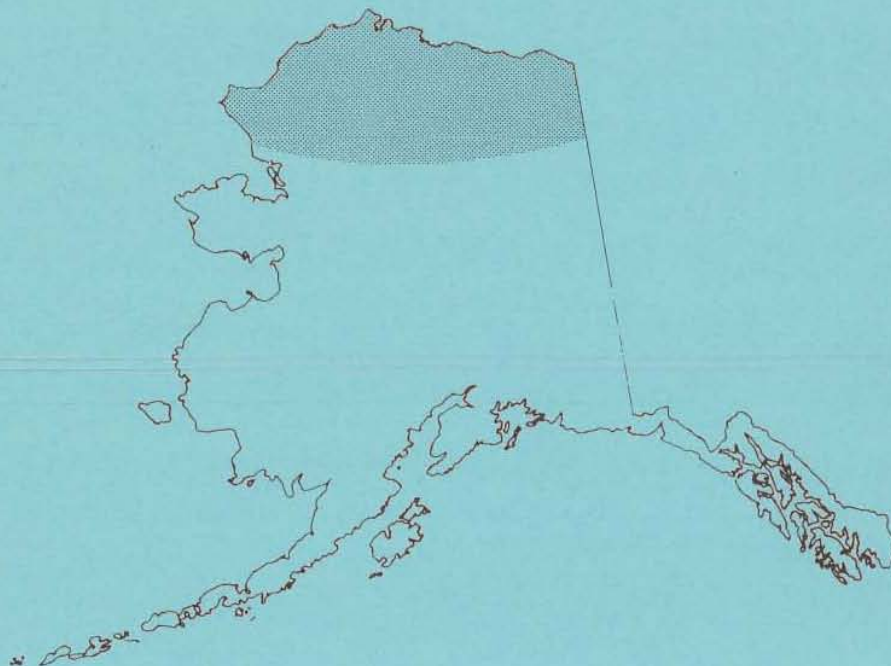


★ **Special Publication**

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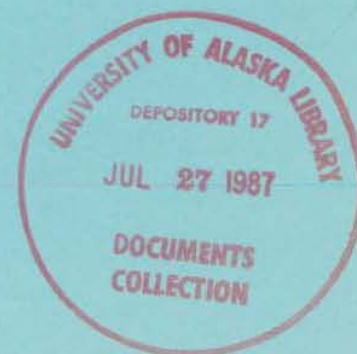
Northern ALASKA



Availability of Land for Mineral Exploration and Development in Northern Alaska, 1986



UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF MINES



Special Publication

**Availability of Land for Mineral
Exploration and Development in
Northern Alaska, 1986**

By Kenneth M. Maas



UNITED STATES DEPARTMENT OF THE INTERIOR

Donald Paul Hodel, Secretary

BUREAU OF MINES

Robert C. Horton, Director

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environment and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

Library of Congress Cataloging-in-Publication Data

Maas, Kenneth M.

Availability of land for mineral exploration and development in northern Alaska, 1986.

(Bureau of Mines special report)

Bibliography: p. 13

Supt. of Docs. no.: I 28.151:Alls/4

1. Mineral lands—Alaska. 2. Mines and mineral resources—Alaska. 3. Mineral industries—Government policy—Alaska. 4. Land use—Government policy—Alaska. I. Title. I. Series.

HD243.A3M32

1987

333.73

86-607920

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ABBREVIATIONS USED IN THIS REPORT

AALRS	Alaska Automated Land Records System
AKMNWR	Alaska Maritime National Wildlife Refuge
ANAA	Alaska Native Allotment Act of 1906
ANCSA	Alaska Native Claims Settlement Act
ANILCA	Alaska National Interest Lands Conservation Act
BIA	Bureau of Indian Affairs, U.S. Department of the Interior
BLM	Bureau of Land Management, U.S. Department of the Interior
DNR	Department of Natural Resources, State of Alaska
EO	Executive order
FWS	Fish and Wildlife Service, U.S. Department of the Interior
IC	Interim conveyance
MAS	Minerals Availability System (U.S. Bureau of Mines)
MCO	Mineral closing order; State land closed to mining by order of the Commissioner, Alaska Department of Natural Resources
MTA	Mineral Terranes of Alaska; 1982
MTP	Master title plat
NANA	Northwest Alaska Native Association
NPRA	National Petroleum Reserve in Alaska
NPS	National Park Service, U.S. Department of the Interior
PLO	Public land order
TA	Tentatively approved
USGS	U.S. Geological Survey, U.S. Department of the Interior

AVAILABILITY OF LAND FOR MINERAL EXPLORATION AND DEVELOPMENT IN NORTHERN ALASKA, 1986

By Kenneth M. Maas¹

ABSTRACT

The Bureau of Mines inventoried the land availability for mineral exploration and development in northern Alaska and compared this land with known mineral terranes and mineral deposits, to quantify the potential for favorable location of mining claims for metalliferous mineral deposits. This report includes thirty-three 1:500,000-scale maps that depict land availability, and the accompanying text and tables relate availability acreage to areas of favorable mineral terranes.

Three categories of land availability and ownership are identified, along with 12 subcategories of land status. Available land comprises approximately 14.5 million acres or 16% of the 90.3-million-acre study area; land available with restrictions accounts for 7.5 million acres or 8%; and unavailable land encompasses 68.3 million acres or 76%. Mineral terranes underlie 37.8 million acres or 42% of the study area; 5.3 million acres or 14% are available for mineral location, 2.8 million acres or 7% are available with restrictions, and 29.7 million acres or 79% are unavailable. There are 500 known mineral deposits or occurrences within the study area. This includes 271 lode deposits, of which 171 lie within a recognized mineral terrane and 55 are on available land. The remaining 229 are placer deposits.

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INTRODUCTION

The Bureau of Mines mission is to help ensure that the United States has an adequate and dependable supply of minerals to meet its defense and economic needs at acceptable social, environmental, energy, and economic costs. To help fulfill this mission, the Bureau is conducting a program for the 11 contiguous States from Montana to New Mexico and west that geographically compares Federal land available for mineral exploration and development with mineral favorability on a State-by-State basis. In Alaska, where a similar study is being made, the scope of the work has been broadened to include all lands: Federal, State, and private.

The need for land availability studies in Alaska was brought about by three major pieces of Federal legislation that divided Alaska's public domain² among three main groups: Federal Government, State government, and Alaska Natives. This legislation includes the Statehood Act, the Alaska Native Claims Settlement Act (ANCSA), and the Alaska National Interest Lands Conservation Act (ANILCA). What was once a territory with 60% of America's public domain is now a State with most of the Nation's national parks, wildlife refuges, and designated wilderness areas. Before statehood, the Federal Government managed nearly 99% of the territory of Alaska (nearly 370 million acres); approximately 80% of this land, or 300 million acres, was open to all forms of appropriation including the location of metalliferous mineral deposits (13).³ The Statehood Act of July 7, 1958 (23), granted Alaska the opportunity to select over 104 million acres of unreserved public domain (including mental health land selections)⁴ upon which to build an economic base. While adjudication of these selections took place, Alaska Natives pursued their claims to vast acreage of traditional aboriginal land. Congress passed ANCSA in December 1971 (22), which provided Alaska Natives with selection rights to nearly 44 million acres of land from the unreserved public domain (including nearly 4 million acres of previously created reservations taken in fee as an alternative to ANCSA participation). A provision of ANCSA directed the Secretary of the Interior to withdraw an additional 80 million acres of land deemed suitable for addition to or creation of national parks, forests, wildlife refuges, and wild and scenic rivers.

ANILCA, which was agreed upon by Congress and signed into law on December 2, 1980 (21), added 104 million acres of land to the Federal conservation system in Alaska. All totaled, nearly 248 million acres of formerly open Federal land have been precluded from mineral entry and location under the Federal mining laws. Some of this land is being reopened for mineral location as State land selections are tentatively approved or patented by the U.S. Bureau of Land Management (BLM); these parcels are legally open to metalliferous location under a State leasing program, unless restricted by statute or agency regulation. However, the total acreage available for mineral exploration and development in Alaska has been severely reduced, and since State and Native selections are still be-

ing adjudicated, updated information on land availability is a useful tool for Federal and State planning agencies, the mineral industry, and the general public.

This report does not provide information about leasable minerals on Federal or State land, as regulations and distribution of land pertaining to leasables are markedly different from those pertaining to locatable minerals (8). Information on leasable minerals can be obtained from the regional BLM or the State of Alaska Department of Natural Resources (DNR) offices in Anchorage or Fairbanks.

OBJECTIVES

This study summarizes land availability and ownership in northern Alaska as of September 1985, and compares land availability with the distribution of mineral terranes and mineral deposits in the study area. The information is presented on 33 U.S. Geological Survey (USGS) 1:250,000-scale quadrangle maps, which have been reduced to 1:500,000 scale and are included in appendix B. Figure 1 shows the quadrangles in the study area. The illustrations, maps, and tables included in this report identify the areas of northern Alaska where mineral location is possible and where favorable terrane exists, so that prospecting efforts may be enhanced and refined.

PREVIOUS STUDIES

The report prepared by the Public Land Law Review Commission in 1970 (18) was the first comprehensive study of Federal land in Alaska. The commission recommended that impediments to State selection be removed and that Federal land management agencies identify all land warranting retention by the Federal Government.

The Joint Federal-State Land Use Planning Commission, created by section 17 of ANCSA, made recommendations about areas proposed for inclusion in Federal parks, game refuges, and other public uses. C.C. Hawley prepared a report for the commission in 1973 that reviewed mineral belts and districts statewide and identified the problem of mineral intensive areas that were being withdrawn from mineral entry (10). The commission's final report, released in 1977, broadly reviewed the mineral potential for the entire State and made recommendations for use in policy decisions by the Federal and State Governments (12). In 1978, the Bureau provided the commission with a summary of available data on the mineral and fuel potential of Alaska (5).

Another study, performed in 1978 by Metz, determined the amount of land open to mineral entry and location in Alaska under the Federal mining laws and the State mining and mineral leasing laws (17). The most recent report discussing the changing pattern of land availability and management in Alaska from 1958 to 1985 was compiled by Leask of the University of Alaska, Institute of Social and Economic Research (13).

Five draft general management plans that outline specific land management goals within Federal conservation units were consulted during the preparation of this land availability study (24-28). These plans were written by the National Park Service (NPS) and the U.S. Fish and Wildlife Service (FWS).

²This and many other terms are defined in appendix A.

³Italic numbers in parentheses refer to items in the list of references preceding the appendixes at the end of this report.

⁴Mental health land selection privileges were initiated under Public Law 830, title 2, section 202, July 28, 1956. The Federal Government granted Alaska 1 million acres of land; the revenues from development will go to support mental health rehabilitation in the State. The Statehood Act confirmed these selection rights.

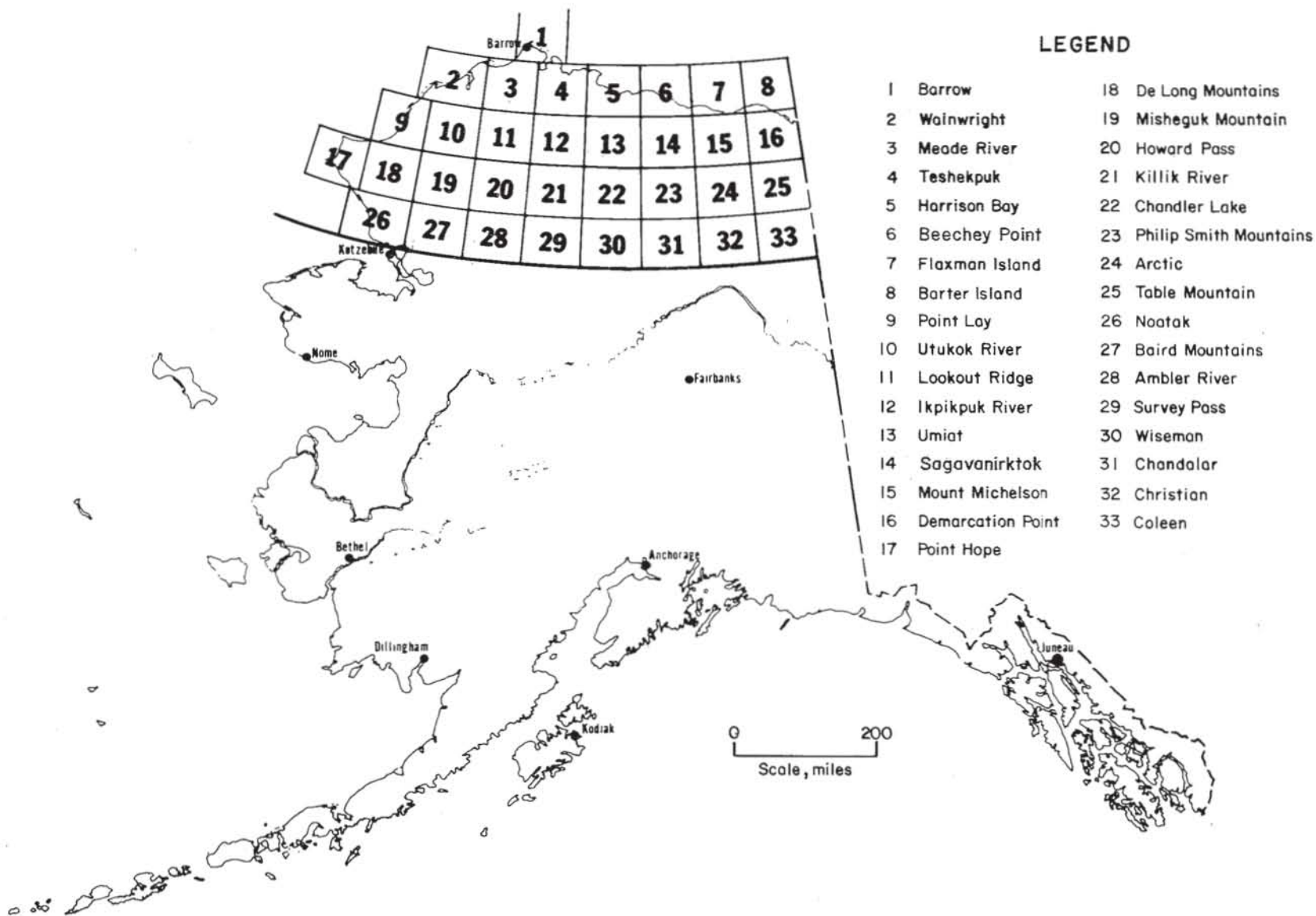


FIGURE 1.—Study area showing quadrangle locations.

This report is one of a series of six Bureau special publications comparing land availability for mineral exploration and development with mineral favorability in Alaska. Previous reports covered southeastern, north-central and south-central Alaska (4,6,19), and the remaining two will discuss western and southwestern Alaska. In

all studies to date, comparisons of land availability and ownership data were made with "Mineral Terranes of Alaska; 1982" (MTA) (3). A generalized mineral terrane map for the study area was modified from the MTA report and is included here (fig. 2).

ACKNOWLEDGMENTS

The Bureau wishes to thank the individuals at the BLM, USGS, FWS, Bureau of Indian Affairs (BIA), and Alaska DNR who assisted in providing the basic data upon which this report is based. Specifically, the author thanks the BLM for its assistance with the Alaska Automated Land Records System (AALRS), providing computer-generated land ownership map overlays and resolving conflicting ownership data. The USGS provided the 1:250,000-scale mineral terrane maps used to determine areas of mineral favorability. The FWS was especially helpful in providing information on the Arctic National Wildlife Refuge and Alaska Maritime National Wildlife Refuge (AKMNR), as no draft general management plans have been written for these units at this time. The BIA provided insight into Venetie

(a former Native reservation) and Native selection rights in general. Alaska DNR furnished updated information on mineral closing orders (MCO's) and was helpful in matters concerning State management and disposal of lands under its jurisdiction.

Robert Bottge, mineral economist for the Bureau of Mines, Alaska Field Operations Center (AFOC), contributed significantly to the format and style of this report and also supplied general counseling throughout the study. Don Baggs, geologist, and Gary Sherman, mining engineer, also with AFOC, wrote computer programs that facilitated the retrieval of mineral deposit location information from the Minerals Availability System (MAS) data base kept in Juneau.

SCOPE AND METHODOLOGY

The information presented in this report has been collected from a variety of sources and in most cases is limited in scope to the section level (640 acres). In coastal areas and portions of the mainland where large bodies of water separate ownership categories, mapping resolution transcends the section level (e.g., clusters of islands with different land status categories have been individually outlined and quantified although less than 640 acres).

The information in this report includes (1) an inventory of Federal, State, and private land and its availability for mineral exploration and development in northern Alaska, (2) a comparison of mineral terranes and land availability categories, and (3) a comparison of mineral deposits and mineral terranes versus land availability.

INVENTORY OF LAND OWNERSHIP

In this report, land is classified by its availability and ownership. Subcategories of land status, used to label land parcels on the maps in appendix B, are based on different combinations of ownership and availability.

Land availability categories are defined from varying degrees of regulatory impacts on mineral exploration and development; they are specifically: "available," "available with restrictions," and "unavailable." Land classified as "available" is legally open to entry and mineral location under the General Mining Law of 1872, as amended (see appendix E), and Alaska statutes 38, title 09, Code of Civil Procedure, chapter 05, article 7, sections 38.05.185-280 (2). Land "available with restrictions" may be legally open to mineral location, but is subject to any restrictions and limitations imposed by the owner of the land. "Unavailable" land is closed to entry and location for metalliferous minerals by legislative action or by an agency's administrative authority.

The Federal and State Governments, as well as Native regional and village corporations, are the major landowners

in northern Alaska. Private inholdings within these major units are generally small and sparsely distributed, and constitute less than 0.02% of the total acreage in the study area.

The 12 subcategories of land status used on the maps in appendix B are defined as follows:

1. Land that is owned by the Federal or State Government and is available for mineral exploration and development is denoted by the symbols OF (open Federal) and OS (open State), respectively.

2. Large tracts (in excess of 640 acres) of Native-owned land that are available with restrictions are labeled PN (patented Native).

3. Federal land unavailable for mineral entry by virtue of public law, Executive order (EO), public land order (PLO), and Native or State selection is denoted by seven land status categories:

CF—closed Federal,
 SN—selected, Native,
 SS—selected, State,
 SS-SN—selected, State and Native,
 SN-CF—selected, Native, on closed Federal land,
 SS-CF—selected, State, on closed Federal land,
 SS-SN-CF—selected, State and Native, on closed Federal land.

4. State-owned land that is unavailable by virtue of departmental regulations is designated by MCO. No direct statutory closures of land occur within the study area.

5. Private inholdings are defined on the maps in appendix B by a dot centered on the section in which they occur and are restricted to mineral development in the same manner as large Native-owned tracts. However, mapping resolution will not allow for their exact location, so the impact of each inholding has not been separated from the larger land status category encompassing the section in which the dot lies.

A ranking of land availability categories is necessary to resolve conflicts when two or more land status categories



FIGURE 2.—Generalized mineral terranes of northern Alaska.

occur in the same section. Since unavailable lands are closed to mineral entry, they are ranked highest, and available land is ranked lowest. Land available with restrictions is ranked between these two categories. For example, if a section of land contains both "SS-CF" and "OS" designated parcels, it is mapped as "SS-CF."

Maps showing State and Native selections and conveyances of Federal lands were acquired from the BLM public office in Anchorage, AK. These maps were plotted from information in AALRS and checked for accuracy against the master title plats (MTP's) of the BLM and the Alaska DNR, Division of Land and Water Management. As State and Native land selections and adjudication of these selections are occurring continuously, the most recent information on the MTP's and AALRS may not correlate. This exemplifies the very dynamic nature of land status in Alaska and the need for reverification of the data supplied in this report before any site-specific work is initiated. Copies of the final maps were reduced to 1:500,000 scale and are included in appendix B. The full-size 1:250,000-scale overlays for this report are on open file at the Bureau's Alaska Field Operations Center offices in Anchorage, Fairbanks, and Juneau, AK (14).

LAND OWNERSHIP

Land ownership in northern Alaska is divided among three Federal agencies, the State of Alaska, Native regional and village corporations, and private individuals. Federal agencies manage nearly 78% of the land in the study area, as follows:

	<i>Acres</i>
Bureau of Land Management	33,152,000
Fish and Wildlife Service	20,574,000

ASSESSMENT OF MINERAL TERRANES AND MINERAL DEPOSIT INFORMATION

After land status acreage was compiled for each quadrangle, a comparison was made with mineral terrane maps (3) to determine how much land is underlain by favorable geologic terrane. Acreage for individual land status categories in each mineral terrane type was determined using a USGS computer-aided digitizer, along with manual methods. Results for the entire region are given in the section "Mineral Favorability," and tabulations for individual quadrangles are in appendix C.

Mineral deposit locations derived from the Bureau's MAS data base were plotted onto the maps in appendix B. Each of the MAS location points identifies one or more mineral deposits within a 3-mile radius. Numbers refer to properties listed in appendix B. Appendix B also indicates whether any production has taken place as well as the major commodities identified at each property. A comparison of mineral deposits and mineral terranes versus land availability categories by quadrangle is given in appendix D.

National Park Service	<u>16,579,000</u>
Total	70,305,000

The State of Alaska presently holds title to approximately 12.5 million acres, or 14%. Native corporations own 8% of the land, or 7.5 million acres.⁵ Nearly 20,000 acres of land has been conveyed to private individuals (table 1).

LAND AVAILABILITY

The availability of a particular parcel of Federal land for mineral location and development depends on applicable public land laws created by Congress, EO reservations and withdrawals issued by the President and authorized by the expressed consent of Congress or by the inherent powers of the office, or PLO's and other departmental regulations promulgated by the Secretary of the Interior. An individual who discovers and develops a deposit on Federal land is charged a yearly assessment fee by the Government, but pays no royalties. The miner can also obtain a patent to the land if production is imminent after \$500 has been expended in development or upkeep. This system is different from the one used by the State of Alaska. Major Federal laws affecting mineral exploration and development are listed in appendix E.

The State of Alaska allows mineral entry through a location and leasing system on its land that has been TA or patented from the BLM. The State does not issue patents to producing mines as in the Federal system; instead, DNR issues mining production licenses and the Department of Revenue collects a license tax on mining, which is calculated on a graduated system based on the amount of production. However, some State land in northern Alaska has been closed to mineral entry and location by an MCO issued by

the commissioner of DNR on recommendation from the DNR's Division of Land and Water Management. The extent of these closures is minor when compared with the extent of Federal closures. A list of MCO's that apply to the study area is found in appendix F.

The State of Alaska has opened nearly 99% of its land in the study area (92% statewide) to mineral location, while the Federal Government allows mineral location on 3% of its land within the study area (24% statewide) (13).

Private land consists of those parcels under IC or patented to Native corporations and private individuals. The land is subject to regulations or restrictions imposed by the owner. Land under IC or patented to Native village corporations has severed estates. The village corporation

⁵Only a fraction of the land transferred to the State or Natives has actually been patented. Most Native land is under interim conveyance (IC), while State land is designated as "tentatively approved" (TA). A precise boundary description provided by survey is necessary before any land is actually patented. However, lack of both time and funding has prevented an expeditious completion of this activity. Congress has recognized this shortcoming in Alaska and declared that land under either of these two designations carries the same ownership rights as do patented lands. This allows for development, leasing, or any other form of disposition that the State or Natives wish to entertain.

Table 1.—Land ownership and availability in northern Alaska

(Thousand acres)

Land-managing agency or type of land	Available	Available with restrictions	Unavailable	Total
FEDERAL				
Bureau of Land Management.....	2,125	0	131,027	33,152
Fish and Wildlife Service.....	0	0	20,574	20,574
National Park Service.....	0	0	16,579	16,579
Total.....	2,125	0	268,180	270,305
STATE (DEPARTMENT OF NATURAL RESOURCES)				
Division of Land and Water Management.....	12,365	0	162	12,527
PRIVATE				
Federal land conveyed to Native corporations.....	0	7,512	0	7,512
Grand total.....	14,490	7,512	68,342	90,344

¹Includes land withdrawn from mining because of Native or State selections, inclusion within the National Petroleum Reserve in Alaska (NPRA), or PLO's that withdraw public domain land from metalliferous entry and location.

²Includes 8,851,000 acres selected by the State of Alaska or Native corporations under the appropriate laws. Breakdown, thousand acres:

Native land (SN).....	1,960
State land (SS).....	3,610
State and Native land (SS-SN).....	1,378
Native selections in closed Federal land (SN-CF).....	1,032
State selections in closed Federal land (SS-CF).....	843
State and Native selections in closed Federal land (SS-SN-CF).....	28
Total.....	8,851

³Includes land patented to Native corporations that lies within closed Federal parcels (i.e., conservation units and NPRA).

⁴Includes private land selected or conveyed from the Federal Government. Acreage is included in the Federal and private land availability categories above. Breakdown, thousand acres:

Native allotments:	
Selected.....	124
Conveyed.....	14
Other private land:	
Selected.....	11
Conveyed.....	5
Total.....	154

receives the surface estate, and the appropriate regional corporation holds title to the subsurface estate. The regional and village corporations in the study area are

<i>Regional</i>	<i>Village</i>
Arctic Slope Regional Corp.	Anaktuvuk Pass. Atkasook. Barrow. Kaktovik. Nooiksut. Point Hope. Point Lay. Wainwright.
Doyon Ltd.....	No established villages in study area.
Northwest Alaska Native Association (NANA).	Ambler. Kivalina. Noatak.

LAND AVAILABLE FOR MINING

Federal and State land available for mining is denoted on the maps in appendix B as OF (open Federal) and OS (open State), respectively. The BLM administers all open Federal land in the study area and allows the development and patent of mineral-bearing land.

Unpatented mining claims may occur in areas denoted as OF. These claims, however, were not identified, and consultation with the BLM on individual parcels is recommended to avoid staking overlapping claims.

In northern Alaska, about 2.1 million acres of BLM-administered lands are available for mining, or about 2.4% of the land in the study area.

State land that is legally open to mining is administered by the DNR, Division of Land and Water Management. State policy toward mining is covered in Alaska statute section 38.05.135, which states that all land to which the State holds title may be obtained by permit or lease for the purpose of exploration, development, and the extraction of minerals, subject to preexisting rights and withdrawal by an MCO. No patents on mineral land can be obtained from the State. Bonding is required to ensure reclamation under both the State and Federal systems (2). The State owns approximately 12.4 million acres of open land in northern Alaska, or 13.7% of the acreage in the study area.

Some townships in the study area are affected by more than one PLO; one may have initially closed the land, and a subsequent PLO opened it. PLO's are drafted and amended periodically, so it is important to check the historical indexes for each township of interest to determine the most up-to-date status of the land.

LAND AVAILABLE WITH RESTRICTIONS

ANCSA provided Native corporations with selection rights to millions of acres of previously unappropriated public domain and thus extinguished any further Native claim to aboriginal land in Alaska. The land was to be selected from designated areas of Federal land withdrawn by several PLO's issued by the Secretary of the Interior around existing villages, apportioned according to population. A village located on an existing reserve created prior to ANCSA was given the option of receiving the complete estate instead of participating in ANCSA. This option provided a few villages with the opportunity to obtain fee title to larger tracts of land than would have been available under ANCSA and also gave management authority over the subsurface estate to the village corporation. There are

five villages statewide that participated in this manner; one of them, Venetie, is located in the northern Alaska region. This tract encompasses nearly 1.8 million acres of land in the Arctic, Chandalar, and Christian quadrangles and is the largest former reserve in Alaska.

Native land encompasses 7.5 million acres in northern Alaska and is denoted as PN (patented Native) on the maps in appendix B. While some of the Native land in the study region may be unavailable for mining, the three regional corporations with jurisdiction in the area, Arctic Slope, Doyon Ltd., and NANA, encourage the development of their resources.

LAND UNAVAILABLE FOR MINING

Federal Land

Nearly 68.2 million acres, or 97% of the land administered by the BLM, FWS, and NPS, is unavailable for mineral exploration and development. This is denoted as CF (closed Federal) on the maps in appendix B. The principal land units legally closed to mining are listed in table 2, and because they are so extensive in northern Alaska, a brief description of each follows.

The Naval Petroleum Reserve #4 was established by EO of the President in 1923 to ensure the availability of adequate supplies of petroleum for the Government's own use. This unit was renamed National Petroleum Reserve in Alaska (NPRA) in 1976, and the administration of this unit was transferred to the Secretary of the Interior, who in turn delegated management responsibilities to the BLM. There is currently a dispute over the location of the eastern boundary of the Reserve with respect to the Colville River, and thousands of acres of State selections hinge on the outcome of the litigation. Although the entire Reserve is legally closed to mineral entry, at least two reports on the mineral resources within the southern portion of NPRA have been compiled, including one by the Bureau (11) and one by the USGS (9). There are three proposed wild and scenic rivers within NPRA, including the Colville River, Etivluk-Nigu River, and Utukok River. These rivers were proposed for study in ANILCA to determine if they have sufficient characteristics that are worthy of addition to the wild and scenic river system. This status closes the rivers to new entry and location for metalliferous deposits. The State of

Alaska owns the beds beneath navigable waters as well as all tidelands (Statehood Act, section 6m), and under ordinary circumstances, these rivers would be open to mineral entry, with restricted access. Because the Federal closure preempts the State's restricted classification, the locations of the wild and scenic river units are included on the maps in appendix B.

Wildlife refuges in the area are managed by the FWS according to provisions of the National Wildlife Refuge System Administrations Act of 1966 (16 U.S.C.A., sections 668dd-668ee) and ANILCA, section 304. All refuge lands are withdrawn from location, entry, and patent under the mining laws, except for valid existing rights, as these endeavors are in direct conflict with the management goals outlined in the acts cited above (1). Wild and scenic rivers in the Arctic National Wildlife Refuge have been outlined on the maps in appendix B for the same reason as the rivers in NPRA. There is considerable designated wilderness in this refuge. The Alaska Maritime National Wildlife Refuge (AKMNWR) is located along the west coast of the study area, and predominantly includes offshore public lands on islands, islets, rocks, reefs, capes, and spires. However, the Point Hope quadrangle contains two large inland units of the AKMNWR.

The national parks, preserves, and monuments within the study area are managed by the NPS. A draft general management plan, environmental assessment, land protection plan, and wilderness review is available for each unit (25-28). These plans outline several management alternatives for each unit, but new mineral entry and development is prohibited in each alternative. The wild and scenic rivers within these NPS units (Gates of the Arctic National Park contains six such designated rivers) are included on the maps in appendix B because the Federal closure preempts the State's restricted access to these rivers.

Several PLO's exist that withdraw land from the public domain, closing it to the entry and location of metalliferous minerals. In northern Alaska, PLO's have withdrawn many small parcels of land scattered throughout the study area; their cumulative total is nearly 700,000 acres of land. These orders are issued by the Secretary of the Interior as the first step toward reserving a parcel of land for a particular use. When land is considered for addition into the conservation system, a PLO is issued to prohibit some uses of the specified land during the study period (e.g., location of mining claims), and then a public law is passed declaring what lands are

Table 2.—Principal Federal land units closed to mineral exploration and development

Unit	Quadrangle(s)	Agency	Thousand acres ¹
Alaska Maritime National Wildlife Refuge	Baird Mountains, Barrow, De Long Mountains, Meade River, Noatak, Point Hope, Point Lay, and Wainwright.	FWS	270
Arctic National Wildlife Refuge	Arctic, Barter Island, Chandalar, Christian, Coleen, Demarcation Point, Flaxman Island, Mount Michelson, Phillip Smith Mountains, Sagavanirktok, and Table Mountain.	FWS	19,160
Cape Krusenstern National Monument	Noatak	NPS	660
Gates of the Arctic National Park and Preserve	Ambler River, Chandalar, Chandler Lake, Killik River, Phillip Smith Mountains, Survey Pass, and Wiseman.	NPS	7,940
Kobuk Valley National Park	Ambler River and Baird Mountains	NPS	1,690
National Petroleum Reserve in Alaska	Barrow, Harrison Bay, Howard Pass, Ikplukuk River, Killik River, Lookout Ridge, Meade River, Misheguk Mountain, Survey Pass, Teshekpuk, Umiat, Utukok River, and Wainwright.	BLM	23,609
Noatak National Preserve	Ambler River, Baird and De Long Mountains, Howard Pass, Killik River, Misheguk Mountain, Noatak, and Survey Pass.	NPS	6,510
Selawik National Wildlife Refuge	Baird Mountains	FWS	1
Yukon Flats National Wildlife Refuge	Coleen, Chandalar, and Christian	FWS	1,290
Total			61,130

¹This acreage includes all land status categories within the boundaries of the unit regardless of the conveyance status; i.e., Native conveyance and State TA or patent acreage within the unit is included in these numbers. This table does not include Federal land withdrawn by PLO. These two exceptions account for the discrepancies in the total acreages shown in this table and table 1.

to be reserved and placed into the conservation system.

Land that has been selected by the State or Native corporations is managed by the Federal Government until it is conveyed. New mineral locations staked on selected land will not be processed by the BLM, but valid unpatented claims will be honored. Initiation of the patent process is contingent on the adjudication of the selection. Depending on the disposition of the parcel, a patent may not even be attainable.

State Land

The State of Alaska owns nearly 12.5 million acres of land in northern Alaska; about 1.3%, or 162,000 acres, is unavailable for mineral exploration and development (table 1). The State can withdraw land from developmental purposes through legislative statute or by an administrative action in the form of an MCO, three of which have been issued by the commissioner, DNR (appendix F).

An MCO is issued when mining is considered incompatible with other uses of the land, such as a pipeline corridor, land disposal subdivision, remote airport runway, and environmentally sensitive areas. In northern Alaska, MCO 67 was issued for a proposed natural gas pipeline. The MCO completely overlaps the trans-Alaska oil pipeline right-of-way (closed under MCO 59) and withdraws a ½-mile strip of land on either side of the pipeline corridor from mineral entry and development. MCO 67 affected five quadrangles in northern Alaska and closed nearly 154,000 acres of land (see the MCO land availability category in figures B-6, B-14, B-23, B-30, and B-31 and appendix F).

The third MCO in the study area was issued in the Chandalar quadrangle to protect State expenditures of funds for subdivision surveys in the region surrounding Chandalar Lake. As depicted in figure B-31, MCO 427 closes over 8,300 acres, even though the actual MCO document describes only 4,306± acres as being withdrawn. This discrepancy developed because exact boundary locations were not provided with the MCO, so the entire section containing the land is shown as withdrawn.

