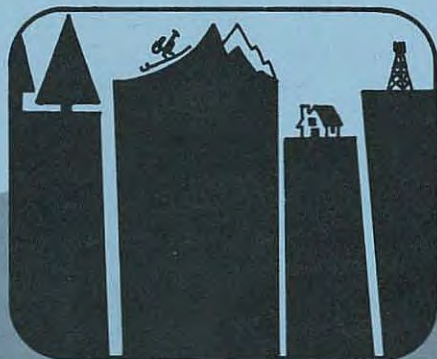
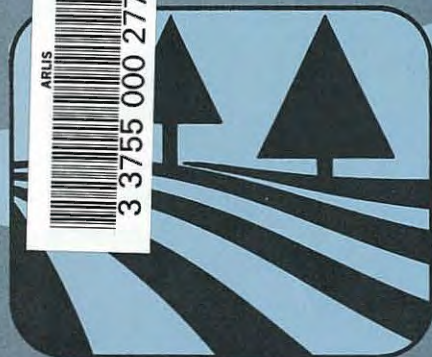


# Resource Bibliography

susitna



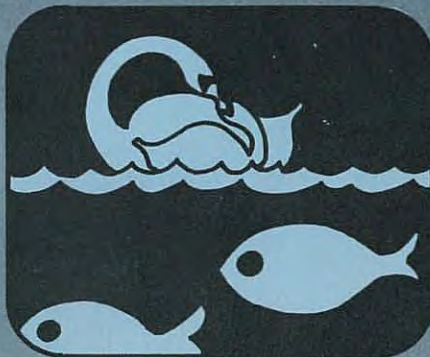
river basin



alaska rivers  
cooperative studies



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RESOURCE BIBLIOGRAPHY  
SUSITNA RIVER BASIN

OCTOBER 1977

State of Alaska  
Department of Natural Resources  
Planning & Research Section  
In Cooperation  
With the U.S. Department  
Of Agriculture  
(Soil Conservation Service, Forest Service, Economic Research Service)

This project was supported by federal Alaska  
Rivers Cooperative Studies funds (P.L. 83-566)  
Granted to the State of Alaska by the U.S. Department  
of Agriculture

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**ARLIS**  
Alaska Resources  
Library & Information Services  
Anchorage, Alaska

## PREFACE

This resource bibliography is in partial fulfillment of a Cooperative Agreement between the State of Alaska, Department of Natural Resources and the U.S. Department of Agriculture, Soil Conservation Service dated September 30, 1977. The Cooperative Agreement (Section A-4) states that the Department shall collect all resource data on the Susitna Basin Cooperative Study area and provide readable copies and/or annotations of all data to the Service by January 1, 1978. The resource bibliography has been prepared directly for use in the cooperative study on the Susitna River Basin, the first in a series of federally funded Alaska Rivers Cooperative Studies.

Research and preparation work for this document began in June 1977 and was completed September 1977.

SUSITNA RIVER BASIN  
RESOURCE BIBLIOGRAPHY

TABLE OF CONTENTS

<u>Sections</u>	<u>Page</u>
I. INTRODUCTION & SUMMARY	1
Study Area Map	7
II. GEOLOGY	8
III. HYDROLOGY	105
IV. SOILS	184
V. VEGETATION	201
VI. FISH & WILDLIFE	217
VII. RECREATION & ARCHAEOLOGY	239
VIII. LAND USE & LAND STATUS	269
IX. CLIMATE	287
X. MISCELLANEOUS REFERENCES	304



# introduction & summary

### Purpose

The purpose of this resource bibliography is to collect and describe existing published information, and to annotate ongoing projects relevant to natural resources in the Susitna Basin. The collection of information will serve as a reference point for future data inventory in the Susitna area and as a foundation tool for planning and resource management by state, borough, local and federal agencies. Resource areas and geographic areas lacking data suitable for management and planning needs are identified here and may be addressed by future field investigations. The result: data fulfilling planning needs rather than duplicating information.

The bibliography is a direct product of the USDA-DNR Cooperative Study of the Susitna River Basin, the first in a series of federally funded projects called Alaska River Cooperative Studies. Input on bibliography form and content has been provided by the Matanuska-Susitna Borough Planning Department. Publications collected by this effort are applicable to the Borough Comprehensive Plan update, and will be shared with the Borough Planning Department.

### Approach

To prepare this document, resource libraries, bibliographic retrieval systems, federal, state and local government personnel and libraries and private business were contacted and used. More detailed accounts of sources are given in subsequent pages.

### Organization

Bibliographic entires are arranged by resource category. These categories include (in order of priority): geology, hydrology, soils, vegetation, fish & wildlife, recreation & archaeology, land use & land status, climate and miscellaneous references. Within resource categories, annotations are broken down according to whether they are published information (reports or maps), or ongoing programs. In certain cases, as for geology and hydrology, a further breakdown has been made to group similar kinds of published reports. Examples of annotated entires of: 1) published information, and 2) ongoing programs follow.

DESCRIPTIVE EXAMPLE: Published Information (Report or Map)

- Title:** Title of publication is underlined. Author; agency, (date), (number of pages, illustrations).
- Area:** The geographic area description locates the research, first in one or more of the six State priority areas, and/or four river sub-basins. Then specific sites within the region may be referenced for further clarification. For example, "State priority area 1; Willow." (See Study Area map for clarification.)
- Interest:** Each publication is assigned a 1, 2, or 3 level of interest based on a varying set of criteria and depending upon the resource category. Entries are rated according to the interest and relevancy of the source to regional planning concerns. Those items ranking first (1) are thought to be of primary interest. Those items ranking second (2) are judged to be of general, indirect interest. Those items ranking third (3) are thought to be of lesser interest for purposes of regional planning. The level of interest category is not intended as judgement of the quality of sources. Specific criteria for interest level ratings are given in the introduction to each resource subject. References are rated individually, or as they relate to all data collected on one category. (Soils data was not rated against climate information, for example.)
- Maps:** Titles of all relevant maps are listed with scales included. Map descriptions are given if necessary.
- Tables:** Relevant tables are listed or summarized.
- Description:** The description, or explanatory annotation, summarizes the contents of the publication, and sometimes gives critical evaluation of the report's utility to regional planning.
- Availability:** This explains restrictions of data availability. If the availability is not cited, at least one copy of the referenced publication has been collected, and is contained in a special "Susitna Collection" shared by the USDA Soil Conservation Service and State of Alaska Department of Natural Resources. When availability is cited, copies of documents may be obtained as indicated.

### DESCRIPTIVE EXAMPLE: Ongoing Project

- Project:** Project identification, (not necessarily the formal project name) is listed.
- Contact:** Name, address and phone number of person to contact for further information is indicated.
- Area:** The geographic area description locates the research, first in one or more of the six State priority areas, and/or four river sub-basins. Then specific sites within the region may be referenced for further clarification of location. For example, "State priority area: Willow." (See Study Area map for clarification.)
- Description:** A short explanation of intent, scope methodology and expected results of the project is given.
- Maps:** Relevant maps and their scales are listed.
- Tables:** Relevant tables are listed and explained if necessary.
- Status:** The project progress to date is given.
- Duration:** The anticipated completion date or length of study is given.



## Summary of Findings

A large quantity of resource information has been published for the Susitna River Basin area; enough references are available to fill volumes twice this size. An attempt to compile all this information however, will show it to be of limited use to comprehensive regional planning. Information has been collected at generalized or inconsistent scales and at different levels of detail. In some cases it has been continually updated; in other cases it has never been updated. Areas of greatest historical concern have been covered most intensively, areas of future concern have often been given little comprehensive coverage. The lack of comprehensive data coverage is not unique to the Susitna River Basin area. Because the Susitna area is in great need of regional planning due to recent growth and resource development activity, many attempts (including the Susitna Cooperative Study) will be made at strengthening the data base -- at filling gaps and updating old information to make sound regional planning possible. Further studies and inventory are certainly necessary. A number of recently completed studies or ongoing projects will fill some data voids by providing information such as surficial geology maps, tectonic studies, water chemistry sampling, wildlife inventories, spawning areas, and new soil surveys. Certain data voids will remain as will the need for analysis and evaluation of new data.

Information is notably inadequate for regional floodplain delineation; determination of extent, thickness and location of aquifers; specific critical habitat (including seasonal or migrational route habitat); occurrence of subsurface permafrost and comprehensive vegetative inventory.

Detailed summaries of the adequacy of existing information for each resource precede the resource sections. A brief summary of adequacies and/or inadequacies, revealed by the data search, is given below by resource subject.

Geology - This section references over 100 reports, maps, or ongoing projects on earth sciences in or near the Susitna River Basin published within the last 25 years. Approximately one third of the published information is considered of primary interest (level 1) because of its usefulness; identifying such factors as depth to bedrock, areas of instability and faults, surficial features, land forms, land contours, mineral deposits, and fossil fuels. The quantity of information in the mineralogy and economic geology subsections suggests the emphasis by private and government entities on identifying and evaluating energy and mineral resources. (No attempt was made to include exploration activities of the private business sector in this document.)

Hydrology - A diversity of hydrologic-related data exists and several extraordinary water-related studies are underway in the Susitna River Basin. The following are of particular importance and their progress should be monitored:

- The Southcentral Alaska Water Resources (Level B) Study.
- Upper Susitna River Hydroelectric Development Project.
- Studies authorized by the Federal Water Pollution Control Act, (Public Law 92-500, Section 201, 208, and 303E Studies).
- Floodplain Information Studies.

Soils - Extensive soil surveys are underway or planned in priority areas of the Susitna Basin, (including the Willow capital site). These and other Soil Conservation Service projects will supplement existing soil surveys of the Matanuska and Susitna Valleys.

Vegetation - Inadequate information exists at a regional level on detailed vegetation and forestry resources. Ongoing and planned application of remote sensing techniques and high altitude photography may assist in providing additional necessary information. Agricultural potential and commercial timber have been analyzed but not at a consistent level of detail adequate for all land management and land classification decisions.

Wildlife and Fish - Quantifying fish and wildlife information in a bibliographic format was difficult. Data has been collected for many years on fish and game harvests in Alaska. Available information includes fish escapement studies, spawning areas, wildlife inventories at generalized scales, water chemistry, habitat studies and migration routes. There is a pressing need for data at a scale larger than 1:250,000, particularly for summer habitat and activity information, and for studies on small game.

Recreation & Archaeology - Most information on existing parks or land areas planned for inclusion in the State park system is of uniform scale. Archaeological investigations at various locations within the Sustina River Basin have been conducted and more field studies are being initiated as development pressures increase in the area. One important need is to identify potential recreation areas in order to keep pace with valley population pressure.

Land Use & Land Status - Little effort was directed toward collection of land use and land status information, yet products discovered while researching other resource topics are included in the bibliography. The land status and land use section should not be considered an adequate survey of area land use-related studies, however. The work tasks underway (as part of the Susitna Cooperative Study) by Alaska Department of Natural Resources (DNR) address existing land use and land status in more detail than any previous studies.

The first is a cultural land use mapping project utilizing aerial photographs and field verification. The second is a land status mapping project showing land ownership patterns and surface and subsurface uses.

Climate - A substantial amount of climatic information is available for the Matanuska and Susitna Valleys. Climatic data is constantly being compiled and monitored, but little work has been done, thus far to map area conditions, e.g. wind direction, isotherms, inversion areas, etc.

Miscellaneous References - Other bibliographies and references sources discovered and used in the course of this regional information search are included in this section. These sources may prove useful in update of this bibliography, or for other resource studies. A collection of miscellaneous but relevant information that did not fit the subject categories established, or the format of the bibliography, is also included here. Socio-economic information for example, was not included as a separate resource subject because the data search was focussed on natural resources, but a few socio-economic references were discovered and are therefore included in this section. Finally, a summary of aerial photography available from a private business firm is noted in this section.

As evidenced from the above qualifications, this document does not provide a complete listing of all reports, maps and projects ever completed or underway within the Susitna River Basin region. It is however, the most comprehensive resource bibliography of the area to date. The intention is for this document to be continually updated, augmented and strengthened to become more useful in the future.

# SUSITNA RIVER BASIN COOPERATIVE STUDY ALASKA

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10 20 30 40 50 KILOMETERS

SCALE 1:2,000,000

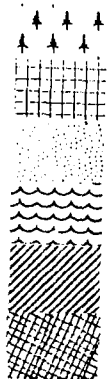
## LEGEND

Sub-Basin boundaries

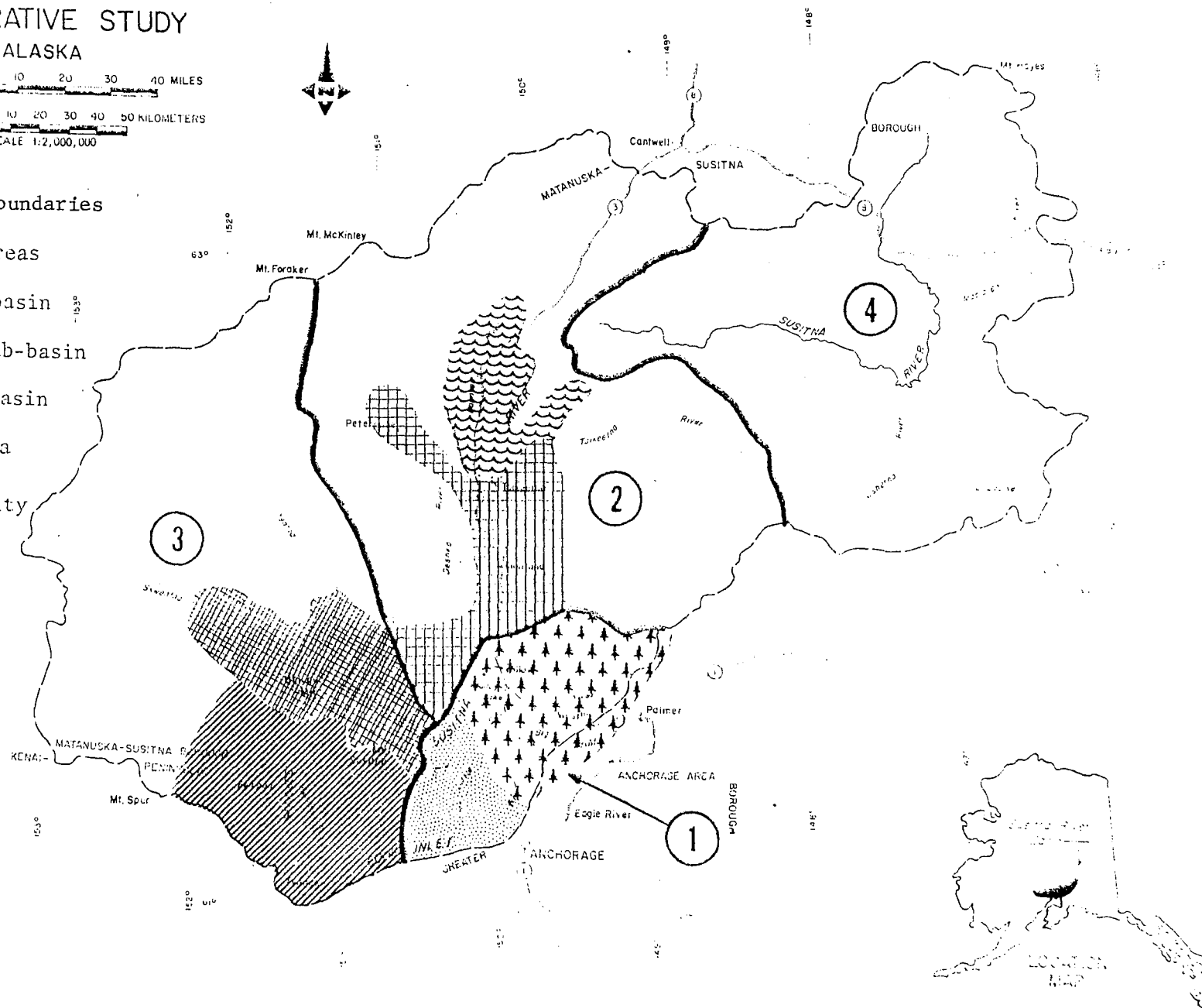
Sub-basin areas

- 1 Willow sub-basin
- 2 Talkeetna sub-basin
- 3 Beluga sub-basin
- 4 Upper Susitna sub-basin

State priority areas



- #1
- #2
- #3a
- #3b
- #4a
- #4b





geology



## CONTENTS: GEOLOGY

	<u>Page</u>
I. INTRODUCTION & SUMMARY	9
II. INDEX	12
III. CROSS INDEX	17
IV. PUBLISHED INFORMATION	18
A. Coal Studies	18
B. Mineralogy	41
C. Geochemistry	54
D. Glacial Geology	60
E. Paleontology	63
F. Stratigraphy	66
V. MAPS	74
A. Geochemical	74
B. Geophysical	77
C. Reconnaissance Geology	81
D. Mineral Resources	88
VI. ONGOING PROJECTS	96

## 1. INTRODUCTION & SUMMARY

## I. INTRODUCTION & SUMMARY: GEOLOGY

The subject of geology, even for a defined geographic area, is quite complex. Due to the volume and complexity of reports and maps dealing with the earth sciences, the Geology Section is organized into subtopics. Geology subtopics and a brief description of their contents follow. Published information on geology is broken down as indicated below.

COAL - Because of the large, known coal deposits found in most parts of the Susitna River Basin region, economic studies of coal reserves have been conducted periodically for many years. Only the more recent coal studies are included in this bibliography.

MINERALOGY - Resource evaluations and investigations of a variety of mineral occurrences are annotated in this section. Gold, copper, chromite, antimony, zeolite and uranium are examples of minerals described.

GEOCHEMISTRY - This section includes studies involving investigations of distribution and amounts of chemical elements, minerals, and ores in rocks, soils and water.

GLACIAL GEOLOGY - This section includes studies of glacial patterns and their chronologic succession as determined by physiographic provinces.

PALEONTOLOGY - These specialized studies examine fossil remains to determine geologic occurrences.

STRATIGRAPHY - These studies investigate form, arrangement, geographic distribution, chronologic succession and correlation of rock strata. Other studies dealing with configuration of the land's surface and its relationship to underlying structures are actually geomorphology. The term geomorphology has come to replace the term physiography and is usually considered a separate report section for purposes of this bibliography.

Maps of geologic information are organized by the subtopics: geochemical, geophysical, reconnaissance geology, and mineral resources.

CROSS INDEX - The Cross Index of the Geology Section includes titles of studies discussing geology, but not as the primary topic found in other resource sections. Geohydrology for example, is found in the Hydrology section of this bibliography.

