cultural resources on state lands are intensively managed. These are usually designated state parks, historic parks, or historic sites and are staffed by the Division of Parks and Outdoor Recreation. Other areas receive brief periods of intensive monitoring when major developments are planned (highways, utility corridors, or major facilities) and funds are made available for cultural resource surveys. At present none of the land in the planning area is in the state park system and there are only occasional site specific surveys and/or test excavations initiated in response to proposed development projects. Some cultural resources may be used and maintained by local residents or local governments.

Projected Use

Historic and prehistoric resources may eventually be a major attraction for users of the Susitna Basin Recreation Rivers, but uses of cultural resources in the planning area are unlikely to change substantially in the near future. The long term trends are more speculative. It is reasonable to expect that over the next 20 years there will be some additional university sponsored research or investigations supported by government grants. It is less clear, however, what influence the private sector will have on cultural resources during this time frame. This will be largely dependent on the willingness of local residents to

protect cultural resources from degradation. Interest in using some of these sites for tourism also will determine how sites will be managed. The significance of the cultural resources within the planning area is not widely known outside the region. Nevertheless, it is conceivable that one day these sites will be recognized by the general public as having statewide and even national significance. This could result if either current or future research on the area is widely circulated by media or, in a more likely scenario, a promotion program is undertaken by local communities or business interests.

State lands are not likely to attract tourists to the area primarily to visit cultural sites. Nonetheless, there may be some peripheral use which is secondary to recreation, sport hunting and fishing, or homesteading.

This publication was released by the Department of Natural Resources, produced at a cost of \$19.82 per copy, and printed in Anchorage, Alaska for the purpose of providing the Legislature and the public an opportunity to review the contents of the Resource Assessment of the Susitna Basin Recreation Rivers Management Plan.