Selected Land

The Federal Government granted the State of Alaska and Native corporations selection rights to nearly 15 million acres of public domain lands according to terms outlined in the Statehood Act, ANCSA, and ANILCA (21-23). Theoretically, there was enough public domain land in Alaska to satisfy all interests, but resources are not evenly distributed and in some areas more than one group wanted the same parcel of land. Conditions were therefore written into ANCSA and ANILCA (title 9) that validated certain Native and State selections within proposed conservation units. This situation created two major categories of selections: those selections made on unreserved public domain and those selections made on legally closed Federal land within conservation units and the NPRA. The Federal Government also allowed the State and Native corporations to select land already selected by the other so that if the original applicant does not receive the selection, the subsequent applicant may. Selections of this nature are labeled on the maps in appendix B as "SN-CF," "SS-CF," and "SS-SN-CF," which define Native selections, State selections, and both State and Native selections, respectively, on closed Federal land. These selections encompass over 1.9 million acres of land, or nearly 3% of the total unavailable land in

northern Alaska (table 1, footnote 2). The majority of State selections on legally closed Federal land have been made in anticipation of a boundary redetermination along the eastern edge of the NPRA.

Selections made on unreserved public domain lands in northern Alaska are labeled "SN," "SS," and "SS-SN" on the maps in appendix B, referring to land selected by Natives, the State, and by both, respectively. Over 6.9 million acres of land in northern Alaska, or 10% of the total unavailable land, are included in these categories (table 1, footnote 2). State selections account for over one-half of this acreage.

Mineral locations made on selected lands will not be honored by the BLM; therefore, these lands are characterized as unavailable. When land is withdrawn for State selection by a PLO, Federal law segregates this land from all forms of appropriation, including the location of metalliferous mining claims. Alaska statute 38.05.275, however, permits the location of mining claims on State-selected lands. If a location notice is filed with the State DNR while the land is in selection status and the land is conveyed to the State, the claimant has preferential rights to that claim against all subsequent locators. If the selection is rejected by the BLM, the claimant loses all rights to that claim and restaking can only be accomplished after the BLM removes the segregative effect from the MTP (notation rule), no matter how long this takes after a mineral opening has been issued for the parcel of land.

There are many varieties of Native selections outlined in ANCSA (sections 11, 12, 14, and 16), including selections for Native villages, Native groups, village corporations, regional corporations, cemetery sites, historical places, and Native allotments. All of these selections are labeled "SN" on the land status maps in appendix B, except the Native allotments, which are depicted as dots centered in the section where they occur. Land that has been withdrawn for Native selection (e.g., for village or regional corporation selections) is segregated from mineral entry at the time the withdrawal is made. Other Native selections (e.g., for cemetery and historical sites) are made on land not initially withdrawn, as the Secretary of the Interior has no way of knowing where these traditional Native parcels are, and therefore, segregation begins at the time the application is filed. It is recommended that all available sources of information be consulted (miscellaneous document index, MTP, historical index, serial registers, Code of Federal Regulations, etc.) to determine the segregative effects of a Native selection. This course of action may help to ascertain the validity of a claim located on selected land, should the application be improperly filed, denied, or abandoned and the land revert to the BLM in its original status. If the selection is conveyed, an individual with a preexisting right to an unpatented mining claim will have to appeal to the Native owners for access.

PRIVATE LAND

Individual Selections and Patents

Beginning with the early preemption acts of the 1820's and up until the Taylor Grazing Act of 1934, the land policies of the Federal Government transferred title of hundreds of millions of acres of land to settlers and Native individuals. In northern Alaska, private lands include homesteads, homesites, patented mining claims, headquarters sites, trade and manufacturing sites, and Native allotments.

Most disposal programs begin with an application from the interested party, followed by a waiting period before a patent is issued. In this report, all private lands, whether under application for patent or already patented, are treated equally. Land parcels in this category are shown on the maps in appendix B as dots centered in the sections in which they occur. There are over 154,000 acres of private lands scattered within the northern Alaska study area (table 1, footnote 4). Over 80% of these, or 124,000 acres, are included in Native allotment applications.

Native allotments were originally provided for in the Alaska Native Allotment Act of 1906 (ANAA) (7). This act enabled Natives to perfect title on up to 160 acres of non-mineral land for their use and occupancy; the amount of acreage depended on the arability of the land in question. If a Native applied for patent on a piece of property deemed suitable for agriculture, that individual would receive less

acreage than an individual who applied for patent on hilly, nonirrigable land. ANCSA repealed ANAA, but guaranteed adjudication of all applications made prior to December 18, 1971. ANCSA contains provisions for Native allotment selections, although with different conditions than for selections under ANAA. The land can be mineral in character, but the mineral estate is severed from the surface estate and goes to the appropriate regional corporation. The MTP will identify the owner of the mineral rights.

Urban and Suburban Land

The major population centers in northern Alaska are located within the Native villages listed at the beginning of this section on land availability. These villages have all been included in "PN" land status designations on the maps in appendix B, and consent from the Native regional corporation is needed before any mining activity commences.

MINERAL FAVORABILITY

MINERAL TERRANES

A terrane is an assemblage of related rock in a given area. When this assemblage contains mineral deposits or displays favorable geological characteristics, it is called a mineral terrane. Knowledge of the relationship between mineral deposits and mineral terranes can help identify the types of mineral deposits likely to be found in each terrane.

Mineral terrane acreage for each land availability category is given in table 3, while tabulations on a quadrangle basis are summarized in appendix C. Figure 2 is a generalized mineral terrane map for the study area.

Recognized mineral terranes underlie nearly 38 million acres of land in northern Alaska. Six categories of mineral terranes are identified in MTA (3). Marine continental sediments comprise the largest proportion of acreage, 31.5 million acres, or 83%, in the study area. The remaining acreage is divided as follows: (1) mafic (3.3 million acres or 9%), (2) felsic (1.7 million acres or 4%), (3) mafic-ultramafic (0.3 million acres or 0.8%), (4) granitic (1.0 million acres or 3%), and (5) altered (0.1 million acres or 0.2%).

Marine continental sediments include limestone, shale, chert, conglomerate, and coal-bearing sandstone and shale. Rocks of this composition are favorable for deposits of copper, lead, zinc, barium, gold with byproduct silver, coal, and uranium with byproduct vanadium. This terrane type is prevalent within NPRA and along the east-west trend of the Brooks Range. The world-class Red Dog lead-zinc mine situated in the De Long Mountains quadrangle is hosted in these types of rocks.

Mafic volcanic rocks are primarily basaltic rocks but also include associated mafic and ultramafic intrusive rocks with minor chert and other deep-water sediments. The mafic rocks are favorable for deposits of copper and zinc with byproduct silver and gold. Nickel and chromium with byproduct platinum-group metals, and gold may also be present. This terrane appears as isolated occurrences in the western Brooks Range and also parallels the southern boundary of the Brooks Range. A large block of mafic rocks also underlies part of the Christian quadrangle.

The felsic volcanic rock terrane contains rhyolite, quartz latite, and associated sediments and is favorable for deposits

of copper, lead, and zinc, all with byproduct silver and gold. This terrane also includes trachyte, phonolite, trachyandesite, and peralkaline volcanics, which are favorable for deposits of uranium and thorium. Felsic volcanic rocks are found predominantly along the southern border of the Brooks Range.

Mafic-ultramafic rocks consist of intrusive rocks ranging in composition from gabbro to peridotite and dunite. The rocks may host deposits of copper, nickel, and chromium, all with byproduct platinum and cobalt. Mafic-ultramafic rocks are clustered in the western Brooks Range, with isolated exposures northeast of Venetie in the Christian quadrangle.

Granitic rocks are defined as intrusives of alkalic, felsic, and intermediate silicic composition. This terrane includes the rock types syenite, peralkaline granite, and monzonite, which are favorable for deposits of uranium and rare-earth elements; granite and quartz monzonite, which are favorable for deposits of tin, tungsten, molybdenum, uranium, and thorium; and granodiorite and quartz diorite, which are favorable for deposits of copper, gold, and molybdenum. Granitic rocks are found primarily in the southern Brooks Range and northwest of Chandalar in the Chandalar quadrangle.

Rocks that have been subjected to metamorphic or igneous-related hydrothermal processes have been classified as altered. This terrane hosts mineral deposits that closely resemble the deposits found in igneous terranes. There is one isolated occurrence of this terrane type in the Ambler River quadrangle.

Of the 37.8 million acres of land underlain by mineral terranes in the study area, about 5.3 million acres, or 14%, are available for mineral exploration and development; 2.8 million acres, or 7% are available with restrictions, and the remaining 29.7 million acres, or 79%, are unavailable for mineral entry. The State of Alaska owns 85% of the favorable available land in the study area, while the Federal Government owns over 99% of the favorable unavailable land. Of the unavailable land, over 3.2 million acres have been selected by either the State, Native corporations, or both. Adjudication of the State selections will ultimately reduce this unavailable acreage. The 2.8 million acres that

Table 3.—Mineral terrane acreage in each land availability category, by terrane type

Land availability category	Volcanic rocks		Intrusives		Sediments		Total
	Mafic	Felsic	Maf/Ult ¹	Granitic	Marine ²	Altered	
AVAILABLE							
OF	150	10	1	170	465	0	796
OS	309	749	4	143	3,327	0	4,532
Total available	459	759	5	313	3,792	0	5,328
AVAILABLE WITH RESTRICTIONS							
PN (total restricted)	401	3	43	14	2,330	45	2,836
UNAVAILABLE							
Federal:							
CF	1,989	651	214	693	23,053	0	26,600
Selected:							
SN	110	54	4	7	323	0	498
SS	167	145	2	13	976	0	1,303
SS-SN	74	23	0	1	386	12	496
SN-CF	90	8	19	3	160	0	280
SS-CF	6	16	0	3	408	0	433
SS-SN-CF	0	0	0	0	11	0	11
Total Federal	2,436	897	239	720	25,317	12	29,621
State: MCO (total State)	1	0	0	0	50	0	51
Total unavailable	2,437	897	239	720	25,367	12	29,672
Grand total	3,297	1,659	287	1,047	31,489	57	37,836

CF Closed Federal.
MCO Mineral closing order.
OF Open Federal.

OS Open State.
PN Patented Native.
SN Selected, Native.

SS Selected, State.
¹Mafic-ultramafic.
²Continental.

are available with restrictions are owned by Native corporations and may become available for development subject to the terms and policies of the corporations.

Table 4 provides a comparison between the total acreage, mineral terrane acreage, and percent available land within "mineral terrane" and "no terrane" designations, by quadrangle. This information shows which quadrangles have the most mineral potential and whether this potential is located on available land. As can be seen from table 4, there are 11 quadrangles with at least 100,000 acres of available land underlain by favorable mineral terranes, and by order of most acreage they are—Sagavanirktok, Wiseman, Chandalar, Survey Pass, Umiat, Chandler Lake, Philip Smith Mountains, Ambler River, Baird Mountains, Point Lay, and Noatak quadrangles. These quadrangles have the greatest potential for hosting mineral deposits on legally open land in the study area.

MINERAL TERRANES AND MINERAL DEPOSITS

The MAS data base contains information on 500 mineral prospects and occurrences in the northern Alaska study area as of February 1986. There are 271 lode and 229 placer deposits; a listing of these by quadrangle is given in appendix B. Mineral locations were plotted onto the land status maps overlaid with the MTA information. Tabulations comparing mineral deposits and mineral terranes against land availability categories were then made for each quadrangle. This information is presented as a comprehensive tally for the entire study area in table 5 and is given on a quadrangle basis in appendix D.

Nearly 44% of the mineral deposits and occurrences are on available land; of these, 170 are on State land and 48 are on Federal land. Almost 25% of the deposits occur on unavailable Federal land that is within a conservation unit, NPRA, or PLO withdrawal, while over 20% of the deposits are on unavailable Federal land that has been selected by the Natives or the State of Alaska. Of these, 44 are on State-selected parcels and 40 are on selected Native land. Only 2% of the deposits are located on unavailable State land

Table 4.—Quantitative summary of available land within "mineral terrane" and "no terrane" designations, by quadrangle

Quadrangle	Area, thousand acres	Mineral terrane		No terrane	
		Thousand acres	% available	Thousand acres	% available
Ambler River	3,548	800	24.5	2,748	11.1
Arctic	3,399	831	0.0	2,568	0.0
Baird Mountains	3,537	1,051	18.6	2,486	18.9
Barrow	605	0	0.0	605	0.0
Barter Island	156	0	0.0	156	0.0
Beechey Point	1,135	0	0.0	1,135	99.0
Chandalar	3,536	1,027	54.2	2,509	64.9
Chandler Lake	3,395	1,486	24.3	1,909	37.3
Christian	3,544	1,329	0.0	2,215	0.7
Coleen	3,542	2,445	3.2	1,097	20.4
De Long Mountains	3,305	1,111	6.9	2,194	0.3
Demarcation Point	2,887	443	0.0	2,444	0.0
Flaxman Island	302	0	0.0	302	55.0
Harrison Bay	1,743	149	0.0	1,594	26.5
Howard Pass	3,387	1,448	0.0	1,939	0.0
Ikplkuk River	3,252	1,244	0.0	2,008	0.0
Killik River	3,391	1,991	0.5	1,400	2.7
Lookout Ridge	3,231	2,873	0.0	358	0.0
Meade River	2,835	2,553	0.0	282	0.0
Misheguk Mountain	3,399	1,563	0.0	1,836	0.0
Mount Michelson	3,221	784	4.6	2,437	19.4
Noatak	2,465	657	17.4	1,808	10.0
Philip Smith					
Mountains	3,392	1,461	20.6	1,931	36.2
Point Hope	1,100	338	0.0	762	1.3
Point Lay	1,207	948	13.8	259	15.4
Sagavanirktok	3,301	1,565	96.1	1,736	68.3
Survey Pass	3,542	1,925	24.5	1,617	10.9
Table Mountain	3,390	828	0.0	2,562	0.0
Teshkepuk	2,955	523	0.0	2,432	0.0
Umiat	3,244	1,292	29.8	1,952	37.4
Utukok River	3,235	2,353	0.0	882	1.6
Wainwright	1,624	1,572	4.0	52	12.7
Wiseman	3,539	1,246	67.2	2,293	23.5
Total	90,344	37,836	14.1	52,508	17.5

closed by an MCO. The remaining 9% of the deposits are located on Native land.

Two hundred and fifty deposits do not occur within a recognized mineral terrane. Of these, 150 are placer deposits and 100 are lode deposits. The placer deposits are not directly associated with a mineral terrane as they are secondary concentrations from a distant source. However, lode deposits are located in situ and should be tied to the geologic pro-

Table 5.—Number of mineral deposits in each land availability category, by terrane and deposit type

Land availability category	Volcanic rocks				Intrusives				Sediments				No terrane		Total	
	Mafic		Felsic		Maf/Ult ¹		Granitic		Marine ²		Altered		P	L	P	L
	P	L	P	L	P	L	P	L	P	L						
AVAILABLE																
OF.....	4	0	0	0	0	0	0	0	10	4	0	0	26	4	40	8
OS.....	7	2	11	25	0	0	0	10	18	14	0	0	46	37	82	88
Total available.....	11	2	11	25	0	0	0	10	28	18	0	0	72	41	122	96
AVAILABLE WITH RESTRICTIONS																
PN (total restricted).....	0	3	0	1	0	1	0	1	0	14	4	6	11	6	15	32
UNAVAILABLE																
Federal:																
CF.....	1	1	1	4	1	5	2	6	4	32	0	0	27	39	36	87
Selected: ³																
SN.....	2	1	0	0	0	0	0	0	5	5	0	0	14	7	21	13
SS.....	0	1	0	11	0	0	2	1	1	9	0	0	15	2	18	24
SS-SN.....	2	2	0	1	0	0	0	0	2	5	1	1	1	2	6	11
SN-CF.....	0	1	0	0	0	1	0	0	0	1	0	0	2	1	2	4
SS-CF.....	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
Total Federal.....	5	6	1	16	1	6	4	7	12	54	1	1	59	51	83	141
State: MCO (total State).....	1	0	0	0	0	0	0	0	0	0	0	0	8	2	9	2
Total unavailable.....	6	6	1	16	1	6	4	7	12	54	1	1	67	53	92	143
Grand total.....	17	11	12	42	1	7	4	18	40	86	5	7	150	100	229	271
CF	Closed Federal.	PN	Patented Native													
L	Lode deposit.	SN	Selected, Native.													
MCO	Mineral closing order.	SS	Selected, State.													
OF	Open Federal.		¹ Mafic-ultramafic.													
OS	Open State.		² Continental.													
P	Placer deposit.		³ There are no mineral deposit locations for the category SS-SN-CF.													

ess that originally formed them. The high number of lode deposits situated outside of a recognized mineral terrane reaffirms the need for further reconnaissance geologic mapping.

Nearly 60% of the mineral deposits occur within the

Wiseman and Chandalar quadrangles; the breakdown is 170 and 125 deposits, respectively. These two quadrangles also contain a high percentage of available land within a recognized terrane (67.2% and 54.2%, respectively).

SUMMARY

The changing pattern of land ownership in Alaska has exerted a profound effect on the availability of land for mineral exploration and development over the past 25 years. Land previously available for mineral entry is now withdrawn in the various units of the national conservation system and in State and Native selections. Twelve land status categories were created to facilitate the discussion of availability, but much of the information offered is subject to change as the BLM adjudicates each remaining selection.

There are over 90.3 million acres of land in the northern Alaska study area. The Federal Government owns 70.3 million acres, or 78%; the State of Alaska owns 12.5 million acres, or 14%; and Native corporations own 7.5 million acres, or 8%.

There are 14.5 million acres of available land, of which 85% is owned by the State and 15% is owned by the Federal Government. Over 68 million acres of unavailable land is located in the study area, with 99.8% of this acreage managed by the Federal Government; the remainder is State-owned land closed by MCO's. The 7.5 million acres owned

by the Native corporations are available with restrictions, but their management policies favor resource development in most instances.

Mineral terranes underlie 37.8 million acres of land in the study area; 14% of these are associated with available land, 7% underlie land available with restrictions, and the remaining 79% are unavailable for mineral exploration and development.

Of the 500 mineral deposits or occurrences located in the study area, 271 are lode and 229 are placer. Of the lode deposits, 171 are located within a mineral terrane; of these, 55 are on available land, 26 are on land available with restrictions, and the remaining 90 are on unavailable land. The placer deposits are divided as follows: 122 are on available land, 15 are on land available with restrictions, and 92 are on unavailable land.

The quadrangles that make up the southern boundary of the study area (except Christian and Coleen) contain the most diverse assemblages of terrane types, the most mineral locations, and the highest percentage of available land underlain by recognized mineral terranes.

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APPENDIX A.—GLOSSARY¹

Acquired land—Land in Federal ownership that was obtained by the Government through purchase, condemnation, or gift; or by exchange for such purchased, condemned, or donated land; or for timber on such land. Acquired lands are not public domain lands and are usually dedicated to a specific use.

Adjudication—When the BLM receives a land selection application, a thorough title search is performed on the land parcel; navigability reports are acquired if the selection encloses bodies of water; records are reviewed to determine the possible presence of unpatented and patented mining claims, etc. The BLM then makes a judicial determination, or adjudicates, as to the outcome of the application. In most cases, the land selection is either conveyed to the applicant, rejected, or suspended awaiting further information.

Available—Federal or State land legally open to mineral exploration and development under the General Mining Law of 1872, as amended, or under Alaska statute, sections 38.05.185 through 38.05.280.

Available with restrictions—Land legally open to mineral exploration and development subject to the management policies of Federal or State land management agencies, Native regional and village corporations, or private individuals. Land may be subject to the management policies of each of these entities.

Classification—The designation of lands as being valuable or suitable for specific purposes, uses, or resources.

Convey—To transfer any or all titles, surface and subsurface, to a piece of real property.

Easement—An interest or right in land owned by another that entitles the holder to a specific limited use, such as crossing over property to gain access to another property, installation of a sewer or water line, etc. The land crossed by such an easement is referred to as the right-of-way.

Entry—An application to acquire title to public lands.

Federal land—Land owned by the United States, without reference to how the land was acquired or what Federal agency administers the lands, but excluding lands held by the United States in trust for Indians, Aleuts, or Eskimos. Also excluded from this category are severed mineral estates (when rights to subsurface minerals are completely separate from those of the surface estate) owned by the Federal Government.

Fee—The estate a person has, where lands are owned by that person and the person's heirs absolutely, with unconditional power of disposition during the person's life, and descending to the person's heirs upon his or her death. Fee title (the same as fee simple or fee absolute title) is conveyed by patent, deed, or grant.

Historical index—A chronological summary of all actions which affect, have affected, or will affect the title to, disposition of, or use status of lands and resources within a township.

Leasable minerals—Minerals such as coal, oil shale, oil and gas, phosphate, potash, chlorides, sulfates, carbonates, sodium, geothermal resources and associated byproducts—all minerals on the Outer Continental Shelf

and all minerals except for salable minerals on acquired lands.

Legal (formal) restrictions—Closure of Federal land to mining and/or mineral leasing, or restraints on mineral exploration and development, by statute (law), executive order, secretarial order, public land order, or other formal method.

Locatable minerals—Whatever are recognized as minerals by the standard authorities, whether metallic or other substance, when found in public lands in quantity and quality sufficient to render the lands valuable on account thereof. This class of minerals also includes the uncommon varieties of sand, stone, gravel, cinders, pumice, or pumicite and excludes minerals specifically designated as leasable or salable minerals. Minerals may be acquired under the General Mining Law of 1872, as amended.

Management restriction—Closure of Federal or State land to mining and/or mineral leasing, or restraints on mineral exploration and development, by agency policy, management decision, or other discretionary method.

Master title plat—A composite of the survey plats of a township which shows ownership and land status.

Meridian—A north-south line from which longitudes and azimuths are reckoned; a plane-directed normal to the globe defining such a line.

Mineral—Inorganic and certain organic substances occurring naturally, with characteristics and economic uses that bring them within the purview of mineral laws; a substance that may be obtained under applicable laws from Federal land by purchase, lease, or mining claim.

Mineral deposit—A mass of naturally occurring minerals that may or may not have economic value.

Mineral exploration and development—The sequence of activities that includes the search for and acquisition of mineral deposits, the study and work necessary to determine if such deposits are feasible to mine, and the preparation, if warranted, of a deposit for production (extraction). These activities generally will not be undertaken by private companies or by individuals without a reasonable expectation that they could produce at a profit any valuable deposit which might be discovered.

Mineral favorability—The occurrence of economic minerals in deposits that are richer than their average crustal abundance due to normal geologic processes. Favorability can be ascertained if the genesis and subsequent history of the rocks in an area are known.

Mineral terrane—An assemblage of related rocks that contains significant mineral occurrences or deposits and occupies a particular geographic area.

Multiple use—The management of public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people; the practice in which a given land area functions in two or more compatible ways.

Patent—A document by which the United States conveys legal title to some portion of the public lands.

Priority use area (emphasis area)—An area where a particular resource, such as wildlife habitat, receives management emphasis or priority. The areas are either unique, significant, or best suited for the development, management, use, or protection of a resource. The principles of multiple use and sustained yield are maintained in each priority use area. Many different uses may be allowed in

¹Many of these terms are defined by T.S. Malley in his book "Mineral Title Examination" (15). Others are defined by Coggins and Wilkinson in "Federal Public Land and Resources Law" (8).

each priority area, but the priority use supercedes all others. Other land uses may have limits placed on them to prevent conflicts with the priority resource. In some instances, a use totally incompatible with the priority resource may be excluded.

Public domain land—Original public domain land acquired by the Federal Government from foreign nations and Indian tribes (through purchase, conquest, and treaty) as a foundation upon which to build the Nation. These lands have never left Federal ownership and are disposed of only under the authority of Congress. Public domain lands also include land in Federal ownership that was obtained by the Government in exchange for other public domain land or for timber on public domain land.

Public land—Any land and interest in land owned by the United States within the several States and administered by the Secretary of the Interior through the BLM, without regard to how the United States acquired ownership, except (1) lands located on the Outer Continental Shelf, and (2) lands held for the benefit of Indians, Aleuts, and Eskimos. Includes public domain and acquired lands.

Public land order—An order effecting, modifying, or canceling a reservation or withdrawal. Such an order is issued by the Secretary of the Interior pursuant to power of the President delegated to the Secretary by Executive Order No. 9146 of April 24, 1943.

Range—A north-south tier of townships. A range of townships is described by its relationship to the principle meridian.

Recreation land—A tract of public land (usually several thousand acres) on which outdoor recreation or wildlife habitat has been determined to be the primary use. Recreation lands may have facilities for intensive recreation use or they may remain in a relatively undeveloped condition. Where wilderness values predominate, an area may be preserved in a primitive, roadless condition. (See special recreation management area.)

Regulations—Regulations are rules promulgated by State and Federal agencies to implement the law and ensure uniform application of the law. Although regulations are not created by the legislature and thus do not have the effect of law, they generally have a statutory authority, and violations are legally punishable.

Restrictions—Restraints of all types on mineral exploration and development on Federal and private land. In this study, restrictions are classified as either legal or management restrictions, depending upon the authority or method by which they are effected. All degrees of restraint are included, ranging from normal regulations and standard stipulations of compliance to closure of Federal land to mining and/or mineral leasing.

Salable minerals—Minerals such as common varieties of sand, stone, gravel, cinders, pumice, pumicite, and clay

that may be acquired under the Materials Act of 1947, as amended.

Section—The unit of subdivision of a township, with boundaries conforming to the rectangular system of surveys, nominally 1 square mile, containing 640 acres.

Segregation—Any action, such as withdrawal, that suspends the operation of all or some of the public land laws, including the mining and mineral leasing laws. A mineral segregation occurs when such an action suspends the operation of the mining and mineral leasing laws for particular Federal land. Three distinct methods of segregation are classification, withdrawal, and reservation.

Special recreation management area—Area requiring explicit recreation management to achieve specific recreation objectives and provide specific recreation opportunities. Special management areas are identified in the resource management plan, which also defines the management objectives for the area. Major recreation investments are concentrated in these areas.

Township—The unit of survey on public lands; normally a quadrangle approximately 6 miles on a side, with boundaries conforming to meridians and parallels within established limits, containing 36 sections, some of which are designed to correct for the convergence of meridians or range lines.

Unavailable—Federal or State land closed to mineral exploration and development by legislative intent, public land order, withdrawal, or agency regulations. This category includes Federal land selected by Native regional and village corporations and/or the State of Alaska but not yet conveyed.

Wilderness area—An area of undeveloped Federal land retaining its primeval character and influence without permanent improvements or human habitation, protected and managed so as to preserve its natural conditions. This category includes designated wilderness areas in the National Wilderness Preservation System.

Wilderness study area—An area designated by a Federal agency or Congress for consideration as a possible addition to the National Wilderness Preservation System. The area is managed to preserve wilderness characteristics until it is determined whether it should or should not be added to the National Wilderness Preservation System. This category includes further planning areas and instant study areas.

Withdrawal—A formal action withholding an area of Federal land from settlement, sale, location, or entry, under some or all of the general land laws, for the purpose of limiting activities under those laws in order to maintain other public values in the area or reserve the area for a particular public purpose or program. Withdrawals also include lands that have been dedicated to public purposes.

APPENDIX B.—LAND AVAILABILITY MAPS AND LISTING OF MINERAL DEPOSITS

LISTING OF MINERAL DEPOSITS IN NORTHERN ALASKA

The listing of deposits that follows the key below was compiled from the Bureau's MAS data base in February 1986. The deposits are grouped by USGS 1:250,000 quadrangles, and the 33 quadrangles that encompass northern Alaska are reproduced at 1:500,000 scale as figures B-1 through B-33 (maps included in envelope). The maps show the locations of the listed deposits (by map location number) and the distribution of land in terms of the land availability categories defined in this report. The key below defines the various fields and modifiers used in the listing of deposits.

Key

Map location	Map location numbers correspond to points plotted on figures B-1 through B-33. (However, not all mineral deposits are represented on these maps. Because of limitations of plot representation at a 1:500,000 scale, the locations were "clustered." A deposit listed with a map location number is represented by that number on the respective quadrangle. Deposits listed without a number lie within a 3-mile radius of the preceding deposit listed with a map location number.)
MAS sequence No.	Number that keys the deposit to the corresponding MAS files.
Deposit name	Name of deposit or occurrence used by MAS; other names are not listed.
Commodities	Metals and other commodities of interest, in decreasing order of importance.
Abbreviation	P Producer or past producer

NOTES.—Where entries are absent, no information is available. In the headings that identify the quadrangles, the number in parentheses is the MAS quadrangle number (as shown in figure 1).

LISTING OF MINERAL DEPOSITS

Map location	MAS sequence No.	Deposit name	Commodities	Map location	MAS sequence No.	Deposit name	Commodities
AMBLER RIVER QUADRANGLE (28)				BAIRD MOUNTAINS QUADRANGLE—Continued			
1	0020280009	Tongarak River Lode	Au	16	0020270006	Goldrun Creek (P)	Au
2	0020280006	Ningyoyak Creek Lode	Cu	17	0020270002	Spruce Creek	Au
3	0020280008	Midas Creek	Au	18	0020270012	Cross Creek	Au
4	0020280057	Kav	Cu	19	0020270005	Jack Creek	Au
5	0020280007	Kookrook River	Au	20	0020270001	Klery Creek (P)	Au
6	0020280058	Kaluich	Pb	21	0020270007	Bear Creek (P)	Au
7	0020280037	Akiak Creek—Malfiatti	Cu	22	0020270003	Boldrin Creek (P)	Au
8	0020280010	Redstone Lode	Au	23	0020270004	Peluk Creek (P)	Au
9	0020280017	Shishakshinovik Pass	Cu	24	0020270008	Central Creek	Au
10	0020280015	Ulaneak Creek, NE		25	0020270019	Kobuk River (P)	Coal
11	0020280036	Hunt River	Au	26	0020270009	Canyon Creek	Au
12	0020280011	Ulaneak Creek, NW		27	0020270010	Mink Creek	Au
13	0020280014	Ulaneak, East		28	0020270018	Kiana	Cb
14	0020280055	Kogoluktuk T 23N, R 11E	Au	BARROW QUADRANGLE (1)			
15	0020280012	Ulaneak Creek, East		1	0020010004	South Barrow Test Well No. 1	Petroleum
	0020280013	Ulaneak Creek, South		2	0020010003	South Barrow Test Well No. 2 (P)	Natural gas
16	0020280052	Ambler East Lode	Cu	3	0020010002	South Barrow Test Well No. 3	Petroleum
17	0020280016	Ambler River Valley (P)	Au	4	0020010001	Cape Simpson Oil Seep	Petroleum
18	0020280045	Ambler Shungnak Ridge	Cu	CHANDALAR QUADRANGLE (31)			
19	0020280033	Smucker	Zn	1	0020310130	Chandalar River, NF, EF	Au
20	0020280046	Shungnak East Lode		2	0020310123	Nutirwik Creek	Au
21	0020280044	Naniratkohort Creek Lode	Cu	3	0020310055	Trembley Creek	
22	0020280031	Jade Mountain Cu	Cu	4	0020310133	Kuyuktuvuk Creek	Au
23	0020280043	Ambler Valley Lode		5	0020310097	Unnamed occurrence	Cu
24	0020280035	Kalurivik River Valley	Cu	6	0020310105	Verna Creek No. 1-8	Cu
25	0020280030	Shungnak, Kogoluktuk Rivers		7	0020310025	Gayle	Cu
26	0020280028	Agnes Creek	Au	8	0020310124	Quartz Creek	Au
27	0020280042	V&B Ruby	Cu	9	0020310073	Big Jim Creek	Cu
28	0020280056	Shungnak River, East		10	0020310096	Unnamed occurrence	Cu
29	0020280003	Jade Mountain (P)	Gemstone	11	0020310125	Thru Creek	Au
30	0020280053	Kogoluktuk T 21N, R 12E		12	0020310111	Ricks Camp 1-4	
31	0020280032	Jade Hills	Ni	13	0020310080	North Fork Chandalar River	Au
32	0020280054	Kogoluktuk T 21N, R 13E		14	0020310081	AM-DE Mine	Au
33	0020280048	Kogoluktuk Lode		15	0020310110	Ricks Upper Camp	
34	0020280059	Back Claims-Resource		16	0020310095	Unnamed occurrence	Cu
35	0020280004	Arctic Camp	Cu	17	0020310023	Upper Camp Group	Cu
36	0020280029	Kobuk River	Au	18	0020310079	Quartz Creek	Cu
37	0020280051	Kogoluktuk West Lode	Cu	19	0020310057	Mathews River, Upper	Au
38	0020280049	Kogoluktuk East	Cu	20	0020310101	Mike No. 1	
39	0020280005	Shungnak Camp	Cu	21	0020310109	Luna	
40	0020280026	Pearl Creek	Au	22	0020310132	Mathews River	Au
41	0020289001	Herbert Ivan Stewart (P)	Gemstone	23	0020310127	Our Creek	Au
42	0020280022	Jay Creek	Au	24	0020310041	Snowden Creek	Cr
43	0020280002	Bornite	Cu	25	0020310122	Dietrich River Trib.	Au
44	0020280027	Boulder Creek	Au	26	0020310058	Upper Sheep Creek	
45	0020280034	Bismark Mountain	Asbestos	27	0020310061	Mathews River, West Side	Au
46	0020280047	Riley Lode	Cu	28	0020310069	Canyon Claim 1-15	
47	0020280023	Riley Creek (P)	Au	29	0020310059	Middle Sheep Creek	Au
48	0020280019	Woodchopper Creek	Au	30	0020310026	Placid	Cu
49	0020280041	Riley Creek Lode	Au	31	0020310114	BVK	
50	0020280001	Iron Mountain	Fe	32	0020310117	Chandalar River, NFEF	
51	0020280018	Shungnak River (P)	Au	33	0020310024	Arsine	Cu
52	0020280024	Ryan Creek	Au	34	0020310119	Dietrich, Mathews River	Au
53	0020280021	Ruby Creek	Au	35	0020310091	Mathews River	Pb
54	0020280020	Cosmos Creek	Au	36	0020310062	Sheep Creek-Lower	Au
55	0020280038	Cosmos Creek Asbestos	Asbestos	37	0020310045	Sheep Creek-Robert Trib.	Au
56	0020280050	Shungnak, Axell Knoll	Gemstone	38	0020310065	Big Spruce Creek	Au
57	0020280025	Canyon Creek	Au	39	0020310074	Willow Creek	Zn
58	0020280040	Asbestos Mountain	Asbestos	40	0020310060	Big Spruce Creek	Au
ARCTIC QUADRANGLE (24)				41	0020310090	Unnamed occurrence	Cu
1	0020240002	Upper Koness River	Cu	42	0020310053	Robert Creek	Au
2	0020240001	Unnamed occurrence	Co	43	0020310139	Limestone Creek Discovery	Au
BAIRD MOUNTAINS QUADRANGLE (27)				44	0020310029	Spruce Creek	Au
1	0020270015	Salmon	Au	45	0020310070	Little Squaw Creek	
2	0020270029	Maiyumerak Mountains	Cr	46	0020310126	Slate Creek	Au
3	0020270027	Hub	Cu	47	0020310040	Phoebe Creek	Au
4	0020270014	Salmon River	Cu	48	0020310043	Mule Creek (P)	Au
5	0020270024	Eli River	Cu	49	0020310071	No Name Creek	
6	0020270023	Nakolikurok Creek	Cu	50	0020310072	Peterman	
7	0020270026	Temby	Cu	51	0020310131	Bettles River	Au
8	0020270017	Tundra	Au	52	0020310118	Spring Creek	
9	0020270016	Agashashok	Cu	49	0020310027	Limestone Creek Mouth	Au
10	0020270020	Omar River	Cu	50	0020310106	Boulder Creek	
11	0020270028	Frost	Ba	51	0020310037	Little Squaw Creek (P)	Au
12	0020270022	Ausley	Au	52	0020310042	Garnet Creek (P)	Au
13	0020270021	Tukpahlearik Creek	Au		0020319003	Vern H. Bouton (P)	Au
14	0020270011	Homestake Creek (P)	Au				
15	0020270013	Timber Creek	Au				