SOURCES - The primary agency contributors to Alaskan geologic investigations are the Department of the Interior's U.S. Geological Survey and U.S. Bureau of Mines; and the Alaska Department of Natural Resources, Division of Geological and Geophysical Survey. Several other agencies contributing to Alaska's geology information include: Army Corps of Engineers, Palmer Seismological Observatory, University of Alaska, Geophysical Institute and School of Mineral Industry.

SUMMARY OF FINDINGS - Reconnaissance geology studies of lode and placer deposits, and investigations of glaciation in the Susitna Basin began as early as 1898. Investigations of coal deposits and metallic mineral sites were carried out shortly after the turn of the century. These studies continued sporadically for the next 40 years, depending on world-wide energy/mineral needs and local military and civilian demands. When the market for coal (temporarily) vanished after World War II and the price of precious metals fell, so did the number of geologic investigations in Alaska. Since the 1960's, interest in Alaska's mineral and fossil fuel resources has continued to rise.

The geology bibliography is not all-inclusive of historical publications, but includes early work of such geologists as Stephen Capps, A.H. Brooks, G.H. Elridge and others which still serves as the groundwork for many of today's geologic investigations. The following subject areas, or named publications briefly summarize some of the more pertinent data found in this bibliography section.

1. Numerous investigations have been completed or are currently underway, on the various coal resources of the Susitna River Basin on State, federal or native lands. The following three, and several other reports, provide valuable information on coal reserves in the State priority area known as the Beluga region:

Geology and Coal Resources of the Beluga-Yentna Region.

Geology and Mineral Deposits of the Chulitna-Yentna Region.

Coal Reserve Study, Chitina-Beluga-Capps Area.

Other investigations cover these areas: a) the Wishbone Hill District, Little Susitna District, Moose Creek District, and Houston deposits, all part of the Matanuska Coal field; b) the Willow Creek Mining District; c) Knik Valley chromite deposits; d) Costello Creek and Broad Pass coal; e) Denali-MaClaren River Area; and f) Diana Lakes area, Upper Talkeetna River.

2. Lode and placer deposits are indicated on the "Metallic Mineral Resource Maps" for all quadrangles that comprise the Susitna River Basin.

3. Seismic hazards and areas of instability may be inferred from these maps:

Reconnaissance Geologic Map along Bruin Bay and Lake Clark Faults in Kenai and Tyonek Quadrangles.

Surface Geology and Holocene Breaks along the Susitna Segment of the Castle Mountain Fault.

Geology and Surface Features along Part of the Talkeetna Segment of the Castle Mountain-Caribou Fault System.

Most other comprehensive geology maps indicate inferred faults of areas of instability.

4. Reports of maps of specific areas may be referred to for data on surface contours, subsurface materials (sand and gravel), physiography, topography, etc. if no other data is available.

LEVEL OF INTEREST - The level of interest rating is meant to assign some other order of priority to the review of the collected documents, and suggest some relevance in their applicability to regional planning tasks. The following are examples of criteria considered for rating geology publications and maps: 1) level of detail of mapping units; 2) specificity to the geographic areas of State concern, (Willow geology would be considered of greater interest than Upper Susitna sub-basin geology); 3) comprehensive and current publications, and; 4) geologic investigations providing information on bedrock, materials, seismic hazards, mineral deposits, fossil fuel deposits, out crops, and ground instability.



## II. INDEX: GEOLOGY

## II. INDEX: GEOLOGY

### PUBLISHED INFORMATION

#### A. COAL STUDIES

1. Coal Reserve Study, Chitina - Beluga Capps Area Alaska.
2. Mineral Resources of Alaska and the Impact of Federal Land Policies on Their Availability: Coal.
3. Cook Inlet Basin Subsurface Coal Reserve Study.
4. Economic and Geologic Studies of the Beluga - Capps Area and Geologic Resource Occurrences in Other Areas of the Proposed Cook Inlet Land Trade.
5. The Wishbone Hill District, Matanuska Coal Field.
6. Geology and Coal Resources of the Beluga - Yentna Region Alaska.
7. Geology and Coal Resources of the Little Susitna District Matanuska Coal Field.
8. Coal Prospects and Coal Exploration and Development in the Lower Matanuska Valley, Alaska, in 1950.
9. The Little Tonzona River Coal Beds Near Farewell, Alaska.
10. Investigation of the W.F. Dunkle Coal Mine Costello Creek, Chulitna District.
11. Carbonizing Properties: British Columbia, Matanuska Valley, and Washington Coals and Blends of Six of them with Lower Sunnyside (Utah) Coals.
12. Sampling and Coking Studies of Coal From Castle Mountain Mine, Matanuska Coalfield, Alaska.
13. Investigations of Subbituminous Coal Deposits in the Beluga River Coalfield.
14. Moose Creek District of Matanuska Coal Fields.
15. Investigation of Subbituminous-Coal Beds Near Houston, Westward Extremity of Matanuska Coalfield Alaska.

PUBLISHED INFORMATION - COAL STUDIES (cont)

16. Bituminous Coal Deposits of the Matanuska Coalfield, Alaska: Central and Western Parts, Wishbone District.
17. Washability of Coals from the Matanuska Valley and Beluga River Fields, Alaska.
18. Investigation of Subbituminous Coal Deposit Suitable for Opencut Mining, Beluga River Coalfield, Alaska.

B. MINERALOGY

1. Geology and Ore Deposits of the Willow Creek Mining District.
2. Geology and Mineral Deposits of the Chulitna-Yentna Mineral Belt, Alaska.
3. Occurrences of Gold and Other Metals in The Upper Chulitna District, Alaska.
4. Geochemical Investigation at Antimony Creek, Antimony Prospect, Northern Talkeetna Mountains.
5. Potential Mineral Resources in Selected D-2 Lands.
6. Investigation of Knik Valley Chromite Deposits, Palmer.
7. Sedimentary Zeolite Deposits of the Upper Matanuska Valley.
8. Investigations of Alaska's Uranium Potential.
9. Geology and Mineral Deposits of the Denali McClaren River Area.
10. Stratabound Copper-Gold Occurrence, Northern Talkeetna Mountains.
11. The Mineral Industry of the Kenai-Cook Inlet-Susitna Region.

C. GEOCHEMISTRY

1. Geology and Geochemistry Diana Lakes Area Western Talkeetna Mountains.
2. Geochemical Investigations of Selected Areas in Alaska, 1964.
3. Geochemical Investigations along Highway and Secondary Roads in Southcentral Alaska.
4. Geochemical Investigations Willow Creek Southerly to Kenai Lake Region Southcentral Alaska.

PUBLISHED INFORMATION - GEOCHEMISTRY (cont)

5. Preliminary Geochemistry and Geology Little Falls Creek Area, Talkeetna Mountains Quadrangle.

6. Geology of an Area on the Upper Talkeetna River, Talkeetna Mountains Quadrangle.

D. GLACIAL GEOLOGY

1. Quaternary Geology of the Kenai Lowland and Glacial History of Cook Inlet.

2. East of Mount McKinley Reconnaissance Glaciological and Geological Survey.

3. Late Wisconsin and Recent History of the Matanuska Glacier, Alaska.

E. PALEONTOLOGY

1. Early Cretaceous (Albian) Ammonities from the Chitina Valley and and the Talkeetna Mountains.

2. Tertiary Stratigraphy and Paleobotany of the Cook Inlet Region, Alaska.

3. Lithology and Palynology of Tertiary Rocks Exposed Near Capps Glacier and Along Chuitna River, Tyonek Quadrangle.

F. STRATIGRAPHY

1. Variation in Rank of Tertiary Coals in The Cook Inlet Basin.

2. Geochronology a Generalized Geology of the Central Alaska Range, Clearwater Mountains and Northern Talkeetna Mountains.

3. Regional Gravity Survey of Beluga Basin and Adjacent Area, Cook Inlet Region, Southcentral Alaska.

4. Preliminary Report on Stratigraphy of Kenai Group, Upper Cook Inlet.

5. Guidebook to the Quarternary Geology Central and Southcentral Alaska.

6. Reconnaissance Geologic Investigation in the Talkeetna Mountains.

7. An Analysis of Earthquake Intensities and Recurrence Rates in and near Alaska.

## MAPS

### A. GEOCHEMICAL

1. Geochemical Anomalies in the Willow Creek Mining District, Talkeetna Mountains Mat-Su Borough.
2. Map Showing Geology, Wildcat Wells, Tertiary Plant Fossil Localities, K-AR age dates, and Petroleum Operations, Cook Inlet Area, Alaska.

### B. GEOPHYSICAL

1. Aeromagnetic Maps for Talkeetna, Talkeetna Mountains and Tyonek.
2. Topographic and Geologic Map of the Knob Creek Area of the Wishbone Hill District, Matanuska Coak Field.
3. Surface Geology and Holocene Breaks along the Susitna Segment of the Castle Mountain Fault.
4. Geology and Surface Features Along Part of the Talkeetna Segment of the Castle Mountain - Caribou Fault System.

### C. RECONNAISSANCE GEOLOGY

1. Reconnaissance Engineering Geology for Selection of Highway Route From Talkeetna to McGrath, Alaska.
2. Reconnaissance Geologic Map Along Bruin Bay and Lake Clark Faults in Kenai and Tyonek Quadrangles.
3. Reconnaissance Geology Southcentral Talkeetna Mountains.
4. Geologic Map of Talkeetna Mountains (A2) Quadrangle, and the Contiguous Area to the North and Northwest.
5. Geologic Map of Talkeetna Mountains (A-1) Quadrangle, and the South Third of Talkeetna Mountains (B-1) Quadrangle.
6. Geologic Map of Lower Matanuska Valley.
7. Generalized Geologic Map of the Alaska-Aleutian Range Batholith Showing Potassium-Argon Ages of The Plutonic Rocks.

### D. MINERAL RESOURCES

1. Metallic Mineral Resources Map of the Mount McKinley Quadrangle.
2. Metallic Mineral Resources Map of the Talkeetna Quadrangle.
3. Metallic Mineral Resources Map of the Talkeetna Mountains Quadrangle.
4. Metallic Mineral Resources Map of the Tyonek Quadrangle.



#### MAPS - MINERAL RESOURCES (cont)

5. Metallic Mineral Resources Map of the Healy Quadrangle.
6. Metallic Mineral Resources Map of the Anchorage Quadrangle.
7. Metallic Mineral Resources Map of the Mount Hayes Quadrangle.
8. Metallic Mineral Resources Map of the Gulkana Quadrangle.

#### ONGOING PROJECTS

1. Alaska Mineral Resource Assessment Program (AMRAP).
2. Alaska Geochemical Analysis.
3. Talkeetna Mountains Quadrangle, Geologic Mapping.
4. Talkeetna Quadrangle, Mineral Resource Evaluation.
5. Beluga Coal Fields, Reserves on State Lands.
6. Analysis of Faults in the Matanuska and Susitna Valleys.
7. Evaluation of Bedrock Geology and the South Side Matanuska Valley.
8. Mineral Exploration, Cities Service Minerals Corporation.
9. Surficial Geology of the Matanuska and Susitna Valleys.

### III. CROSS INDEX: GEOLOGY

#### Page

At times, studies and the resultant reports, encompass more than one natural resource subject included in this annotated bibliography. Because of this, a cross index has been prepared to facilitate the reader in locating other reports that discuss geology, but in a secondary manner. An attempt has been made to include reports in the section most closely related to the bulk of the report's content.

See HYDROLOGY SECTION for annotations of the following:

<u>Geology and Ground Water Resources of the Matanuska Valley Agriculture Area.</u> USGS Water Supply Paper 149.	114
<u>Salinity Study, Cook Inlet Basin.</u> DGGs, Geologic Report No. 54.	129
<u>Upper Susitna River: An Inventory &amp; Evaluation of Environmental Aesthetic and Recreational Resources.</u> By Jones and Jones for The Corps of Engineers.	149

See SOILS SECTION for annotations of the following:

<u>Contributions to Clay Mineralogy and Petrology, Cook Inlet Basin.</u> DGGs, Alaska Open File Report No. 102.	194
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See VEGETATION for annotations of the following:

<u>Denali Remote Sensing Project</u>	211
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#### IV. PUBLISHED INFORMATION: GEOLOGY

A. COAL STUDIES

Title: Coal Reserve Study, Chitina - Beluga  
Capps Area Alaska. McGee, D.L.; DGGs Alaska  
Open File Report #30, (1973), (7 p. 5 plates).

Area: Priority area 4a.

Interest: Interest Level 1.

Maps: 1) Location Map (statewide; no scale).  
2) Geologic Map (1:63,360) west side Cook  
Inlet Basin. Includes recent, Tertiary, Jurassic  
and/or Cretaceous formations and other  
geologic information.  
3,4 & 5) Cross sections of coal regions.

Description: The area covered by the investigation is  
approximately 468 square miles. The study area  
is between Beluga River and Nikolai Creek, bounded  
by Beluga Lake on the north and Cook Inlet on  
the south.

A geologic description includes the following sections  
on general stratigraphy: Tertiary age rocks, Quaternary  
rocks, pyroclastic deposits, intrusive rocks, Castle  
Mountain fault and folding. Economic considerations  
(such as physical aspects and reserve calculations  
of coal), coal reserves (in short tons); and references  
are also given.



Title: Mineral Resources of Alaska and the Impact  
of Federal Land Policies on Their Availability: Coal.  
McGee, D.L. and O'Connor, K.M.; DGGS  
Alaska Open File Report 51, (March 1975), (26  
p. illus.).

Area: Statewide, including known and hypothetical  
resources of coal.

Interest: Interest Level 2.

Maps: All Maps are reduced, Series E, 1"=150 miles,  
approximately, color overlays.

1) Map of Alaska showing known and hypothetical  
coal areas in Alaska.

2) Map of Alaska showing present use of coal  
potential land in Alaska.

3) Proposed ultimate use of coal potential  
land in Alaska.

4) Coal potential areas with proposed lands  
of high adverse impact.

5) Map of Alaska showing multiple use lands.

6) Coal potential areas and state lands.

7) Coal potential areas with Native Land.

Tables: 1) Estimated known and hypothetical resources  
of coal in Alaska.

2) Present (and estimated) impact of previous and  
proposed public land withdrawals on coal potential  
land in Alaska (onshore).

3) Effect of lands of high adverse impact on  
coal development.

4) Effect of multiple use lands on coal  
potential areas.

5) Effect of State land on coal potential  
areas.

6) Effect of Native lands on coal potential  
areas.

Description: The report is divided into two parts. Part I indicates where known and hypothetical coal resources are located and estimates how much of the resource can be economically produced. The second part discusses the availability of coal in Alaska with regard to present and proposed land use policies.

The known and hypothetical coal resources of the Matanuska Coal fields, the Susitna Coal Field (Beluga-Yentna area) and the Kenai offshore coal areas are wholly within or offshore of the Susitna River Basin.

Recommendations and references of other reports used in making the estimates used in this report are included.

Title: Cook Inlet Basin Subsurface Coal Reserve Study. McGee, D.L. and O'Connor, K.M.; DGGs Alaska Open File Report #74, (April 1975). (19 p. illus.).

Area: Priority Areas 4a and 4b.

Interest: Interest Level 1.

Maps: 1) Cumulative Coal Map, Surface to 2,000' (1"=4 miles).  
2) Cumulative Coal Map, 2,000' to 5,000', (1"=4 miles).  
3) Cumulative Coal Map, Surface to 10,000' (1"=4 miles).

Tables: 1) List of Control Wells for data points (86 wells).

Illustrations: 1) Aerial location of a coal bed or beds, each thicker than 20', in the interval 1,000' to 2,000', (Scale 1"=4 miles).  
2) Aerial location of a coal bed or beds, each thicker than 20', in the interval 2,000' to 3,000' (scale 1"=4 miles).  
3) Aerial location of a coal bed or beds, each thicker than 20', in the interval 3,000' to 4,000' (scale 1"=4 miles).  
4) Aerial location of a coal bed or beds, each thicker than 20', in the interval 4,000' to 5,000', (scale 1"=4 miles).  
5) Aerial location of a coal bed or beds, each thicker than 20', in the interval of 5,000' to 10,000', (scale 1"=4 miles).

Description: The contents of the report are divided into these sections: Introduction, geology by stratigraphy, Tertiary and Quaternary age rocks, procedures, physical aspects of the coal, conclusions, explanation of example diagram, and references.

Data from exploratory and production wells have been examined to establish subsurface coal reserves. Coal trends and areas of favorable deposition are described. Much of the coal described in this report is not recoverable by known methods and technologies, but new methods of recovery may create a need for information contained in this report.

Title: Economic and Geologic Studies of the Beluga - Capps Area and Geologic Resource Occurrences in other areas of the Proposed Cook Inlet Land Trade. Dobey, P.L. and McGee, D.L.; DGGs, Alaska Open File #94, (January 1976), (86 p. illus.).

Area: State Priority Area 4a and 4b.

Interest: Interest Level 1.

Maps: The report includes an index map, a map of the trade area; and a classification diagram by economic, identified or undiscovered resource occurrence.

The following map also accompanies the report:

"Proposed Land Trade, Capps, Glacier - Beluga Areas, Land Evaluation and Coal Reserve Study." (1:63,360, 50 foot contour intervals).

Tables:

- 1) "Theoretical estimates of State Royalty Income from trade area coal years 1971-2025."
- 2) Theoretic production schedules.
- 3) Potential real value of royalty income from coal.
- 4) Present values of coal based on three inflation rates.
- 5) Theoretic royalty income projected to 2025.

Description: This economic and geologic study is organized into three sections:

- 1) Coal Resource Appraisal of the Beluga-Capps Glacier area.
- 2) Potential revenues from coal royalties in the Capps Glacier area.
- 3) Resource appraisal of land exchange outside of the Beluga-Capps Glacier area.

Description: The third section gives a brief appraisal of the oil and gas, coal, metallic minerals, uranium, geothermal and gravel resources of each of these areas: Point McKenzie and Knik-Willow; Kashwitna area; Chickaloon area; Alexander Creek; Salamatof; and South Kenai. These are land areas involved in trades between the State and the Cook Inlet Region, Inc.

The third section also gives a resource appraisal for the Iliamna, Talkeetna Mountains, Kamishak and Tutna Lake areas. These are land areas involved in trades between the state and the federal government.

Appendix: "The Potential for Developing Alaskan Coals for Clean Export Fuels". Office of Coal Research, USDI, Stanford Research Institute (18 p. included in Alaska Open File #94).

Area: Priority Area 4.

Availability: Included in Alaska Open File #94 for reproduction only.

Description: The report examines the economic feasibility of a coal conversion facility using the Beluga coal reserves as an example. In order to demonstrate the feasibility of this coal conversion project four major areas are investigated: 1) coal reserve size, quality, mining costs, etc.; 2) coal conversion plant; 3) product transportation port survey in Alaska; and 4) market survey.

Title: The Wishbone Hill District, Matanuska Coal Field. Barnes, F.F. and Payne, T.G.; USGS Bulletin 1016 (1956), (88 p. 20 maps).

Area: Matanuska Valley.

Interest: Interest Level 2.

Maps: Twenty plates (maps) and four tables are included in the report. Technical data illustrated on these maps and tables includes geology, structure cross sections, coal bed sections, graphic logs of drill holes, temperature and precipitation, coal production and estimated remaining coal reserves in the Wishbone Hill District.

Four of the maps most pertinent to other studies in the Matanuska-Susitna area are:

1) Geologic map of eastern part of Wishbone Hill district, Matanuska coal field. (1:12,000, with 25 foot contour intervals).

2) Geologic map of western part of Wishbone Hill district (1:12,000 with 25 foot contour intervals).

3) Geologic map of Eska mine and vicinity. (1:3,000 scale, with 100 foot contours).

4) Geologic map of Evan Jones mine and vicinity. (1:6,000 scale, with 20 foot contours).

Geologic features, including faults and thrust zones are shown on these maps.

Description: The report is a historical tool helpful to understanding the coal resources of this coal field, (which in 1953 contained the only producing bituminous coal mines in Alaska).

Title: Geology and Coal Resources of The Beluga - Yentna Region Alaska. Barnes, F.F.; USGS Bulletin 1202-C (1966), (54 p. illus.).

Area: Includes all of State Priority Areas 4a and 4b.

Interest: Interest Level 1.

Maps:

- 1) (In Pocket) Geologic Map of Beluga - Yentna Region. (Scale 1:250,000 with 200 foot contour intervals.) Colored map indicates various deposits, formations, faults, anticline, syncline, and strike and dip of beds. The map keys geographic areas covered by more detailed maps.
- 2) (In Pocket) Geologic maps and sections of the principal coal-bearing areas in the northern and central parts of the Beluga-Yentna region. Includes the Fairview Mountain area, Canyon Creek area, Johnson Creek area, and Coal Creek area (all at 1:63,360 scale, with 100 foot contour intervals). Colored maps for each area are included on this plate.
- 3) Sections of coal beds showing types of coal, claystone, siltstone, sandstone, coal and rock lenses, conglomerate and gravel are included for the following locations: a) Central part of Beluga-Yentna region, b) Capps Glacier area, c) Beluga River area, and d) Chuitna River area.
- 4) (In Pocket) Geologic map and section of Beluga and Chuitna River areas. Map includes the partial boundary of the Moquawkie (Tyonek) Indian Reservation. (Scale 1:63,360, contour intervals 50 and 100 feet.)
- 5) The text includes a generalized map of the Cook Inlet Basin indicating the location of the Beluga-Yentna region and its relation to other coal fields in south-central Alaska (Reduced in reproduction, scale is approximately 1"=50 mi.)

- Tables:
- 1) Analyses of coal from the Beluga-Yentna region.
  - 2) Estimated reserves of coal in the Beluga-Yentna region.

Description: The report abstract explains the fieldwork, aerial photographs and supplemental aerial reconnaissance work needed to study the nearly 5,000 square mile area. The purpose, scope, location and extent of study are explained in the introduction.

Under the geography section heading, the following are included: topography, drainage; climate, vegetation, land use, settlement and accessibility.

The geology section is divided into three sections: a) rocks of Jurassic and/or Cretaceous age, b) rocks of Tertiary age, and c) rocks of Quaternary age.

The discussion of the region's coal includes: a) the character and distribution of the coal beds, b) their physical and chemical properties, c) estimates of reserves, and d) coal occurrences by townships.

The potential of oil and gas in the area is discussed, but is summarized as less than encouraging.



Title: Geology and Coal Resources of The Little Susitna District Matanuska Coal Field.  
Barnes, F.F. and Sokol D.; USGS Bulletin 1058-D (1959), (17p. illus.).

Area: State priority area 1.

Interest: Interest Level 2

Maps: 1) Index map of south-central Alaska, showing location of the Little Susitna district.  
(Map shows generalized location of the region, no determinable scale.)

2) Several other maps (or sketches) of individual coal beds, drill holes and outcrops are included in the text.

3) (In Pocket) Geologic Map of the Little Susitna District, (scale 1:63,360). Contour intervals 50 and 100 feet. Colored map showing alluvium, terrace gravels, morainal and outwash deposits, coal-bearing formation schist and other geologic information such as fault lines.

4) (In Pocket) Four maps and sections of coal localities (scales vary from 1"=100' to 1"=300' with 10 foot contour intervals.) Faults are shown on maps and cross sections.

Tables: 1) Analyses of coal from the Little Susitna district, Matanuska coal field, Alaska. Various coal location samples are tested for the following: moisture, volatile matter, fixed carbon, ash, sulfur, and heating value in b.t.u.

Description: The following information about the Little Susitna district is included in the report: general features of the region; stratigraphy; structure; character and distribution of the coal; subsurface exploration equipment and methods; description of four coal localities including coal production near Houston. The coal resources are summarized.

Description: The Little Susitna District of the Matanuska Coal Field is located along the northern border of the lower Matanuska Valley. At the west end of the district is the Alaska Railroad. The district includes an area of coal-bearing rocks ranging from 1 to 2 miles in width, extending for about 22 miles along the north side of the lower (west) end of the Matanuska Valley.

Title: Coal Prospects and Coal Exploration and Development in the Lower Matanuska Valley, Alaska, in 1950. USGS Circular 154, (1951), (6 p. copy of original and sketch map),

Area: State priority area 1 and Matanuska Valley area.

Interest: Interest Level 3.

Maps: 1) Sketch map showing location of coal and prospects of lower Matanuska Valley (1"=4 miles, approximate; poor quality map reproduction).

Description: Sites examined as part of this incidental field examination included all the operating coal mines in the lower Matanuska Valley and several isolated and little-known coal prospects.

The geologic setting of the region is described. Mines and prospects at Eska Creek (3), Moose Creek (3), Little Susitna River (3) Willow Creek (1), and the area of Granite Creek are described with respect to mining or prospecting activity, productivity and commercial potential. The quality, with regard to moisture, volatile matter, fixed carbon, ash, sulfur and heating value is given for various samples.

References are cited at the conclusion of the report.

Title: The Little Tonzona River Coal Beds Near Farewell, Alaska. Player, G.F., and Bannister, D.P.; USDI, Bureau of Mines preliminary report for Open Files. (No date, approximately January 1977), (16 p. illus.).

Area: North edge of the Alaska Range, 35 miles southwest of Mt. McKinley (Denali) National Park.

Interest: Interest Level 3.

Map: 1) Little Tonzona River Coal Outcrop and Other Occurrences of the Railbelt (1"=40 miles).

Table: 1) Comparison of analyses of coals from the Little Tonzona River and other Alaskan Tertiary Coal Fields.

Description: The report describes findings of investigations of previously unreported thick coal beds cropping out between Farewell and Mt. McKinley Park recognized and sampled as part of the Bureau of Mines investigation of mineral potential of D-2 lands. One sequence of coal beds includes at least 120 feet of subbituminous coal in a Tertiary exposure.

Report discusses location and accessibility, general geology, and investigations by contractors.

Title: Investigation of The W.F. Dunkle Coal Mine Costello Creek, Chulitna District.  
Rutledge, F.A.; USDI, Bureau of Mines, Report of Investigations 4360, (October 1948), (9 p. illus.).

Area: Upper Talkeetna Basin. The W.E. Dunkle Coal Mine is in the Broad Pass region on the south slope of the Alaska Range.

Interest: Interest Level 3.

Maps: 1) Location map, W.E. Dunkle Coal Mine (1"=5 miles).  
2) Geologic and topographic sketch map of Costello Creek coal basin (1"=1 mile).  
Other maps include: underground workings, drill hole locations, and cross sections of the coal mine.

Description: Because of the age of this report, the information, even the physical description of the area, have changed since 1948.  
Report contents include: descriptions of the location and its accessibility, physical features and climate, history, production, geology, description of deposits, calculated coal reserves, mine workings, and analysis of the mining products.

Availability: USDI, Bureau of Mines, Anchorage office has a copy of the original report available for reproduction.

Title: Carbonizing Properties: British Columbia, Matanuska Valley, and Washington Coals and Blends of Six of them with Lower Sunnyside (Utah) Coals.  
Davis, J.D. and others; USDI, Bureau of Mines Bulletin 510, (1951), (42 p.).

Area: Matanuska Valley, Eska-Jonesville and Chickaloon areas.

Interest: Interest Level 3.

Description: This report gives results of an investigation of the carbonizing properties of 18 coals, including two from Alaska. The Alaska samples were ranked as medium-volatile bituminous and coked strongly.

Field work, testing and report preparation took place in the late 1940s and '50s; since that time available technology and environmental requirements may have invalidated conclusions drawn as a result of this coal carbon study.

Availability: USDI, Bureau of Mines, office file copy available for reproduction.

Title: Sampling and Coking Studies of Coal From  
Castle Mountain Mine, Matanuska Coalfield,  
Alaska. Warfield, R.S., Landers, W.S. and  
Boley, C.C.; USDI, Bureau of Mines Open File  
Report 7-66, (February 1966), (14 p.).

Area: Castle Mountain, Chickaloon area of the  
Matanuska Coal Field.

Interest: Interest Level 3.

Tables: Six tables are included showing results  
of work by the Coal Research Laboratory,  
Denver, Colorado. Laboratory work included  
"cleaning" of samples to reduce ash  
content, bench-scale studies, coke production  
tests, and tests on the coke produced.

Description: Although the remaining strip-minable  
reserves at the Castle Mountain mine are  
small, this study was undertaken because  
the area was believed to be underlain by  
coal of a quality equal to that mined. Coke  
from the unblended coal was strong and was  
considered of foundry quality according to  
the report abstract.

Location and accessibility were discussed,  
as was geology of the vicinity, actual  
sampling and coking study process.

Availability: USDI, Bureau of Mines, office file copy  
available for reproduction.

Title: Investigations of Subbituminous Coal Deposits in the Beluga River Coalfield. Warfield, R.S.; USDI, Bureau of Mines, Open File Report 43-61, (Feb. 1961), (70 p. illus.).

Area: State Priority area 4a.

Interest: Interest level 1.

Maps: 1) Location Map of Beluga River Project Area. (1/2"=2 miles).

2) Plan of Beluga River Project Area (1"=1,000'). Indicates location of diamond drill hole, test hole, muskeg and the bottom of the coal seam contour.

3) Two cross sections of the Beluga River Project area.

Tables: 1) Pertinent drill-hole data. Includes 23 drill holes and indicates the following: total depth, unconsolidated overburden depth, coal section interval, and bedding angle.

2) Analyses of Beluga River coal cores. The following information is tabulated for 32 samples: interval, depth, core rejected, core analyzed (all in feet); moisture, ash, volatile matter, fixed carbon (percentages); and caloric value (in btu).

Photos: 1) Discovered outcrop area exposing 40 feet of coal.

2) Typical core drill operating in a muskeg area.

Description: The report introduction describes drill holes made during the 1959 and 1960 summer field seasons, and a bulldozer trench made to excavate unweathered coal for washability studies.

Location, method of access and mode of transportation used by the Bureau of Mines are explained. Conclusions are drawn about accessibility of the area for commercial mining. Land, water and air routes into the area east of Beluga Lake are noted.



Description: Topography of the vicinity, and overburden character as it relates to mining methods are given. Core drilling procedures and results used in determining character, attitude and extent of a 50 to 65 foot thick coal seam are shown.

Sampling procedures, laboratory examination and results are discussed with regard to the economic feasibility of mining the deposit.

The reserves are described, but no estimates are given for the smaller seam analyzed because of the few intersections and consequent scant knowledge.

An appendix includes a detailed analysis of each of the Beluga River drill holes.

Availability: Available for reproduction from the USDI, Bureau of Mines.

Title: Moose Creek District of Matanuska Coal Fields. Apell, G.A.; USDI, Bureau of Mines, Report of Investigations 3784, (December 1944), (35 p.).

Area: Matanuska Valley, Wishbone Hill area.

Interest: Interest Level 3.

Description: The Moose Creek coal field is defined as to accessibility, quality, production capability, etc, but due to the date of study (1943-1944), the data has become obsolete.

Availability: USDI, Bureau of Mines, Anchorage office has original copy for reproduction.

Title: Investigation of Subbituminous-Coal Beds  
Near Houston, Westward Extremity of Matanuska  
Coalfield Alaska. May, R.R. and Warfield,  
R.S; USDI, Bureau of Mines, Report of Investigations  
5350, (August 1957), (20 p.)

Area: State Priority Area 1.

Interest: Interest Level 3.

Maps: Location map of Houston coal-drilling  
project. (1"=5 miles, approximately).

Description: Preliminary examination of the Houston  
strip-coal mine and a review of the available  
information resulting from early coal exploration  
was undertaken because of the proximity of  
the mine to the Alaska Railroad. The report  
concludes that some coal beds in the vicinity lie  
beneath a zone of pressurized gas and brackish  
water. Continued development, it explains,  
would depend on cheap mining methods and on  
diligent prospecting for strippable coal.

Location, accessibility, topography and climate  
(as it affects mining operations) are described.  
Production history, area geology and results  
of coal sampling, analyses and methodology are  
given.

Availability: USDI, Bureau of Mines, Anchorage office has a  
copy of the original report available for  
reproduction.

Title: Bituminous Coal Deposits Of the Matanuska Coalfield, Alaska: Central and Western Parts, Wishbone District. Warfield, R.S.; USDI, Bureau of Mines, Report of Investigations 5950, (1962), (190 p. illus.).

Area: Matanuska Valley, Wishbone Hill.

Interest: Interest Level 3.

Maps: Two pocket maps indicate plans for the central and western parts of the Wishbone Hill coal district (scale 1"=500').

Other maps indicate the location of the Wishbone Hill district, and numerous core sections of drill holes.

Tables: 1) Coal production from the Wishbone Hill district through 1959.

Other tables include a summary of drill-holes for the western and central parts of the district, estimated coal reserves remaining in the district and an analysis of diamond-drill core samples.

Description: This report describes the program conducted by the Bureau of Mines from 1949 to 1958, and briefly summarizes previous investigations, (the results of which have already been published). The program provided additional information on the nature of synclinal structure, and determined the character and quality of the coal over a much larger area than previously explored. With additional data, coal reserve estimates in the vicinity of the Buffalo, Baxter and Premier Mines were increased and some reserves were reclassified. The investigations conducted by the Bureau of Mines and USGS, have been extensive enough to serve as a adequate guide for private exploration and development.

The report includes information on location, accessibility, topography, climate and vegetation. History of each of the mines is given, and production and area geology are described. Other work by the Bureau of Mines is described in detail.

Availability: USDI, Bureau of Mines, Anchorage office has original copy for reproduction.

Title: Washability of Coals from the Matanuska Valley and Beluga River Fields, Alaska.  
Greer, M.R. and Fennessy, F.D.; USDI, Bureau of Mines, Report of Investigations 6017, (1962), (33 p.).

Area: State priority area 4a (Beluga River) and Matanuska Valley coal fields.

Interest: Interest Level 3.

Description: The report synthesizes all coal washability data available (as of date of publication) on coals of the Matanuska Valley and Beluga River fields. Data from earlier studies as listed below is included in the report:

- 1) Bituminous-Coal Deposits in the Vicinity of Eska, Matanuska Valley Coal Field, Alaska. (Feb. 1952) Report of Investigations 4838.
- 2) Washability Characteristics and Washing of Coals From the Matanuska Field of Alaska. (January 1946) Report of Investigations 3840.
- 3) Reconnaissance of the Beluga River Coalfield, Alaska. (June 1958), Report of Investigations 5430.

The summary report describes each mine and mining area. Numerous coal bed cross sections are depicted. Most of the report is devoted to tabulations for each of the mines, (float and sink tables).

Availability: All reports, including the summary and individual investigations, are available from the USDI, Bureau of Mines, Anchorage office for reproduction.

Title: Investigation of a Subbituminous Coal  
Deposit Suitable for Opencut Mining, Beluga River  
Coalfield, Alaska. Warfield, R.S.; USDI, Bureau of  
Mines Report of Investigations 6238, (1963), (100 p.  
illus.).

Area: State Priority area 4a, Beluga River Area.

Interest: Interest Level 3.

Maps: 1) Location map, Beluga River project  
area. (Scale 1"=4 miles).

2) General Geology, Beluga River Coalfield.  
(Scale 1"=10 miles approximately.) Shows  
major coal outcrops and areas of general  
geologic formations.

3) Plan, Beluga River Project Area. (Scale:  
1"=1500' approximately.)

Tables: Pertinent drill-hole data, coal bed sections,  
specific-gravity analyses of various sized  
raw coal, analysis of raw coal and analysis  
of coal cores.

Description: The Bureau of Mines investigated a favorable  
coal area (east of Beluga Lake) to determine  
whether there were sufficient minable coal reserves  
to meet projected thermal power needs of the Anchorage  
area. Studies indicated that mechanical cleaning  
would be of doubtful value. Drainage problems  
which might complicate hydraulic methods of  
mining were noted.

The Beluga River project area description includes  
access and transportation, the region's physical  
features, climate, vegetation and general geology.  
The washability study was explained in detail, and  
detailed logs of drill holes are included in the  
report appendix.

Availability: USDI, Bureau of Mines, Anchorage office has  
original copy for reproduction.

## B. MINERALOGY

Title: Geology and Ore Deposits of The Willow Creek Mining District. Ray, R.L.; USGS Bulletin -1004 (1954), (85 p. illus.).

Area: State Priority area 1.

Interest: Interest Level 2.

Maps:

- 1) Geologic map of the Willow Creek Mining District (2"=1 mile.)
- 2) Structure map showing lineation and foliation, Willow Creek Mining District (2"=1 mile).
- 3) Map showing joint system and general foliation pattern in quartz diorite, Willow Creek Mining District. (2"=1 mile).
- 4) Map showing general location of claims surveyed for patent (vertical 1"=80 feet).
- 5) Map showing workings of Gold Cord mine. (crosscut: 1"=100 feet).
- 6) Map showing main workings of Independence mine. (crosscut: 1"=100 feet).
- 7) Map showing workings of Fern mine. (crosscut: 1"=100 feet).
- 8) Map showing workings of Mabel mine. (crosscut: 1"=100 feet).
- 9) Map showing workings of Kelly-Willow prospect. (crosscut: 1"=60 feet).

29 other illustrations are included which show mineral occurrences; aerial views of the Willow Creek mining area; photomicrographs of different minerals; and maps of several mine workings including Lonesome, Snowbird, Highgrade, and Thorpe mines.

Tables:

- 1) Records of temperature and precipitation at Wasilla, 1945-1950.
- 2) Monthly mean high and low temperatures at Wasilla, 1945-1950.