LISTING OF MINERAL DEPOSITS—Continued

Map location	MAS sequence No.	Deposit name	Commodities	Map location	MAS sequence No.	Deposit name	Commodities
CHANDALAR QUADRANGLE—Continued				CHRISTIAN QUADRANGLE—Continued			
53	0020310028	Eightmile Creek	Au	3	0020320004	CHA	
54	0020310120	Linda Creek Lake	Au	4	0020320002	Pops Mine No. 1 and 2	
	0020310121	Linda Creek	Au	COLEEN QUADRANGLE (33)			
55	0020310092	Kelty	Sb	1	0020330001	Procrastination Creek	Au
56	0020310089	Big Squaw Creek	Au	2	0020330003	Rapid River Tributary	U
57	0020310088	Big Squaw Creek	Sb	3	0020330004	Sunagun Creek	U
58	0020310138	Little Squaw Mine (P)	Au	4	0020330002	Porcupine River	Ni
59	0020310050	Emory Creek (P)	Au	DE LONG MOUNTAINS QUADRANGLE (18)			
60	0020310064	Carter Prospect	Au	1	0020180005	Thetis Mine (P)	Coal
61	0020310083	Star	Au	2	0020180008	Corwin Bluff (P)	Coal
62	0020310104	Ready Bullion Creek		3	0020180003	Red Fox	Au
63	0020310001	Mikado (P)	Au	4	0020180009	Pitmegea River	Au
	0020310047	Mikado Mill (P)	Au	5	0020180007	Mt. Kelly	Au
64	0020310129	Grave Creek	Au	6	0020180004	Su	Zn
65	0020310002	Tobin Creek (P)	Au	7	0020180006	Kivallina River	Petroleum
66	0020310090	Big Jim (Suklak) Creek	Cu	8	0020180001	Lik	Zn
67	0020310113	Vi Creek		9	0020180002	Red Dog	Zn
68	0020310036	Rex (P)	Au	DEMARICATION POINT QUADRANGLE (16)			
69	0020310128	McLellan Creek	Au	1	0020160001	Unnamed occurrence	Co
70	0020310003	Linda Creek (P)	Au	HARRISON BAY QUADRANGLE (5)			
	0020319002	Compass Mining Co. (P)	Au	1	0020050001	Fish Creek Well No. 1	Petroleum
71	0020310051	Gold Creek (P)	Au	HOWARD PASS QUADRANGLE (20)			
72	0020310136	Little Squaw Mill (P)	Au	1	0020200004	Lisburne Ridge	Va
73	0020310115	Canyon Creek		2	0020200002	Drenchwater Creek	Pb
74	0020310099	Last Chance 1-2	Au	3	0020200005	Mount Bupto	Rare earth
75	0020310004	Big Creek (P)	Au	4	0020200001	Eskimo Venture	Pb
76	0020310052	Magnet Creek	Au	5	0020200006	Siniktanneyak	Cr
77	0020310102	Billy Glen Creek		6	0020200003	Kivliktort Mountain	Pb
78	0020319005	B & B Mining Co. (P)	Au	IKPIKPUK RIVER QUADRANGLE (12)			
79	0020310112	Hilltop Discovery	Au	1	0020120002	Oumalik Test Well No. 1	Petroleum
80	0020310005	Lake Creek (P)	Au	2	0020120005	Ikpikpuk River	Coal
81	0020310093	Wolf Pup	Au	3	0020120004	Colville River	Coal
82	0020310100	Holy Moses 1-2	Au	4	0020120001	Awuna River	Coal
83	0020310107	No Name Creek		5	0020120003	Killik River	Coal
84	0020310103	Wolf Creek		LOOKOUT RIDGE QUADRANGLE (11)			
85	0020310087	Shamrock Creek	Au	1	0020110002	Kigalik River	Coal
86	0020310108	Glacier Creek Trib.		2	0020110001	Awuna River	Coal
87	0020310066	Gold King	Au	MEADE RIVER QUADRANGLE (3)			
88	0020310031	California Creek (P)	Au	1	0020030003	Peard Bay	Coal
	0020310032	Jim Pup Creek (P)	Au	2	0020030002	Meade River 1	Coal
	0020310098	Wake Up Creek	Au	3	0020030001	Meade River Mine (P)	Coal
89	0020310044	Sheep Creek-Middle Fork Trib. (P)	Au	4	0020030004	Meade River 2	Coal
90	0020310054	Chandalar Lake		MISHEGUK MOUNTAIN QUADRANGLE (19)			
91	0020310049	Bore Creek	Au	1	0020190008	Nimiuktuk	Ba
92	0020310082	Big Joe Creek	Au	2	0020190006	MDA No. 3	
93	0020310137	Chekhechunnjik Creek	Au	3	0020190007	Ginny Creek	Zn
94	0020310086	Unnamed occurrence	Au	4	0020190002	Northerner	Cu
95	0020319004	Arctic Ventures of Alaska (P)	Au	5	0020190003	Misheguk Mtn. Asbestos	Asbestos
96	0020310067	Big Creek, Lower (P)	Au	6	0020190004	Avan 123-130	Au
97	0020310046	Minnie Creek (P)	Au	7	0020190005	Avan 1-122	Au
98	0020310039	Sawlog Creek	Au	8	0020190001	Kugururok River Chromite	Cr
99	0020310076	Horse Creek	Cu	MOUNT MICHELSON QUADRANGLE (15)			
100	0020310034	Dennys Gulch	Au	1	0020150007	Katakturuk River	Rare earth
	0020310035	Wizard	Au	2	0020150008	Canning River	Au
101	0020310075	Howard Creek	Cu	3	0020150003	Unnamed occurrence	Rare earth
102	0020310038	Dictator Creek	Au	4	0020150002	Sadlerochit Island	Phosphate
103	0020310048	Marion Creek (P)	Au	5	0020150005	Shublik Island	Rare earth
104	0020310033	Upper Myrtle Creek (P)	Au	6	0020150006	Okpilak River	Au
105	0020310063	Boulder Creek	Au	7	0020150001	Katak Creek	Sn
106	0020319001	Bill Feles (P)	Au	8	0020150004	Hulahula River	Phosphate
107	0020310030	Myrtle Creek (P)	Au	9	0020150011	Marsh Fork	Zn
108	0020310068	Slate Creek (P)	Au	10	0020150010	Unnamed occurrence	Co
109	0020310084	Unnamed occurrence	Cu	CHANDLER LAKE QUADRANGLE (22)			
110	0020310078	West Fork Chandalar River	Cu	1	0020220003	Kiruktagiak River	Phosphate
111	0020310085	Unnamed occurrence	Cu	2	0020220002	Chandler Lake	Phosphate
112	0020310077	Siwash Creek	Cu	3	0020220004	Natvakruak River	Phosphate
113	0020310056	Mosquito Fork	Au	4	0020220005	Tiglukpuk Creek	Phosphate
114	0020310116	Granite Creek	Au	5	0020220001	Anaktuvuk River	Phosphate
CHRISTIAN QUADRANGLE (32)				CHRISTIAN QUADRANGLE (32)			
1	0020320001	Glacier Mine 1-4	Limestone CB	1	0020320001	Glacier Mine 1-4	Limestone CB
2	0020320003	Christian River	Petroleum	2	0020320003	Christian River	Petroleum

LISTING OF MINERAL DEPOSITS—Continued

Map location	MAS sequence No.	Deposit name	Commodities	Map location	MAS sequence No.	Deposit name	Commodities
NOATAK QUADRANGLE (26)				WISEMAN QUADRANGLE (30)			
1	0020260004	Punupkroak Mtn.	Pb	1	0020300148	Union Creek	Au
2	0020260005	Iyikrok Mt. Chromite	Cr	2	0020300062	Lucky Boy No. 8	Au
3	0020260003	Kivalina River Gold Mining Co.	Au	3	0020300002	Hunt Fork	Pb
4	0020260006	Kikmiksot Mountain		4	0020300061	Allen River	Au
5	0020260001	Sours Prospect	Cr	5	0020300003	John River	Sb
6	0020260002	Noatak 1-20	Au	6	0020300001	Unnamed occurrence	Cu
PHILIP SMITH MOUNTAINS QUADRANGLE (23)				7	0020300066	Pass Creek	
1	0020230043	Occasional	Pb	8	0020300007	Unnamed occurrence	Cu
POINT HOPE QUADRANGLE (17)				9	0020300070	Grotto Mountain 1-6	Va
1	0020170004	Corwin Mine (P)	Coal	10	0020300067	Gary	
2	0020170003	Niak	Coal	11	0020300154	Tinayguk River	Au
3	0020170002	Cape Lewis	Coal	12	0020300015	Unnamed occurrence	Pb
4	0020170001	Cape Dyer	Coal	13	0020300162	Unnamed occurrence	Pb
5	0020170005	Jack 1-548		14	0020300006	Sheep Creek	Cu
POINT LAY QUADRANGLE (9)				15	0020300063	Chuck Creek	Au
1	0020090003	Tepsako River	Coal	16	0020300005	Unnamed occurrence	Cu
2	0020090002	Kukpowruk River	Coal	17	0020300013	Unnamed occurrence	Cu
3	0020090001	Cape Beaufort	Coal	18	0020300159	Unnamed occurrence	Cu
SURVEY PASS QUADRANGLE (29)				19	0020300158	Unnamed occurrence	Cu
1	0020290027	Nigikpalvururvrak Creek (P)	Au	20	0020300099	Canyon Creek	
2	0020290002	Lucky Six Creek Lode	Au	21	0020300111	Bonanza Creek	Au
3	0020290009	Pingaluk River	Au	22	0020300038	Washington Creek (P)	Au
4	0020290003	Lucky Six Creek (P)	Au	23	0020300065	Spring Creek 1-3	Au
5	0020290025	Tupik Creek	Pb	24	0020300004	Unnamed occurrence	Cu
6	0020290006	Quartz Hill	Au	25	0020300023	Vermont Dome	Cu
7	0020290026	Angiaak Pass	Pb	26	0020300028	Surprise Creek (P)	Au
8	0020290024	Arrigetch Peaks	Cu	27	0020300029	Spring Creek (P)	Au
9	0020290007	Reed River	Au	28	0020300161	Rocky Point	Cu
10	0020290001	Angunelechak Pass	Ag	29	0020300010	Unnamed occurrence	Cu
11	0020290020	Rass Group	Cu	30	0020300153	Seward Creek	Au
12	0020290022	Nel Group	Cu	31	0020300039	Vermont Creek & Hammond River (P)	Au
13	0020290011	Giahugus	Cu	32	0020300069	Jana No. 1	
14	0020290008	Walker Lake	Au	33	0020309008	Koyukuk Gold Co. (P)	Au
15	0020290018	Pip & Ava Groups	Cu	34	0020300011	Unnamed occurrence	Cu
16	0020290019	Spot Group	Cu	35	0020300027	Sirr Creek (P)	Au
17	0020290012	B. T., Z., & Cynbad Groups	Cu	36	0020300064	My Lou (P)	Au
18	0020290013	Missik	Cu	37	0020300160	Unnamed occurrence	Pb
19	0020290005	Aiatna River	Au	38	0020300074	Webster Gulch 1-10	Au
20	0020290014	Thomas Douglas	Cu	39	0020300109	Upper Hammond River (P)	Au
21	0020290017	Tommy Lee claims	Cu	40	0020300114	Swift Creek	Au
22	0020290010	Picnic Creek	Cu	41	0020309015	Samuel L. & Walter L. Munjar (P)	Au
23	0020290015	Sun Group	Zn	42	0020300073	Thompsons Pup (P)	Au
24	0020290016	Hot Group	Cu	43	0020309018	Tri-Con Mining, Inc.—Frank Figlinski (P)	Au
25	0020290023	Isaac Douglas	Cu	44	0020309005	Samuel Leonard Munjar Sr. (P)	Au
26	0020290004	Helpmejack Creek	Au	45	0020300012	Wild Lake	Cu
TABLE MOUNTAIN QUADRANGLE (25)				46	0020300110	Lower Hammond River (P)	Au
1	0020250001	Bear Mountain	W, Mo	47	0020300140	Jennie Creek	Au
2	0020250002	Galena Creek	Cu, Zn, Pb, Ag	48	0020300138	Agnes Creek	Au
TESHEKPUK QUADRANGLE (4)				49	0020300021	Smith Creek Dome	Ag
1	0020040002	Oil Seep	Petroleum	50	0020300022	Lofty Gulch	Pb
2	0020040001	Simpson Test Well No. 1	Petroleum	51	0020300157	Unnamed occurrence	Cu
3	0020040003	Teshkepuk Lake	Petroleum	52	0020309016	Tri-Con Mining, Inc.—Silverado Mines (P)	Au
UMIAT QUADRANGLE (13)				53	0020300115	Acme Creek	Au
1	0020130002	Colville River	Clay	54	0020309023	Coldfoot Arctic Mining Inc. (P)	Au
2	0020130001	Chandler River	Clay	55	0020309014	Cinco Mining (P)	Au
3	0020130003	Schrader Bluff	Clay	56	0020300086	Lake Creek (P)	Au
WAINWRIGHT QUADRANGLE (2)				57	0020300020	Smith Creek 1-4 (P)	Sb
1	0020020005	Kugrua River	Coal	58	0020309009	Joseph Vincent Strunka (P)	Au
2	0020020001	Point Collier	Coal	59	0020309010	R. H. Svoboda (P)	Au
3	0020020002	Kuk River 1 (P)	Coal	60	0020300113	Snowshore Creek	Au
4	0020020003	Kuk River 2 (P)	Coal	61	0020300075	Tasker Midnight	
5	0020020004	Kuk River 3 (P)	Coal	62	0020300032	Smith Creek (P)	Au
				63	0020300076	Pasco No. 1	
				64	0020300031	Oregon Creek	Au
				65	0020309017	Pete Pasqual (P)	Au
				66	0020300156	Matthews Dome	Cu
				67	0020300085	Wild River (P)	Au
				68	0020300043	Confederate Gulch	Au
				69	0020300072	Pasco Creek	Au
				70	0020300019	Midnight Dome	Sb
				71	0020300040	Nolan Creek (P)	Au
				72	0020300087	Trout Lake Discovery	Au
				73	0020300042	Union Gulch (P)	Au
				74	0020300088	Allen R No. 5 & 6	Au
				75	0020309001	Albert & Cecilia Manns (P)	Au
				76	0020300094	ABO	Pb

LISTING OF MINERAL DEPOSITS—Continued

Map location	MAS sequence No.	Deposit name	Commodities	Map location	MAS sequence No.	Deposit name	Commodities
WISEMAN QUADRANGLE—Continued				WISEMAN QUADRANGLE—Continued			
66	0020300071	Ace 1-12	Au	107	0020300105	D&L #1	
67	0020300084	Birch Creek (P)	Au	108	0020300152	Pat Creek	Au
68	0020300144	Koyukuk River, North Fork	Au	109	0020300147	Niakuk River	
69	0020300093	McKinley Creek	Au	110	0020309020	L-S Mining (P)	Au
70	0020300037	Mascot Creek (P)	Au	111	0020300035	Galena Creek	Pb
71	0020300080	Ice Worm 1-3		112	0020309006	William H. Nordeen (P)	Au
72	0020300034	Kay Creek	Au	113	0020300090	Bull Run Creek (P)	Au
73	0020300044	Minnie Creek (P)	Au	114	0020300092	Black Bear	Au
	0020300078	Minnie Creek Bluff	Pb	115	0020300047	Kelly Gulch (P)	Au
74	0020300077	Poorman 1-4		116	0020300014	Michigan Creek	Au
75	0020309019	Kirkman Construction, Inc. (P)	Au	117	0020300117	Fall Creek	Au
76	0020300041	Wiseman Creek	Au	118	0020300116	Michigan Creek	Au
	0020300155	Wiseman Unit (P)	Au	119	0020300036	Bourbon Creek (P)	Au
77	0020300018	Wiseman	Cu	120	0020309022	Coldfoot Mining Co.—Clara Creek (P)	Au
78	0020300119	Lode and Behold		121	0020300048	Clara Creek (P)	Au
79	0020300033	Rye Creek (P)	Au	122	0020300050	Porcupine Creek (P)	Au
	0020309002	Castle Creek Mines (P)	Au	123	0020300030	Myrtle Creek (P)	Au
80	0020300095	Buzz		124	0020300049	Slate Creek	Au
81	0020300107	Moose Trail		125	0020300151	Fork Creek	Au
82	0020300104	Zirc 450-553		126	0020300051	Rosie Creek (P)	Au
83	0020300017	Cow Creek	Cu	127	0020300083	Alder 1&2 (P)	Au
84	0020300118	Glacier River	Au		0020309013	Glenn D. Bouton (P)	Au
85	0020300106	Ann Group	Pb	128	0020309021	Coldfoot Mining Co.—12 Mile Creek (P)	Au
86	0020300008	Allen	Cu	129	0020300026	Suckik Creek (P)	Au
	0020300089	McCament Creek (P)	Au	130	0020300052	Twelvemile Creek (P)	Au
87	0020300134	Lasalle Creek	Au	131	0020300101	Red 1-8	
88	0020300141	Moose Creek	Au	132	0020300146	Jones Creek	
89	0020300137	Ruby Creek		133	0020300100	Roosevelt Creek	Cu
90	0020300098	Allen River (P)	Au	134	0020300143	Jones Creek	Au
91	0020300163	East Creek	Au	135	0020300103	Bog	
92	0020300025	Crevice Creek (P)	Au	136	0020300053	Mallbox Creek (P)	Au
93	0020300060	Mettenpherg Creek (P)	Au	137	0020300054	Chapman Creek (P)	Au
94	0020300096	Rock Creek	Au		0020300055	Tramway Bar (P)	Au
95	0020300009	Crevice Creek	Cu		0020309012	Glenn D. Bouton (P)	Au
96	0020300097	Sixtymile Creek (P)	Au	138	0020300145	Koyukuk River, South Fork	Au
97	0020300045	Sawyer Creek (P)	Au	139	0020300081	Wilson Creek (P)	Au
98	0020300024	Midas Creek (P)	Au	140	0020300164	Minie (P)	Au
99	0020300136	Horse Creek	Au		0020309003	A. E. Hartley (P)	Au
100	0020300135	Rock Creek	Au	141	0020300059	Eagle Cliff (P)	Au
101	0020300016	Emma Dome	Au	142	0020309011	Raymond A. Demoss & Josie G. (P)	Au
102	0020300150	Larowe Creek	Au	143	0020300112	Hidden Creek	Au
103	0020300142	Malenute Fork Trib.		144	0020300056	Smally Creek (P)	Au
104	0020300046	Emma Creek (P)	Au	145	0020309007	Smally Creek Mine (P)	Au
	0020300079	Marion Discovery (P)	Au				
105	0020300102	EPI 1-6					
106	0020300091	Bull Run Lode No. 1					

APPENDIX C.—MINERAL TERRANE ACREAGE IN EACH LAND AVAILABILITY CATEGORY, BY TERRANE TYPE, FOR EACH QUADRANGLE¹

(Thousand acres. Availability categories for which there is no corresponding mineral terrane acreage of any type are not listed.)

Land availability category	Volcanic rocks		Intrusives		Sediments		Total
	Mafic	Felsic	Maf/Ult ²	Granitic	Marine ³	Altered	
AMBLER RIVER QUADRANGLE							
AVAILABLE							
OS (total available).....	33.5	144.4	0	18.2	0	0	196.1
AVAILABLE WITH RESTRICTIONS							
PN (total restricted).....	26.0	1.3	18.5	0	0	44.7	90.5
UNAVAILABLE							
CF.....	26.1	125.1	0	2.4	159.4	0	313
Selected:							
SN.....	23.8	2	0.2	0	0	0	26
SS.....	0	96.6	0	6.2	0	0	102.8
SS-SN.....	32.3	16.2	0	0	0	12.3	60.8
SN-CF.....	2.2	0	0	0	0.6	0	2.8
SS-CF.....	0	4.8	0	3.1	0	0	7.9
Total unavailable.....	84.4	244.7	0.2	11.7	160	12.3	513.3
Grand total.....	143.9	390.4	18.7	29.9	160	57	799.9
ARCTIC QUADRANGLE							
UNAVAILABLE							
CF.....	4.3	22	5	0	790.1	0	821.4
Selected:							
SN-CF.....	0	0	0	0	9	0	9
Grand total.....	4.3	22	5	0	799.1	0	830.4
BAIRD MOUNTAINS QUADRANGLE							
AVAILABLE							
OF (total available).....	0	6	0.7	0	188	0	194.7
AVAILABLE WITH RESTRICTIONS							
PN (total restricted).....	0	2.2	0	0	3.2	0	5.4
UNAVAILABLE							
CF.....	69.9	329.1	0.2	3.1	376.1	0	778.4
Selected:							
SN.....	0	51	0	0	7.2	0	58.2
SN-CF.....	8.7	4.9	0	0	1.1	0	14.7
Total unavailable.....	78.6	385	0.2	3.1	384.4	0	851.3
Grand total.....	78.6	393.2	0.9	3.1	575.6	0	1,051.4
CHANDALAR QUADRANGLE							
AVAILABLE							
OF.....	43.9	4.5	0	169.4	75.4	0	293.2
OS.....	101.9	26.6	0	108.3	27	0	263.8
Total available.....	145.8	31.1	0	277.7	102.4	0	557
AVAILABLE WITH RESTRICTIONS							
PN (total restricted).....	0	0	0	13.2	0	0	13.2
UNAVAILABLE							
Federal:							
CF.....	0	5	0	85.3	34.3	0	124.6
Selected:							
SN.....	49.6	0	0	7.1	44.4	0	101.1
SS.....	63.2	24.2	0	6.6	70.5	0	164.5
SS-SN.....	7.6	6.7		1.4	49.3	0	65
Total Federal.....	120.4	35.9	0	100.4	198.5	0	455.2
State: MCO (total State).....	0	0	0	0	2.2	0	2.2
Total unavailable.....	120.4	35.9	0	100.4	200.7	0	457.4
Grand total.....	266.2	67	0	391.3	303.1	0	1,027.6
CHANDLER LAKE QUADRANGLE							
AVAILABLE							
OS (total available).....	0	0	0	0	360.9	0	360.9
AVAILABLE WITH RESTRICTIONS							
PN (total restricted).....	0	0	0	0	300.4	0	300.4
UNAVAILABLE							
CF.....	0	0	0	0	790	0	790
Selected:							
SN.....	0	0	0	0	9.2	0	9.2
SS.....	0	0	0	0	15.4	0	15.4
SS-SN.....	0	0	0	0	9.2	0	9.2
SN-CF.....	0	0	0	0	1.3	0	1.3
Total unavailable.....	0	0	0	0	825.1	0	825.1
Grand total.....	0	0	0	0	1,486.4	0	1,486.4

See explanatory notes at end of table.

**MINERAL TERRANE ACREAGE IN EACH LAND AVAILABILITY CATEGORY,
BY TERRANE TYPE, FOR EACH QUADRANGLE¹—Continued**

Land availability category	Volcanic rocks		Intrusives		Sediments		Total
	Mafic	Felsic	Maf/Ult ²	Granitic	Marine ³	Altered	
CHRISTIAN QUADRANGLE							
AVAILABLE WITH RESTRICTIONS							
PN (total restricted)	374.3	0	24.5	0.9	0	0	399.7
UNAVAILABLE							
CF	534	0	0	5	343.3	0	882.3
Selected: SN-CF	23.3	0	0	0	23.3	0	46.6
Total unavailable	557.3	0	0	5	366.6	0	928.9
Grand total	931.6	0	24.5	5.9	366.6	0	1,328.6
COLEEN QUADRANGLE							
AVAILABLE							
OF (total available)	74	0	0	0	5.1	0	79.1
UNAVAILABLE							
CF	640.7	0	0	230.7	1,473.6	0	2,345
Selected: SN-CF	0.6	0	0	0	20.4	0	21
Total unavailable	641.3	0	0	230.7	1,494	0	2,366
Grand total	715.3	0	0	230.7	1,499.1	0	2,445.1
DE LONG MOUNTAINS QUADRANGLE							
AVAILABLE							
OF	21.6	0	0	0	7.3	0	28.9
OS	8.4	0	0	0	39.5	0	47.9
Total available	30	0	0	0	46.8	0	76.8
AVAILABLE WITH RESTRICTIONS							
PN (total restricted)	0	0	0	0	182	0	182
UNAVAILABLE							
CF	15	0	38.5	0	200.1	0	253.6
Selected:							
SN	0	0	0	0	62.6	0	62.6
SS	49.1	0	0	0	384.4	0	433.5
SS-SN	2.6	0	0	0	81.2	0	83.8
SS-CF	0	0	0	0	17.6	0	17.6
SS-SN-CF	0	0	0	0	1.1	0	1.1
Total unavailable	66.7	0	38.5	0	747	0	852.2
Grand total	96.7	0	38.5	0	975.8	0	1,111
DEMARICATION POINT QUADRANGLE							
UNAVAILABLE							
CF (grand total)	105.3	0	0	58.7	278.7	0	442.7
HARRISON BAY QUADRANGLE							
AVAILABLE WITH RESTRICTIONS							
PN (total restricted)	0	0	0	0	8.8	0	8.8
UNAVAILABLE							
CF	0	0	0	0	131.7	0	131.7
Selected: SS	0	0	0	0	8.3	0	8.3
Total unavailable	0	0	0	0	140	0	140
Grand total	0	0	0	0	148.8	0	148.8
HOWARD PASS QUADRANGLE							
UNAVAILABLE							
CF	113.1	0	48.9	0	1,185.1	0	1,347.1
Selected: SS-CF	4	0	0	0	96.7	0	100.7
Grand total	117.1	0	48.9	0	1,281.8	0	1,447.8
IKPIKPUK RIVER QUADRANGLE							
AVAILABLE							
OF (total available)	0	0	0	0	3.4	0	3.4
AVAILABLE WITH RESTRICTIONS							
PN (total restricted)	0	0	0	0	96.3	0	96.3
UNAVAILABLE							
CF	0	0	0	0	1,091.7	0	1,091.7
Selected:							
SN	0	0	0	0	26.6	0	26.6
SN-CF	0	0	0	0	25.8	0	25.8
Total unavailable	0	0	0	0	1,144.1	0	1,144.1
Grand total	0	0	0	0	1,243.8	0	1,243.8

See explanatory notes at end of table.

**MINERAL TERRANE ACREAGE IN EACH LAND AVAILABILITY CATEGORY,
BY TERRANE TYPE, FOR EACH QUADRANGLE¹—Continued**

Land availability category	Volcanic rocks		Intrusives		Sediments		Total
	Mafic	Felsic	Maf/Ult ²	Granitic	Marine ³	Altered	
KILLIK RIVER QUADRANGLE							
AVAILABLE							
OS (total available)	0	0	0	0	8.6	0	8.6
AVAILABLE WITH RESTRICTIONS							
PN (total restricted)	0	0	0	0	476.9	0	476.9
UNAVAILABLE							
CF	0	0	0	0	1,173.5	0	1,173.5
Selected:							
SN	0	0	0	0	118.1	0	118.1
SS	0	0	0	0	14.4	0	14.4
SS-SN	0	0	0	0	5.2	0	5.2
SN-CF	0	0	0	0	4.8	0	4.8
SS-CF	0	0	0	0	189.1	0	189.1
Total unavailable	0	0	0	0	1,505.1	0	1,505.1
Grand total	0	0	0	0	1,990.6	0	1,990.6
LOOKOUT RIDGE QUADRANGLE							
UNAVAILABLE							
CF (grand total)	0	0	0	0	2,872.8	0	2,872.8
MEADE RIVER QUADRANGLE							
AVAILABLE WITH RESTRICTIONS							
PN (total restricted)	0	0	0	0	69.1	0	69.1
UNAVAILABLE							
CF	0	0	0	0	2,481.5	0	2,481.5
Selected: SN-CF	0	0	0	0	1.9	0	1.9
Total unavailable	0	0	0	0	2,483.4	0	2,483.4
Grand total	0	0	0	0	2,552.5	0	2,552.5
MISHEGUK MOUNTAIN QUADRANGLE							
UNAVAILABLE							
CF	175	0	120	0	1,215.5	0	1,510.5
Selected:							
SS	0	0	0	0	12.5	0	12.5
SN-CF	3.5	0	0	0	3.3	0	6.8
SS-CF	1.8	0	0	0	31.5	0	33.8
Grand total	180.3	0	120	0	1,262.8	0	1,563.1
MOUNT MICHELSON QUADRANGLE							
AVAILABLE							
OS (total available)	0	0	0	0	35.8	0	35.8
UNAVAILABLE							
CF	4.8	0	0	49.5	687.5	0	741.8
Selected: SS	0	0	0	0	7.1	0	7.1
Total unavailable	4.8	0	0	49.5	694.6	0	748.9
Grand total	4.8	0	0	49.5	730.4	0	784.7
NOATAK QUADRANGLE							
AVAILABLE							
OF	0	0	0	0	1.2	0	1.2
OS	19.1	0	3.7	0	90.5	0	113.3
Total available	19.1	0	3.7	0	91.7	0	114.5
AVAILABLE WITH RESTRICTIONS							
PN (total restricted)	0.3	0	0	0	37.1	0	37.4
UNAVAILABLE							
CF	111.9	0	1	0	86.2	0	199.1
Selected:							
SN	37.1	0	3.5	0	2.5	0	43.1
SS	52.5	0	2.1	0	23.2	0	77.8
SS-SN	31.1	0	0	0	52.3	0	83.4
SN-CF	51.8	0	19.2	0	25.2	0	96.2
SS-SN-CF	0	0	0	0	5.8	0	5.8
Total unavailable	284.4	0	25.8	0	195.2	0	505.4
Grand total	303.8	0	29.5	0	324	0	657.3

See explanatory notes at end of table.

**MINERAL TERRANE ACREAGE IN EACH LAND AVAILABILITY CATEGORY,
BY TERRANE TYPE, FOR EACH QUADRANGLE¹—Continued**

Land availability category	Volcanic rocks		Intrusives		Sediments		Total
	Mafic	Felsic	Maf/Uit ²	Granitic	Marine ³	Altered	
PHILIP SMITH MOUNTAINS QUADRANGLE							
AVAILABLE							
OF	0	0	0	0	102.5	0	102.5
OS	0	6.8	0	0	192.1	0	198.9
Total available	0	6.8	0	0	294.6	0	301.4
AVAILABLE WITH RESTRICTIONS							
PN (total restricted)	0	0	0	0	3.1	0	3.1
UNAVAILABLE							
Federal:							
CF	0	3.4	0	0	1,037.8	0	1,041.2
Selected:							
SS	0	21.6	0	0	69.1	0	90.7
SS-SN	0	0	0	0	0.6	0	0.6
SS-CF	0	0	0	0	7.1	0	7.1
Total Federal	0	25	0	0	1,114.6	0	1,139.6
State: MCO (total State)	0	0	0	0	16.7	0	16.7
Total unavailable	0	25	0	0	1,131.3	0	1,156.3
Grand total	0	31.8	0	0	1,429	0	1,460.8
POINT HOPE QUADRANGLE							
AVAILABLE WITH RESTRICTIONS							
PN (total restricted)	0	0	0	0	114.7	0	114.7
UNAVAILABLE							
SN	0	0	0	0	8.5	0	8.5
SS	0	0	0	0	125.8	0	125.8
SS-SN	0	0	0	0	6.6	0	6.6
SN-CF	0	0	0	0	15.8	0	15.8
SS-CF	0	0	0	0	63	0	63
SS-SN-CF	0	0	0	0	3.8	0	3.8
Total unavailable	0	0	0	0	223.5	0	223.5
Grand total	0	0	0	0	338.2	0	338.2
POINT LAY QUADRANGLE							
AVAILABLE							
OS (total available)	0	0	0	0	130.5	0	130.5
AVAILABLE WITH RESTRICTIONS							
PN (total restricted)	0	0	0	0	668.3	0	668.3
UNAVAILABLE							
SN	0	0	0	0	35.9	0	35.9
SS	0	0	0	0	0.2	0	0.2
SS-SN	0	0	0	0	112.7	0	112.7
Total unavailable	0	0	0	0	148.8	0	148.8
Grand total	0	0	0	0	947.6	0	947.6
SAGAVANIRKTOK QUADRANGLE							
AVAILABLE							
OF	0	0	0	0	56.2	0	56.2
OS	0	0	0	0	1,447.6	0	1,447.6
Total available	0	0	0	0	1,503.8	0	1,503.8
UNAVAILABLE							
Federal:							
CF	0	0	0	0	33.7	0	33.7
Selected: SS	0	0	0	0	1.8	0	1.8
Total Federal	0	0	0	0	35.5	0	35.5
State: MCO (total State)	0	0	0	0	26.2	0	26.2
Total unavailable	0	0	0	0	61.7	0	61.7
Grand total	0	0	0	0	1,565.5	0	1,565.5
SURVEY PASS QUADRANGLE							
AVAILABLE							
OS (total available)	58.9	332.5	0	11.1	79.2	0	471.7
UNAVAILABLE							
CF	82.1	148	0	229.4	970.9	0	1,430.4
Selected:							
SN	0	0.6	0	0	0	0	0.6
SS	0	2.6	0	0	0	0	2.6
SN-CF	0	3.1	0	0.6	1.3	0	5
SS-CF	0	11.5	0	0	3.2	0	14.7
Total unavailable	82.1	165.8	0	230	975.4	0	1,453.3
Grand total	141	488.3	0	241.1	1,054.6	0	1,925
TABLE MOUNTAIN QUADRANGLE							
UNAVAILABLE							
CF	51.7	17.7	0	21.3	732.9	0	823.6
Selected: SN-CF	0	0	0	2.7	2.1	0	4.8
Grand total	51.7	17.7	0	24	735	0	828.4

See explanatory notes at end of table.

**MINERAL TERRANE ACREAGE IN EACH LAND AVAILABILITY CATEGORY,
BY TERRANE TYPE, FOR EACH QUADRANGLE¹—Continued**

Land availability category	Volcanic rocks		Intrusives		Sediments		Total
	Mafic	Felsic	Maf/Ult ²	Granitic	Marine ³	Altered	
TESHEKPUK QUADRANGLE							
UNAVAILABLE							
CF (Grand total)	0	0	0	0	523.6	0	523.6
UMIAT QUADRANGLE							
AVAILABLE							
OS (total available)	0	0	0	0	384.8	0	384.8
AVAILABLE WITH RESTRICTIONS							
PN (total restricted)	0	0	0	0	110.1	0	110.1
CF	0	0	0	0	511.2	0	511.2
Selected:							
SN	0	0	0	0	2.1	0	2.1
SS	0	0	0	0	227.2	0	227.2
SS-SN	0	0	0	0	57.1	0	57.1
Total unavailable	0	0	0	0	797.6	0	797.6
Grand total	0	0	0	0	1,292.5	0	1,292.5
UTUKOK RIVER QUADRANGLE							
AVAILABLE							
OS (total available)	0	0	0	0	8.8	0	8.8
AVAILABLE WITH RESTRICTIONS							
PN (total restricted)	0	0	0	0	65.3	0	65.3
UNAVAILABLE							
CF	0	0	0	0	2,262.5	0	2,262.5
Selected:							
SN	0	0	0	0	5.6	0	5.6
SS-SN	0	0	0	0	11.3	0	11.3
Total unavailable	0	0	0	0	2,279.4	0	2,279.4
Grand total	0	0	0	0	2,353.5	0	2,353.5
WAINWRIGHT QUADRANGLE							
AVAILABLE							
OS (total available)	0	0	0	0	63.4	0	63.4
AVAILABLE WITH RESTRICTIONS							
PN (total restricted)	0	0	0	0	186.4	0	186.4
UNAVAILABLE							
CF	0	0	0	0	1,297.9	0	1,297.9
Selected: SN-CF	0	0	0	0	23.7	0	23.7
Total unavailable	0	0	0	0	1,321.6	0	1,321.6
Grand total	0	0	0	0	1,571.4	0	1,571.4
WISEMAN QUADRANGLE							
AVAILABLE							
OF	10.4	0	0	0	26.2	0	36.6
OS	87.6	249.1	0	5.8	458	0	800.5
Total available	98	249.1	0	5.8	484.2	0	837.1
AVAILABLE WITH RESTRICTIONS							
PN (total restricted)	0	0	0	0	8.5	0	8.5
UNAVAILABLE							
Federal:							
CF	54.9	1.2	0	7.7	310.8	0	374.6
Selected:							
SN	0	0	0	0	0.4	0	0.4
SS	2	0	0	0	16.8	0	18.8
Total Federal	56.9	1.2	0	7.7	328	0	393.8
State: MCO (total State)	1.4	0	0	0	5	0	6.4
Total unavailable	58.3	1.2	0	7.7	333	0	400.2
Grand total	156.3	250.3	0	13.5	825.7	0	1,245.8
CF	Closed Federal.		SN	Selected Native			
MCO	Mineral closing order.		SS	Selected, State			
OF	Open Federal.		¹ Quadrangles containing no mineral terrane acreage: Barrow, Barter Island, Beechey Point, Flaxman Island.				
OS	Open State.		² Mafic-ultramafic.				
PN	Patented, Native.		³ Continental.				

APPENDIX D.—NUMBER OF MINERAL DEPOSITS IN EACH LAND AVAILABILITY CATEGORY, BY TERRANE AND DEPOSIT TYPE, FOR EACH QUADRANGLE¹

(Land availability categories for which there are no corresponding mineral deposit locations are not listed.)

Land availability category	Volcanic rocks				Intrusives				Sediments				No terrane		Total	
	Mafic		Felsic		Maf/Ult ²		Granitic		Marine ³		Altered		P	L	P	L
	P	L	P	L	P	L	P	L	P	L						
AMBLER RIVER QUADRANGLE																
AVAILABLE																
OS (total available)	0	1	1	7	0	0	0	4	0	0	0	0	0	5	1	17
AVAILABLE WITH RESTRICTIONS																
PN (total restricted)	0	2	0	1	0	1	0	0	0	0	4	6	0	0	4	10
UNAVAILABLE																
CF	0	0	0	2	0	0	1	0	1	1	0	0	1	2	3	5
Selected:																
SN	1	0	0	0	0	0	0	0	0	0	0	0	2	2	3	2
SS	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	8
SS-SN	2	0	0	0	0	0	0	0	0	0	1	1	0	0	3	1
SN-CF	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Total unavailable	3	1	0	10	0	0	1	0	1	1	1	1	4	4	10	17
Grand total	3	4	1	18	0	1	1	4	1	1	5	7	4	9	15	44
ARCTIC QUADRANGLE																
UNAVAILABLE																
CF (grand total)	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
BAIRD MOUNTAINS QUADRANGLE																
AVAILABLE																
OF (total available)	0	0	0	0	0	0	0	0	2	2	0	0	5	0	7	2
AVAILABLE WITH RESTRICTIONS																
PN (total restricted)	0	0	0	0	0	0	0	0	0	0	0	0	6	0	6	0
UNAVAILABLE																
CF	0	0	0	2	0	0	0	0	0	4	0	0	1	4	1	10
Selected: SN	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
Total unavailable	0	0	0	2	0	0	0	0	0	4	0	0	2	5	2	11
Grand total	0	0	0	2	0	0	0	0	2	6	0	0	13	5	15	13
BARROW QUADRANGLE																
AVAILABLE WITH RESTRICTIONS																
PN (total restricted)	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0
UNAVAILABLE																
CF (total unavailable)	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
Grand total	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4
CHANDALAR QUADRANGLE																
AVAILABLE																
OF	2	0	0	0	0	0	0	0	3	2	0	0	5	0	10	2
OS	0	1	0	1	0	0	0	4	1	1	0	0	24	19	25	26
Total available	2	1	0	1	0	0	0	4	4	3	0	0	29	19	35	28
AVAILABLE WITH RESTRICTIONS																
PN (total restricted)	0	0	0	0	0	0	0	1	0	0	0	0	4	0	4	1
UNAVAILABLE																
Federal:																
CF	0	0	0	0	0	0	0	0	1	1	0	0	3	1	4	2
Selected:																
SN	0	1	0	0	0	0	0	0	4	5	0	0	7	1	11	7
SS	0	1	0	0	0	0	2	1	1	4	0	0	13	0	16	6
SS-SN	0	1	0	1	0	0	0	0	2	4	0	0	1	0	3	6
Total Federal	0	3	0	1	0	0	2	1	8	14	0	0	24	2	34	21
State: MCO (total State)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
Total unavailable	0	3	0	1	0	0	2	1	8	14	0	0	25	3	35	22
Grand total	2	4	0	2	0	0	2	6	12	17	0	0	58	22	74	51
CHANDLER LAKE QUADRANGLE																
AVAILABLE WITH RESTRICTIONS																
PN (total restricted)	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3
UNAVAILABLE																
CF (total unavailable)	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
Grand total	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	5
CHRISTIAN QUADRANGLE																
AVAILABLE WITH RESTRICTIONS																
PN (total restricted)	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
UNAVAILABLE																
CF (Total unavailable)	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	3
Grand total	0	1	0	0	0	0	0	0	0	1	0	0	0	2	0	4

See explanatory notes at end of table.

**NUMBER OF MINERAL DEPOSITS IN EACH LAND AVAILABILITY CATEGORY,
BY TERRANE AND DEPOSIT TYPE, FOR EACH QUADRANGLE¹—Continued**

Land availability category	Volcanic rocks				Intrusives				Sediments				No terrane		Total	
	Mafic		Felsic		Maf/Ult ²		Granitic		Marine ³		Altered		P	L	P	L
	P	L	P	L	P	L	P	L	P	L						
COLEEN QUADRANGLE																
UNAVAILABLE																
CF (grand total)	0	0	0	0	0	0	0	2	0	1	0	0	1	0	1	3
DE LONG MOUNTAINS QUADRANGLE																
AVAILABLE WITH RESTRICTIONS																
PN (total restricted)	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3
UNAVAILABLE																
SN	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
SS	0	0	0	0	0	0	0	0	0	3	0	0	1	0	1	3
SS-SN	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Total unavailable	0	0	0	0	0	0	0	0	0	3	0	0	2	1	2	4
Grand total	0	0	0	0	0	0	0	0	0	6	0	0	2	1	2	7
DEMARCATION POINT QUADRANGLE																
UNAVAILABLE																
CF (grand total)	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
HARRISON BAY QUADRANGLE																
UNAVAILABLE																
CF (grand total)	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
HOWARD PASS QUADRANGLE																
UNAVAILABLE																
CF (grand total)	0	0	0	0	0	2	0	0	0	4	0	0	0	0	0	6
IKPIKPUK RIVER QUADRANGLE																
AVAILABLE WITH RESTRICTIONS																
PN (total restricted)	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
UNAVAILABLE																
CF	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	3
Selected: SN-CF	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Total unavailable	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	4
Grand total	0	0	0	0	0	0	0	0	0	4	0	0	0	1	0	5
LOOKOUT RIDGE QUADRANGLE																
UNAVAILABLE																
CF (grand total)	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
MEADE RIVER QUADRANGLE																
AVAILABLE WITH RESTRICTIONS																
PN (total restricted)	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
UNAVAILABLE																
CF (total unavailable)	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3
Grand total	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	4
MISHEGUK MOUNTAIN QUADRANGLE																
UNAVAILABLE																
CF (grand total)	0	0	0	0	1	3	0	0	0	3	0	0	0	1	1	7
MOUNT MICHELSON QUADRANGLE																
UNAVAILABLE																
CF (grand total)	0	1	0	0	0	0	0	0	1	2	0	0	1	5	2	8
NOATAK QUADRANGLE																
AVAILABLE																
OS (total available)	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
AVAILABLE WITH RESTRICTIONS																
PN (total restricted)	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
UNAVAILABLE																
SN	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
SS-SN	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	2
SN-CF	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Total unavailable	1	1	0	0	0	1	0	0	0	0	0	0	0	1	1	3
Grand total	1	1	0	0	0	1	0	0	0	1	0	0	1	1	2	4

See explanatory notes at end of table.

**NUMBER OF MINERAL DEPOSITS IN EACH LAND AVAILABILITY CATEGORY,
BY TERRANE AND DEPOSIT TYPE, FOR EACH QUADRANGLE¹—Continued**

Land availability category	Volcanic rocks				Intrusives				Sediments				No terrane		Total	
	Mafic		Felsic		Maf/Ult ²		Granitic		Marine ³		Altered		P	L	P	L
	P	L	P	L	P	L	P	L	P	L	P	L				
PHILIP SMITH MOUNTAINS QUADRANGLE																
UNAVAILABLE																
CF (grand total)	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
POINT HOPE QUADRANGLE																
AVAILABLE WITH RESTRICTIONS																
PN (total restricted)	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
UNAVAILABLE																
SS-SN	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
SN-CF	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
SS-CF	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
Total unavailable	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	4
Grand total	0	0	0	0	0	0	0	0	0	4	0	0	0	1	0	5
POINT LAY QUADRANGLE																
AVAILABLE WITH RESTRICTIONS																
PN (grand total)	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	3
SURVEY PASS QUADRANGLE																
AVAILABLE																
OS (total available)	1	0	1	9	0	0	0	0	0	0	0	0	0	1	2	10
UNAVAILABLE																
CF	0	0	1	0	0	0	1	3	0	1	0	0	2	2	4	6
Selected:																
SS	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	3
SN-CF	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
Total unavailable	0	0	1	3	0	0	1	3	0	1	0	0	3	2	5	9
Grand total	1	0	2	12	0	0	1	3	0	1	0	0	3	3	7	19
TABLE MOUNTAIN QUADRANGLE																
UNAVAILABLE																
CF (grand total)	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	2
TESHEKPUK QUADRANGLE																
UNAVAILABLE																
CF (grand total)	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3
UMIAT QUADRANGLE																
AVAILABLE WITH RESTRICTIONS																
PN (total restricted)	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
UNAVAILABLE																
SN (total unavailable)	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Grand total	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3
WAINWRIGHT QUADRANGLE																
AVAILABLE WITH RESTRICTIONS																
PN (total restricted)	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3
UNAVAILABLE																
CF (total unavailable)	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
Grand total	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	5
WISEMAN QUADRANGLE																
AVAILABLE																
OF	2	0	0	0	0	0	0	0	5	0	0	0	16	4	23	4
OS	6	0	9	8	0	0	0	2	17	12	0	0	22	12	54	34
Total available	8	0	9	8	0	0	0	2	22	12	0	0	38	16	77	38
AVAILABLE WITH RESTRICTIONS																
PN (total restricted)	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
UNAVAILABLE																
Federal:																
CF	1	0	0	0	0	0	0	0	1	1	0	0	19	12	21	13
Selected:																
SN	0	0	0	0	0	0	0	0	1	0	0	0	3	2	4	2
SS	0	0	0	0	0	0	0	0	0	2	0	0	1	2	1	4
Total Federal	1	0	0	0	0	0	0	0	2	3	0	0	23	16	26	19
State: MCO (total State)	1	0	0	0	0	0	0	0	0	0	0	0	7	1	8	1
Total unavailable	2	0	0	0	0	0	0	0	2	3	0	0	30	17	34	20
Grand total	10	0	9	8	0	0	0	2	24	15	0	0	68	34	111	59

CF Closed Federal.
L Lode deposit.
MCO Mineral closing order.
OF Open Federal.
OS Open State.
P Placer deposit.

PN Patented Native.
SN Selected, Native.
SS Selected, State.

¹Quadrangles containing no mineral deposit locations: Barter Island, Beechey Point, Flaxman Island, Killik River, Sagavanirktok, and Utukok River.

²Mafic-ultramafic.
³Continental.

APPENDIX E.—MAJOR FEDERAL LAWS AFFECTING MINERAL EXPLORATION AND DEVELOPMENT¹

Act of March 3, 1807 (2 Stat. 448)—First mineral land leasing act, reserved lead mines and adjacent areas to the Federal Government for future disposal, and provided for their lease to private parties for limited terms. Later related acts reserved specific minerals (salt springs, lead, and hot springs) in certain States from sale and/or provided for leasing. Most Federal mineral lands were available by leasing from 1807 to 1846.

Act of April 25, 1812 (2 Stat. 716)—General Land Office was organized as a bureau in the Treasury Department. It was transferred in 1849 to the Department of the Interior and abolished in 1946 when its functions were merged with the Department of the Interior's Grazing Office to form the Bureau of Land Management. Responsible for public land laws relating to surveys, disposal, and other activities concerning administration and management of the public land.

Act of July 11, 1846 (9 Stat. 37)—Authorized sale of lead mines in the Upper Mississippi Valley and in Arkansas at public auction for \$2.50/acre. Other related acts provided for survey and sale of mineral land in various States, and authorized preemptive rights for mineral land. Period of Federal mineral land sales extended from 1846 to 1866. Some mineral land was sold under the agricultural laws for various reasons.

Act of May 20, 1862 (12 Stat. 392)—Homestead Act of 1862—This and later homestead acts allowed settlers to enter nonmineral public land for agricultural purposes, meet certain conditions for improvements, and obtain a patent (title) to the land, including the minerals in most cases. Many of these lands have subsequently yielded substantial mineral deposits.

Act of March 3, 1865 (13 Stat. 529)—Coal lands could be disposed from public lands. For actual coal mining operations, up to 160 acres of land could be acquired at a minimum rate of \$20.00/acre.

Act of July 26, 1866 (14 Stat. 251)—Mining Act of 1866—All mineral lands of the public domain were declared open to exploration and occupation. The act provided for location of lode mining claims, and upon expenditure of at least \$1,000 in improvements, a patent could be purchased at the rate of \$5.00/acre. The law allowed only one location per lode and limited each location to 200 feet along the lode or vein.

Act of July 9, 1870 (16 Stat. 217)—Placer Claims Act of 1870—This act amended the Act of July 26, 1866, to include placer locations. It allowed placer claims to conform to legal subdivision on surveyed lands. Placer claims could not exceed 160 acres for any one person or association of persons. Payment for patent of placer claims was \$2.5/acre.

Act of May 10, 1872 (17 Stat. 91)—General Mining Law of 1872—This well-known act replaced much of the 1866 and 1870 laws. It declared "all valuable mineral deposits in lands belonging to the United States . . . to be free and open to exploration and purchase." It authorized placer and lode mining claims to be located by a procedure that is largely unchanged to this day. The act also required that not less than \$100 worth of work be performed on each claim per year. Patents could be issued for claims containing "valuable deposits" upon expenditure of \$500 worth of work. Later acts excluded varieties of leasable and salable minerals from the purview of the General Mining Law.

Act of March 3, 1873 (17 Stat. 607)—Entry could be made on vacant coal lands belonging to the United States.

Act of March 3, 1877 (19 Stat. 377)—Desert Land Entries Act—Provided for entry and disposal of arid land, non-mineral in character, in tracts of up to 640 acres in size at only \$0.25/acre, with patent to follow upon proof that the land had been irrigated.

Act of March 3, 1879 (20 Stat. 394)—Established the office of Director of the Geological Survey. Duties included geology and mineral resource studies and classification of the public lands.

Act of June 4, 1897 (30 Stat. 34)—National Forest System Organic Act of 1897—Provided for administration and management of the national forest reserves established by Presidential proclamation under the Act of March 3, 1891, to improve and protect the forest, and secure favorable conditions for waterflows and a supply of timber. Administration transferred from the Department of the Interior to the Agriculture Department in 1905. Vacant unappropriated Federal land in the National Forest System is generally open to entry under the mining and mineral leasing laws, subject to rules and regulations governing the forest. The first major closure of public lands to disposal under nonmineral, but not mineral, land laws.

Act of May 14, 1898 (30 Stat. 409; 43 USC 270), as amended—This act and its amendments extended the homestead laws to Alaska. In general, the act required that proposed homesteads be surveyed. The only minerals that could be reserved were coal, oil, and gas. If the land was found to be valuable for other minerals prior to patent, the homestead would be rejected.

Act of May 14, 1898 (30 Stat. 413), as amended August 23, 1958 (72 Stat. 730; 43 USC 687a)—Provided procedure for affidavits of location, including filing, publishing, and posting of notices in Alaska. Also authorized the sale of tracts not to exceed 80 acres for trade and manufacturing sites. The lands had to be nonmineral in character. However, if the lands were valuable for coal, oil, and gas, such deposits could be reserved under the Act of March 8, 1922 (42 Stat. 415; 43 USC 376).

Act of May 14, 1898 (30 Stat. 415)—Canadians were given the same mining rights in Alaska as United States citizens had in Canada.

Act of June 6, 1900 (31 Stat. 327)—Mining laws of the United States were extended to Alaska. The act specified a 90-day time period and place for filing notices of location for mining claims in Alaska.

Act of June 17, 1902 (32 Stat. 388)—Reclamation Act of 1902—Authorized withdrawal of land for irrigation projects and all land believed to be susceptible to irrigation from such projects. Such land was segregated from operation of the mining laws but has remained open to mineral leasing, with restrictions, since 1920. In addition, the Act of October 2, 1888, as amended, effected an automatic withdrawal of all land actually designated or selected for reservoirs, ditches, or canals for irrigation purposes, unless otherwise provided by law.

Act of April 28, 1904 (3 Stat. 525)—Gave procedure for locating coal lands in Alaska.

Act of May 17, 1906 (34 Stat. 197)—Alaska Native Allotment Act—Authorized Alaska Natives to apply for title on up to 160 acres of nonmineral land that they had used in the "customary Native manner," either for

¹Many of these laws were compiled from "Mining Law" (16), by T.S. Malley.

residence or subsistence purposes. Such land could not have any mineral value other than for coal, oil, or gas.

Act of June 8, 1906 (34 Stat. 225)—Antiquities Act of 1906—Provided for protection of cultural resources on Federal land, specified penalties for violations, and authorized the President to proclaim lands containing historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest as national monuments; such areas were reserved from operation of the mining and mineral leasing laws, unless specifically provided otherwise.

Act of March 3, 1909 (35 Stat. 844)—Coal Lands Act of 1909—This was the first land disposal act that reserved mineral rights to the United States. Land being disposed of for agricultural purposes was severed from its subsurface estate, with the contained coal reserved to the United States, except that amount used for domestic purposes. Many acts of this type followed, reserving all or some of the mineral rights to the United States.

Act of May 16, 1910 (36 Stat. 369)—Bureau of Mines Organic Act—Bureau of Mines was established with duties covering health and safety, conservation, research, and prevention of waste in the mineral industries.

Act of June 25, 1910 (36 Stat. 847)—General Withdrawal Act (Pickett Act)—Authorized the President to temporarily withdraw from settlement, location, sale, or entry any of the public lands of the United States and reserve the same for water power sites, irrigation, or classification of lands until withdrawal is revoked by the President or by an act of Congress. The withdrawn lands remain open to exploration and location under the mining laws of the United States as they apply to metalliferous minerals.

Act of February 18, 1911 (36 Stat. 917)—Reclamation Homesteads Act, as amended by the Act of August 13, 1914 (Stat. 689; 43 USC 436)—To qualify for reclamation withdrawal, lands must be nonmineral in character. However, valuable leasable minerals may be specifically reserved in a patent pursuant to 30 USC 121-123.

Act of August 25, 1916 (39 Stat. 535)—National Park Service Organic Act—Established the National Park Service to administer existing and future national parks and monuments "to conserve the scenery and the natural and historic objects and the wildlife therein to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." Most units of the National Park System are specifically withdrawn from all mineral development.

Act of December 29, 1916 (39 Stat. 863)—Stockraising Homestead Act of 1916—Authorized entries on the public land for stockraising (grazing) purposes, but unlike earlier homestead acts, this act reserved all minerals to the United States whether or not the land was considered to be valuable for any mineral. Minerals in these lands are open to location and patent under the mining laws, with appropriate compensation due to the surface owner if damages occur from these activities. This act is not applicable to Alaska.

Act of February 25, 1920 (41 Stat. 437)—Mineral Leasing Act of 1920—Removed deposits of coal, phosphate, sodium, oil, oil shale, and gas from disposal under the mining laws, and made such deposits subject to a leasing system. The law specifies rental and royalty rates, lease size, and terms for each leasable mineral, and it provides for non-competitive prospecting permits and competitive bidding on known geologic structures. This act grants the Secretary

of the Interior broad discretion in granting permits and leases. Although later amended to include other minerals and change certain requirements, the act remains the method of disposal of leasable-type minerals.

Act of June 10, 1920 (41 Stat. 1063)—Federal Water Power Act—Section 24 of the act provided that filing an application for a permit or license for a power site automatically withdraws the land from all other forms of disposal; classification of land as valuable for powersite purposes by the U.S. Geological Survey also effects a withdrawal under the act. Such withdrawals were opened, with restrictions, by the Act of August 11, 1955.

Act of May 25, 1926 (44 Stat. 629)—Native Townsite Act—Provided an opportunity for individual Alaska Natives to obtain title to lands in the public domain. Designated lands were withdrawn, boundaries surveyed, and lands subdivided. Once a patent was issued for the townsite, the lands were withdrawn from the public domain.

Act of June 14, 1926 (44 Stat. 741)—Recreation and Public Purposes Act—Provided for reservation of public land chiefly valuable for recreational purposes, and for the lease, exchange, or sale of such land to State and local governments. All minerals in such lands are reserved to the United States and are unavailable under the mining and mineral leasing laws.

Act of February 7, 1927 (44 Stat. 1057)—Amendment to Mineral Leasing Act of 1920—Authorized the Secretary of the Interior to grant prospecting permits and preference-right leases for chlorides, sulfates, carbonates, borates, silicates, or nitrates of potash.

Act of March 3, 1927 (44 Stat. 1354; 43 USC 687a)—Homesite Act of 1927, as amended—Authorized the sale of homesites not to exceed 5 acres in size. The lands had to be nonmineral in character, except that lands valuable in coal, oil, or gas deposits were subject to disposition under the provisions of the Act of March 8, 1922 (42 Stat. 415; 43 USC 270).

Act of December 22, 1928 (45 Stat. 1069)—Color of Title Act—Authorized the issuance of patents for public land erroneously held for a specified period in good faith. Minerals may be reserved to the United States or included in the patent.

Act of April 23, 1932 (47 Stat. 136)—Public lands withdrawn under the reclamation laws could be open to location and patent under the general mining laws with certain rights reserved to the United States.

Act of May 2, 1932 (47 Stat. 14)—States that made lieu land selections because the original grant lands were classified as valuable for minerals and hence, not available, could relinquish the lieu selections and acquire the mineral lands if still available.

Act of May 4, 1934 (48 Stat. 663)—The general mining laws of the United States were extended to Alaska.

Act of June 16, 1934 (48 Stat. 977)—Amended the Mineral Leasing Act of 1920, to provide that if water in sufficient quality and quantity is discovered while drilling an oil and gas well that land is to be reserved as a waterhole.

Act of June 28, 1934 (48 Stat. 1269)—Taylor Grazing Act of 1934—Marking the end of liberal Federal disposal policies on nonmineral public land, the act provided for management of all unreserved public land, except in Alaska, withdrawal of all vacant public land for classification (but not from entry under the mining laws), and establishment of grazing districts and the Grazing Service.

Act of June 1, 1938 (52 Stat. 609)—Small Tract Act—Permitted the lease, or sale of tracts of public land of 5 acres

or less that were valuable for recreational, home, or business site purposes. All minerals were reserved to the United States. Classification of land for small tract disposal segregated the land from location under the mining laws. This act was repealed by the Federal Land Policy and Management Act of 1976.

Act of June 7, 1939 (53 Stat. 811)—Authorized the President to stockpile strategic and critical minerals, and the Secretary of the Interior to investigate and develop new sources of such minerals.

Act of May 7, 1941 (55 Stat. 177)—This coal mine safety act authorized inspectors of coal mines and the distribution of health and safety information.

Act of September 27, 1944 (58 Stat. 745)—Authorized the Secretary of the Interior to dispose of sand, stone, and gravel on public lands.

Reorganization Plan No. 3 of 1946 (60 Stat. 1097)—Authorized the Secretary of the Interior to lease, with the concurrent approval of the Secretary of Agriculture, those minerals in acquired national forest and grassland that are disposed of by location on public land. Also established the Bureau of Land Management with combined functions of the General Land Office and the Grazing Service.

Act of July 31, 1947 (61 Stat. 681)—Materials Act of 1947 (Public Law 291)—Authorized disposal of materials including, but not limited to, sand, stone, gravel, and common clay on public lands through a sales system. If the appraised value of the material exceeds \$1,000, it must be disposed by competitive bidding. The law also provided for free use of such materials for noncommercial use by government and nonprofit agencies.

Act of August 7, 1947 (61 Stat. 913)—Mineral Leasing Act for Acquired Lands (Public Law 382)—Authorized the Secretary of the Interior to issue mineral leases on acquired lands, subject to concurrence of the surface management agency.

Act of June 21, 1949 (63 Stat. 214)—Deferment of assessment work on mining claims may be approved if the claimant is denied access to his property.

Act of June 30, 1950 (64 Stat. 311)—Development of mineral resources was extended to certain public lands not open to such development at the date of this act.

Act of May 22, 1953 (67 Stat. 29)—Submerged Lands Act—Granted title of land beneath navigable waters to the respective States. The act also confirmed that the seaward boundary of the coastal States extends 3 miles from the coastline of the State.

Act of August 7, 1953 (67 Stat. 462)—Outer Continental Shelf Lands Act—Extended the jurisdiction of the United States to include that part of the Continental Shelf outside the 3-mile zone. The act also authorized the Secretary of the Interior to grant mineral leases on the Outer Continental Shelf through a competitive bidding system.

Act of August 12, 1953 (67 Stat. 539)—Validated certain mining claims located on lands that, at the time of location, were under a prospecting permit or mineral lease. In the event a mineral patent should issue, a mineral reservation is made to the United States.

Act of August 13, 1954 (68 Stat. 708)—Multiple Mineral Development Act of 1954 (Public Law 585)—Amended the mining and mineral leasing laws to permit multiple development of both locatable and leasable minerals on the same tract of land. If a mineral patent is issued, a reservation is made to the United States for the leasable minerals.

Act of August 30, 1954 (68 Stat. 919)—Atomic Energy Act of 1954—Authorized the Atomic Energy Commission, and now the Department of Energy, to issue leases for exploration and mining of fissionable materials on public lands.

Act of July 23, 1955 (69 Stat. 367)—Surface Resources Act of 1955 (Public Law 167)—Defined common varieties of sand, stone, gravel, pumice, pumicite, cinders, and petrified wood, and excluded such mineral materials from location under the general mining laws; they are salable under the Materials Act of 1947. The act also authorized the United States to manage and dispose of surface resources that are not incident to mining on unpatented mining claims. Procedures were outlined for determining title uncertainties on unpatented mining claims.

Act of August 11, 1955 (69 Stat. 679)—Uraniferous Lignite Act of 1955 (Public Law 357)—Permitted location of mining claims for uranium and other fissionable source materials on public land classified or known to be valuable for lignite coal.

Act of August 11, 1955 (69 Stat. 681)—Mining Claims Rights Restoration Act of 1955 (Public Law 359)—Provided for location of mining claims on approximately 7 million acres of land previously withdrawn or reserved for power site development. Mineral development is liable to risk from any future power development. Location of placer claims is subject to additional requirements, and placer mining may be denied by the Secretary of the Interior if such operation would substantially interfere with other uses of the land.

Act of July 20, 1956 (70 Stat. 592)—Provided that any reserved mineral deposit located prior to the Mineral Leasing Act of 1920 is subject to disposal by mineral patent.

Act of July 3, 1958 (72 Stat. 323)—Provided that oil and gas leases may be issued pursuant to the Mineral Leasing Act of 1920 for lands beneath nontidal or navigable Alaskan waters.

Act of July 7, 1958 (72 Stat. 339)—The Statehood Act (Public Law 85-508)—Authorized the selection of 104 million acres from unreserved public domain lands, title to the beds of the State's navigable rivers and lakes, and ownership of submerged lands up to 3 miles off the coast of Alaska.

Act of August 21, 1958 (72 Stat. 700)—Authorized the Secretary of the Interior to develop a program to encourage exploration for mineral reserves by private industry.

Act of September 2, 1958 (72 Stat. 1701)—Geological, geochemical, and geophysical surveys may be used to fulfill the \$100 annual labor requirement needed to maintain a legal unpatented mining claim. These surveys may be used for 2 consecutive years, but may not exceed 5 years, and must be conducted by qualified experts.

Act of March 18, 1960 (74 Stat. 7)—Placer Claims Millsite Act of 1960 (Public Law 86-390)—Provided for location and patent of up to 5 acres of nonmineral land in connection with a placer mining claim.

Act of June 12, 1960 (74 Stat. 215)—Multiple-Use, Sustained-Yield Act of 1960 (Public Law 86-517)—Directed the Secretary of Agriculture to develop and administer the renewable surface resources of the national forests for multiple use and sustained yield, giving due consideration to the relative values of the various resources (outdoor recreation, range, timber, watershed, and wildlife and fish purposes) in particular areas. The establishment and maintenance of areas of wilderness are consistent with the purposes and provisions of this act; the act does not af-

fect the use or administration of the mineral resources of national forest lands.

Act of September 1, 1960 (74 Stat. 785)—This amendment to the Mineral Leasing Act of 1920 specified new requirements for the leasing act minerals, including maximum leasehold per State, application procedures, and assignment procedures.

Act of August 17, 1961 (75 Stat. 384)—Authorized the Secretary of the Interior to sell lands in Alaska with known oil, gas, or coal deposits.

Act of September 26, 1962 (76 Stat. 652)—Petrified wood is defined and removed from the category of locatable minerals. Limited quantities of petrified wood may be obtained from the public lands on a free-use basis.

Act of October 23, 1962 (76 Stat. 1127)—**Mining Claim Occupancy Act of 1962**—Authorized the Secretary of the Interior to convey interests up to fee simple title of 5 acres or less to residential occupants of unpatented mining claims on which valuable improvements have been made.

Act of December 17, 1963 (77 Stat. 392)—**Clean Air Act (Public Law 88-206)**—Established a national program to control air pollution. Under the act, as amended, standards are set for air quality and attainment status is determined by area. Permits are required for new sources of air pollution, including mining and milling operations.

Act of September 3, 1964 (78 Stat. 890)—**Wilderness Act (Public Law 88-577)**—Created the National Wilderness Preservation System and provided for its administration in such a manner as will leave it unimpaired for future use and enjoyment as wilderness. All Federal land in the system was closed to operations under the mining and mineral leasing laws, subject to valid existing rights, after midnight December 31, 1983.

Act of September 19, 1964 (78 Stat. 986)—**Classification and Multiple Use Act of 1964**—Authorized the Secretary of the Interior to classify and manage Bureau of Land Management land for retention or for disposal, and for multiple use, including specification of dominant uses and preclusion of inconsistent uses in an area. Notice of proposed classification segregated the land from the mining and mineral leasing laws.

Act of September 16, 1966 (80 Stat. 772)—**Federal Metal and Nonmetallic Mine Safety Act**—Increased requirements for mine safety.

Act of October 15, 1966 (80 Stat. 915)—**National Historic Preservation Act of 1966**—Expanded Federal support for historical preservation through the National Register of Historic Places, a list of places protected from destruction by any project involving Federal action. All agencies must review the effect of a project on any district, site, building, structure, or object on the National Register.

Act of October 2, 1968 (82 Stat. 906)—**Wild and Scenic Rivers Act of 1968 (Public Law 90-542)**—Created the Wild and Scenic Rivers System to preserve certain selected rivers of the Nation from further development; these are managed to preserve the scenic, recreational, geologic, historic, cultural, wildlife, or other values that justified designation. Minerals on Federal land within 1/4 mile of each bank of a designated river are withdrawn from the mining and mineral leasing laws. All public lands within 2 miles on either side of a proposed river corridor are also withdrawn, pending study.

Act of January 1, 1970 (83 Stat. 852)—**National Environmental Policy Act of 1969 (Public Law 91-190)**—Declared a national policy of “productive and enjoyable harmony between man and his environment.” The act requires

a detailed environmental analysis for all “major Federal actions significantly affecting the quality of the human environment.” The permitting process mandated by the mining and mineral leasing laws has subjected many projects to the purview of this law, and substantial costs have resulted from the required environmental studies and mitigation of environmental impacts.

Act of December 24, 1970 (84 Stat. 1566)—**Geothermal Steam Act of 1970 (Public Law 91-581)**—Authorized the leasing of geothermal resources and associated byproducts in public lands through competitive and noncompetitive leasing systems. The Geothermal Energy Research, Development, and Demonstration Act of 1974 was passed to promote the development and utilization of geothermal resources.