Tables:  
(cont)

- 3) Records of temperature and precipitation at Palmer 1941-1950.
- 4) Monthly mean high and low temperatures at Palmer, 1941-1950.
- 5) Micrometric analyses of quartz diorite.
- 6) Lode gold production by years, 1909-1950.

Description: The report contents are organized as follows;

The geography of the area includes a discussion of the location and accessibility. Topography, climate and vegetation are described, including tables of National Weather Service weather data since the Palmer and Wasilla stations have been maintaining records.

General geology includes a discussion of metamorphic rocks, igneous rocks, sedimentary rocks and structural features of the area.

Economic geology includes a general history and production discussion, and an analysis of the ore veins in the area.

Title: Geology and Mineral Deposits of the Chulitna-Yentna Mineral Belt, Alaska, Hawley, C.C. and Clark, A.L; USGS Professional Paper 758-A (1973), (10 p. illus.).

Area: Upper Beluga sub-basin.

Interest: Interest Level I.

Maps: 1) (Plates in Pocket) "Generalized geologic map showing mineral deposits of the Chulitna-Yentna mineral belt, Alaska, " (1:250,000, contour intervals 200'). Color shaded geologic map includes veins, deposits, placer gold occurrences, the Pass Creek Fault, and other mineral bearing geologic occurrences.

2) Maps showing distribution of metals and mafic and ultramafic rocks in the Chulitna-Yentna mineral belt.

Four maps of the same location indicate (by means of color-shading), the occurrence of the following: a) mafic and ultramafic rocks, platinum, and chromium; b) copper, c) gold and arsenic, and d) tin. (1:500,000)

Table: Ore minerals of the Chulitna-Yentna mineral belt. Includes relative abundance and indicates whether prospects are of a placer or lode nature.

Description: In the report introduction, the mineral belt is described as a "nearly linear feature 5-20 miles wide and at least 100 miles long ....." Previous and present investigations of the mineral belt are outlined.

The description of the geologic setting includes the Upper Chulitna fault, the west district fault, the Peters Hills lineament, the Pass Creek fault, and the Dutch Creek lineament. The relation of the mineral belt to those major faults is discussed.

The mineral deposits and occurrences in the belt are described. Included are details on the distribution and occurrence of gold, arsenic, copper, tin and other metals.

Description: The Chulitna-Yentna mineral belt is compared--  
(cont) in relation to faults, igneous intrusives, and  
tectonic positions--to some other mineral belts  
in other states.

Mineral resources and general suggestions  
for prospecting are summarized in a concluding  
section.

Report references are cited.

Title: Occurrences of Gold and Other Metals in the Upper Chulitna District, Alaska. Hawley, C.C. and Clark, A.L; USGS Circular 564, (1968), (13 p. illus.)

Area: Upper Beluga sub-basin.

Interest: Interest Level 2.

Maps:

- 1) Index map showing location of the Upper Chulitna district (localized area indicator map for Healy Quad., 1:250,000 series).
- 2) Location of four mineralized areas in the Upper Chulitna district (1:63,360, contour intervals 100').
- 3) Generalized geologic map of the Colorado Creek area. (Poor quality reproduction, reduced scale 1"=1,000' approximately).
- 4) Generalized geologic map of the Golden Zone mine area (1"=300' approximately, poor quality reproduction).
- 5) Generalized geologic map showing assay data, 100-foot-level Golden Zone mine.
- 6) Generalized geologic map of the Blind Creek area (1"=1000').
- 7) Generalized geologic map of the Long Creek area (1"=1000').
- 8) Location and gold concentration of stream-sediment samples, Upper Chulitna district. (1 1/2"=2 miles).

Description: The main economic features of the four areas containing deposits of gold or other metals are described in detail. These areas are, from north to south: Colorado Creek, Golden Zone, Blind Creek, and Long Creek.

Stream sediment samples are described with regard to the amounts of gold and other elements. A final paragraph of the report is devoted to a district-wide summary of mineral occurrence and recommendations for geophysical prospecting.

Title: Geochemical Investigation at Antimony Creek,  
Antimony Prospect, Northern Talkeenta Mountains.  
Hawley, C.C., Meier, A.L., Miller, R.L., U.S.  
Geological Survey Open File Report 68-123 (preliminary  
report) (1968), (8 p. illus. sketches).

Area: Upper Talkeetna Sub-basin, near Antimony Creek  
tributary to the east fork of the Chulitna River.

Interest: Interest Level 2.

Maps: 1) Index map showing generalized geology near  
Antimony prospect (1"=1 mile; sketch).  
2) Metal anomaly maps at the Antimony prospect  
(1"=100 feet; sketch map).

Tables: Analyses of samples from the Antimony prospect.

Description: The report abstract states that a stibnite-quartz  
vein near Antimony Creek contains as much as 0.18  
ounces of gold per ton. Geochemical reconnaissance  
suggests that the vein, although very small, is  
more continuous than previously assumed, and zinc  
probably exists in the area.

The history of the investigation of the prospect is  
explained and the geologic setting briefly described.

The investigation took place prior to the completion  
of Alaska Highway 3, which may have further influenced  
prospecting in the region.

Title: Potential Mineral Resources in Selected D-2 Lands. Bottge, R.G.; USDI, Bureau of Mines Open File Report 9-74, (June 1973), (51 p. illus.).

Area: Statewide D-2 lands. Of particular interest to the Susitna River basin are the findings for the Talkeetna and Mt. McKinley quadrangles.

Interest: Interest Level 2.

Maps: 1) Talkeetna and Mt. McKinley areas: Tracts within D2 lands which should remain open for mineral and fossil fuel development. (1:250,000 scale.) Includes Chulitna-Yentna mineral belt region. D-2 lands with relation to known mineral, coal or oil shale deposits are shown.

(16 tracts throughout the state are shown but the above is the only area indicated within the Susitna River basin suggested for multiple-use, i.e. mining.)

Description: This report discusses the need for Alaska's minerals, the need for surface transportation corridors, and their relationship to planned D-2 withdrawals.

A review of actions leading up to the recommendations in the report is included in the introduction.

Generalized accounts are given of the need for Alaska's minerals, and the questions: "When will mining commence?" and "How long will mining last?" are discussed. Transportation of minerals, and multiple uses of D-2 lands are discussed in a general fashion.

Each land tract has an accompanying data sheet which gives: 1) the location from Anchorage to Fairbanks, 2) its present accessibility and its nearness to future highway corridors, 3) its proximity to labor and supplies, 4) the general geology, and 5) the occurrence of mineral and fuel commodities known or likely to exist. Finally, the mineral potential is assessed and the potential mineral value estimated.

Availability: Available from the USDI, Bureau of Mines, Anchorage, for reproduction.

Title: Investigation of Knik Valley Chromite Deposits, Palmer. Bjorklund, S. and Wright, W.S.; USDI, Bureau of Mines, Report of Investigation 4356, (October 1948), (5 p. illus.).

Area: South side of Knik River Valley.

Interest: Interest Level 3.

Description: This report is the result of studies of two chromite occurrences on the south side of Knik River Valley. Because of the date of the publication (1948), much of the information is invalid or has altered over time.

Brief descriptions include the following:  
location, accessibility, climate, vegetation, ownership, ore deposits, occurrence of chromite deposits, character of the ore, sampling, and analysis.

Availability: USDI, Bureau of Mines, Anchorage Office has a copy of the original report for reproduction.

**Title:** Sedimentary Zeolite Deposits of the Upper Matanuska Valley. Hawkins, D.W., Department of Natural Resources, Division of Geological and Geophysical Surveys, Special Report #6 (1963), (17 p. illus.).

**Area:** Matanuska Valley from Caribou Creek north of Camp Creek.

**Interest:** Interest Level 3.

**Maps:** Location of areas studied, sample localities and simplified geologic maps. (1"=1 mile).

Other illustrations include a Venn diagram, various cross-sections, specimen descriptions and mineralogy samples are tabulated. The chemical test results for zeolite are given.

**Description:** The purpose of this study was to investigate the type and extend of zeolite in the rocks of the Talkeetna and Matanuska formations of the Upper Matanuska Valley, and to determine if deposits of economic significance were present.

Zeolites are minerals structurally related to the feldspars. The study search methods, laboratory studies, economic potentials and conclusions are included in the report.

**Availability:** Copies available from Department of Natural Resources, Division of Geological and Geophysical Surveys; price: \$1.00.



Title: Investigations of Alaska's Uranium Potential.  
Eakins, G.R., DGGs Special Report No. 12  
(1976) (270 p. illus. 2 part text).

Area: Statewide, pertinent sections on Matanuska Valley and Susitna Lowlands.

Interest: Interest Level 2.

Maps: 1) Maps of the Granitic rocks and Tertiary sediments of Alaska - Major faults and Cenozoic Basins shown (1:1,000,000) for each of these regions: Central, Northern, Southwestern, Aleutian Chain and Southeastern Alaska.

Figures: 1) Stratigraphy near the lower end of the Matanuska Valley (table).  
2) Generalized geologic map of the Matanuska Valley showing approximate extent of Tertiary sedimentary rocks and localities of fossil plants and mollusks.  
3) Radioactive analyses of channel samples from the Fishhook Creek-Archangel Creek area of the Willow Creek mining district.  
4) Comparison of lithologic assemblages and depositional environments in the eastern and west-central Alaska Range. (p. 161).  
5) Ore minerals of the Chuitna-Yentna mineral belt (p. 178).

Description: For the Matanuska Valley and Susitna Lowlands descriptions are given of the following: sedimentary rocks, igneous rocks, structure, economic geology, and radioactive investigations.

Availability: This Special Report and mylars are available for reproduction only from the Division of Geologic and Geophysical Surveys.

Title: Geology and Mineral Deposits of the Denali-Maclaren River Area. Kaufman, M.A.; Division of Mines and minerals (now DGGs) Geologic Report #4. (May 1964) (6 p.).

Area: Near Denali, Northeastern corner Upper Susitna River Basin.

Interest: Interest Level 3.

Maps: Geologic Map of the Denali-Maclaren Area (1"=1 mile, contour interval 1,000 feet). Shows the relationship between the minerals occurrences and the regional geology.

Description: The results of the study are a description of all known mineralized localities, and a drainage geochemical study of the whole area.

Maps and descriptions are of a reconnaissance nature, mainly concentrating along drainages where outcrops were relatively abundant.

Availability: Department of Natural Resources, Division of Geological and Geophysical Surveys; price: \$1.00

Title: Stratabound Copper-Gold Occurrence, Northern Talkeetna Mountains. Bundtzen, T.K. and Tribe, T.C., Department of Natural Resources, Division of Geological and Geophysical Surveys, Miscellaneous Paper 3, (1975), (7 p. illus.).

Area: Northeast corner, Talkeetna Mountains, and southeast corner, Healy, quadrangles.

Interest: Interest Level I.

Maps: 1) Generalized geologic map of area and location of prospect indicated in eastern portion of map (1"=4 miles).  
2) Detailed location of prospect and sample sites (no scale). Two tables indicate various aspects of the analyses of samples from the prospect site.

Description: In 1973 an occurrence of copper and gold bearing volcanic rocks were discovered in low glaciated hills of the northern Talkeetna Mountains. This brief paper provides preliminary data on this precious-metal occurrence. Regional geology, mineral occurrences and recommendations for further field study are included in this report.

Availability: Department of Natural Resources, Division of Geologic and Geophysical Surveys; no charge.

Title: The Mineral Industry of the Kenai-Cook Inlet-Susitna Region. Race, W.H. Department of Natural Resources, Division of Mines and Minerals, (now DGGs), (1962), (42 p.).

Area: All of Susitna Basin study area, also Kenai and Lower Cook Inlet.

Interest: Interest Level 3.

Map: Generalized area map of region (no scale, for illustrative purposes only).

Tables: 1) General Climatic Data, Kenai-Cook Inlet-Susitna Region.

2) Willow Creek District Lode Mine Production - 1909-1961.

3) Matanuska Valley Coal Production - 1916-1961.

4) Selected coal analyses for Kenai-Cook Inlet-Susitna region. These regions are analysed: Broad Pass, Tyonek, Beluga, Chickaloon U.S. Navy Reservation, Eska, Jonesville, Moose Creek, Premier, and Houston. A variety of tables also indicate wages, transportation costs, power costs, potential water power and selected mining industry taxes.

Description: The report describes, for the entire region, the following: physical features - size, climate and topography, general geology, mining history and production by mineral, mineral resources, economic factors, water supply power, and a bibliography.

## C. GEOCHEMISTRY

Title: Geology and Geochemistry Diana Lakes Area  
Western Talkeetna Mountains. Anderson, R.E.;  
Division of Mines and Geology (now DGGG).  
Geologic Report #34, (June 1969) (27 p.  
illus.).

Area: State Priority Area 2.

Interest: Interest Level 2.

Maps: Geology and Geochemistry Diana Lakes area,  
Western Talkeetna Mountains (5/8"=1/2 mile):  
shows Granodiorite, Greenstone, Rhyolite,  
sandstone, stream sediment sample sites,  
rock sample sites and findings, and fault  
and contact lines showing direction of move-  
ment. (Map has one color.)

Tables: 1) Threshold and anomalous stream sediment  
samples (38 samples).  
  
2) Tabulation of geochemical stream sediment  
samples with their threshold and anomalous  
values.  
  
Other tables are included.

Description: The area of study is the western edge of the  
Talkeetna Mountains between Sheep River on  
the southwest and Iron Creek on the northeast.  
Iron staining in the area is indicative of  
a number of hydrothermal and porphyritic  
mineral deposits. Another encouraging feature  
for possible mineralization came from a study  
of aerial photos indicating several major faults  
near the iron stained sections.  
  
Included are the following: 1) Structural geology  
including faults and joints, 2) petrologic discussion  
including metamorphic, intrusive, and volcanic rocks,  
3) geochemical investigations of stream sediment  
samples and rock samples, and 4) trend surface  
analyses. Hydrothermal mineralization at several  
locations were found as a result of the trend surface  
analyses. These are viewed as possible target areas  
for future ore mineral exploration.

Availability. Available from Department of Natural Resources,  
Division of Geologic and Geophysical Surveys;  
price: \$1.00.

Title: Geochemical Investigations of Selected Areas in Alaska, 1964. Jasper, M.W. Department of Natural Resources, Division of Mines and Minerals (now DGGs) Geochemical Report #4 (May 1965), (31 p. illus.).

Area: Selected areas within the Matanuska Valley and State Priority areas 1,2,and 3b.

Interest: Interest Level 2.

Illustrations: 1) Vicinity map. Indicates location of other selected area maps. (No scale, poor quality.)

1-A, 1-B & 1-C) Glenn Highway Area. (Reduced for reproduction, scale is approximately 1"=1 mile.) Shows anomalous sample sites.

2-A, 2-B) Anchorage-Fairbanks Highway Area (reduced map, scale is approximately 1"=1 mile.) Non-anomalous sample locations.

3) Willow Creek - Little Susitna River Areas, Willow Creek Mining District (reduced map, scale is approximately 1"=1 mile). Anomalous and non-anomalous sample sites.

Tables: 1) Presence of lead, copper, zinc, and molybdenum, 2) field tests for cold-extractable heavy metal, 3) color reaction, 4) bedrock, 5) creekfloat and 6) panned concentrations of minerals. Frequency Distribution Graphs were prepared for each of the above elements in each area.

Description: The summary section of the report suggests that anomalies found are sufficient to encourage further investigations in the following areas: 1) Sheep Mountain area, and 2) the moderately anomalous copper and molybdenum locations in the Willow Creek and the Little Susitna River Drainage areas.

The introduction explains the program to sample sediments of accessible streams and drainage systems. Types of exposed rock and stream "float" were recorded at the sample sites.

Results are interpreted for each of the four selected areas. Geochemistry, geology and mineralogy of each is explained.

Availability: Available from Department of Natural Resources, Division of Geological and Geophysical Surveys; Price: \$1.00.

Title: Geochemical Investigations along Highway and Secondary Roads in Southcentral Alaska.  
Jasper, M.W.; Department of Natural Resources,  
Division of Mines and Minerals, (now DGGs)  
Geochemical Report #7 (July 1966), (32 p. illus.).

Area: State Priority Area I, Matanuska Valley  
area as well as Kenai Peninsula.

Interest: Interest Level 3.

Illustrations: 1 to 19) Sample location maps on topographic  
quadrangles -- scale, 1"=1 mile (estimated).

- Concentration frequency graph for copper,  
lead, zinc, molybdenum, and nickel (Little  
Susitna River area).
- Concentration frequency graph for copper  
and lead (Matanuska Valley to Kenai).
- Concentration frequency graph for zinc,  
molybdenum and nickel.
- Table - Results of Analyses. For each site  
the following information is given: 1) presence  
of lead, copper, zinc, molybdenum and nickel,  
2) color reaction, 3) bedrock, 4) creekfloat,  
and 5) concentrates.

Description: The report includes a brief introduction,  
summary, and descriptions of topography,  
general geology, and mineral deposits.  
Geochemical field investigation methods  
are explained. Results of samples from  
river and stream areas are described and  
keyed to the maps.

Availability: Available from the Department of Natural  
Resources, Division of Geological and Geophysical  
Surveys; Price: \$1.00.



Title: Geochemical Investigations Willow Creek  
Southerly to Kenai Lake Region Southcentral  
Alaska. Jasper, M.W., Department of Natural  
Resources, Division of Mines and Minerals  
(now DGGs), Geochemical Report #14. (June 1967),  
(47 p. illus.).

Area: State Priority Area I, Willow Creek South  
to Kenai Lake.

Interest: Interest Level 3.

Illustrations: 1) Diagram showing locations of figures  
1 to 14. (No scale.)

2) Sample location topographic maps 1 to 14.  
(No scale.)

3) Concentration frequency graph for copper,  
lead, zinc, molybdenum and nickel.

4) Results of analyses. Table of mineral  
occurrence for each sample, color reaction,  
bedrock description, creekfloat, and other  
mineral concentrates.

Description: The report includes a summary of findings,  
and an introduction to the geochemical stream  
sediment sampling program. The program was part  
of the state's search for trace amounts of metallic  
minerals. Short descriptions of regional topography,  
general geology, mineral deposits for the  
Kenai Peninsula and Willow Creek Districts are  
included. Geochemical field investigations are  
explained and results are tabulated according to  
mineral values.

Availability: Available from Department of Natural Resources,  
Division of Geological and Geophysical Surveys; Price:  
\$1.00.

Title: Preliminary Geochemistry and Geology -  
Little Falls Creek Area, Talkeetna Mountains  
Quadrangle. Anderson, R.E, Department of  
Natural Resources, Division of Mines and  
Minerals, (now DGGs) Geochemical Report #19.  
(March 1969), (16 p. illus.).

Area: Upper Talkeetna Sub-Basin.

Interest: Interest Level 3.

Map: 1) Geology of an area along the Talkeetna  
River (3/8"=1 mile)

Tables: Tables include stream sediment samples,  
occurrence of minerals (in parts per  
million), rock sample sediments for each  
sample site.

Description: The report includes the following sections:  
abstract of findings, introduction and  
acknowledgement, geologic setting, petrology,  
structural geology, stream sediment geochemistry,  
rock sample geochemistry, capping investigations,  
the Little Fall Creek phyllite exposure and  
conclusions of investigations.

Availability: Available from Department of Natural Resources,  
Division of Geological and Geophysical Surveys;  
Price: \$1.00.

Title: Geology of an Area on the Upper Talkeetna River, Talkeetna Mountains Quadrangle.  
Rose, A.W.; Division of Mines and Minerals  
(now DGGs) Geologic Report #32 (Feb. 1967).

Area: State Priority Area 2.

Interest: Interest Level 3.

Map: Geology of an area along Talkeetna River  
(1"=1 mile).

Description: The report contains short descriptions  
of the following: regional geology; description  
of nine rock units; structural geology;  
economic geology; stream sediment geochemistry;  
and some suggestions for prospectors.

Availability: Department of Natural Resources, Division  
of Geologic and Geophysical Surveys; Price  
\$1.00.

## D. GLACIAL GEOLOGY

Title: Quaternary Geology of the Kenai Lowland and Glacial History of Cook Inlet. Karlstrom, T.N.V.; USGS Professional Paper 443. (1964), (68 p. illus.).

Area: Entire Susitna River Basin Area.

Interest: Interest Level 3.

Maps: Plate 1) The extent of glaciation in Cook Inlet and adjoining regions. (Scale 1"=50 miles, includes all of Susitna Basin.)

Plate 2) Climatic zonation, regional snowline and present and past distribution of glacial ice in southwestern, southcentral and southeastern Alaska (1:5,000,000; 1"=approx. 80 miles).

Description: Concentrated study is on Kenai lowland. Cook Inlet lowlands are subdivided by major physiographic provinces, i.e. Kenai lowland, Kustatan lowland, Susitna lowland, and lower Matanuska lowland.

The geologic history as it relates to glaciation is discussed for each lowland area. Stratigraphy of coastal bogs; fauna and the Pleistocene age is described.

Title: East of Mount McKinley Reconnaissance  
Glacialological and Geological Survey. Carter,  
H.A., American Alpine Journal, v.11, No.2,  
issue 33, p. 201-207. (1959).

Area: Upper Talkeetna Sub-basin.

Interest: Interest Level 3.

Description: This is a brief report on reconnaissance  
glaciation and geological survey of the  
Eldridge Glacier region. Measurements of  
accumulation, ablation, and movement of  
the glacier were made and compared with  
earlier results.

(Abstract from Geology Bibliography, by  
William N. Sharik, for USDI National Park  
Service, Alaska Task Force, August 1972.)

Availability: Copies may be ordered from the publishing journal.

Title: Late Wisconsin and Recent History of the  
Matanuska Glacier, Alaska. Williams, J.R.,  
and Ferrains, O.J., Geol. Soc. Am. Bull.  
v.69, no. 12, p. 1757 (1958)

Area: Matanuska Valley.

Interest: Interest Level 3.

Description: The report describes past positions indicated by  
moraines and marginal channels of this glacier,  
which has had only minor horizontal retreat,  
but considerable thinning since 1898. The  
glacier filled the Matanuska Valley, terminating  
between Anchorage and Willow, during Wisconsin  
time.  
  
(Abstract from Geology Bibliography, by W.N.  
Sharik, for USDI, National Park Service,  
Alaska Task Force, August 1972. Entry 137.)

Availability: Copies may be ordered from the publishing journal.

## E. PALEONTOLOGY



Title: Early Cretaceous (Albian) Ammonites from  
The Chitina Valley and the Talkeetna Mountains.  
Imlay, W.R.; USGS Professional Paper 354-D,  
(1960), (26 p. illus.).

Area: Caribou Creek area, Upper Matanuska Valley.

Interest: Interest Level 3.

Description: The report describes marine fossils found  
in two regions of the state, primarily from  
the Early Cretaceous age.

Description of these particular fossils is  
used as an aid in geologic mapping, and as a  
means of interpreting local geologic history  
in terms of events elsewhere.

Albian ammonites have been found in the  
Talkeetna Mountains at only two places, one  
near the head of Billy Creek and the other  
near the head of Flume Creek.

Title: Tertiary Stratigraphy and Paleobotany  
of the Cook Inlet Region, Alaska. Wolfe,  
J.S.; Hopkins, D.M. and Leopold, E.B., USGS  
Professional Paper 398-A, (1966), (29 p.  
illus.).

Area: Cook Inlet Region.

Interest: Interest Level 3.

Maps: 1) Map showing distribution of Neogene  
Rocks in the Cook Inlet Region. (1:1,000,000)  
Fossil localities and general geologic formations  
are shown on this shaded map.

2) Structure section between Capps Glacier  
and Lower Chuitna River (1"=1 mile).

3) Map of Cook Inlet region, showing areas  
covered by previous reports. (1"=30 miles,  
approximately, generalized area sketch).

Tables: Three tables include checklists, by regions  
within the lower Susitna and Chitna Rivers,  
of megafossil flora found in Seldovian,  
Homerian and Clamgulchian units.

Description: The report abstract explains that three new  
provincial time - stratigraphic units (the  
Seldovian, Homerian, and Clamgulchian Stages)  
are proposed which encompass all plantbearing  
strata in Alaska. Rocks belonging to these  
three stages are recognized and distinguished  
from one another primarily by fossil plants.  
These nonmarine sedimentary rocks are of  
considerable economic importance in that they  
contain, coal, petroleum, and natural gas.  
Early studies of the sedimentary rocks of  
Cook Inlet are explained because of their  
coal value.

A section discussing the evolution of stratigraphic  
nomenclature and age assignments is helpful  
in understanding the remainder of the report.

References are cited in a final section.

Title: Lithology and Palynology of Tertiary  
Rocks Exposed Near Capps Glacier and Along  
Chuitna River, Tyonek Quadrangle. Adkison,  
Kelley, and Newman; USGS Open file report 75-  
121; (58p), (1975) Cooperative Agreement with  
DGGs & USGS.

Area: State Priority Area 4a and 4b.

Interest: Interest Level 3.

Maps: 1) Stratigraphic sections of Kenai Group  
near Capps Glacier and along Chuitna River,  
Tyonek Quad (1"=400 miles).

2) Location of measured sections map (no  
scale).

3) Five cross sections of Westforeland and  
Tyonek formations are depicted.

Tables: Checklist of palynomorph taxa pollen in measured  
sections, Kenai Group.

Description: The report is part of a study to provide  
stratigraphic control to aid in the search  
for oil and gas in the Cook Inlet basin. The  
report includes these sections: Introduc-  
tion, Tertiary rocks, Kenai Group, Westforeland  
formation, Tyonek Formation. Stratigraphic  
sections are described in detail, including  
palynological samples (pollen of seed plants and  
their dispersal) and rock types.

Availability: USGS Public Inquiries Office Copy available  
for reproduction.

## F. STRATIGRAPHY

Title: Variation in Rank of Tertiary Coals in The Cook Inlet Basin. Barnes, F.F.; USGS Professional Paper 450-C; Short Papers in Geology and Hydrology, Article 60-119. (1962), (3 Page xerox copy; page C-14 through C-16).

Area: Includes priority area 1, 3a, 4a and 4b; Cook Inlet Basin region.

Interest: Interest level 3.

Maps: 1) Index map of Cook Inlet Basin, showing sampled coal localities in the Matanuska Coal field. (2cm: 25 miles, approximately).  
2) Index map of Anchorage quadrangle, showing sampled coal localities in the Matanuska Coal field. (2cm: 25 miles, approximately).

Table: 1) Analyses of coals in the Cook Inlet Basin. The following data is given for the Kenai, Matanuska and Susitna coal fields: sample locality; the percent of moisture, volatile matter, fixed carbon, ash and sulfur; heating value (btu); moist mineral-matter-free (btu).

Description: The paper analyses the data and coal-bed samples and draw some conclusions. Conclusions concern the age and depth; local metamorphism, and regional metamorphism of the Tertiary coals.

Title: Geochronology a Generalized Geology of The Central Alaska Range, Clearwater Mountains and Northern Talkeetna Mountains. Turner, D.L. and Smith, T.E.; DGGs Alaska Open File 72 (October 1974).

Area: Eastern Upper Susitna River.

Interest: Interest Level 2.

Map: Shows geochronology and generalized geology of the Central Alaska Range, Clearwater Mountains and Northern Talkeetna Mountains (scale 1:250,000) key to layered and intrusive rocks.

Table: Analytical data for K-Ar (radioactive) age determinations.

Description: The purpose of this map and table of potassium argon measurements is to make the basic data of the study available in advance of a formal publication.

Availability: Alaska Open File reports and mylars are available for reproduction from the Department of Natural Resources, Division of Geological and Geophysical Surveys.

Title: Regional Gravity Survey of Beluga Basin and Adjacent Area, Cook Inlet Region, South Central Alaska. Hackett, S.W.; Department of Natural Resources, Division of Geological and Geophysical Surveys, Alaska Open File #100, (October 13, 1975), (39 p. illus.)

Area: Cook Inlet Basin including Central Susitna River Basin.

Interest: Interest Level 2.

Illustrations: A total of 36 illustrations are included. Most are generalized regional maps of mediocre quality used to illustrate portions of the accompanying text. Types of illustrations include (but are not limited to): ERTS-1 Mosaic of Beluga Basin; new gravity stations; gravity maps; geophysical profiles and structural cross sections; earthquake hypocenter distribution studies; various geology maps; oil, gas, coal, metallic mineral, uranium, and geothermal resource potentials in Cook Inlet region.

Description: The report indicates that the tectonic framework of the region differs in many respects from that previously published. The area of major tectonic concern contains 1) the junction of the Alaska and Aleutian mountains, 2) the termination of the active Aleutian volcanic arc, 3) the junction of several major fault systems, and 4) gas, oil, and coal-bearing sedimentary basins of Tertiary areas.

The introduction explains the source of report data; gravity survey; structural features and tectonic elements. It describes the potential for petroleum, coal, minerals, uranium and geothermal energy. A paragraph summarizes the usefulness of the data included in the text.

Availability: Copy available for reproduction from Division of Geological and Geophysical Surveys, Department of Natural Resources.

Title: Preliminary Report on Stratigraphy of  
Kenai Group, Upper Cook Inlet. Hartman,  
D.C., Pessel, G.H., McGee, D.L.; Department  
of Natural Resources, Division of Geologic  
Survey, Special Report No. 5, (July 1972),  
(6 p. 10 plates.).

Area: Cook Inlet Basin.

Interest: Interest Level 2.

Illustrations: Four Stratigraphic correlation cross-  
sections are included for the Northern Kenai  
Peninsula and Northeastern Cook Inlet.

Isopach maps (6) are included for each formation  
of the Kenai Group, as well as for the total  
thickness of the Group. These maps show  
thickness penetrated by wells, and well  
location. Map scales are 1:500,000.

Description: The report area includes all of the inter-  
mountain trough that is the Cook Inlet Basin,  
to the Alaska Range and the Castle Mountain  
fault on the South, and on the southeast to  
the Chugach Mountains. The report is a  
summary interpretation of presently-known  
stratigraphy of the Kenai Group, where nearly  
all Cook Inlet wells have been drilled. Each  
formation is described. A summary and conclusions  
section is included.

Availability: Report is out of print. File copy is stored  
at Division of Geological and Geophysical  
Surveys for reference purposes.



Title: Guidebook to The Quarternary Geology Central and Southcentral Alaska. Pewe, T.L. (editor); reprinted by Department of Natural Resources, Division of Geologic and Geophysical Surveys, (1977), (141 p. illus.). Reprinted from a guidebook for a field conference of the International Association for Quarternary Research (1965).

Area: Central and Southcentral Alaska, including Upper Cook Inlet and Matanuska Valley areas.

Interest: Interest Level 1.

Description: Five major areas are considered: the Fairbanks area, the central Tanana River area, the Delta River area of the Alaska Range, the Copper River Basin, the Upper Cook Inlet area and the Matanuska River Valley. Marine, fluvial, lacustrine, glacial, eolian and periglacial deposits of Quarternary age are present and being formed today. Landslide areas and archaeological references are also included in this report.

For the purposes of this work, only the section of this report dealing with Upper Cook Inlet and the Matanuska River Valley will be described.

The vegetation, climate and topography of the region are all briefly described. The five periods of Pleistocene glaciation are described in detail. Included are details of the Naptowne advances, recession of glaciation in the Matanuska Valley and the process of radiocarbon and ionium/uranium radio dating methods.

A road log and locality description of the Matanuska Valley are included.

A variety of maps of a general nature are presented. Most maps are excerpts from other, more detailed, geologic work. The report's usefulness is, as its title suggests, as a guidebook to geology, archaeology and the general physical setting of the areas described.

Title: Reconnaissance Geologic Investigation  
in the Talkeetna Mountains, Csejtey, B. Jr.;  
USGS Open File Report 74-147 (53 p. illus) 1974

Area: State Priority Areas 2 and 3b; Talkeetna Mountains Area.

Interest: Interest Level 2.

Tables: 1) Chemical data of representative bedrock samples; Watana Lake area. (14 chemicals).

2) Chemical data of representative bedrock samples; Talkeetna Mountains C-4 quad, Talkeetna Mountains.

3) Chemical and model data of representative bedrock samples from part of Talkeetna Mountains A-5 quad.

4) Potassium-argon age determinations on biotite and hornblende mineral pairs for plutonic rocks of the A-5 quad.

Maps: 1) Index map showing locations of the three geologically mapped areas of the Talkeetna Mountains (1"=50 miles approx.)

2) Generalized geologic map of the Talkeetna Mountains (1"=50 miles approximately).

3) Geologic map of the Watana Lake area (1:63,360 contour interval 100').

4) Geologic map of a part of the Talkeetna Mountains C-4 quad; Talkeetna Mountains (1:63,360, contour intervals 100').

5) Geologic map of the A-5 Quad (1:63,360, contour interval 100').

6) Plutonic rock nomenclature used in this report (diagram).

7) Model diagram, and plots of  $K_2O$  against  $SiO_2$  for plutonic rocks of the A-5 quad.

8) Generalized tectonic map of southcentral Alaska (1"=100 miles).

Description: The contents include the following sections:

Introduction; geologic setting of the Talkeetna Mountains; previous work; geology of the Watana Lake area; geology of a part of the Talkeetna Mountains (C-4 quad and A-5 quad); Talkeetna Mountains batholithic complex; tectonics; reports and references.

Availability: USGS Public Inquiries Office, copy available for reproduction only.

Title: An Analysis of Earthquake Intensities and Recurrence Rates in and near Alaska.  
Meyers, H., Brazee, R.J., Coffman and Lessig;  
National Geophysical and Solar-Terrestrial  
Data Center, Boulder, Colorado, (NOAA Technical  
Memorandum EDS NGSDC-3); (October 1976), (101  
p. with microfiche in pocket).

Area: Statewide.

Interest: Interest Level 3.

Maps: 1) Statewide map shows the plot of maximum intensities reported in Alaska, 1786-1974.

2) 4 Isoseismal maps of earthquakes, March 27, 1964 - October 29, 1968.

3) Projected maximum intensities of earthquakes in and near Alaska, 1786-1974.

Tables: Numerous tables depict such data as:  
intensities, frequencies, magnitude-distance relationship, recurrence rate of earthquakes by magnitude and geographic coordinates. Microfiche in pocket includes 1) an alphabetical list of earthquake felt reports, and 2) chronological list of earthquake-felt reports.

Description: This publication analyzes and summarizes the intensity data and recurrence rates of earthquakes in Alaska. It also describes the intensity file, the formats in which intensity data are available, and the sources and limitations of the data. Two sections are included titled "Maximum Earthquake Intensities in Alaska using a Magnitude - Maximum Intensity Conversion" and "Magnitude - Frequency Relationships." The parameters included for each earthquake, when available, are: date, origin time, epicenter, magnitude, focal depth, intensity and geographic coordinates for each reporting city, and the distance of each city from the earthquake source. The file (in pocket on microfiche) does not include effects of Alaska Tsunamis.

#### IV. MAPS: GEOLOGY

A. GEOCHEMICAL

Title: Geochemical Anomalies in The Willow Creek Mining District, Talkeetna Mountains Mat-Su Borough. Silberman, O'Leary, Peterson and Csejtey; USGS Open File report 76-191 (5 plates), (release date February 1976).

Area: State Priority Area 1.

Interest: Interest Level 1.

Maps: 1) Distribution of Copper in the Willow Creek Mining District (scale 1:24,000).

2) Distribution of lead in the Willow Creek Mining District (scale 1:24,000).

3) Distribution of zinc in the Willow Creek Mining District (scale 1:24,000).

4) Copper enrichment in the Willow Creek Mining District (scale 1:24,000).

5) Lead enrichment in the Willow Creek Mining District (scale 1:24,000).

Description: The same description of the Willow Creek Mining District is included on each of the five plates. The maps include a geologic description, the methods of analyses, conclusions and references.

Title: Map Showing Geology, Wildcat Wells, Tertiary Plant Fossil Localities, K-AR age dates, and Petroleum Operations, Cook Inlet Area, Alaska. Magoon, L.B., Adkison, W.L., and Egbert, R.M.; USGS Miscellaneous Investigations Series I-1019 (1976).

Area: Includes State Priority Areas 4a, 4b and the Matanuska Valley.

Interest: Interest Level I.

Maps: Sheet 1) Scale 1:250,000 contour interval 200 feet (some 100 foot contours). Upper Cook Inlet map showing geology, wildcat wells, tertiary plant fossil localities, radioactive age dates, and petroleum operations.

Sheet 2) Scale 1:250,000 contour interval 200 feet. (Some information as above is shown for the Kenai Peninsula and Lower Cook Inlet Region).

Sheet 3) Index Sheet includes the following data:

- 126 Tertiary Plant Fossil localities; includes stages, formations, location.
- Petroleum operations and Wildcat wells are listed by company, name, number, total depth, and deepest rock unit.
- 72 Potassium - argon or radioactive age dates, includes rock type, mineral dated, age and location.
- List of pipelines, the owner/operator, commodity, origin and destination.
- Production facilities, the owner/operator, location, the oil field being served, design function, commodity, and destination.
- Refinery/Petrochemical Facilities; the owner, facility, location field being served, daily capacity and products.
- Tanker loading facilities
- Status of Petroleum resources



Maps:  
(cont)

Sheet 3 also includes an index map showing principal sources of geologic data on sheets 1 and 2.