Act of December 31, 1970 (84 Stat. 1876)—**Mining and Minerals Policy Act of 1970 (Public Law 91-631)**—Declared that the Federal Government policy is to encourage private enterprise in the development of (1) a sound and stable domestic minerals industry, (2) domestic mineral deposits, (3) minerals research, and (4) methods for reclamation in the minerals industry.

Act of December 18, 1971 (85 Stat. 688)—**The Alaska Native Claims Settlement Act (Public Law 92-203)**—Alaska Natives were awarded nearly \$1 billion and 44 million acres of land to be chosen from specifically withdrawn Federal lands around the State. Twelve regional corporations and over 200 village corporations were established to make the land selections and manage the money received. The act also directed the Secretary of the Interior to withdraw up to 80 million acres of unreserved public land deemed suitable for addition to or creation as units of the national conservation system. This act repealed the Alaska Native Allotment Act of 1906 but did not affect the Alaska Native Townsite Act (1926). It also extinguished all Native reservations created by the Government under the appropriate laws, except for Metlakatla on Annette Island.

Act of October 18, 1972 (86 Stat. 816)—**Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500)**—Established a program to control pollution by limiting the amount of effluent that may be discharged into a body of water. Permits are required for the discharge of water from point sources including mining and milling processes. The related Safe Water Drinking Act of 1974, as amended, also requires permits for injection wells for oil and gas operations, and for special wells for solution mining, in situ gasification, and recovery of geothermal energy.

Act of December 28, 1973 (87 Stat. 884)—**Endangered Species Act of 1973 (Public Law 93-205)**—Established a policy to conserve endangered and threatened species of plants and animals. The act, as amended, provides for determination of such species and designation of their critical habitat, and prohibits any Federal action modifying such a critical habitat, unless exempted by a cabinet-level committee. Affects any mining activity requiring Federal action.

Act of August 4, 1976 (90 Stat. 1083)—**Federal Coal Leasing Amendments Act of 1976 (Public Law 94-377)**—Amended the Mineral Leasing Act of 1920 to change the procedure for leasing coal on Federal land, to provide for fair market value and diligent development on Federal coal leases, to coordinate management of coal and nonmineral resources, and to ensure compatibility of coal mining with land use plans.

Act of September 28, 1976 (90 Stat. 1342)—**Mining in the National Parks Act (Public Law 94-429)**—Closed

certain national parks and monuments to mining, imposed a moratorium on mineral exploration and development, and established additional requirements on mining ventures in national parks and monuments where mining is still allowed.

Act of October 21, 1976 (90 Stat. 2743)—Federal Land Policy and Management Act of 1976 (Public Law 94-579)—The act, also known as the Bureau of Land Management (BLM) Organic Act, established a comprehensive procedure for the inventory, analysis, planning, and management of BLM land. Repealed most previous public land laws, including the Small Tract Act of 1938 and the Native Townsite Act of 1926, set up a comprehensive land planning system, controlled withdrawal procedures more closely (and repealed the implied authority of the President to make withdrawals), required recordation of mining claims with the BLM, and authorized the Secretary of the Interior to establish a regulatory program to “take any action necessary to prevent unnecessary or undue degradation of the lands.”

Act of October 21, 1976 (90 Stat. 2795)—Resource Conservation and Recovery Act of 1976—Established a Federal program for management of solid waste, prohibited future open dumping, and defined and regulated hazardous waste closely. The related Comprehensive Environmental Response, Compensation and Liability Act of 1980 (the Superfund Act) provided that Federal or State Governments may bring claim for any damage to natural resources under their trusteeship caused by release of hazardous substances.

Act of October 22, 1976 (90 Stat. 2949)—National Forest Management Act of 1976—The act, which supplements and amends the Forest and Rangeland Renewable Resources Planning Act of 1974, provided a comprehensive framework and prime source of direction to the Forest Service through required land and resource management planning to achieve effective use of renewable resources on National Forest System land. Required the Secretary of Agriculture to set up planning regulations; standards and guidelines in the regulations must be incorporated into land and resource management plans.

Act of August 3, 1977 (91 Stat. 445)—Surface Mining Control and Reclamation Act of 1977 (Public Law

95-87)—Established the Office of Surface Mining in the Department of the Interior to administer reclamation of all surface-mined coal land. Authorized a fund for abandoned mine reclamation, standards for environmental protection, requirements for reclamation plans, and designation of areas unsuitable for mining.

Act of November 9, 1977 (91 Stat. 1290)—Federal Mine Safety and Health Amendments Act of 1977—Repealed or amended the previous Mine Safety and Health Acts of 1966 and 1969. Created the Mine Safety and Health Administration (MSHA) in the Department of Labor, which is responsible for enforcement of the mine health and safety laws.

Act of September 18, 1978 (92 Stat. 629)—Outer Continental Shelf Lands Act Amendments of 1978—Established new policies and procedures for managing the oil and natural gas resources of the Outer Continental Shelf.

Act of November 8, 1978 (92 Stat. 3021)—Uranium Mill Tailings Radiation Control Act of 1978—Established a remedial action program for uranium mill tailings at certain inactive sites and a uranium mill tailings license and regulatory program, administered by the Nuclear Regulatory Commission.

Act of June 28, 1980 (94 Stat. 553)—Deep Seabed Hard Mineral Resources Act—Established an interim legal regime under which technology can be developed and the exploration and recovery of hard mineral resources of the deep seabed can take place.

Act of October 21, 1980 (94 Stat. 2305)—National Materials and Minerals Policy, Research and Development Act of 1980 (Public Law 96-479)—Reaffirmed a national policy to foster promotion of domestic materials, minerals, and the mineral reclamation industry under private enterprise. Among specific points, Federal agencies are encouraged to “facilitate availability and development of domestic resources to meet critical materials needs.”

Act of December 2, 1980 (94 Stat. 2371)—Alaska National Interest Lands Conservation Act (Public Law 96-487)—Added 104 million acres to the national conservation system, mostly as national parks and national wildlife refuges, based on the withdrawals authorized in the Alaska Native Claims Settlement Act (1971). A total of 56 million acres were designated as “wilderness.”

APPENDIX F.—STATE MINERAL CLOSING ORDERS AFFECTING NORTHERN ALASKA

Closing order No.	Quadrangle	Meridian	Township	Range	Area closed, acres
67 ¹	Beechey Point	Umiat	T8-11N	R14E	11,572
	Chandalar	Fairbanks	T31-37N T31N	R10W R11W	24,663
	Philip Smith Mountains	Umiat	T5-8S T8-9S T9S T11-15S T9-11S T15-16S	R14E R13E R12E R12E R11E R11E	50,852
	Sagavanirktok	..do	T5-7N T1-4N T1-2N T1-5S	R13,14E R14E R15E R14E	44,125
	Wiseman	Fairbanks	T30-31N T25-30N T25-28N	R11W R12W R13W	22,388
427	Chandalar	..do	T31N	R4-5W	28,320
Total					161,920

¹MCO 67 completely overlaps MCO 59, so to avoid redundancy, only the acreage for MCO 67 is shown.
²This is more acreage than the approximately 4,306 acres stated on the MCO. Because no exact boundaries were available to calculate the acreage for this MCO, whole sections were used.

LEGEND FOR LAND AVAILABILITY MAPS, FIGURES B-1 THROUGH B-33

Base maps are from U.S. Geological Survey, Alaska Planimetric Series.

Land Availability Categories

The land availability categories identified below and shown on the maps reflect the availability or closure of land to mineral entry under public laws, including the General Mining Law of 1872, as amended, and statutes of the State of Alaska, sections 38.05.185 through 38.05.280.

Available:

- OF Open Federal: Federal land available for mineral exploration and development under the General Mining Law of 1872, as amended
- OS Open State: State land available for mineral exploration and development under Alaska statutes, sections 38.05.185 through 38.05.280

Available with restrictions:

- PN Patented Native: Federal land conveyed to Native regional and village corporations. Land may be available for mineral exploration and development subject to the management policy of each corporation

Unavailable:

- CF Closed Federal: Federal land unavailable for mineral exploration and development by land closure, withdrawal, or agency regulations
- SN Selected, Native: Federal land selected by Native regional and village corporations but not yet conveyed
- SS Selected, State: Federal land selected by the State of Alaska but not yet conveyed
- SS-SN Federal land selected by both the state and Native corporations
- SN-CF Native-selected land within Federal withdrawals for national parks, preserves, wildlife refuges, or NPRA
- SS-CF State-selected land within Federal withdrawals for national parks, preserves, wildlife refuges, or NPRA
- SS-SN-CF Native- and State-selected land within Federal withdrawals for national parks, preserves, wildlife refuges, or NPRA
- MCO Mineral closing order: State land closed to mining by order of the Alaska Department of Natural Resources

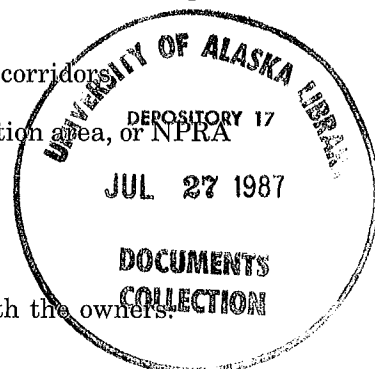
Private land:¹

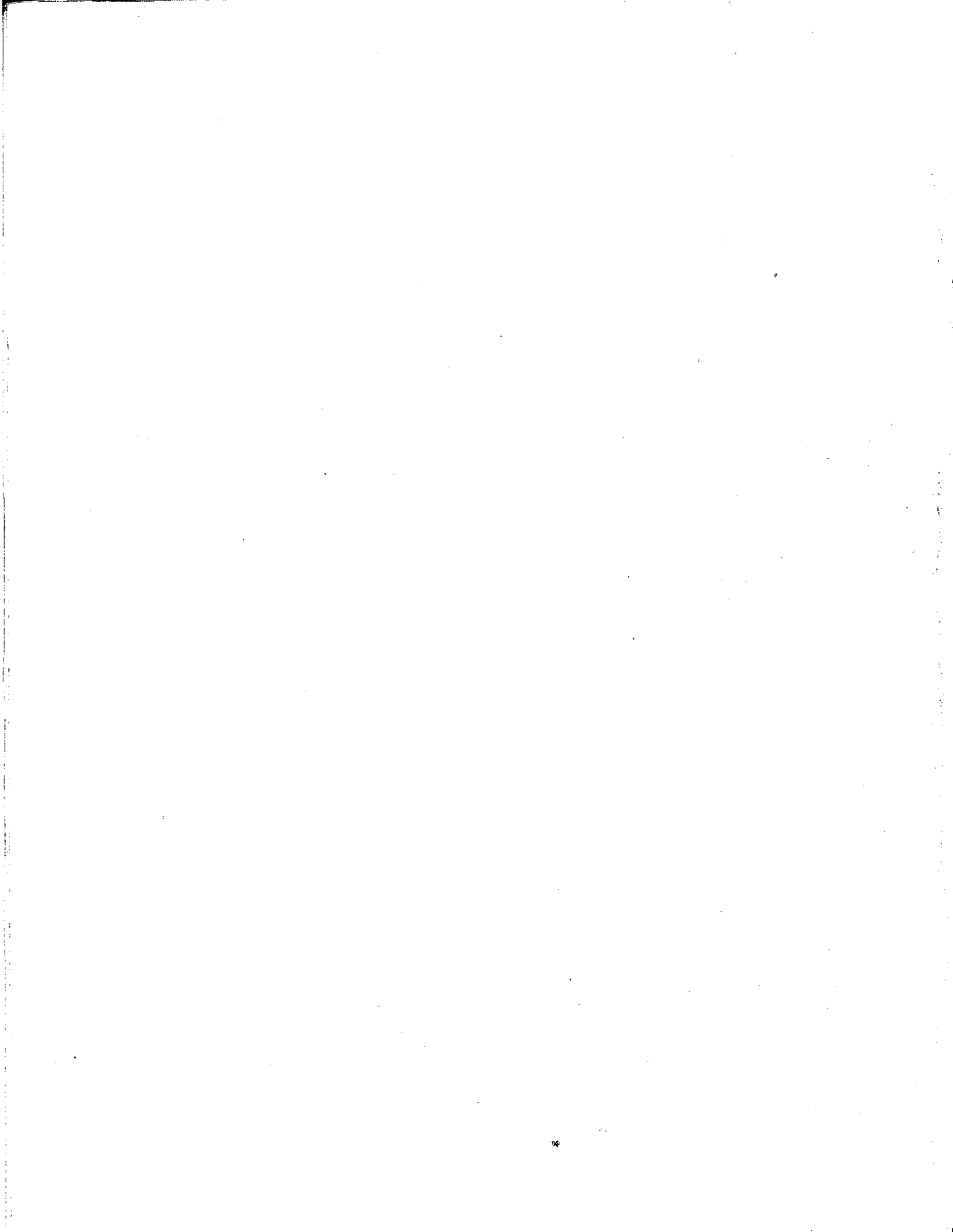
- A section of land containing at least one parcel of private land, including Native allotments, patented mining claims, homesteads, etc.

- x¹ Map location number; relates deposit location shown on map to descriptive data in listing of deposits (appendix B)

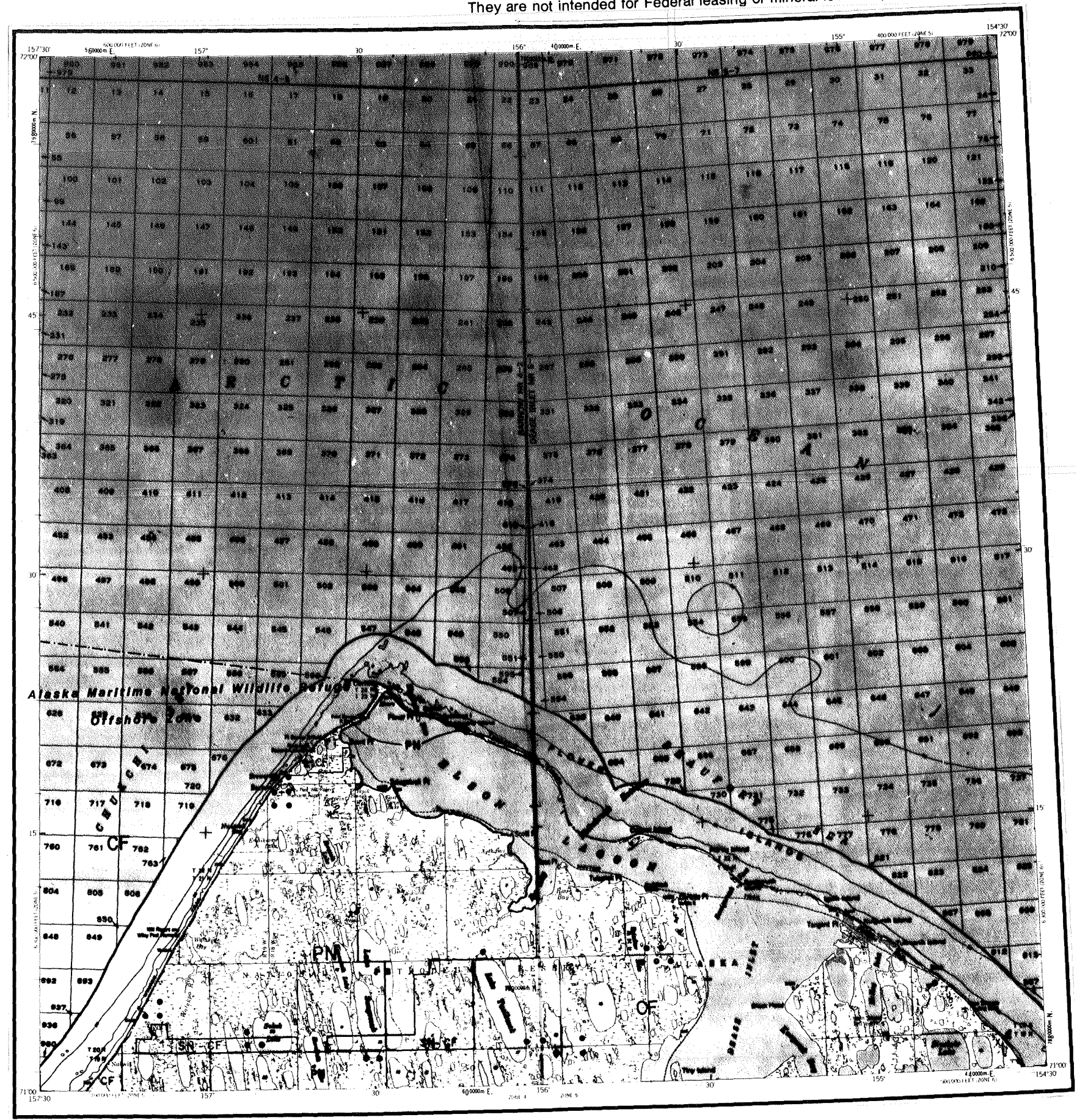
- ===== Boundary of State land withdrawn by mineral closing order for pipeline corridors
- • — Boundary of Federal park, preserve, wildlife refuge, conservation or recreation area, or NPRA
- ••• — Designated wild and scenic river boundary
- Proposed wild and scenic river boundary

¹Private land may or may not be available for mining. Terms must be negotiated with the owners.





(Numbers within offshore grid represent protraction survey data compiled by BLM.
They are not intended for Federal leasing or mineral location purposes.)



(Scale: 1:500,000)

FIGURE B-1.—Barrow quadrangle.
(See accompanying legend)

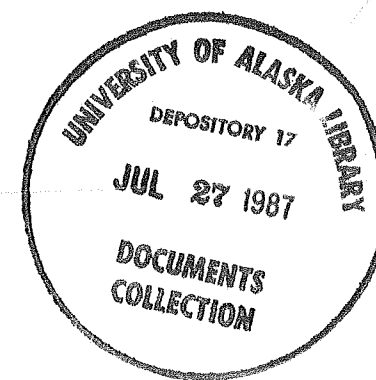


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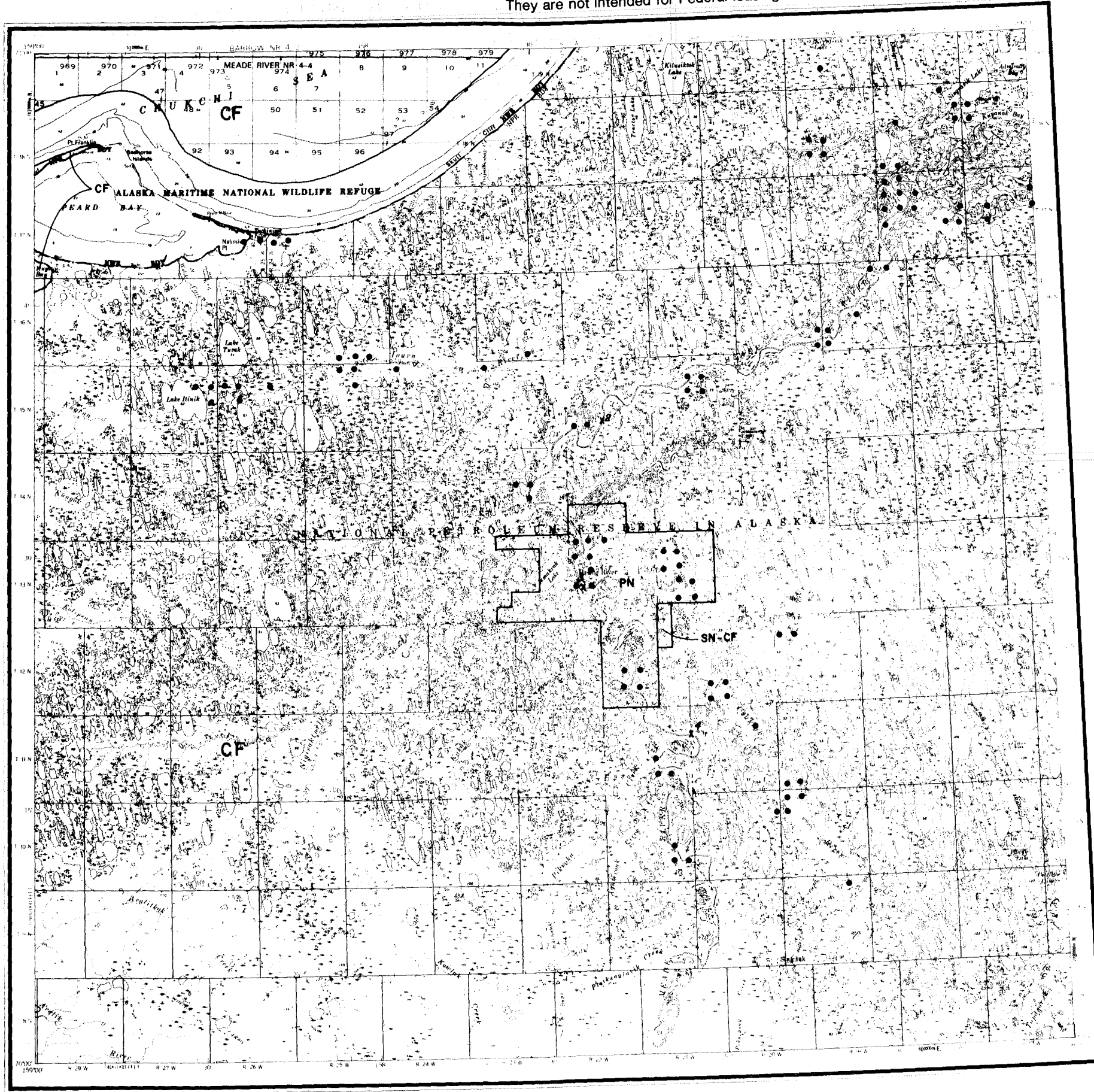
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FIGURE B-2.—Wainwright quadrangle.
(See accompanying legend)



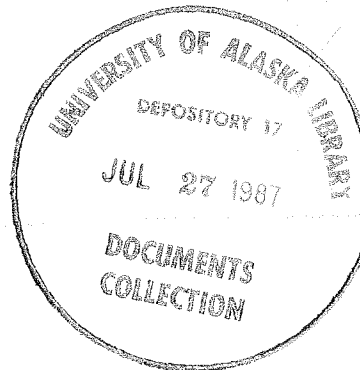
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(Numbers within offshore grid represent protraction survey data compiled by BLM.
They are not intended for Federal leasing or mineral location purposes.)



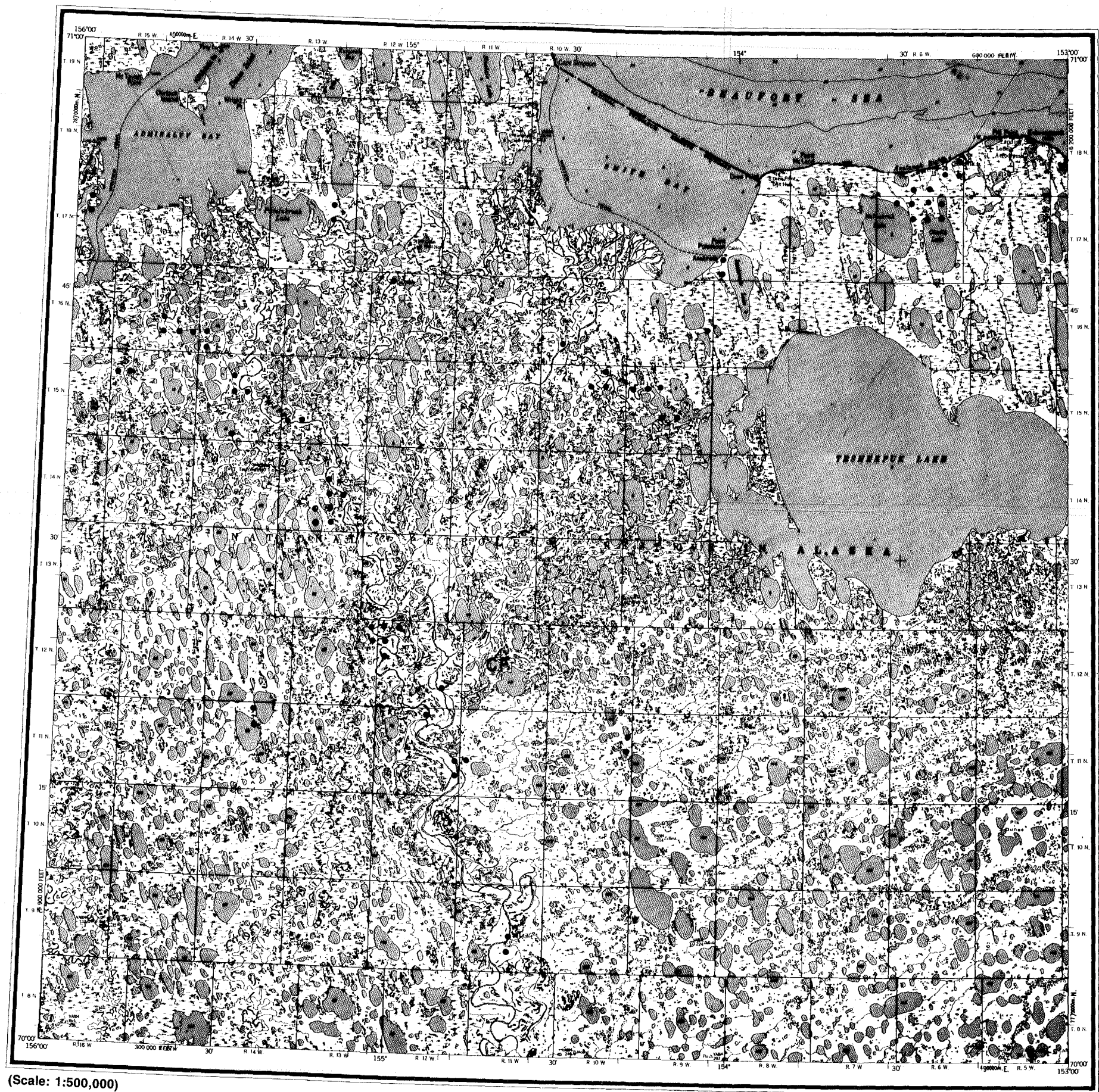
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FIGURE B-3.—Meade River quadrangle.
(See accompanying legend)



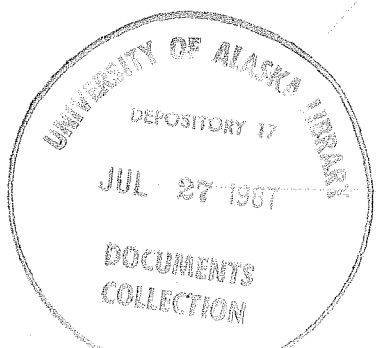
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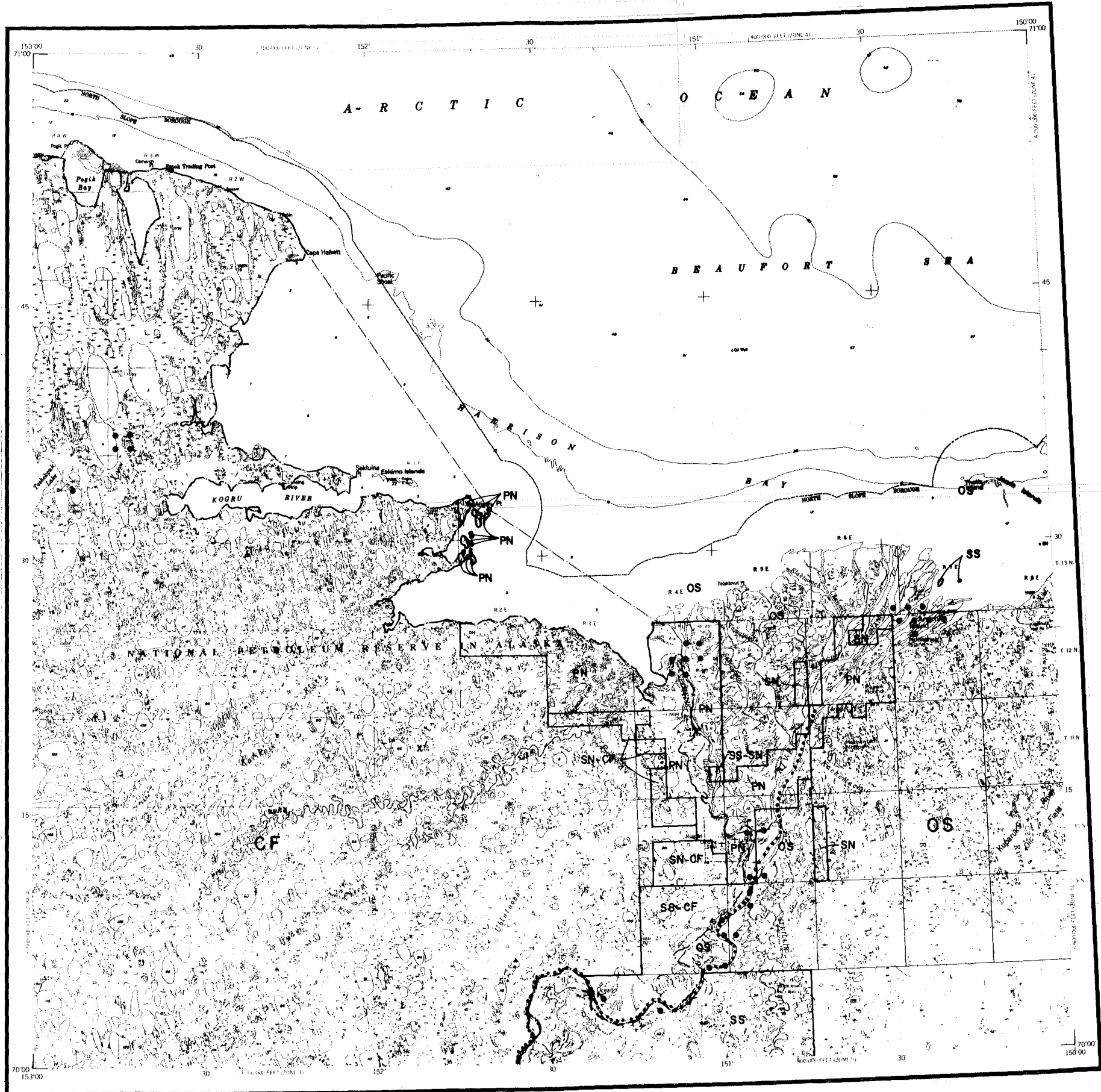
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(Scale: 1:500,000)

FIGURE B-4.—Teshekpuk quadrangle.
(See accompanying legend)





(Scale: 1:500,000)

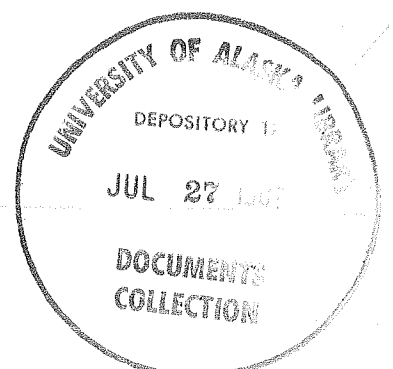
FIGURE B-5.—Harrison Bay quadrangle.
(See accompanying legend)





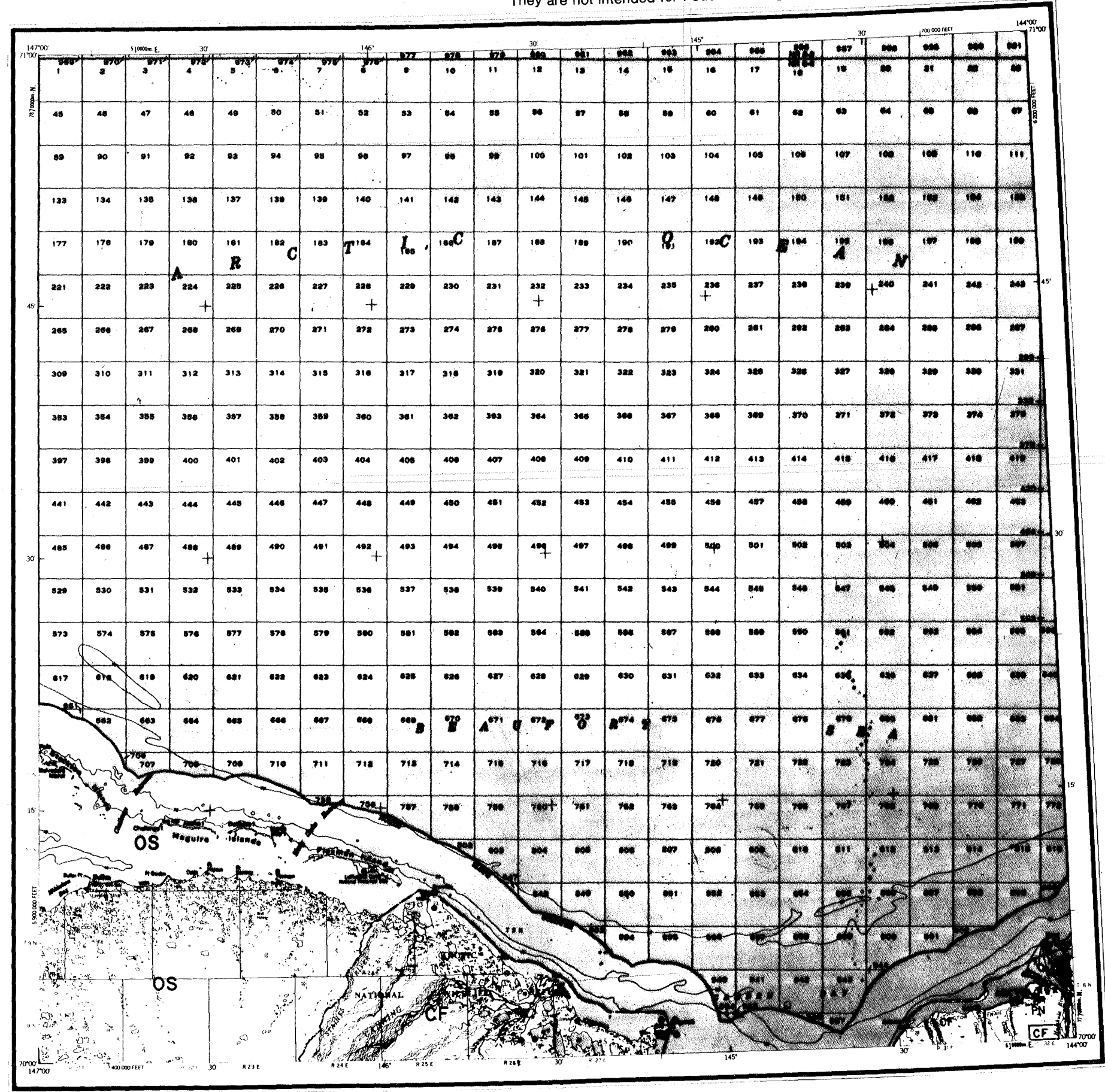
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FIGURE B-6.—Beechey Point quadrangle.
(See accompanying legend)



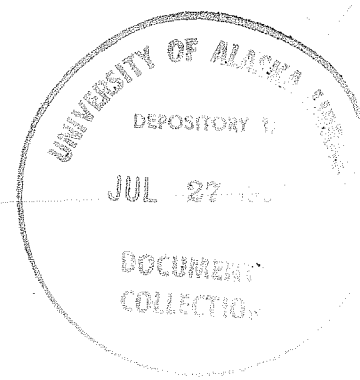
(Numbers within offshore grid represent protraction survey data compiled by BLM. They are not intended for Federal leasing or mineral location purposes.)