Availability: USGS Public Inquiries Office: price \$4.25.

B. GEOPHYSICAL

Title: Aeromagnetic Maps for Talkeetna, Talkeetna Mountains and Tyonek. DGGs; Alaska Open File Reports #19, 20 & 21, (June 1973).

Area: Upper Talkeetna Sub-basin.

Interest: Interest level 3.

Maps: Scale 1:63,360 original mylar is open filed.  
Scale 1:250,000 of USGS Quadrangel is open filed.

Description: 1971-1973 data: The survey of light lines are spaced 3/4 mile apart and at 1000' where possible. 1974 data: Survey lines were flown 1 mile apart 15 mile tie lines.

Availability: Available for reproduction from Division of Geologic and Geophysical Surveys.

Title: Topographic and Geologic Map of the Knob  
Creek Area of The Wishbone Hill District,  
Matanuska Coal Field. Barnes, F.F.: USGS  
Coal Investigations Map C-51 (1962).

Area: Matanuska Valley Northeast to Knob Creek.

Interest: Interest Level I.

Map: Scale 1:6,000; (1"=500 feet) contour interval  
20 feet.

Stratigraphic section of south slope of  
Knob Ridge. Sections of coal beds in the  
Knob Creek area map known occurrences of  
coal and bony coal, bone and coaly shale,  
claystone, siltstone, and silty claystone,  
sandstone, ironstone concretions, faults, and  
the stratigraphic position of the coal sections.

Description: The map includes a written description of  
the following: introduction to the mapped  
area, stratigraphy, Matanuska formation,  
Chickaloon Formation, quaternary deposits,  
structure and coal.

Title: Surface Geology and Holocene Breaks along the Susitna Segment of the Castle Mountain fault. Delterman, Plafker, Hudson, Tysdal and Puvoni.; USGS Miscellaneous Field Studies 618 (1974)

Areas: Priority area 1.

Interest: Interest Level 1.

Maps: 1) "Surface Geology Orthophoto mosaic prepared from 1974 photography," (scale 1:24,000).  
2) "Index map showing location of Castle Mountain Fault and this map." (1"=1 mile).  
3) "Map showing location of strip map segments and major physiographic provinces." (1:1,000,000).

Description: The map includes these sections: description of the Castle Mountain fault, location of fault breaks, field recognition and classification of Holocene faulting, age of fault breaks, and an annotated bibliography. Map symbols and terms are explained, map units are correlated by geologic age, and map units (types of deposits) are described.

Title: Geology and Surface Features Along Part  
of the Talkeetna Segment of the Castle Mountain -  
Caribou Fault System. Delterman, R.L.,  
Plafter, G., Tysdal, Russell, and Hudson, T.;  
USGS Miscellaneous Field Studies 738 (1976)

Area: State Priority Area 1.

Interest: Interest Level 1.

Maps: 1) Reconnaissance geologic map (scale  
1:63,3360).  
  
2) Index map showing location of Castle  
Mountain fault and area of detailed map  
(1/2"=100 km).  
  
3) Strip map showing surface features of the  
Castle Mountain fault (where it crosses part  
of the Susitna Lowland, scale 1:1,000,000).  
  
4) Cross sections of Castle Mountain Fault  
and Caribou Fault.

Description: The map and accompanying narrative delineate  
and evaluate geologic hazards related to  
earthquakes along the Castle Mountain fault.  
The map delineates fault traces, large  
individual landslides and areas of potential  
landslides. The map includes a correlation  
of units (geologic ages), description of  
units, and an explanation of map symbols.  
The map narrative includes these sections:  
general characteristics of the Castle Mountain  
fault system, field recognition of fault  
trace, seismicity, special features along the  
Talkeetna segment of the Castle Mountain  
fault-system, landslide hazards and an annotated  
bibliography.

### C. RECONNAISSANCE GEOLOGY

Title: Reconnaissance Engineering Geology For Selection of Highway Route From Talkeetna to McGrath, Alaska.  
Weber, F.R.; U.S. Geologic Survey Open File Report (Map) 61-169, (1961), (Map, limited text).

Area: State Priority Area 2.

Interest: Interest Level 2.

Map: 1) Reconnaissance Engineering Geologic Map for Selections of possible road routes between Talkeetna and McGrath (1:250,000 scale, 200 feet contour intervals; mapped 1959-1960).

Table: 1) Description of Units: Work done on behalf of the U.S. Bureau of Public Roads. Includes descriptions of the following: lithology, terrain, vegetation, drainage, permafrost, susceptibility to frost action, bearing strength and slope stability, excavation and compaction, and evaluation for road construction and maintenance. Descriptions correspond to mapping units.

2) Mechanical Analysis of Samples (graph).

Description: This is a photogeologic report designed to provide a general basis for determination of road routes and is concerned only with the geologic factors as they would affect construction. Two possible highway extensions were considered, one extending west from Talkeetna and the other west from the vicinity of Flat Lake.

The geography, physiography, climate, glaciation and permafrost of the region are briefly described in the accompanying map description.

Availability: May be ordered from: Technical Data Unit, Alaska Geology Branch USGS, 345 Middlefield Road, Menlo Park, California 94025.



Title: Reconnaissance Geologic Map Along Bruin Bay and Lake Clark Faults in Kenai and Tyonek Quadrangles. Delterman, R.L., Hudson, R., Plafker, G. Tysdal and Houre; USGS Open File Report 76-477 (Release date July 1976).

Area: State Priority Areas .

Interest: Interest Level I.

Maps: Open File map 76-477 (1:250,000) (Preliminary map has not been reviewed for conformity).

Index map showing location of faults and area mapped. (1"=50 miles, approximately).

Description: The purpose of the map is to describe the general features, determine if there is evidence of Holocene displacement along the Bruin Bay and Lake Clark faults, and report the distribution of major geologic units. The four page map narrative includes these descriptions of areas of discussion: general geology, Bruin Bay fault, Lake Clark fault, conclusions and references.

The map includes location of surficial, landslide and glacial deposits; formations; rocks; and minerals by geologic ages. Contacts, faults, lineaments and shear zones are also mapped.

Title: Reconnaissance Geology - South Central  
Talkeetna Mountains. McGee, D.L. and Henning,  
M.W.; DGGs Open File Report #103, (Feb.  
1977).

Area: Talkeetna Subbasin - Kings River, Chickaloon  
River area.

Interest: Interest Level 1.

Map: 1"=1 mile; base map is taken from USGS  
Anchorage, (A-3),(A-4),(D-4),(D-5),(D-6)  
quadrangles.

Description: Geologic formations by ages are presented.  
They include the following: Tertiary (Cenozoic) -  
sedimentary and volcanic rocks, and Chickaloon  
formation; Early Jurassic - Talkeetna formation;  
Undifferentiated - meta-argillite and marble  
(limestone); Mesozoic - Plutonic rocks;  
granodiorite, quartz, diorite. The following  
information is also mapped from the reconnaissance  
field investigation: Contacts, faults,  
thrust fault, anticlines, synclines, and  
strike and dip of beds are depicted on the map.

Title: Geologic Map of Talkeetna Mountains (A2)  
Quadrangle, and the Contiguous Area to the  
North and Northwest. Grantz, Arthur; USGS  
Miscellaneous Geologic Investigations Map I-  
313 (1960).

Area: Upper Susitna Basin.

Interest: Interest Level I.

Scale: 1:48,000; 1 1/4"=1 mile; contour interval 100'.

Description: The map presents reconnaissance geology in the vicinity of the Oshetna, Little Oshetna and Nelchina Rivers. Formations within the Jurassic, Cretaceous, Tertiary and Quaternary ages are identified. Faults, folds, anticlines and synclines, and attitudes of beds are shown on the map.

Two cross sections are shown.

Title: Geologic Map of Talkeetna Mountains  
(A-1) Quadrangle, and the South Third of  
Talkeetna Mountains (B-1) Quadrangle. Grantz,  
Arthur; USGS Miscellaneous Geologic Investigations  
Map 1-314 (1960).

Area: Upper Susitna Basin.

Interest: Interest Level 1.

Scale: 1:48,000, 1 1/4"=1 mile, contour interval  
100'.

Description: The following data is symbolized and mapped  
for these geologic ages:

1) Quaternary - rock glaciers, alluvial  
deposits, talus and colluvium, landslide  
deposits, glacial deposits.

2) Tertiary - fluvial conglomerate and  
coaly sandstone.

3) Cretaceous - siltstone and shale (Matanuska  
formation); cobble conglomerate; Calcareous  
sandstone, siltstone and claystone; Nelchina  
limestone.

4) Jurassic - Naknek formation, Chinitna  
formation, sandstone, Tuxedni formation,  
Talkeetna formation.

The map also shows contacts, faults, anticlines,  
synclines, strike and attitude of beds.

Two map cross sections are included.

Title: Geologic Map of Lower Matanuska Valley.  
Barnes, F.F.; USGS Miscellaneous Investigations  
Map I-359 (1962).

Area: State Priority Area I; Matanuska Valley  
to Chickaloon.

Interest: Interest Level I.

Scale: 1:63,360, contour interval 100 feet.

Description: The map presents, on a topographic base, the character, distribution, structure and relations of the coal-bearing Chickaloon formation and associated rocks of the Matanuska coal field. The map narrative describes these rocks and formations: bedded rocks, Talkeetna, Naknek, unnamed limestone, Arkose ridge, Matanuska, Chickaloon, Wishbone and Tsadaka Formations, basaltic lava and tuff, intrusive rocks, unconsolidated quaternary deposits, structure and coal.

The coal description explains that the principal coal resources of the Matanuska coal field are in the Wishbone Hill District, in which the estimated remaining reserves are about 100 million tons. Knob Creek, Chickaloon District, and Little Granite Creek coal reserves are also described. Cross sections are included.

Title: Generalized Geologic Map of The Alaska-Aleutian Range Batholith Showing Potassium-Argon Ages of The Plutonic Rocks. Reed, B.L., and Lanphere, M.A.; USGS Miscellaneous Field Studies Map -MR372 (1972) (2 map sheets)

Area: Southcentral and Southwestern Alaska.

Interest: Interest Level 3.

Map: 1) Generalized Geologic Map of the Alaska-Aleutian Range Batholith Showing Potassium-Argon Ages of the Plutonic Rocks, (3"=50 miles).

Table: Potassium-Argon ages and analytical data.

Description: The brief description explains that age assignments of plutonic rocks in the Alaska-Aleutian Range batholith are based on potassium-argon measurements of 130 rock samples of various types.

#### D. MINERAL RESOURCES

Title: Metallic Mineral Resources Map of The  
Mount McKinley Quadrangle. Cobb, E.H.; USGS  
Miscellaneous Field Studies Map 366 (1972)

Area: Northern most portion of Talkeetna Sub-  
basin.

Interest: Interest Level I.

Map: 1:250,000; contour interval 200 feet.

Description: Lode and placer deposits are identified  
by name, principal reference of geologic  
investigation and commodity.



Title: Metallic Mineral Resources Map of the  
Talkeetna Quadrangle. Clark, A. and Cobb,  
E.; USGS Miscellaneous Field Studies Map 369  
(1972).

Area: State Priority Area 3b in Upper Talkeetna  
Sub-basin.

Interest: Interest Level 1.

Map: 1:250,000 contour interval 200 feet.

Description: Lode and placer deposits are identified  
by name, principal reference of geologic  
investigation and commodity.

Title: Metallic Mineral Resources Map of the  
Talkeetna Mountains Quadrangle. Cobb, E.;  
USGS Miscellaneous Field Studies Map 370  
(1972).

Area: State Priority Areas 2 and 3b in Talkeetna  
Sub-basin.

Interest: Interest Level 1.

Map: 1:250,000 contour interval 200 feet.

Description: Lode and placer deposits are identified  
by name, principal reference of geologic  
investigation and commodity.

Title: Metallic Mineral Resources Map of The  
Tyonek Quadrangle. Cobb., E.H.; USGS Miscellaneous  
Field Studies Map 385 (1972).

Area: Portions of State Priority Areas 3a, 4a  
and 4b.

Interest: Interest Level I.

Map: 1:250,000, contour interval 200 feet.

Description: The lode and float occurrences, placer  
deposits are identified by location name,  
principal reference of investigating geologist  
and commodity.

Title: Metallic Mineral Resources Map of The  
Healy Quadrangle. Clark, A. and Cobb, E.;  
USGS Miscellaneous Field Studies Map 394  
(1972)

Area: Upper Talkeetna Sub-basin and Upper Susitna  
Sub-basin.

Interest: Interest Level 2.

Map: 1:250,000, contour interval 200 feet.

Description: The location, name, or owner, principal  
references and commodity are indicated for  
lode and placer deposits.

Title: Metallic Mineral Resources Map of The  
Anchorage Quadrangle. Cobb, C.H.; USGS  
Miscellaneous Field Studies Map 409 (1972)

Area: State Priority Area I; Matanuska Valley.

Interest: Interest Level I.

Map: 1:250,000, contour interval 200 feet.

Description: Lode and placer deposits are identified  
by name, principal reference and commodity.

Title: Metallic Mineral Resources Map of the  
Mount Hayes Quadrangle. Cobb, E.H.; USGS  
Miscellaneous Field Studies Map 414 (1972)

Area: Most Northeastern portion of Upper Susitna  
Basin.

Interest: Interest Level 2.

Map: 1:250,000; contour interval 200 feet.

Description: The location name or owner, principal  
references and commodity are indicated for  
lode and placer deposits. Commodities,  
include chromite, copper, gold, lead, mercury,  
platinum-group materials, silver, tungsten,  
zinc and monazite.

Title: Metallic Mineral Resources Map of The  
Gulkana Quadrangle. Richter, D.H. and Matson,  
N.S.; USGS Miscellaneous Field Studies Map  
419 (1972)

Area: Southeastern part of Upper Susitna Sub  
Basin.

Interest: Interest Level 2.

Map: 1:250,000, contour interval 200 feet.

Description: The name, principal references and commodity  
are indicated for lode deposits and placer  
deposits. Few, if any, are located within  
the Upper Sustina Basin.

## VI. ONGOING PROJECTS: GEOLOGY



Project: Alaska Mineral Resource Assessment Program (AMRAP).

Contact: Henry C. Berg, USGS, Branch of Alaskan Geology, 345 Middle Field Road; Menlo Park, California 94025; (415) 323-8111, ext. 2266.

Area: Statewide.

Description: The Alaska Mineral Resource Assessment Program (AMRAP) began in 1976 in response to the public and private concern about the classification, allocation and development of Alaska's lands. One objective of the program, based on a 1:250,000 scale quadrangle format, is a systematic assessment of terrains having high economic mineral potential. The other objective, based on a 1:1,000,000 scale map format, is a synoptic mineral appraisal of the 83.47 million acres proposed for classification as national interest (D-2) lands (for the Department of the Interior).

Informally termed "RAMRAP" (Regional AMRAP), this program is scheduled for completion by early 1978. Geologists from the Division of Geological and Geophysical Surveys, the University of Alaska, and the Bureau of Mines are also participants in the program.

Of importance to the Susitna basin, are these general resource assessment reevaluations:

- New potential resources of molybdenum, chromite, gold, and tin were discovered in the Talkeetna quadrangle.
- Significant increases were recognized in size of copper deposits in the Ketchikan and Talkeetna Mountains quadrangles.

Status: More than 20 AMRAP sponsored research reports on geology, geochemistry, geophysics and mineral resources are published, to date. Pertinent reports are included in this bibliography.

Duration: Regional Alaska Mineral Resource Assessment Program, 1976 through 1978.

Project: Alaska Geochemical Analysis

Contact: Elizabeth Yount; US Geological Survey,  
Branch of Alaskan Geology; 345 Middlefield  
Road; Menlo Park, California 94025; (415)  
323-8111 ext. 2477 .

Area: Statewide .

Description: This is an ongoing project aimed at providing  
computer-based technical data files, and  
maintaining contact with other agencies that  
compile or create files of Alaskan geologic  
or resource data.

Special emphasis is presently being given to  
the computer files of Alaskan geochemical  
analyses. The files are stored in Denver,  
Colorado using a file system called RASS.

Methods of access, manipulation of data, and  
additional data is being added to these files  
to provide a better tool for the current  
mineral resource assessment of Alaskan lands.

Status: Priority is being given to updating stream sediment  
analysis records from Central Alaska. It is anti-  
cipated that the entire process can be completed in  
slightly more than a year.

Duration: Ongoing project.

Project: Talkeetna Mountains Quadrangle,  
Geologic Mapping .

Contact: Bela Csejtey, Jr.; US Geologic Survey;  
345 Middlefield Road; Menlo Park, California  
94025; (415)323-8111 ext 2277 .

Area: Upper Talkeetna Sub-basin .

Description: The objectives of the program are the  
evaluation of the mineral resources of the  
quadrangle (part of AMRAP), through reconnaissance  
geologic, geochemical, geophysical and  
telegeologic mapping. Fieldwork includes: 1)  
regional geologic mapping at 1:250,000 scale  
and detailed mapping of mineralized areas; 2)  
a geochemical survey utilizing stream-  
sediment, soil, and mineralized-bedrock  
samples; 3) sampling of mineral deposits for age  
determinations and for trace-element studies;  
and 4) completion of a regional gravity  
survey.

Status: Geologic mapping in about 90 percent of  
the quadrangle was completed in June 1976.  
Geochemical sampling was carried out in the  
western third of the quad in 1975. Geochemical  
sampling, gravity measurements and geophysical  
fieldwork was finished during July 1977.  
Processing of geochemical samples and geophysical  
data is in progress.

A preliminary geologic map covering all but  
the northern most part of the Talkeetna  
Mountains is scheduled to be published during  
the winter (1977). Publication of final  
reports is planned for late 1978.

Duration: 1974 through 1978.

Project: Talkeetna Quadrangle, Mineral Resource Evaluation.

Contact: Bruce L. Reed, Project Chief: US Geologic Survey; 1209 Orca Street; Anchorage, Alaska 99501; 272-8228.

Area: Upper Talkeetna Sub-basin and Upper Beluga Sub-basin.

Description: The objective is the evaluation of the mineral resources of the quadrangle through reconnaissance geologic, geochemical, geophysical and telegeologic mapping. Fieldwork consists of: 1) geologic mapping at 1:250,000 scale; 2) geochemical investigations, primarily through the use of sediment and various methods of rock sampling, to delineate areas of metal enrichment; 3) an aeromagnetic survey and interpretation to support the geologic mapping; 4) regional gravity survey; and 5) mapping of selected areas to Tertiary sedimentary rocks to assess their coal potential.

The project is part of the Alaska Mineral Resource Assessment Program (AMRAP).