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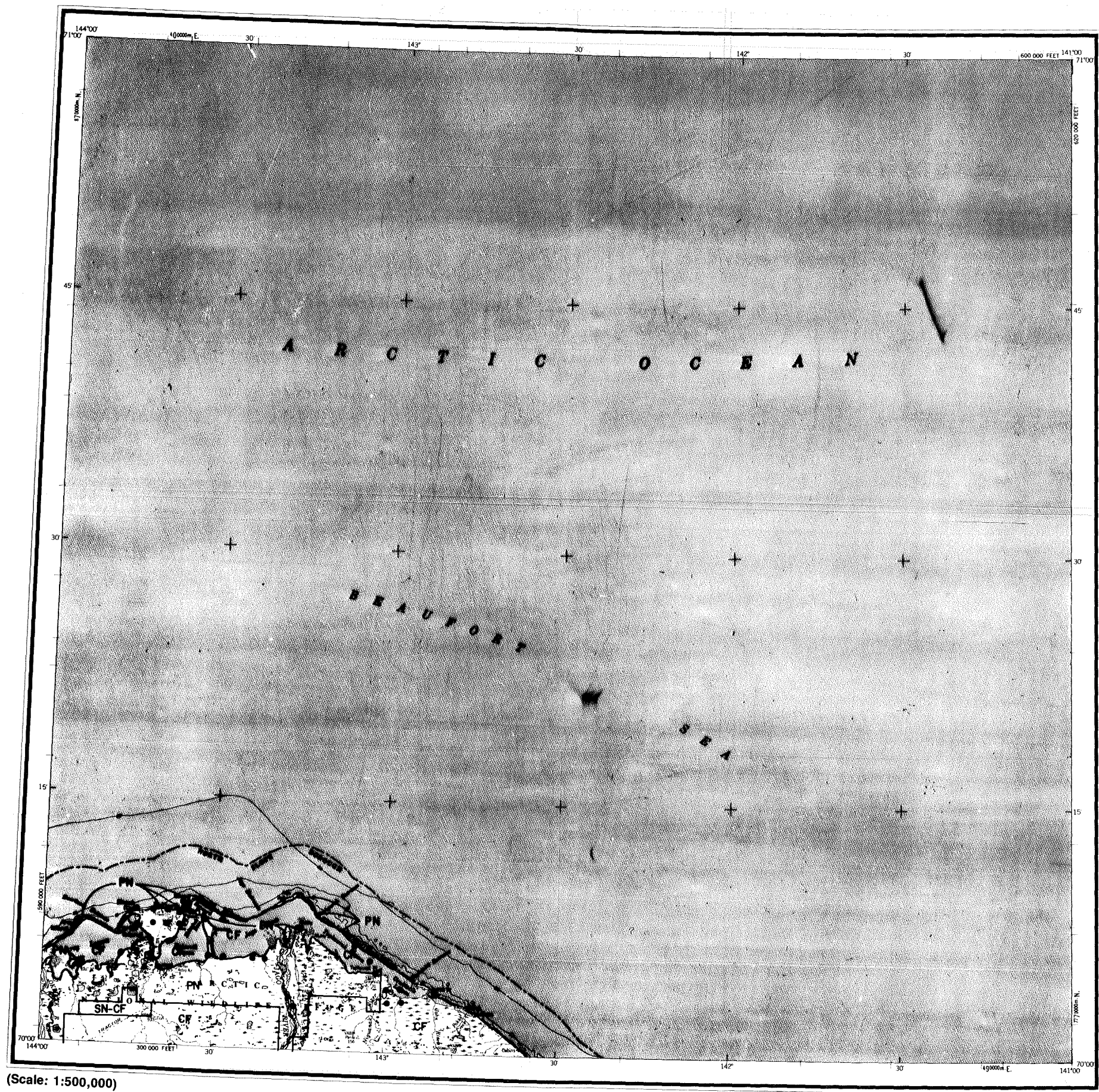
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FIGURE B-7.—Flaxman Island quadrangle.
(See accompanying legend)



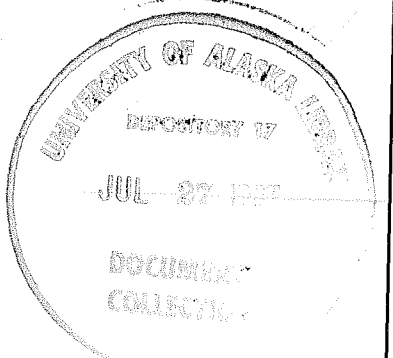
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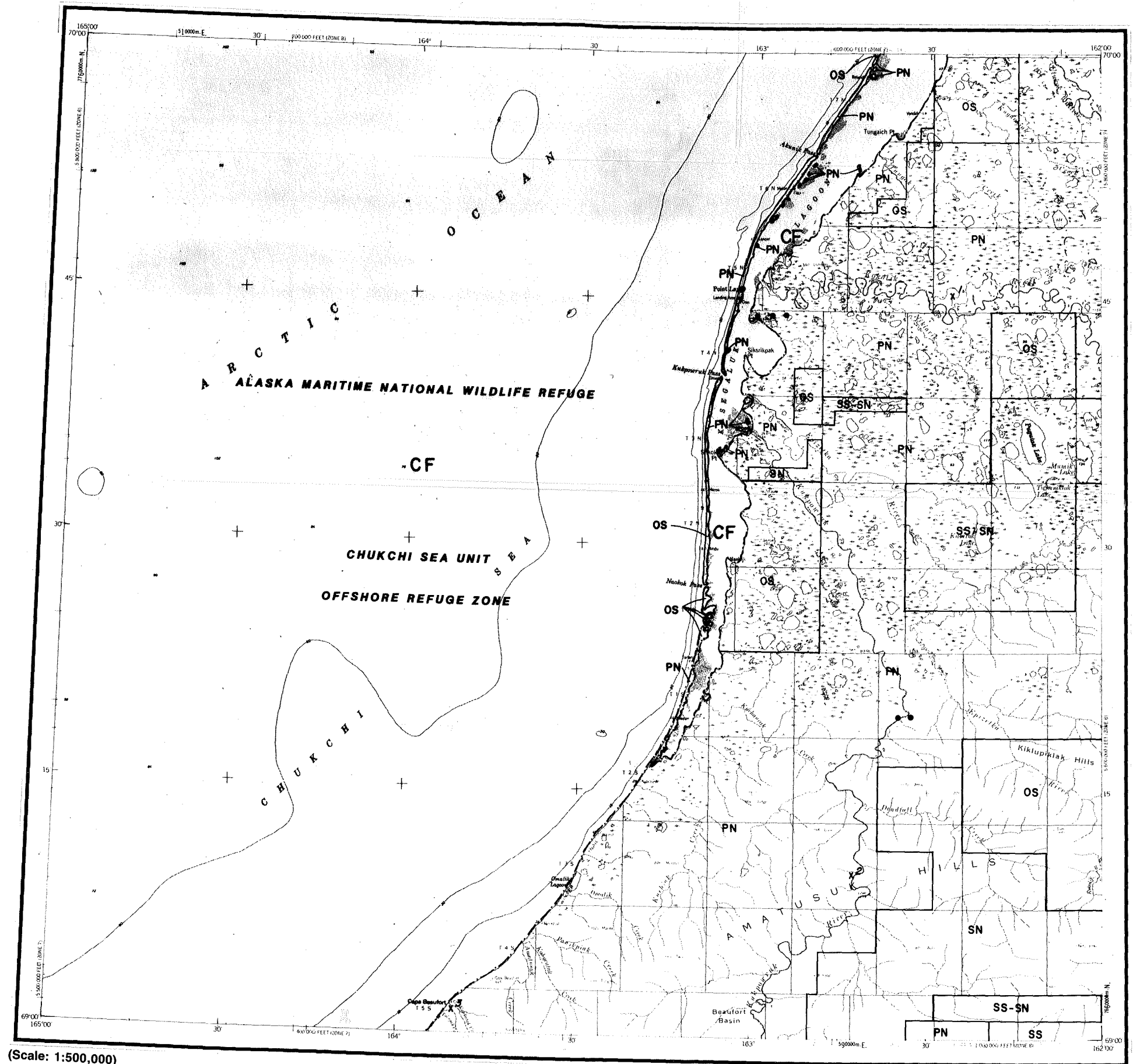
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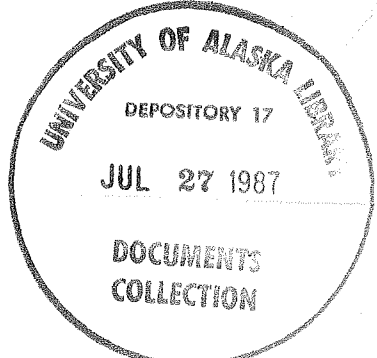
FIGURE B-8.—Barter Island quadrangle.
(See accompanying legend)



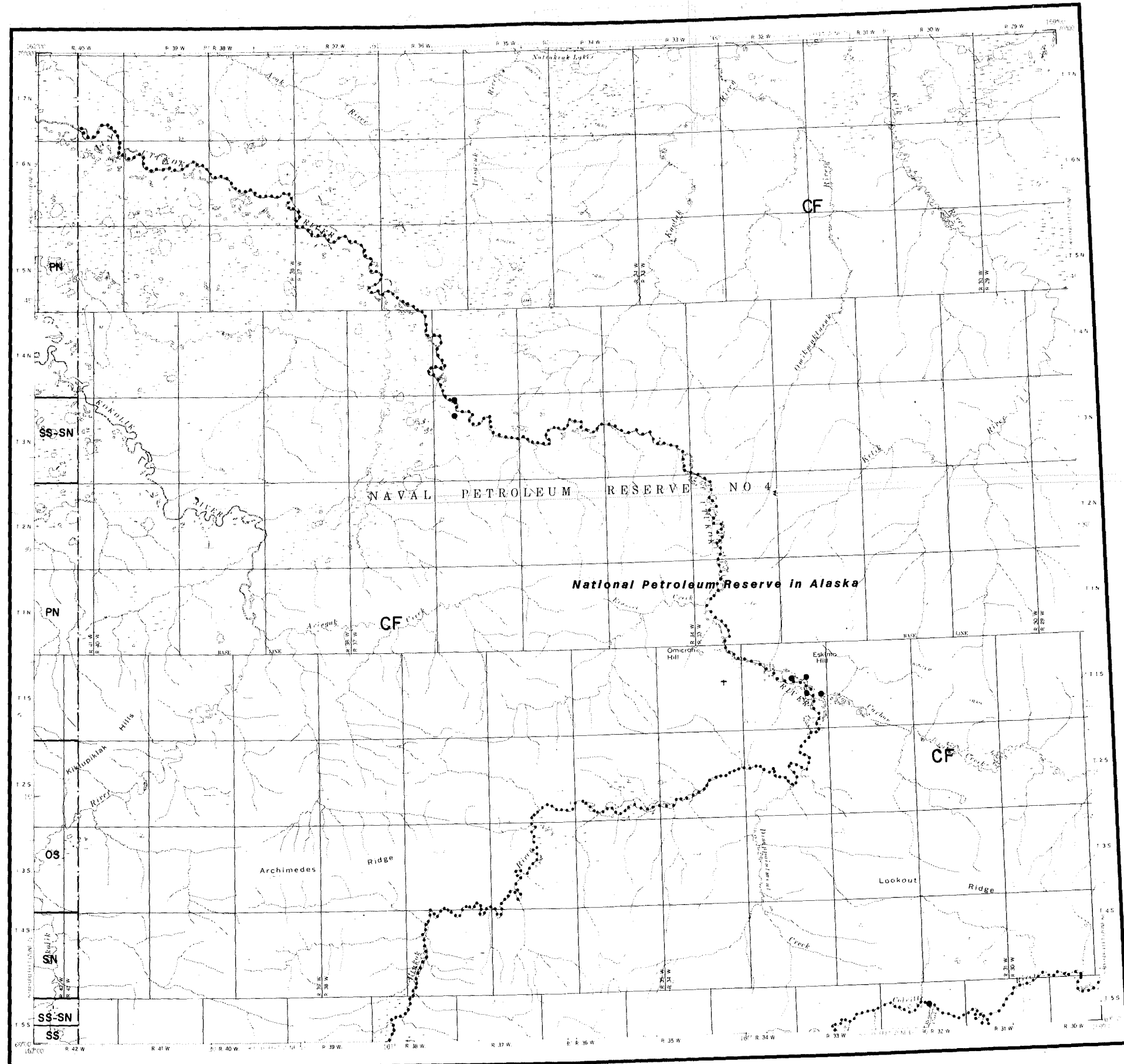


(Scale: 1:500,000)

FIGURE B-9.—Point Lay quadrangle.
(See accompanying legend)

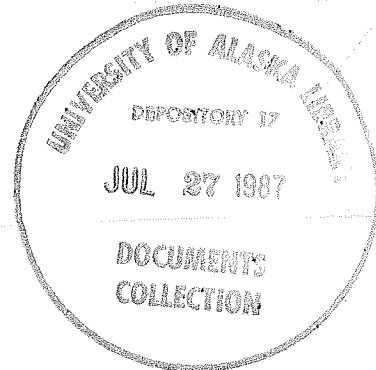


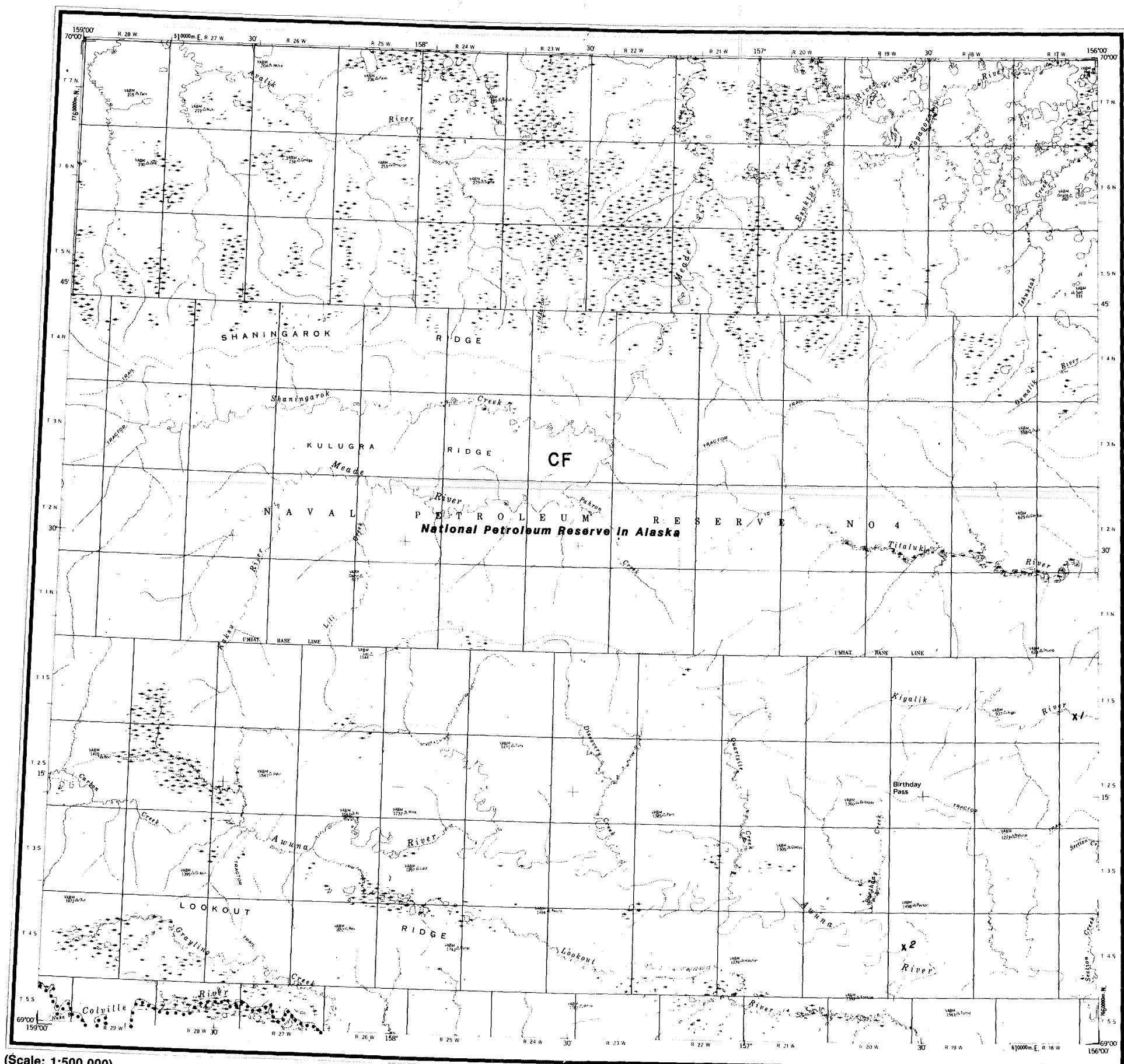
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(Scale: 1:500,000)

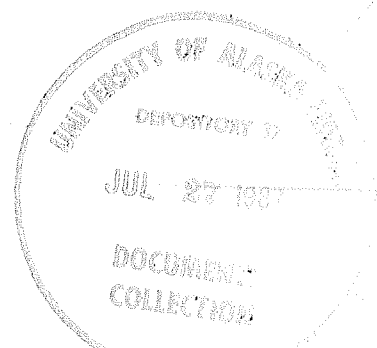
FIGURE B-10.—Utukok River quadrangle.
(See accompanying legend)

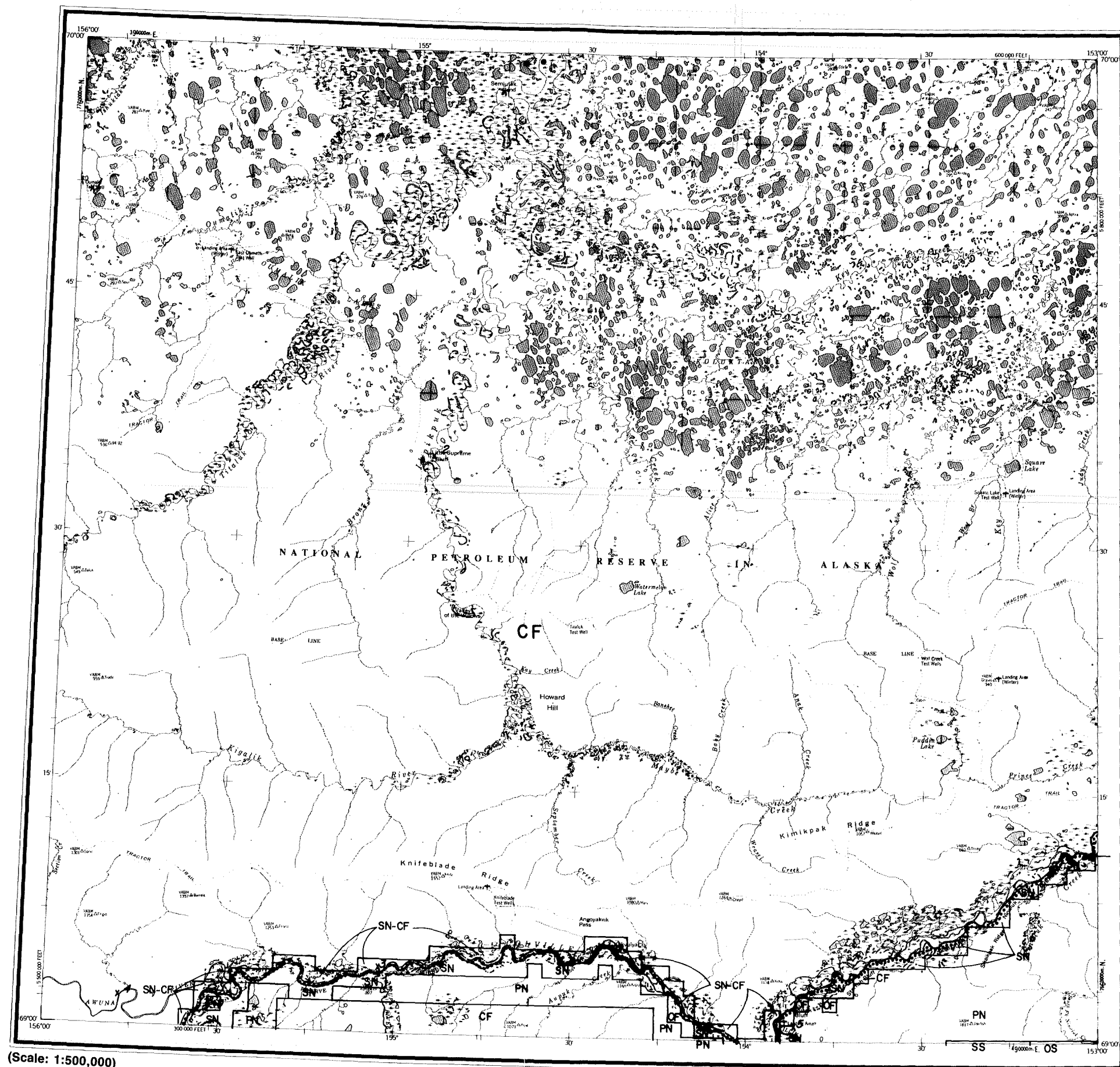




(Scale: 1:500,000)

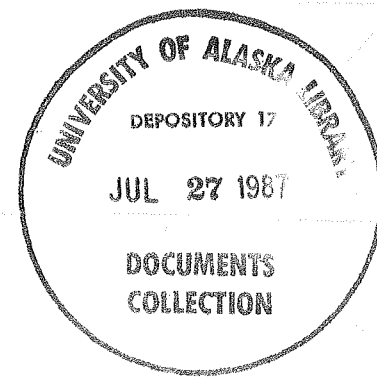
FIGURE B-11.—Lookout Ridge quadrangle.
(See accompanying legend)

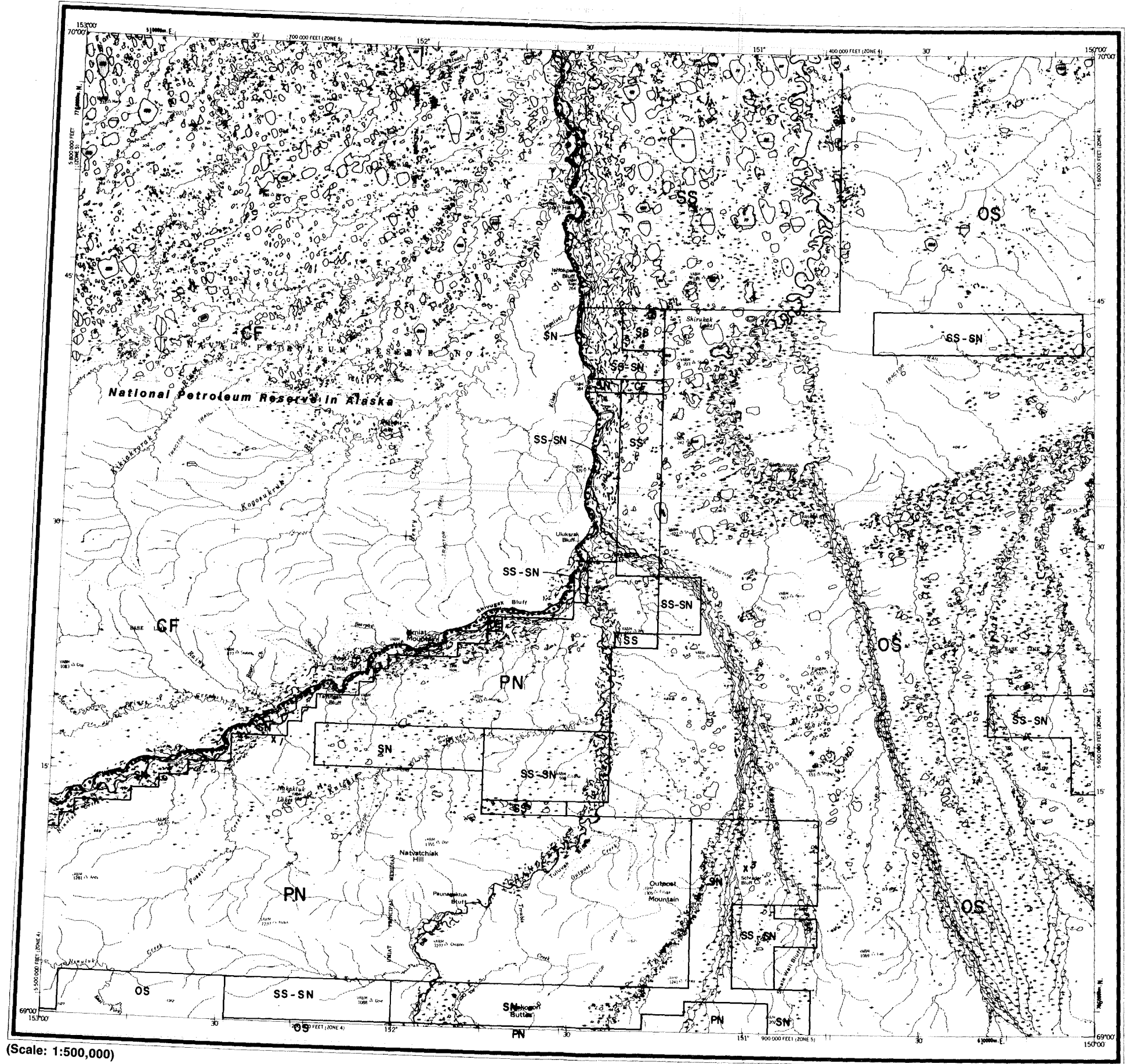




(Scale: 1:500,000)

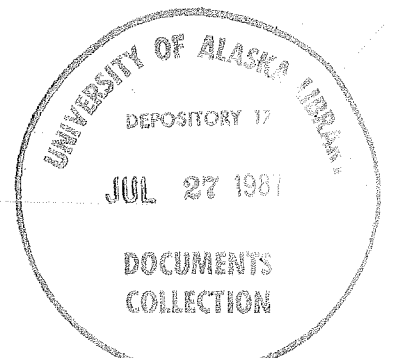
FIGURE B-12.—Ikpikuk River quadrangle.
(See accompanying legend)

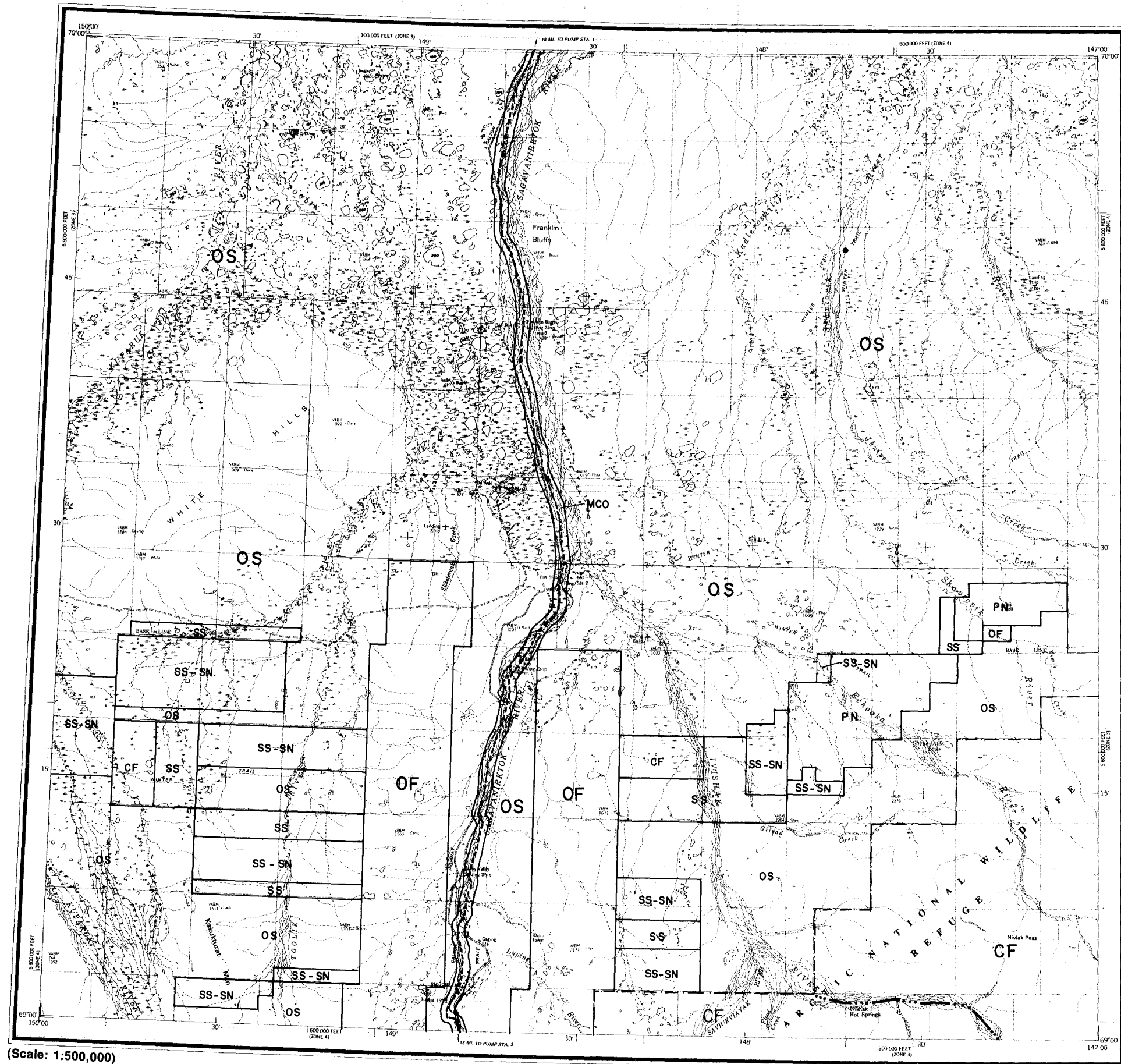




(Scale: 1:500,000)

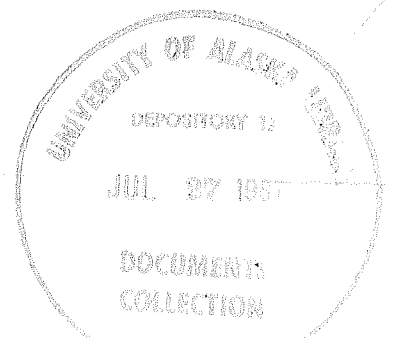
FIGURE B-13.—Umiat quadrangle.
(See accompanying legend)

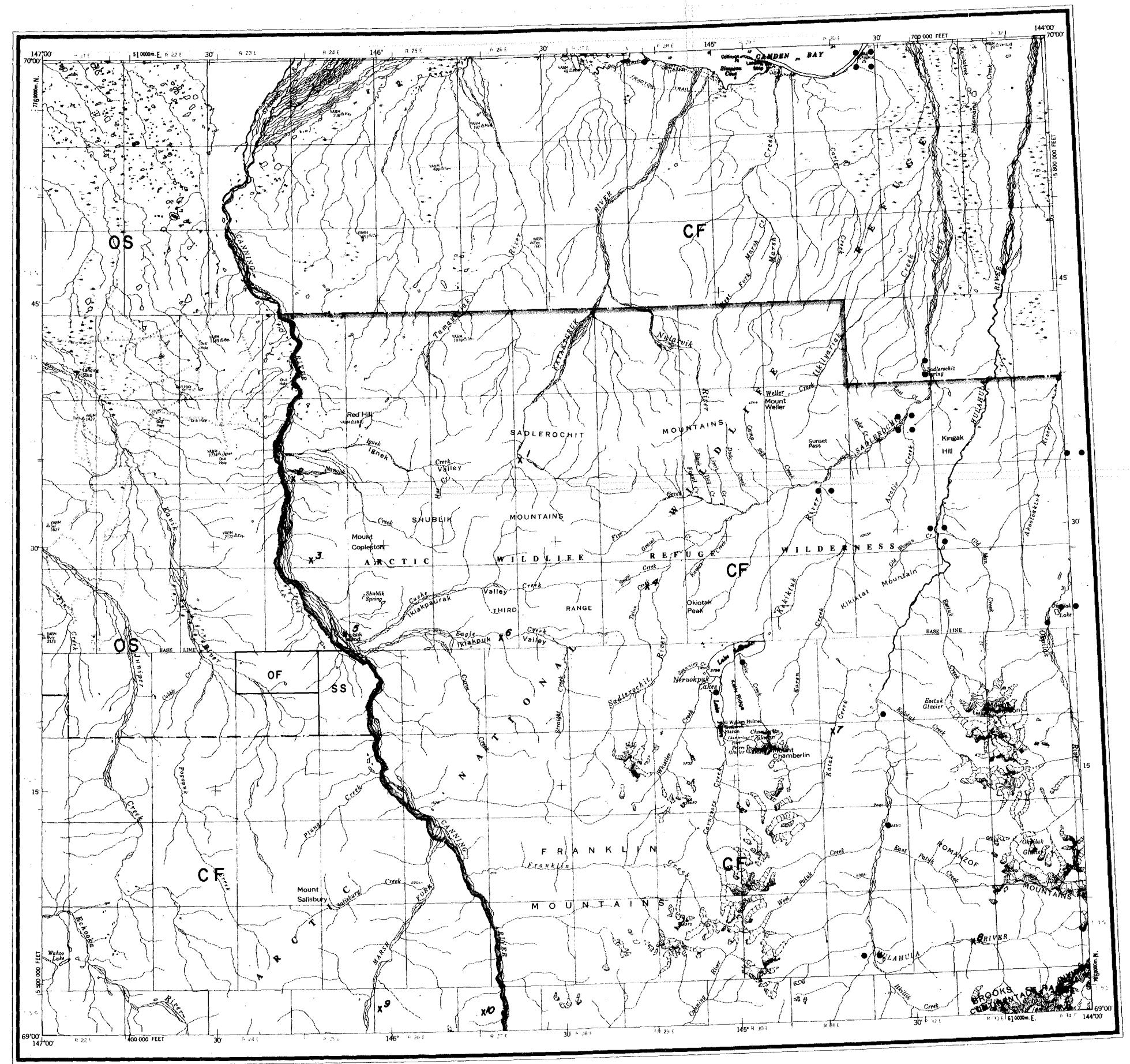




(Scale: 1:500,000)