Status: Fieldwork and mapping was completed during the summer (1977).

Maps and a final report are presently in printing and will be published as Miscellaneous Field series number 870.

Duration: Three year project, 1974-1977.

Project: Beluga Coal Fields, Reserves on State Lands.

Contact: Don McGee, Department of Natural Resources, Division of Geological and Geophysical Surveys 279-7691.

Area: State Priority areas 4a, and 4b Beluga Coal Fields.

Description: The physical parameters of the Beluga coal reserves are in the process of being mapped. The objective is to delineate coal reserves with the best commercial value potential. The project is designed to provide the State with information of value in the formulation of leasing policies on State lands in the Beluga fields.

The preliminary report will utilize the 1:63,360 scale map prepared for the "Proposed Land Trade, Capps, Glacier-Beluga Areas, Land Evaluation and Coal Reserve Study".

Status: A preliminary report (10 to 15 pages, approximately) and map are expected to be transmitted to Fred Boness, Deputy Commissioner, Department of Natural Resources by mid-September 1977.

Duration: Unknown.

Project: Analysis of Faults in the Matanuska and  
Susitna Valleys.

Contact: Ross Schaff; Division of Geological and  
Geophysical Surveys (Project by Ronald Bruhn,  
University of Utah); 3001 Porcupine Drive;  
Anchorage, Alaska; 274-8602.

Area: Eastern part Susitna Valley and Matanuska  
Valley.

Description: Reconnaissance investigation of the eastern  
segment of the Castle Mountain fault system  
in the Matanuska/Susitna Valleys. The primary  
objective is to determine the location,  
frequency, magnitude and trends of faulting.

Status: Publishing of a final report will await  
results of Carbon 14 age dating. However,  
preliminary information is scheduled for  
publication in the DGGs, Mines and Minerals  
Bulletin in September 1977.

Duration: December 1977, preliminary report.

Project: Evaluation of Bedrock Geology of the South Side Matanuska Valley.

Contact: Don McGee; Division of Geological and Geophysical Surveys; 3001 Porcupine Drive; Anchorage, Alaska; 274-8602 .

Area: Matanuska Valley; eastern part of Susitna Valley.

Description: Part of an ongoing evaluation program that includes surficial geology and bedrock geology, with emphasis on coal outcrops in Chickaloon Formation, and an examination of geologic hazards.

Status: Approximately one-third of the investigation has been completed, with notes and maps used in field investigation. Work has been temporarily discontinued.

Duration: No estimate of completion date; work has been temporarily discontinued.

Project: Mineral Exploration, Cities Service Minerals Corporation .

Contact: Earl Redman; 1016 West 6th Avenue; Anchorage, Alaska;  
272-9441 .

Area: Upper Susitna Basin .

Description: Cities Service Minerals Corporation is conducting  
exploratory investigations at the following areas  
in the Upper Susitna Basin: 1) Denali Prospect  
near Windy Creek; 2) the South end of West Fork  
Glacier; and 3) near the foot of the Nenana Glacier.

Staging for the exploration is from the West end of  
the Denali Highway, and transportation is via helicopter.

Status: Field work evident during 1977 summer.

Duration: Unknown.



Project: Surficial Geology of the Matanuska and Susitna Valleys .

Contact: Dick Reger; Division of Geological and Geophysical  
Surveys (DGGS); Box 80007; College, Alaska 99708;  
479-6123.

Area: State Priority areas 1, 2 and 3b. Willow and Talkeetna  
Subbasins.

Description: The primary objective of this project is to complete  
the mapping of the surface deposits. Secondary objective  
is to determine the location and nature of geologic  
hazards, extent of potentially exploitable resources, and  
to delineate recent faults which should be studied in  
greater detail. The product will be a series of geologic  
and interpretive maps on a 1:63,360 scale. A limited  
text will accompany the interpretive maps.

Field investigations for a reconnaissance geologic report  
of the Talkeetna-Kashwitna area began in August 1976.  
These investigations mark the northern-most limits of the  
Matanuska-Susitna reconnaissance geologic studies, and  
are expected to be placed in open file sometime before  
1978.

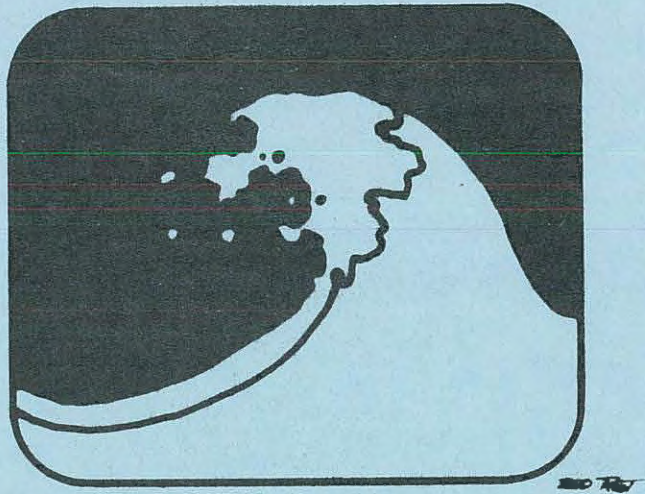
Since June 1977, the DGGS has continued the field investi-  
gations in the area from Kashwitna to Palmer for surficial  
and bedrock geology. Photo interpretation and mapping is  
presently in progress for the Willow Creek and the Little  
Susitna River areas and is expected to be completed by  
December 1977.

Data has been collected relative to bedrock geology,  
surficial geology, building and foundation materials,  
extent of agricultural materials, and inferred geologic  
hazards. Field investigations during 1978 are anticipated  
to concentrate on more detailed studies of Willow Creek,  
Little Susitna River, Birch Creek and Peters Creek, with  
the possibility of mapping at 1:24,000 scale. A derivative  
map of slope stability may be a by-product of this more  
detailed investigation.

Future field investigations will also include the Upper  
Matanuska Valley, and from Talkeetna north to Broad Pass.  
The eventual product will be a composite map of the  
surficial geology of the entire Susitna and Matanuska  
Basins.

Duration: 1976-1978. Completion of the work is dependant on  
funding and areas of State concern.

The preliminary maps are expected to be available by  
December 1977.



# hydrology

## CONTENTS: HYDROLOGY

	<u>Page</u>
I. INTRODUCTION & SUMMARY	106
II. INDEX	108
III. CROSS INDEX	111
IV. PUBLISHED INFORMATION	112
A. Groundwater	112
B. Surface Water	118
C. Water Quality	124
D. Flooding	134
E. Hydropower Related	142
F. Water Resource Management	158
V. ONGOING PROJECTS	163

## I. INTRODUCTION & SUMMARY: HYDROLOGY

## I. INTRODUCTION & SUMMARY: HYDROLOGY

The hydrology section of the bibliography has been divided into subtopics. As hydrologic-related investigations often deal with more than one aspect of water, e.g. quantity and quality of surface water, the references are located according to the main theme of the report. The following summarizes the type of data found in each of the subtopic sections.

**GROUNDWATER** - Information on availability of groundwater and estimates of sustained yield for certain basin locations are given; however, thickness and extent of aquifers is virtually unknown. Reports on effects of permafrost on groundwater serve as technical documents, yet little is known about the location of permafrost in the Susitna River Basin region. A few areas of discontinuous permafrost are described, yet little is known about extent, thickness and relation to groundwater.

**SURFACE WATER** - Surface water flow measurements are widespread, with continuous records available for major rivers and tributaries, and discontinuous measurement records available for smaller tributaries and unestablished gaging sites. Data on sediment yields are available from many of the surface water gaging stations. Reports discuss impacts of scour (suspended sediment) on bridge sites in the lower Mat-Su Valley. Unfortunately, stream discharge records are not available for some of the potential development areas of the Susitna Basin, for example, Willow Creek and Deception Creek.

**WATER QUALITY** - Sampling and record-keeping of lake and stream water quality has been conducted, either on a periodic or continuous basis, in the lowlands areas of the Susitna River Basin. The amount of information on water quality is, perhaps, attributable to a number of factors including federal legislation requiring water quality standards, impacts on urban development, effects on fish habitat, and impacts of hydroelectric development on water quality. Water quality tests include chemical, biological, temperature and sediment analysis. Salinity concentrations in subsurface waters are used in correlation with oil and gas accumulations, but salinity findings may be useful for water resource planning. Impacts of waste discharge on estuaries is another topic addressed within the water quality section.

**FLOODING** - Analyses of the impacts of flooding are presently limited to those populated areas that have sustained enough damage to justify investigations of problems. Examples of flood studies of the confluence of the Talkeetna, Susitna, and Chulitna Rivers at Talkeetna; the Matanuska and Knik Rivers near Palmer; and the Little Susitna River near Houston. Maximum stage and discharge data are available for locations that have an established gaging station. The specialized threat of glacier dammed lakes and outburst floods is also addressed. Floodplains have not be delineated.

HYDROPOWER RELATED - Because of the quantity of information generated on potential for and impacts of hydroelectric power development, hydropower is discussed as a separate topic. Bureau of Reclamation reports regarding hydropower potential date back to 1948. The primary location for dam sites have been in the Upper Susitna sub-basin. In 1949, a study addressed the potential for hydroelectric power through a combination of dams and canals on the Little Susitna River and Cottonwood Creek. Some of the most detailed inventories of fish, wildlife, water quality, and recreation potential for the Susitna area accompany the plans for power development on the Upper Susitna River.

WATER RESOURCE MANAGEMENT - A conglomeration of background studies, research needs, and management recommendations for water resources in the Cook Inlet-Susitna River Basin region are contained in this portion of the hydrology section.

SOURCES - A number of agencies are involved in record keeping and data collection of Alaskan waters. State agencies include the Department of Natural Resources, the Department of Environmental Conservation and the University of Alaska's Institute of Water Resources. Federal entities include the Geological Survey, the Environmental Protection Agency, the Corps of Engineers, the Bureau of Reclamation, the Alaska Power Authority, and the Soil Conservation Service. Other agencies play a secondary role in water conservation, record keeping or water resource management.

ONGOING PROJECTS - Nearly as many water studies are presently underway or anticipated, as have been completed in recent years. All these projects will assist in providing needed data, and mapping information for use by local governments and others. Because of the volume of work presently in progress or planned, close coordination should be maintained among State and Federal agency personnel to avoid duplication of products and to abide by standard guidelines in the collection of data (with particular regard to water quality parameters).

## II. INDEX: HYDROLOGY

## II. INDEX: HYDROLOGY

### A. GROUNDWATER

1. Water Levels and Artesian Pressures in the U.S. and the Northwestern States.
2. Groundwater in the Permafrost Regions of Alaska.
3. Geology and Groundwater Resources of the Matanuska Valley Agricultural Area.
4. Water Resources Reconnaissance of a Part of the Mat-Su Borough.

### B. SURFACE WATER

1. Water Resources Data for Alaska (Summary).
2. Water Resources Data for Alaska Water Year 1975.
3. Quantity and Quality of Surface Water in Alaska (Summary).
4. Programs and Plans - Estimating Flow Characteristics from Channel Size.
5. Computer Model of the Tidal Phenomena in Cook Inlet.

### C. WATER QUALITY

1. Water Quality Monitoring Programs An Inventory.
2. Index of Surface Water Quality Records to September 30, 1973.
3. Comprehensive Water and Sewer Study, Matanuska-Susitna Borough.
4. Spectographic and Chemical Analysis of Stream-Sediment and Rock Samples From the Western Part of the Talkeetna Mountains, Quadrangle.
5. Scour at Selected Bridge Sites in Alaska.
6. Salinity Study, Cook Inlet Basin.
7. Effect of Waste Discharges into a Silt-Laden Estuary: A Case Study Of Cook Inlet.
8. Water Quality Status Report.
9. Regional Sediment Yield Analysis of Alaska Streams.



D. FLOODING

1. Final Environmental Impact Statement, Talkeetna River Project.
2. Flood Plain Information Talkeetna River, Susitna River, Chulitna River.
3. Magnitude and Frequency of Floods in Alaska South of the Yukon River.
4. Flood Frequency in Alaska.
5. Floods of the Summer of 1971 in Southcentral Alaska.
6. Small Stream Flood Investigations in Alaska: A Compilation of Peak Data May 1963 to September 1972.
7. Public Meeting: Report of Survey Harbors and Rivers of Alaska, Matanuska and Little Susitna Rivers Flood Control.
8. Glacier Dammed Lakes and Outburst Floods in Alaska.

E. HYDROPOWER RELATED

1. Background and Summary of Susitna River Hydropower Reports and Studies.
2. Southcentral Railbelt Area, Interim Feasibility Report - Hydroelectric Power and Related Purposes for the Upper Susitna.
3. Upper Susitna River Alaska: An Inventory and Evaluation of the Environmental, Aesthetic and Recreational Resources.
4. Devil Canyon Status Report.
5. Reassessment Report on Upper Susitna River Hydroelectric Development For the State of Alaska.
6. A Hydrologic Reconnaissance of the Susitna River Below Devil's Canyon.
7. Preliminary Report on Water-Power Resources of Little Susitna River and Cottonwood Creek.
8. A Report on the Potential Development of Water Resources in the Susitna River Basin.

F. WATER RESOURCE MANAGEMENT

1. The Cook Inlet Environment: A Background Study of Available Knowledge.

F. WATER RESOURCE MANAGEMENT (cont)

2. A Program for Cook Inlet Alaska for the Collection, Storage and Analysis of Baseline Environmental Data.
3. Alaska Water Resources Research Needs for the 70's.
4. Water Resource Management for the Cook Inlet Basin, Kenai Peninsula Region: A Study of Existing Practice with Recommendations for a Comprehensive Plan.

ONGOING PROJECTS

1. Upper Susitna River Basin Hydropower Studies, Advanced Engineering and Design.
2. Surface Water Quality Sampling, Capital Site Area.
3. Nancy Lake Water Quality Monitoring.
4. Hydrological Studies Related to Coal Mining.
5. Hydrological Data Compilation for the Cook Inlet Area.
6. STORET Computerized Data Base System.
7. WATSTORE Computer System.
8. (Proposed) Matanuska-Susitna Borough-wide Flood Insurance Study.
9. Reclamation Considerations for Potential Development of the Cook Inlet Coal Fields.
10. Sediment Stations.
11. Wasilla Water and Sewer System.
12. Public Participation 208 Planning - Mat-Su Borough.
13. Alaska 208 Program for Undesignated Area.
14. Alaska 303E River Basin Planning, Susitna Basin.
15. Southcentral Level B Study.
16. Willow Creek Companion Study.
17. MAUS.

### III. CROSS INDEX: HYDROLOGY

### III. CROSS INDEX: HYDROLOGY

#### Page

See LAND USE AND LAND STATUS Section:

Solid Waste Disposal Study, Matanuska-Susitna Borough. 278

See GEOLOGY Section:

Geology and Geochemistry, Diana Lakes Area Western Talkeetna Mountains. 54

Preliminary Geochemistry and Geology Little Fall Creek Area, Talkeetna Mountains Quadrangle. 58

See VEGETATION Section:

Alaska's Agricultural Potential. 204

See FISH AND WILDLIFE Section:

Annual Performance Report(s) for Inventory and Cataloging. 231

Pre-Authorization Assessment of the Proposed Susitna River Hydroelectric Projects: Preliminary Investigations of Water Quality and Aquatic Species Composition. 227

See CLIMATE Section:

Ten Year Comprehensive Plan for Climatological and Hydrological Data. 299

#### IV. PUBLISHED INFORMATION: HYDROLOGY

A. GROUND WATER

Title: Water Levels and Artesian Pressures in the United States and Northwestern States.. U.S. Geological Survey, Water Supply Papers.

Area: Statewide.

Interest: Interest Level 3.

Description: Scattered records of groundwater measurements are included in these Water Supply Papers. The years covered and the Water Supply Paper number are listed below:

<u>Water Years Covered</u>	<u>Water Supply Paper</u>
Prior to 1956 (summary)	1760
1956-60	1760
1961-65	1845
1966-70	1980
1971-75	(Number not known)

Availability: U.S. Geological Survey, Public Inquiries Office.  
Note this is an annual water-year report series.

Title: Groundwater in the Permafrost Regions of Alaska.  
Williams, J.R.; U.S. Geological Survey Professional  
Paper 696, (1970), (83 p. illus.).

Area: Statewide.

Interest: Interest Level 3.

Maps: Figures 3-8) Distribution of basic data used in this  
report. (Other tables and maps included but not  
relevant to the Susitna region.)

Description: Little evidence is presented in the report regarding  
permafrost in the Susitna River Basin area, but  
other more northern areas of the state are discussed  
in detail with respect to groundwater in permafrost.

The report states that groundwater supplies are  
unaffected by permafrost in the following population  
centers within the permafrost region: Anchorage,  
Palmer, King Salmon, Dillingham, and Tok.

Few data are available to show the relation between  
permafrost and groundwater in upland and mountain  
bedrock of the discontinuous-permafrost zone. The  
report does state that scattered occurrences of perma-  
frost have been noted (Capps, 1940) above an altitude  
of 3,000 feet in the western Talkeetna Mountains, parti-  
cularly in the lode gold mines of the Willow district  
(Capps, 1914; Ray, 1954). Test borings recorded perma-  
frost at the Vee dams site on the Susitna River in the  
northeastern Talkeetna Mountains. However, no data  
are available on the effect of permafrost on ground-  
water occurrences.

The report is a technical document on permafrost  
characteristics, its effects on groundwater, general  
occurrence of groundwater, continuous and discontinuous  
permafrost zones.



**Title:** Geology and Groundwater Resources of the Matanuska Valley Agricultural Area. Trainer, Frank W.; U.S. Geological Survey, Water-Supply Paper 1494; (1960), (116 p. illus.).

**Area:** State Priority area 1; and Palmer, Bodenbug Butte and Sutton areas

**Interest:** Interest Level 1.

**Plates:**

- 1) Map of the Matanuska Valley Agricultural Area, showing surficial geology and location of wells. (1:50,000 map coloring indicates the following geologic formations: nonglacial, glacial, and undifferentiated deposits; ground moraine, lateral moraine and bedrock. Well locations are circled and numbered for reference in the text.)
- 2) Contour map of the bedrock surface near Palmer. (1 1/4"=1 mile) Map shows bedrock exposure, bedrock surface known from well or other excavation, wells that do not reach bedrock, and bedrock contours.)
- 3) Diagram of buried till-sheet near Palmer. (2 1/2"=1 mile) (Compilation of cross-sections estimating depth in wells to till, sand and gravel and bedrock.)