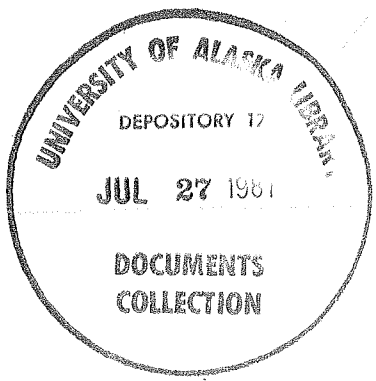
FIGURE B-14.—Sagavanirktok quadrangle.
(See accompanying legend)



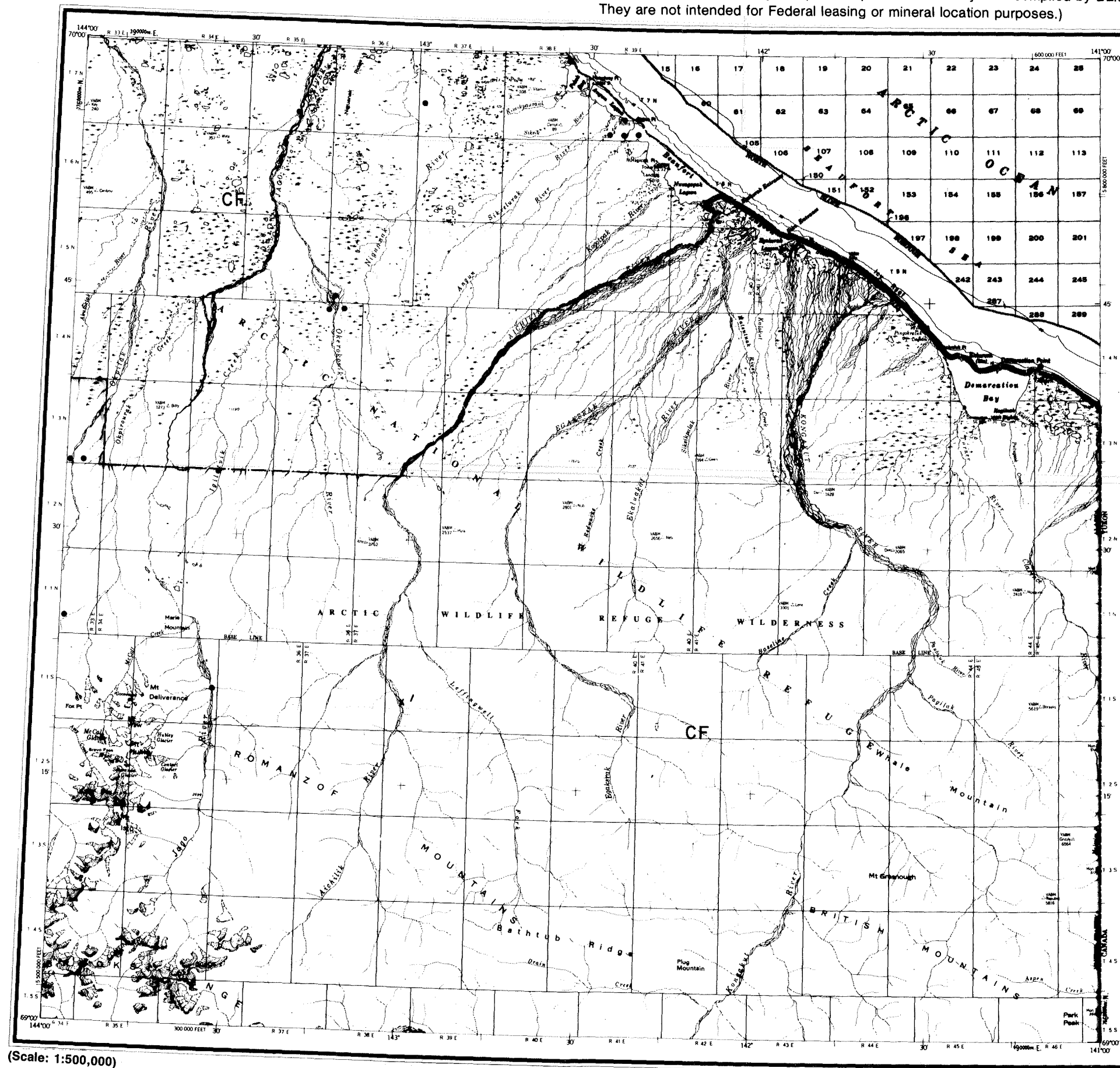


(Scale: 1:500,000)

FIGURE B-15.—Mount Michelson quadrangle.
(See accompanying legend)

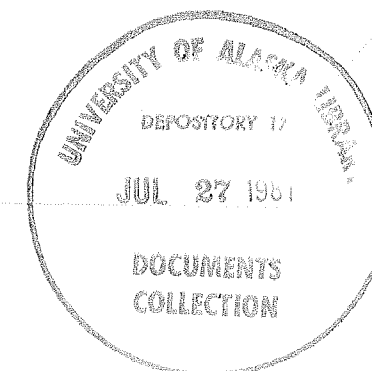


(Numbers within offshore grid represent protraction survey data compiled by BLM. They are not intended for Federal leasing or mineral location purposes.)

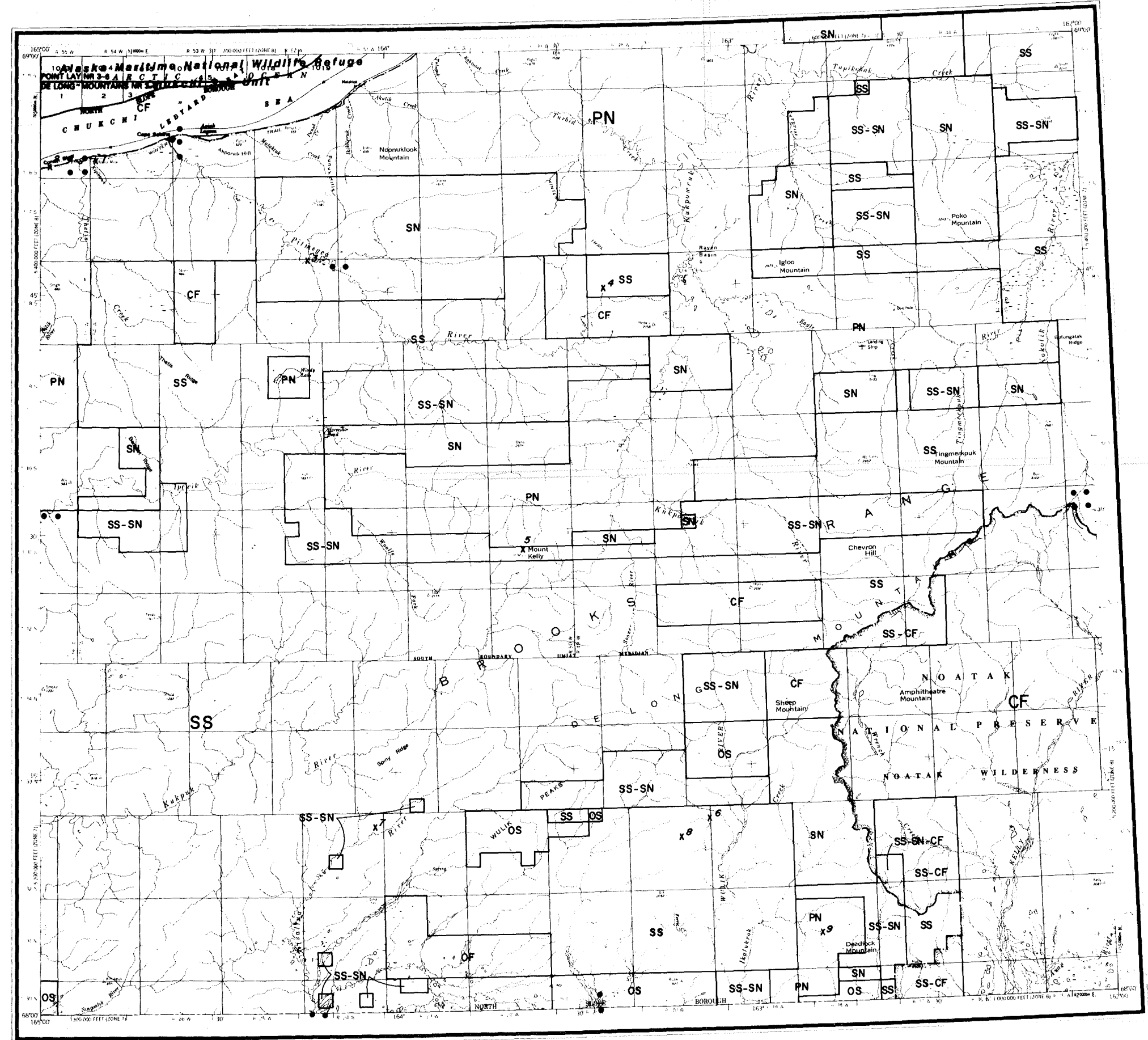


(Scale: 1:500,000)

FIGURE B-16.—Demarcation Point quadrangle.
(See accompanying legend)

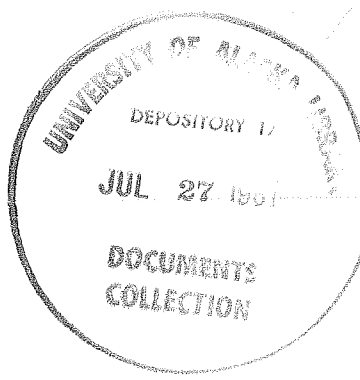


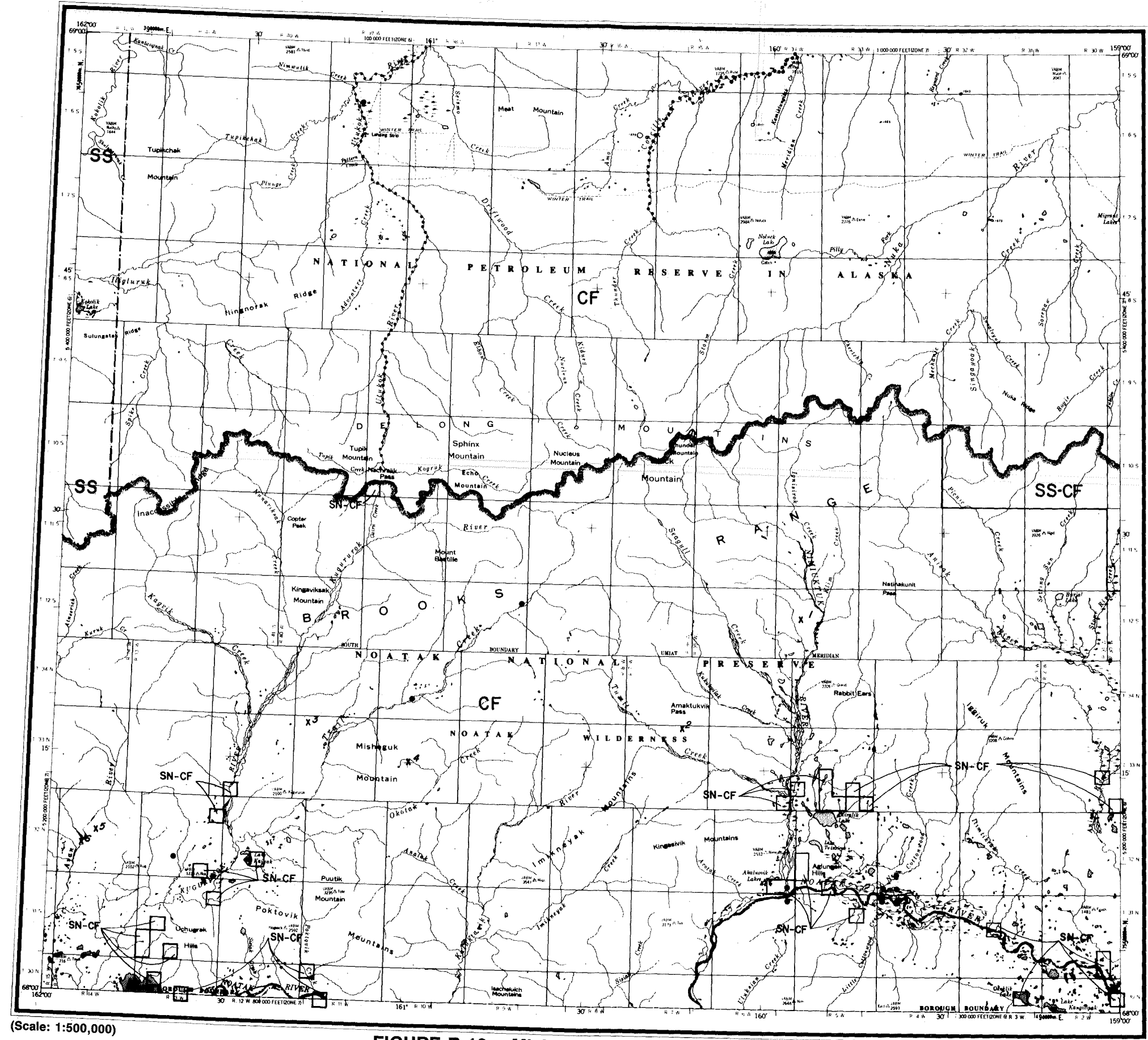
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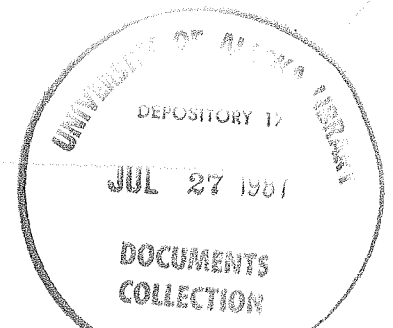
FIGURE B-18.—De Long Mountains quadrangle.
(See accompanying legend)

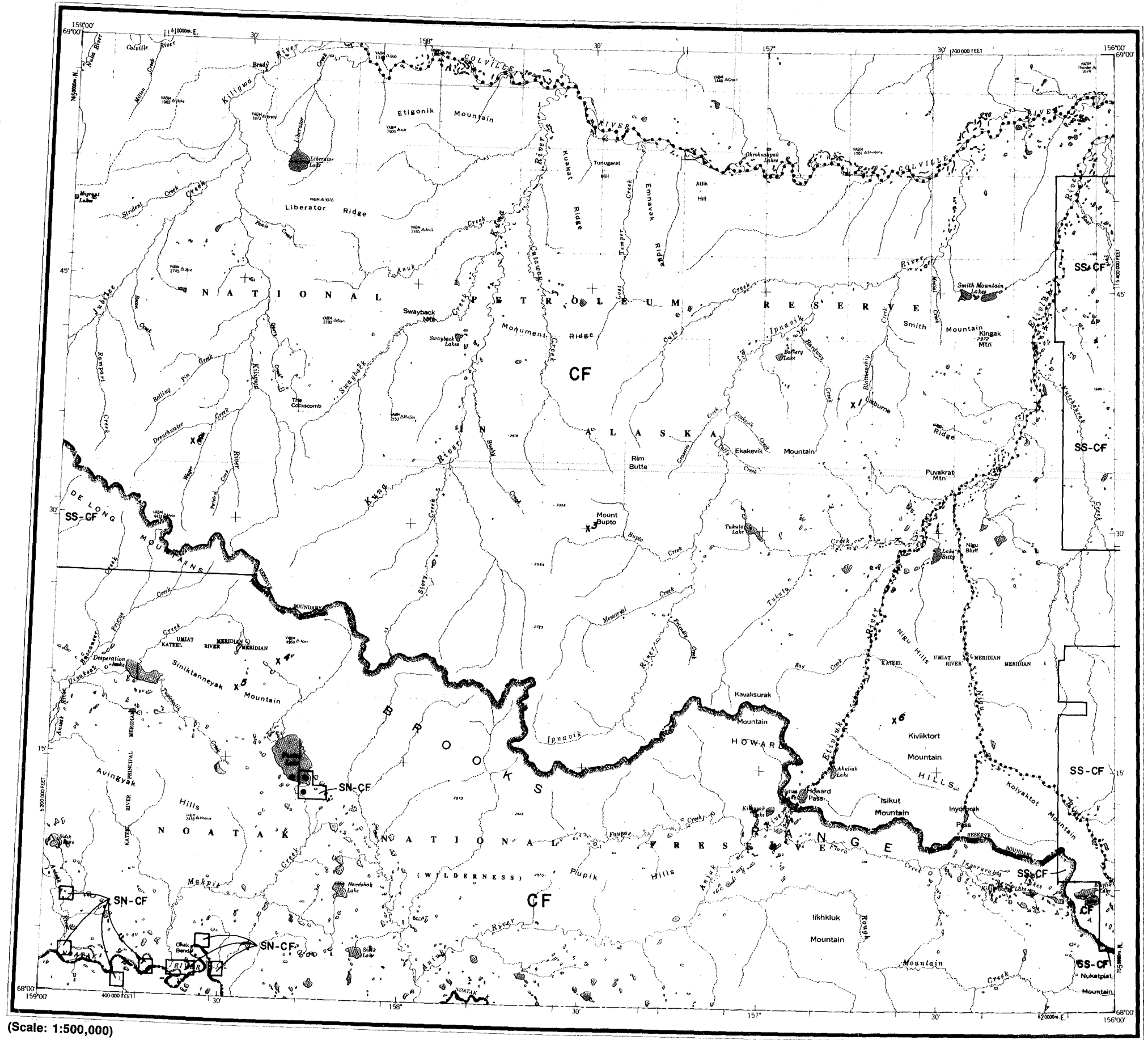




(Scale: 1:500,000)

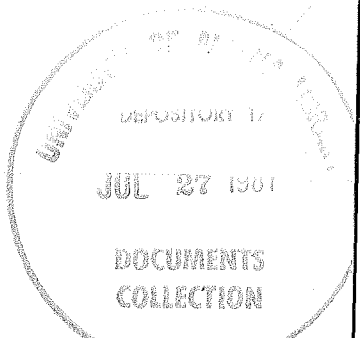
FIGURE B-19.—Misheguk Mountain quadrangle.
(See accompanying legend)

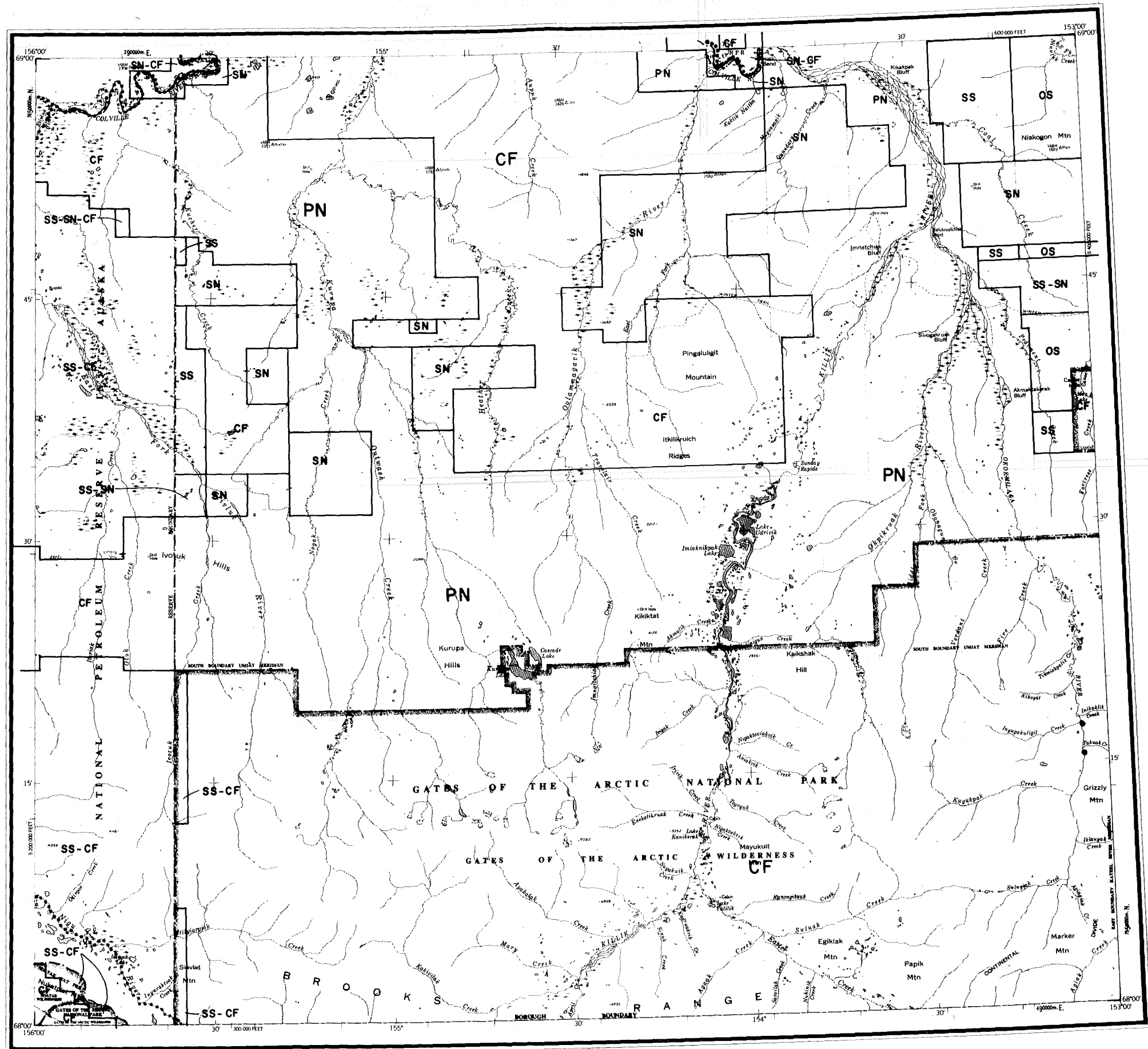




(Scale: 1:500,000)

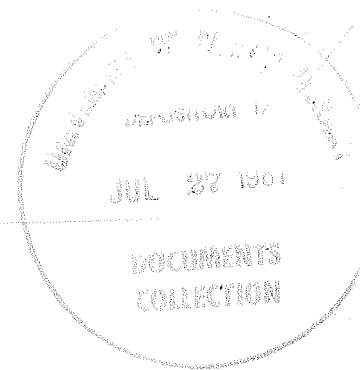
FIGURE B-20.—Howard Pass quadrangle.
(See accompanying legend)

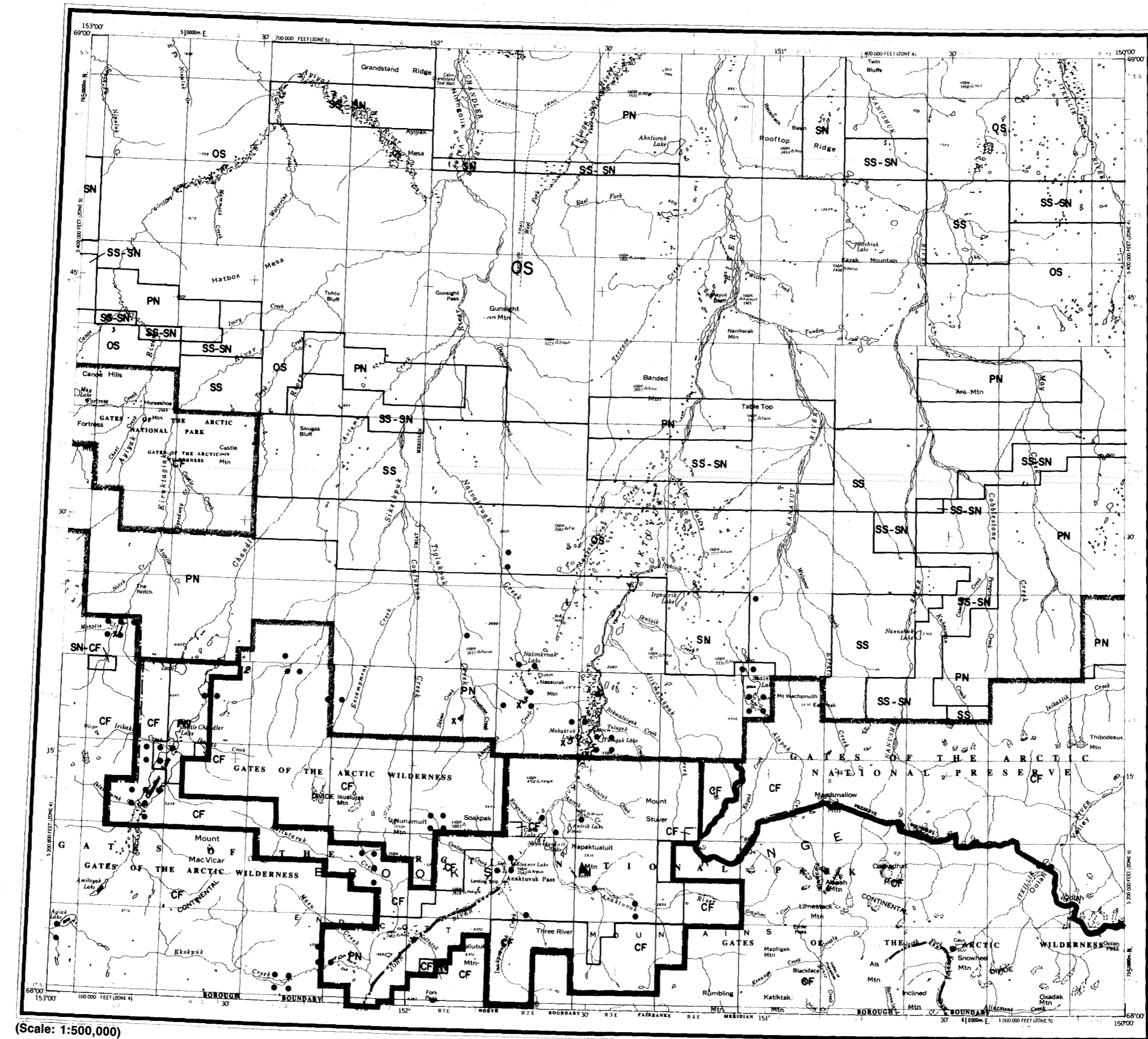




(Scale: 1:500,000)

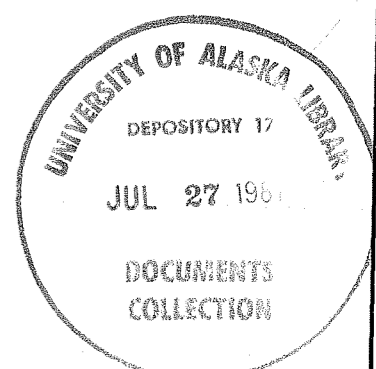
FIGURE B-21.—Killik River quadrangle.
(See accompanying legend)

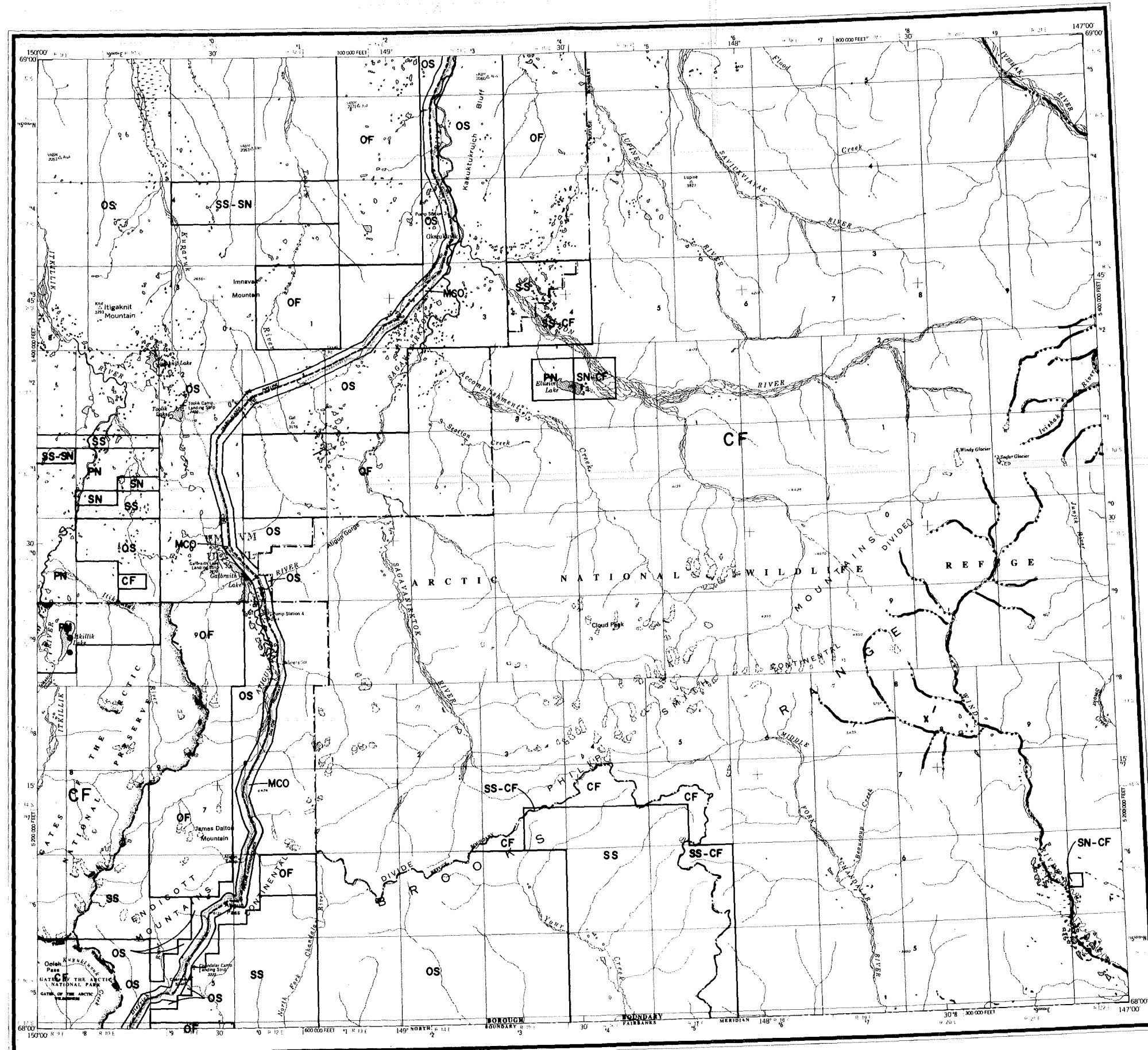




(Scale: 1:500,000)

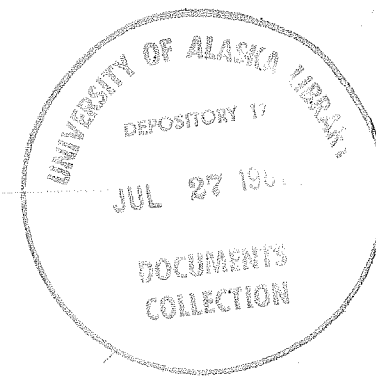
FIGURE B-22.—Chandler Lake quadrangle.
(See accompanying legend)

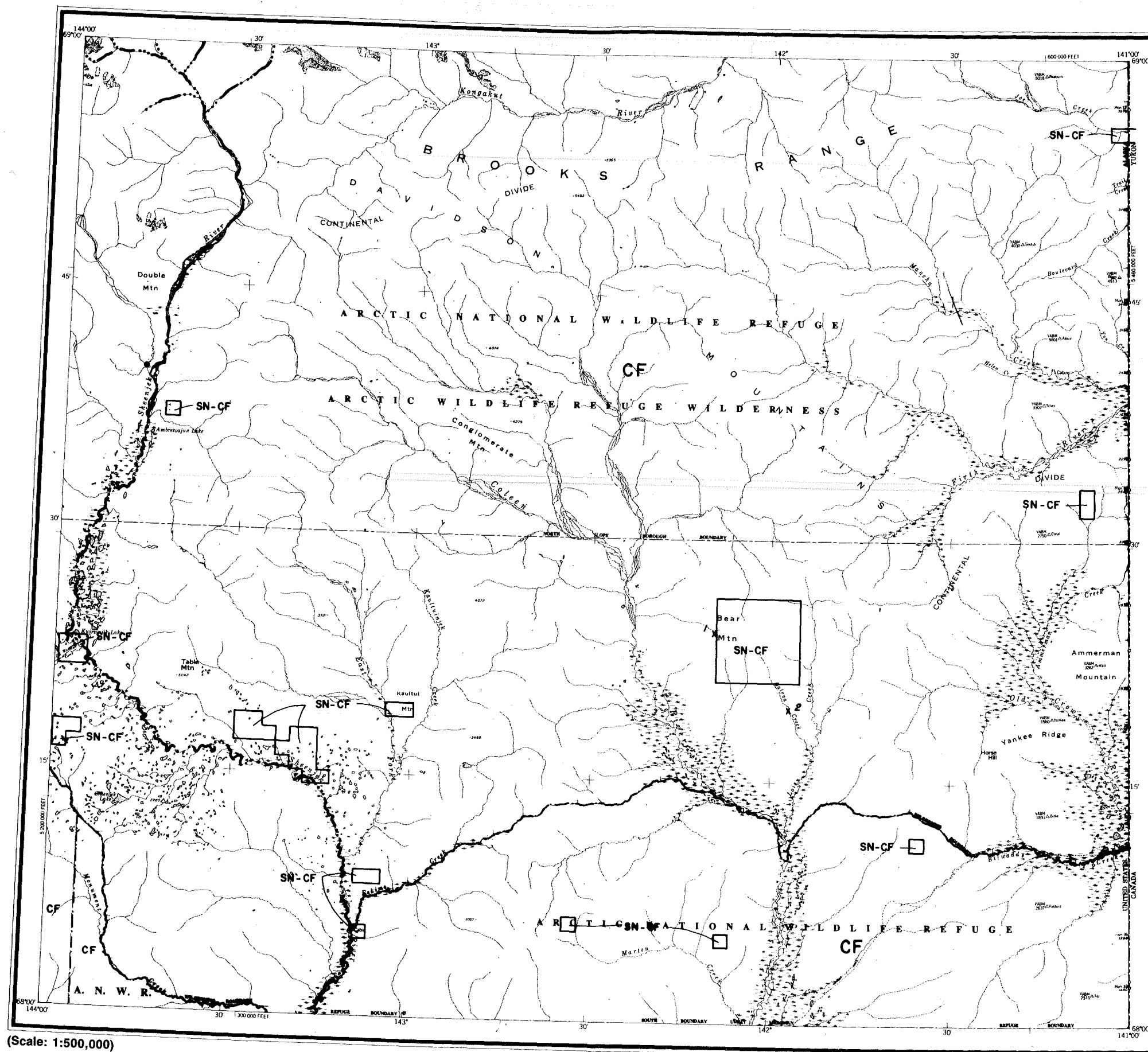




(Scale: 1:500,000)

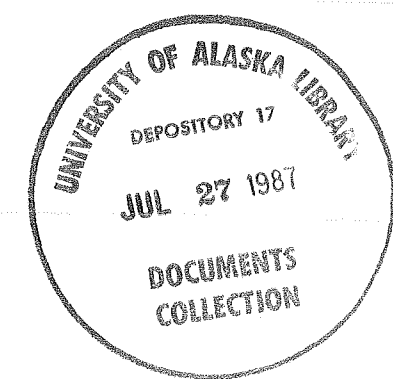
FIGURE B-23.—Philip Smith Mountains quadrangle.
(See accompanying legend)

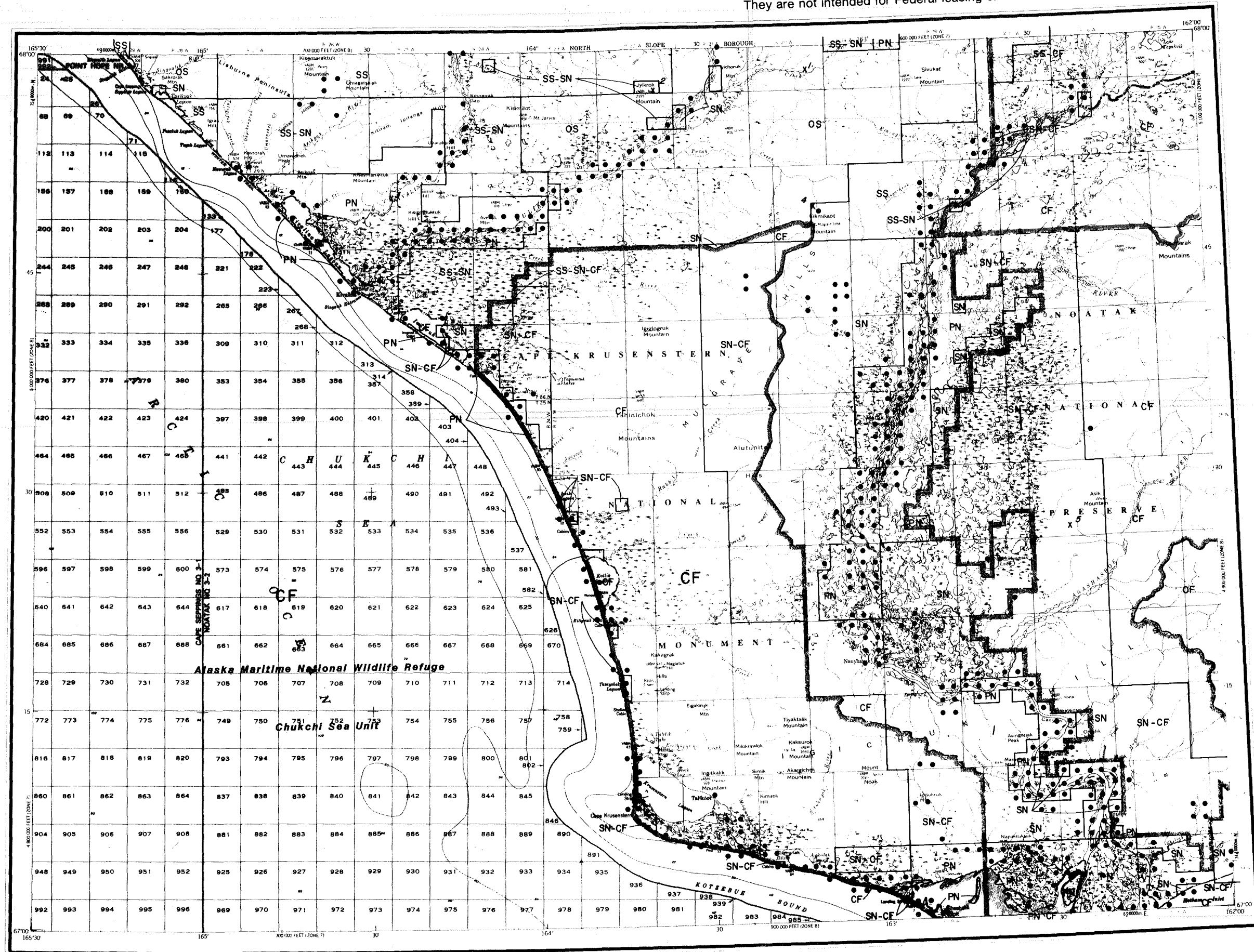




(Scale: 1:500,000)

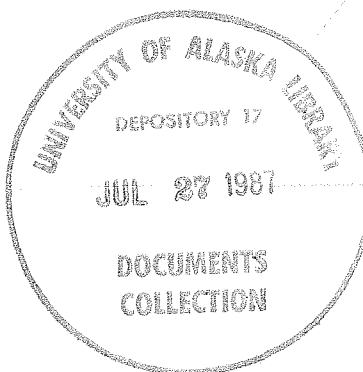
FIGURE B-25.—Table Mountain quadrangle.
(See accompanying legend)



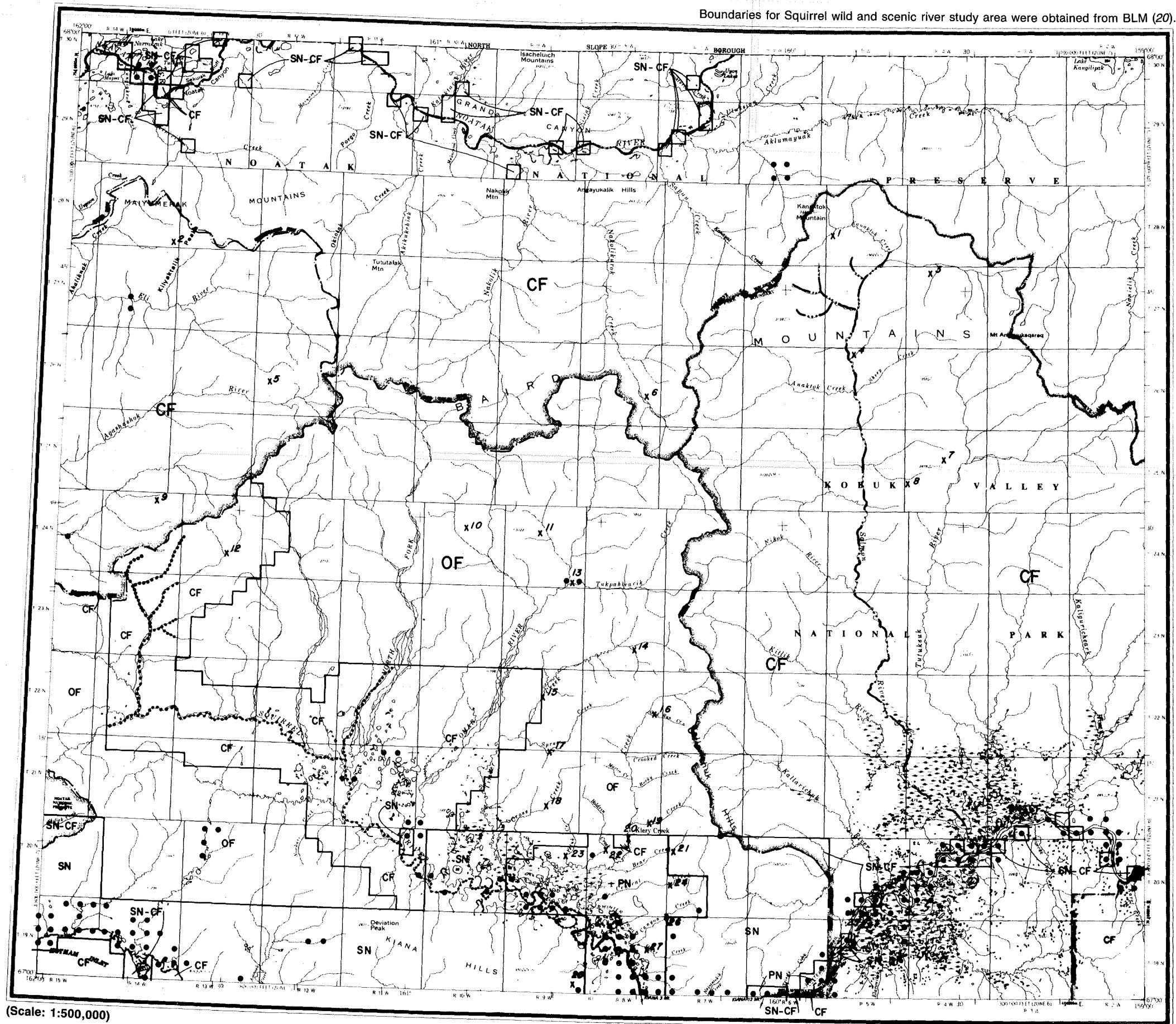


(Scale: 1:500,000)

FIGURE B-26.—Noatak quadrangle.
(See accompanying legend)

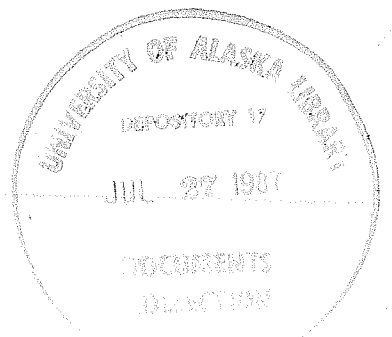


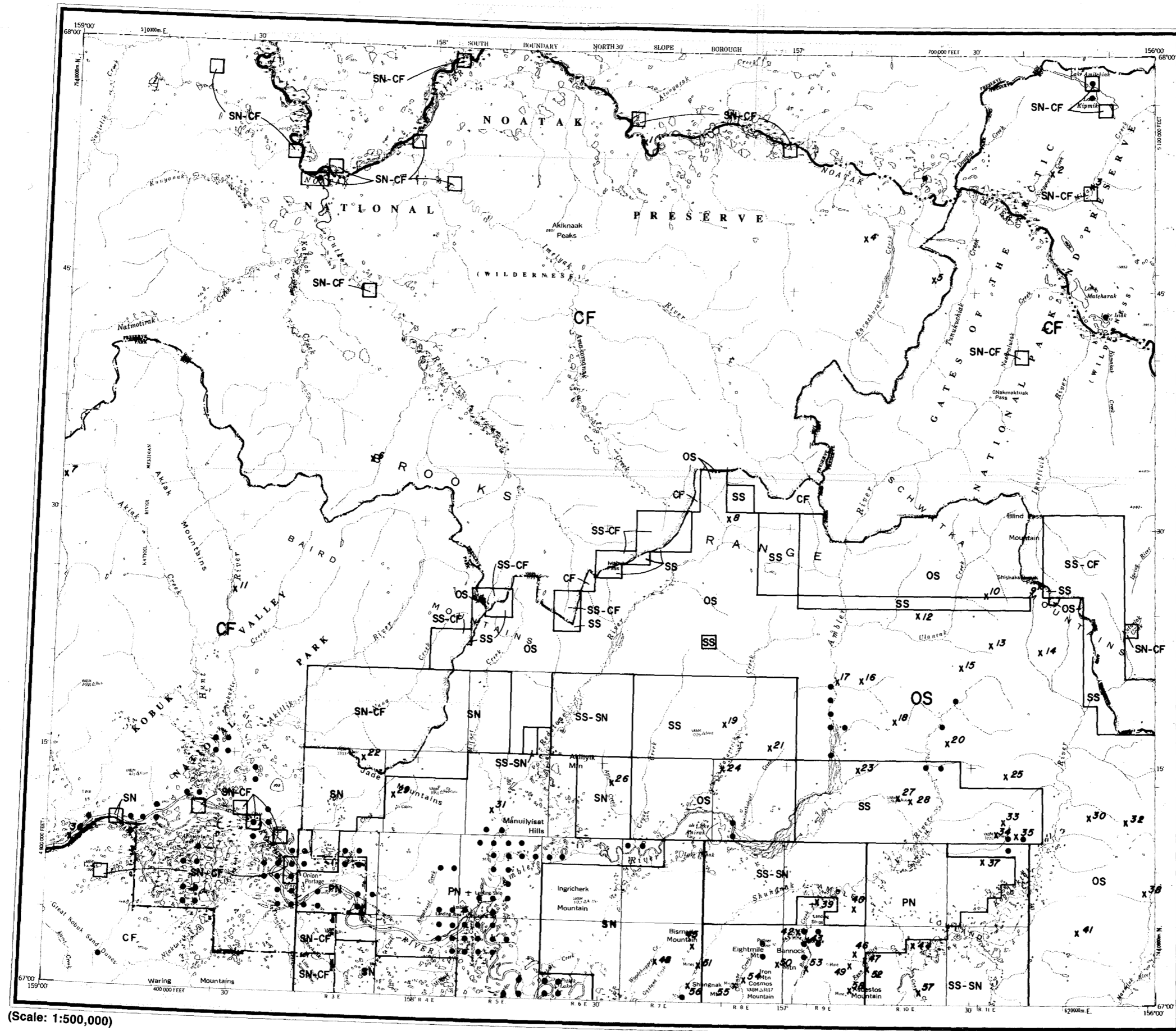
Boundaries for Squirrel wild and scenic river study area were obtained from BLM (20).



(Scale: 1:500,000)

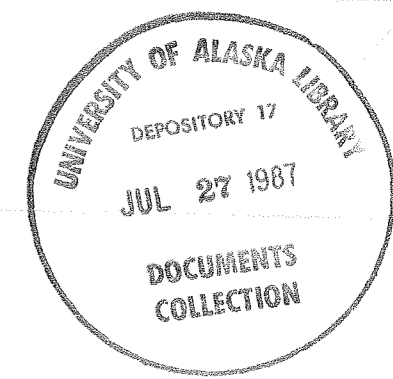
FIGURE B-27.—Baird Mountains quadrangle.
(See accompanying legend)





(Scale: 1:500,000)

FIGURE B-28.—Ambler River quadrangle.
(See accompanying legend)



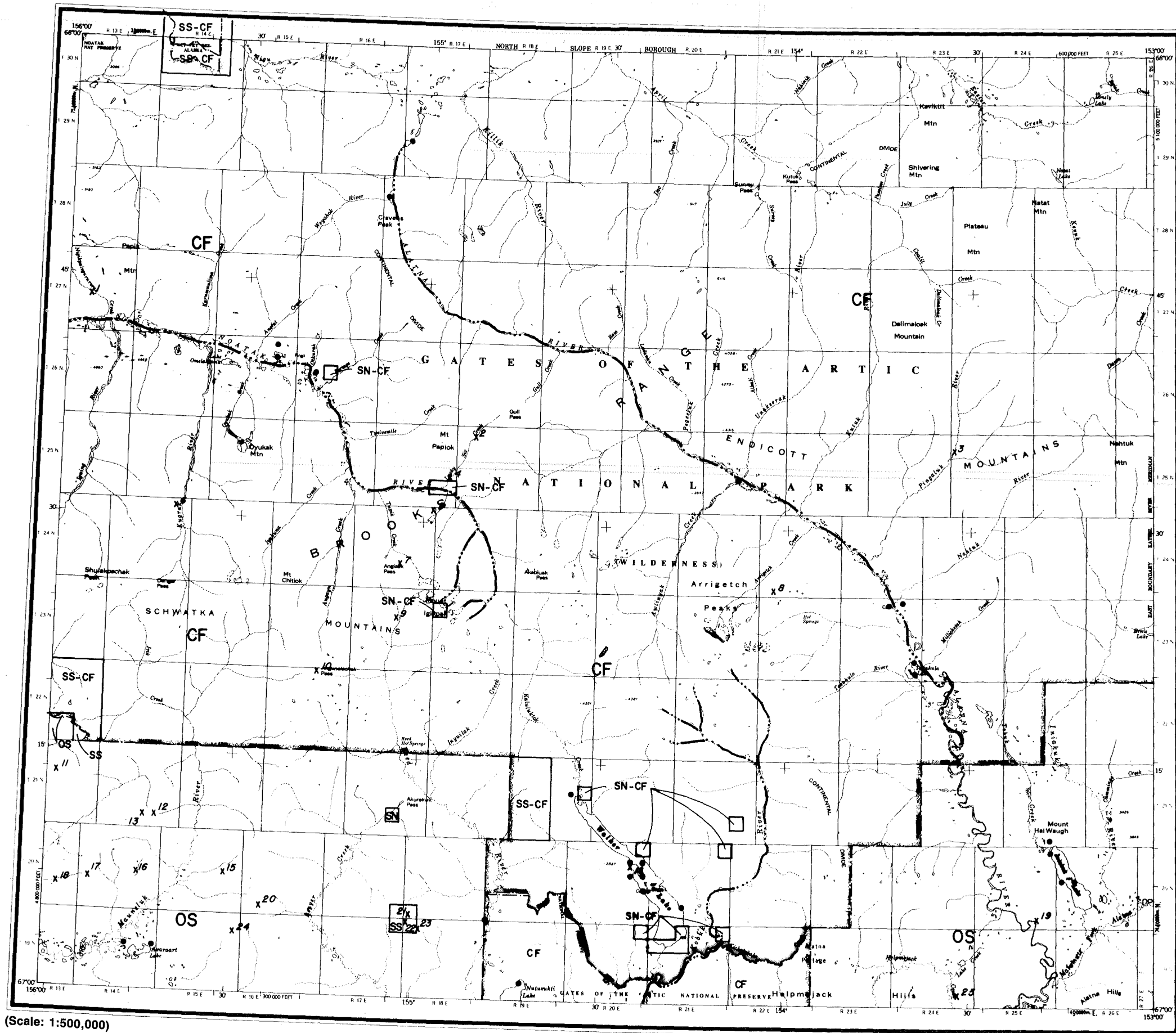
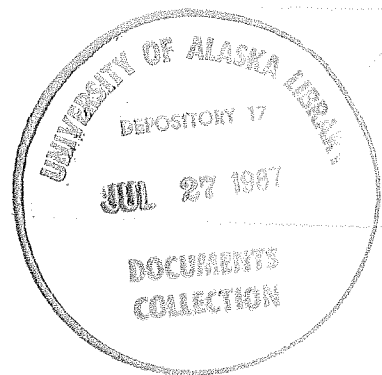
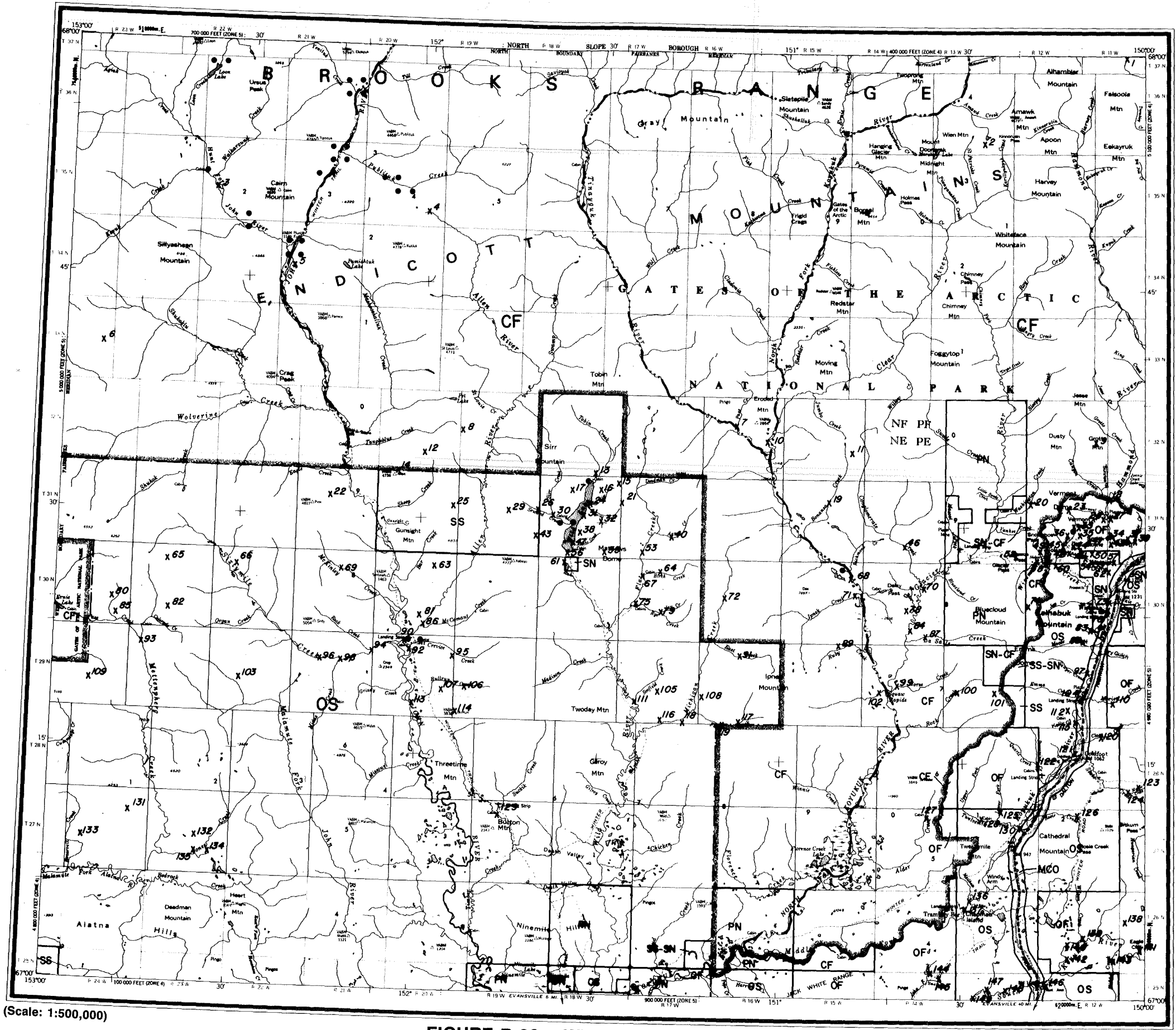


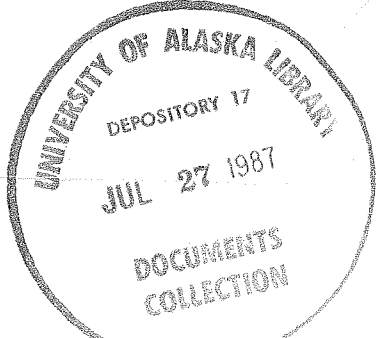
FIGURE B-29.—Survey Pass quadrangle.
(See accompanying legend)

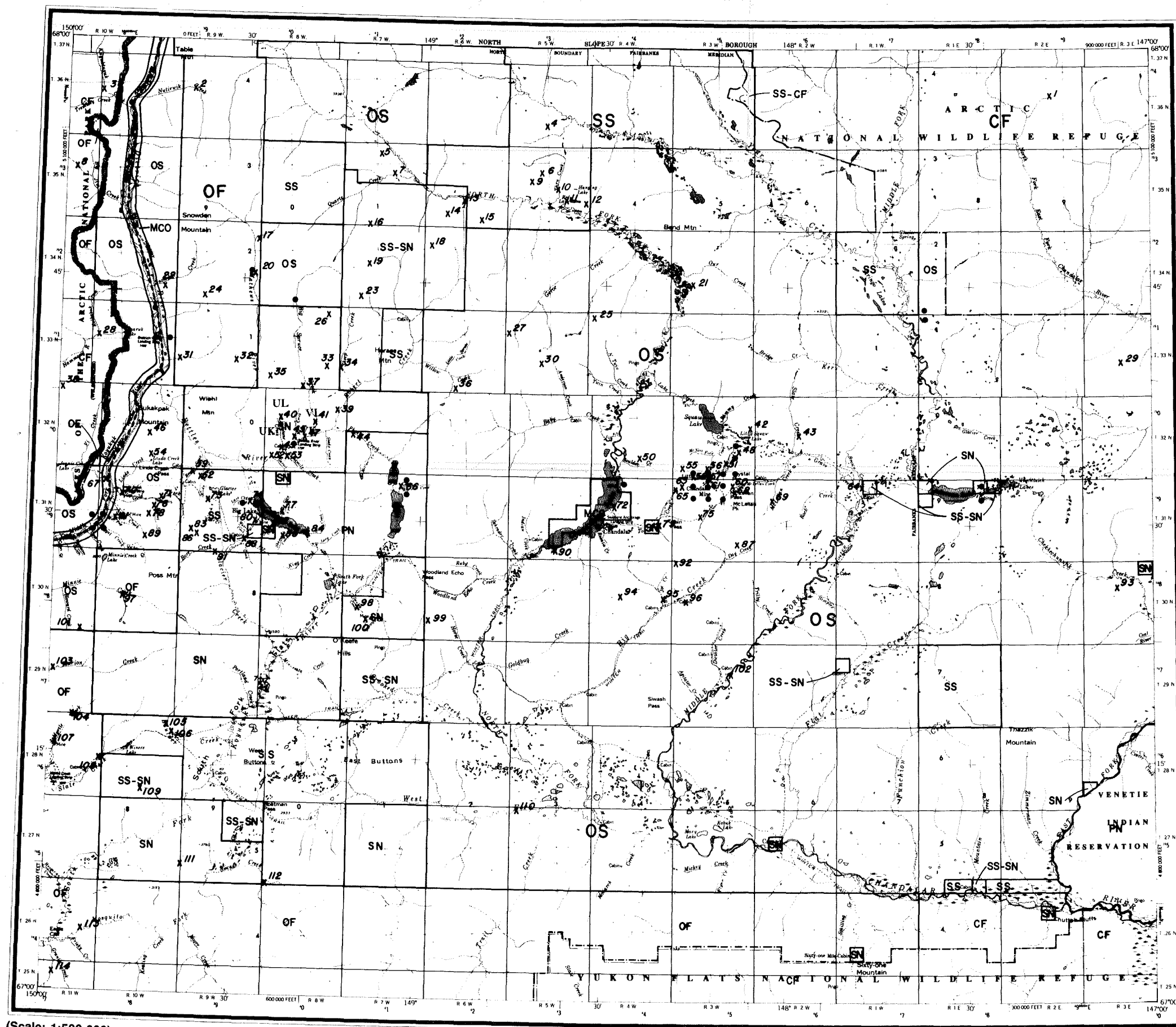




(Scale: 1:500,000)

FIGURE B-30.—Wiseman quadrangle.
(See accompanying legend)

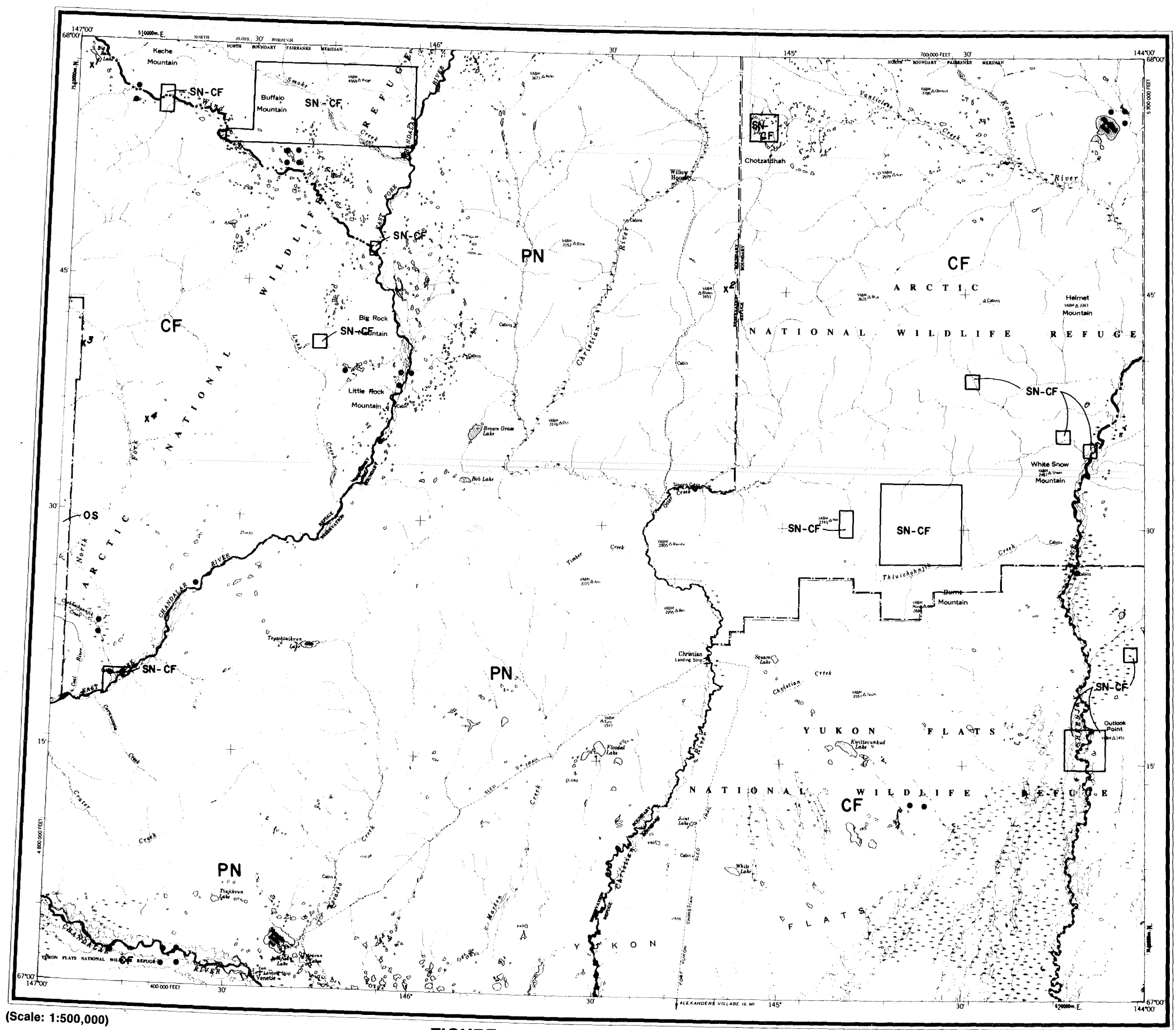




(Scale: 1:500,000)

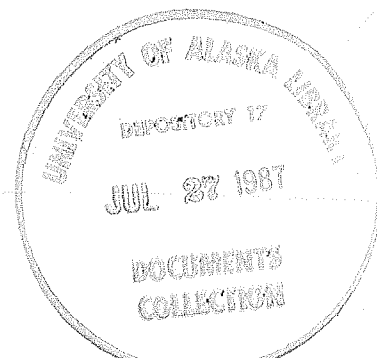
FIGURE B-31.—Chandalar quadrangle.
(See accompanying legend)



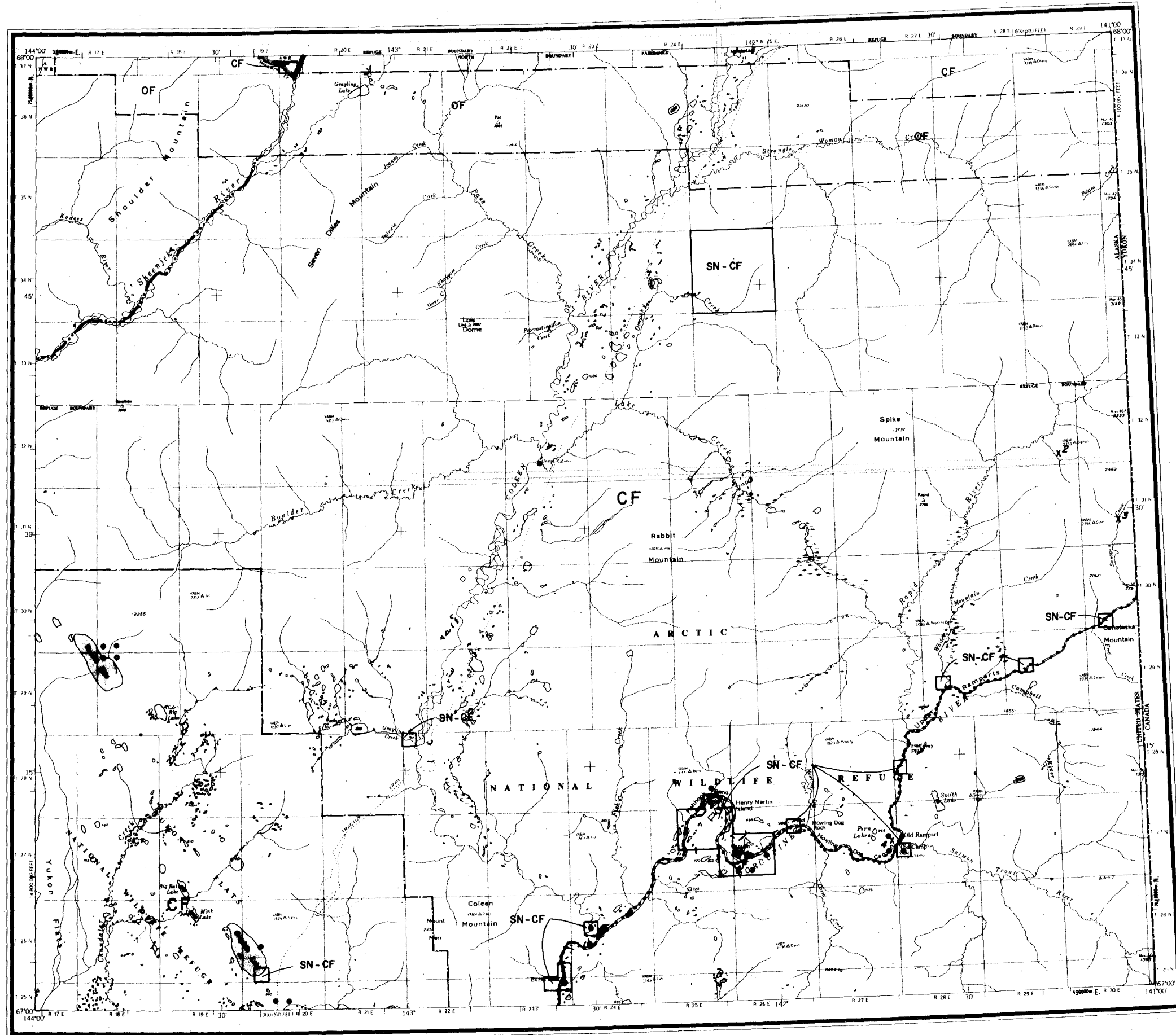


(Scale: 1:500,000)

FIGURE B-32.—Christian quadrangle.
(See accompanying legend)



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(Scale: 1:500,000)

FIGURE B-33.—Coleen quadrangle.
(See accompanying legend)