**Figures:**

- 1) Maps showing the location of the Matanuska Valley agricultural area, and the physiographic units in it. (1/2"=5 miles, approximately).
- 2) Graphs showing particle size distribution in water-bearing materials.
- 3) Maps showing fluctuations of the water table near the Knik River during and after the flood of the river (1955).
- 4) Map showing locations of wells that obtain water from sand or gravel beneath till (1/2"=5 miles, approximately).
- 5) Map showing altitudes of water levels in wells and contours on the water table in Palmer and vicinity (3/8"=1 mile, approximately).
- 6) Map showing altitudes of water levels in artesian wells and contours on the water table in Palmer and vicinity, (3/8"=1 mile, approximately).

Figures:  
(cont)

7) Graphs showing fluctuations of water levels in wells (vertical axes: precipitation in inches and depth to water in feet below land surface. Horizontal axes: dates: 1949-55.)

8) Diagrams showing the chemical composition of samples of groundwater.

Tables:

1) Climatological data for Agricultural Experiment Station, near Matanuska 1951-52.

2) Coefficients of transmissibility and storage determined from pumping tests of the artesian aquifer near Palmer.

3) Chemical analyses of groundwater from the Matanuska Valley agricultural area.

4) Logs of representative wells in the Matanuska Valley agricultural area.

5) Records of wells in the Matanuska Valley agricultural area.

Description: The text's contents is organized as follows:

Abstract and introduction.

Geography - climate, topography and drainage, vegetation and culture.

Geology - consolidated rocks, unconsolidated deposits, permafrost, Quaternary history.

Groundwater - principles of occurrence; conditions, hydrologic character, groundwater conditions in physiographic units; fluctuations of levels, discharge and recharge of groundwater; quality of water; construction of wells; and utilization of groundwater.

References cited, records of wells and an index.

**Title:** Water Resources Reconnaissance of a Part of the Matanuska-Susitna Borough. Feulner, A.J.; U.S. Geologic Survey in cooperation with Alaska Power Administration, 1971. Hydrological Investigations Atlas HA-364.

**Interest:** Interest Level 1.

**Area:** State Priority areas 1,2,3a. The report area includes the Susitna River Valley east of the river, from the Cook Inlet tidal waters on the south to the Talkeetna River (62°25') on the north. The Sutton-Eska area in the Matanuska Valley is the eastern study area boundary.

**Maps:** Availability of Ground Water, 1:250,000  
Quality of water, 1 500,000

**Tables:** Average Measured Discharge of Streams.  
  
Chemical Analyses from Wells and Streams in the Mat-Su Study Area.  
  
Seasonal Distribution of Monthly mean Discharges for the Little Susitna River.  
  
Average monthly temperature at Palmer.  
  
Average monthly temperature at Talkeetna  
  
Average monthly precipitation at Palmer.  
  
Average monthly precipitation at Talkeetna.

**Description:** The "Availability of Ground Water" map shows estimated potential yield in gallons per minute by three (shaded) units. The units are less than 10 gpm, 10 to 50 gpm, and 50 to 100 gms. Wells yielding more than 100 gpm are shown, and a fractional measure is given for selected wells on which water level and well depth were recorded.  
  
The "Quality of Water" map shows chemical-quality of surface water and ground water at 18 sample sites. The "Chemical Analyses" table enumerates by sample site, the quality of water in milligrams per liter. For each sample site, the following information is included: date of the sample, occurrence of 12 chemicals, dissolved solids, hardness, specific conductance, ph and color.  
  
The "Average Measured Discharge of Streams" table gives discharge for six streams in cubic feet per second, acre-feet per year, and millions of gallons per day.

Description: The map narrative includes the following sections:  
(cont)

An introduction, which discusses the climate, and the area resident and nonresident populations.

The Availability of Surface Water section includes a discussion of major streams, stream-gaging stations, peak-flow periods, discharge, lakes and small streams.

The Availability of Ground Water section discusses the division of the study area into three units based on geologic and hydrologic data and an analogy with similar areas. These areas are;

- 1) Upland east and north of the transportation system;
- 2) The populated Cook Inlet, Knik Arm Susitna River area; and
- 3) The flood plains and lowlands areas adjacent to streams.

The Quality of Water section discusses the hardness, chemical variation and specific site concentrations of chemicals in the surface and ground water.

The Potential Water Development section discusses the availability of surface and/or ground water for domestic, municipal and industrial use. Water potential or problems in the Palmer, Wasilla, Big Lake, Houston Willow, Montana, Sunshine and Talkeetna communities are highlighted.

B. SURFACE WATER

Title: Water Resources Data for Alaska (Summary)  
U.S. Geological Survey.

Area: Statewide.

Interest: Interest Level 1.

Description: An annual publication. Water Resources Data for Alaska, gives basic data for quantity and quality of surface water, and in some cases ground water, in the State. The most recent edition is cited as a Water-Data Report (AK-75-1): the earlier volumes in this series do not have this title for the publication format and have no series number, but are very similar in other respects. (A detailed description of this most recent edition is included in the bibliography.) Listed below is an outline of the series of publications.

Title	Publication Date
Surface water records for Alaska, 1961	1961
Surface water records for Alaska, 1962	1962
Surface water records for Alaska, 1963	1963
Surface water records for Alaska, 1964	1964
Water Quality Records for Alaska, 1964	1965
Water Resources Data for Alaska, 1966, pt. 1 pt. 2.	1965
Water Resources Data for Alaska, 1966 pt. 1	1967
pt. 2	1966
Water Resources Data for Alaska, 1967	
Water Resources Data for Alaska, 1968 pt. 1	1969
pt. 2	1968
Water Resources Data for Alaska, 1969 pt. 1	1971
pt. 2	1968
Water Resources Data for Alaska, 1970 pt. 1, pt. 2	1971
Water Resources Data for Alaska, 1971 pt. 1, pt. 2	1972
Water Resources Data for Alaska, 1972 pt. 1, pt. 2	1973
Water Resources Data for Alaska, 1973 pt. 1, pt. 2	1974
Water Resources Data for Alaska, 1974 pt. 1, pt. 2	1975
Water Resources Data for Alaska, Water Year 1975 (includes ground-water data)	1976

Description: The following description exemplifies information included  
(cont) in these reports:

1) Gauging station records: daily discharge in cubic feet per second and short description of the physical location of the site.

2) Discharge at crest-stage partial-record stations. Includes description of location, the drainage area size, the period of record, annual maximum gauge height and discharge amount.

3) Discharge measurement at miscellaneous sites.

The above data are available for these surface-water stations within the Susitna Basin:

- Knik River near Palmer
- Caribou Creek near Denali
- Little Susitna River near Palmer
- Susitna River near Denali
- MacIaren River near Paxson
- Susitna River at Gold Creek
- Talkeetna River near Talkeetna
- Skwentna River near Skwentna

Water quality records include chemical quantities (for 13 chemicals) and temperature by sample site. Analyses of surface-water samples are for miscellaneous sites.

Suspended sediment analyses generally includes a) discharge, (CFS); b) sediment concentration (ppm); c) sediment discharge (tons per day); and d) suspended particle size.

**Title:** Water Resources Data for Alaska - Water Year 1975.  
USGS Water-Data Report AK-75-1.

**Area:** Statewide records; annotation is for water records within Susitna Study area, Southcentral Alaska.

**Interest:** Interest Level 1.

**Map:** 1) Locations of gauging stations in Alaska. (Large scale state map).

**Description:** This report contains discharge records for 107 gauging stations; stage only records for two gauging stations; water quality for 31 gauging stations; and water levels for 19 observation wells.

Within the Susitna Study area these records are given:

- 1) Discharge records for nine gauging stations.
- 2) Chemical, water temperature and sediment records for three gauging stations on the Susitna River, near Denali; at Gold Creek; and at Susitna Station.
- 3) Lake level measurements at Fish Creek and Nine mile Creek.
- 4) Surface water samples collected at 26 miscellaneous sites in the Susitna basin.
- 5) Ground water level measurements and well descriptions at Glenn Woods on Springer Road near Palmer and at Talkeenta.



Title: Quantity and Quality of Surface Water in Alaska (Summary)  
U.S. Geological Survey, Water Supply Papers.

Area: Statewide.

Interest: Interest Level I.

Description: Water Supply Papers containing basic data describing the surface-water resources of the state have been published in a continuing series since 1946. General data includes daily discharge in cubic feet per second and total mean. Each site is described by location, drainage area, dates of available records, type of gage, extremes, and in some cases quality parameters. Years covered and Water Supply Paper numbers and dates are listed below.

<u>Water Years Covered</u>	<u>Water Supply Paper</u>
Prior to 1946 (Summary)	1372
1946-50	1372
1951-53	1466
1954-56	1486
1957	1500
1958	1570
1959	1640
1960	1720
1950-60	1740
1966-70	2136
1971-74	(Number not available)

Availability: USGS Public Inquiries Office. Water Supply Paper 1720 (1962).

Title: Programs and Plans - Estimating Flow Characteristics from Channel Size. Surface Water Technical Memorandum No. 75.16, U.S. Geological Survey (March 1975), (xerox paper copy).

Area: Not Applicable.

Interest: Interest Level 1.

Description: The information contained in this memo is of general interest, in that similar techniques may, in the future, be applicable in the Susitna Basin, or other Alaskan River systems.

This memo 1) suggests appropriate uses for the method; 2) presents guidelines for data collection, analysis and application; 3) emphasizes that field guidance is necessary; and 4) encourages improvements in this method.

Title: A Computer Model of the Tidal Phenomena in Cook Inlet.  
Carlson, R.F. and Behlke, C.E.; Institute of Water Resources,  
Report No. IWR-17 (March 1972), (75 p.).

Area: Cook Inlet.

Interest: Interest Level 3.

Maps: Generalized location maps of Cook Inlet and Knik Arm,  
including depth in fathoms.

Tables: 1) The time difference between time of high tide and time  
of maximum flow with reference to the time of maximum flow  
at Cape Ninilchik according to published field values  
for Cook Inlet.

2) The mean tide range as a function of Cook Inlet,  
field and computed values.

3) The maximum flow value as a function of distance for  
Cook Inlet, field and computed values.

4) The relative time difference between time of high tide  
and time of maximum flow given by computed values;  
for Seldovia, Knik Arm, at Fire Island, and at Anchorage  
dock area.

Other tables summarize computed tidal phenomena values.

Description: Information contained in this report is presented in the  
following manner:

1) A general description of the techniques involved in  
modeling surface water bodies.

2) The Cook Inlet analytical model of flow.

3) Numerical computation model.

4) A description of the investigation program.

5) A summary of report results and references.

Availability: Institute of Water Resources, University of Alaska  
Fairbanks, Alaska 99701.

Arctic Environmental Information and Data Center.

## C. WATER QUALITY

Title: Water Quality Monitoring Programs (An Inventory)  
Rummel, B.; Alaska Department of Environmental  
Conservation (1977) (34 p. ).

Area: All water quality programs throughout Alaska.

Interest: Interest Level 2.

Description: This inventory identifies organizations - local,  
State, and Federal agencies, plus universities -  
participating in water quality monitoring programs.  
The inventory is an annotated listing of organizations,  
and includes the following: identification of the  
organization objective of the program, variables  
monitored, geographic area monitored, type of analysis  
(such as field sampling or laboratory analysis), disposi-  
tion of data, publication citations, and other remarks.

Title: Index of Surface Water Quality Records to September 30, 1973.  
Still, P.J.; Southcentral Alaska. US Geological Survey,  
(1976) (37 p.).

Area: Southcentral Alaska.

Interest: Interest Level 2.

Maps: Locations of surface water quality stations in Southcentral Alaska. (Base from USGS National Atlas 1:2,000,000. The water quality collection sites are indicated on the map and numerically keyed to the indexed table in the text. The map indicates whether chemical, biological, temperature or sediment data was collected at each site.

Table: "Index of surface water quality records, Southcentral Alaska"

Description: This report lists in tabular form, all sites in Southcentral Alaska for which water-quality data are available and the type of data collection. The report contains the following sections: introduction, explanation of table; computer retrieval of data, alphabetical list of stations. The table shows the calendar years, frequency in which data collection began or ended, for chemical, temperature, sediment and biological tests.

Computer retrieval of data listed in the index can be made for individual stations, or for series of stations by number, or in latitude-longitude sequence. (See WATSTORE description.)

**Title:** Comprehensive Water and Sewer Study, Matanuska-Susitna Borough. Tryck, Nyman and Hayes, Consulting Engineers for the Matanuska-Susitna Borough (May 12, 1970), (85 p. illus.).

**Area:** Matanuska-Susitna Borough.

**Interest:** Interest Level 2.

**Maps:** The Plate number and map title of relevant; detailed maps are as follows:

- 1) Potential availability of Groundwater (no scale).
- 3) Recommended development Plan for Palmer Water System (1/2"=100 feet, approximately).
- 4) Recommended development plan for Palmer Sewer System.
- 6) Development Plan for Wasilla Water System (5/8"=1000 feet, approximately).
- 7) Development plan for Wasilla Sewer System (5/8"=1000 feet, approximately).
- 8) Talkeetna map, including population (no scale).
- 9) Possible future sewer system for Talkeetna (1/2"=15,000 feet, approximately).
- 10) Minimum water and sewer systems to service existing development Talkeetna (1/2"=15,000 feet, approximately).
- 11) Possible future Water System Talkeetna (1/2"=15,000 feet, approximately).

**Description:** Data used by the study is generally annotated in other segments of this Bibliography. A look at the report's contents shows these sections: an introduction to the Borough; general conclusions and recommendations; and detailed analysis and recommendations of population centers and community centers. Population centers include Palmer, Wasilla and Talkeetna; and community centers are all other communities and Big Lake.

Title: Spectrographic and Chemical Analyses of Stream-Sediment and Rock Samples from the Western Part of the Talkeetna Mountains Quadrangle. Miller, R.J., Curtin, G.C., Hopkins, R.T., and Csejtey, B.; U.S. Geologic Survey Open File Report 77-471. (no date) (105 p. with plates). Preliminary report, not edited for USGS conformity.

Area: State priority areas 2 and 3b; Upper Talkeetna Sub-basin.

Interest: Interest Level 3.

Maps: 1) Map of the Talkeetna Mountains quadrangle showing sites at which samples of stream sediments were collected. (1"=250,000).

2) Map of the Talkeetna Mountains quadrangle showing sites where analyzed rock samples were collected. (1"=250,000)

Tables: 1) Lower limits of determination for elements analyzed. (indicates elements analyzed by the spectrographic method and the atomic absorption method.)

2) Stream-sediment samples analytical data.

3) Rock samples analytical data.

4) Statistical summary for stream sediment sample analyses.

5) Statistical summary of rock sample analyses.

Description: Since 1972, a total of 403 stream-sediment samples and 356 rock samples have been collected and analyzed, as part of a reconnaissance geochemical sampling program in the western and central Talkeetna Mountains. This report publishes the analyses and locations of these samples.

Stream-sediment samples were collected in the active channels of rather steep, rushing mountain streams. Rock sampling was done both to assess background values and to investigate obviously mineralized areas.

Sediments were analyzed by a spectrographic method and some samples were analyzed for gold, copper, lead, and zinc by the atomic absorption method.

The rock and stream-sediment data were processed by the "GEOSUM" computer program.

Availability: USGS Public Inquiries Office has original report and mylar maps.



Title: Scour at Selected Bridge Sites in Alaska. Norman, V.W.;  
USGS Water Resources Investigations 32 75 (November 1975)  
(160 p. illus.).

Area: Three bridges, located on the Susitna River near  
Sunshine, Knik River near Palmer and Knik River near  
Eklutna.

Interest: Interest Level 3.

Description: The following information is given for each bridge  
scour site: general description, general scour cross-  
sections, water-surface slopes and stream bed profiles,  
velocity distribution, sediment analyses, local  
scour at piers, and general scour. A detailed descrip-  
tion of the physical setting, hydraulic characteristics,  
and channel geometry at low and high flows is given for  
each site.

The purpose of this report is to describe the results  
of data collection at these bridge sites and compare  
the results with existing laboratory and field data,  
and with those results predicted from selected scour  
formulas. Scour is related to either channel contraction  
(general scour) or localized flow conditions at  
piers and abutements (local scour).

The Knik River was chosen because many floods of  
high discharge result from the breakout of lake  
waters trapped behind the Knik Glacier.

Title: Salinity Study, Cook Inlet Basin. McGee, D.L.;  
Department of Natural Resources, DGGG Geological  
Report #54 (1977), (6 p. illus.).

Area: State Priority Areas 1 and 3a (Coastal Zone).

Interest: Interest Level 1.

Maps: 1) "Cook Inlet Water Salinities Section Location Map"  
(1"=8 miles) Map indicates selected boreholes drilled for  
hydrocarbon within the limits of the Cook Inlet Basin.

2-5) Plates 2-5, Cook Inlet Water Salinities Cross  
Section. Values of water resistivities are indicated. This  
is a measure of the conductivity of the fluid portion of  
the mud system and the water present in subsurface  
rocks.

6) Contoured thickness from ground surface to base of  
Salt Water/Fresh Water Gradient (1"=8 miles)

7) Contoured Sub sea Depth to top of High Salinity  
(1"=8 miles). This represents a surface below which  
the waters are relatively salty and is also the top of the  
section in which nearly all the liquid hydrocarbons (oil)  
occur in the Cook Inlet.

Description: Exploratory boreholes drilled in Cook Inlet basin for oil  
and gas yield are applied to the study of subsurface waters.

The report introduction points out that Plate 1 delineates those  
areas where adequate fresh water may be available. Conversely,  
the map indicates areas where brackish water is relatively  
near the ground surface and where it may be difficult to sus-  
tain large flow rates of fresh water.

Interpretation techniques are explained. Several methods  
may be used for determining resistivity which is directly  
related to the quantity of dissolved salts.

A section of the report is devoted to definitions and water  
resistivities calculated from the SSP (static spontaneous potential)  
curves. Four vertical distributions or concentrations of  
salinities in Cook Inlet Basin are described. Each has a  
particular salinity range. They are:

1) Fresh water, (water usable for community needs).

2) Slightly salty to moderately salty water (up to 200 grains  
per gallon NaCl.)

Description: 3) Moderately salty formation waters (from 200 to 1,000 grains per NaCL).  
(cont)

4) Very salty formation waters (salinities in excess of 1,000 grains per gallon). Two report paragraphs include map presentations and interpretation restraints.

The report conclusions interpret geographic areas where fresh water occurs (plate 6), and oil and gas accumulations related to saline water (plate 7).

A paragraph summarizes the report findings.

Availability: Report copies available Department of Natural Resources, Division of Geological and Geophysical Surveys; price \$3.00.

Title: Effect of Waste Discharges into A Silt-Laden Estuary:  
A Case Study of Cook Inlet. Institute of Water Resources,  
Publication No. IWR 26, (November 1972), (26 p. illus.).

Area: Upper Cook Inlet.

Interest: Interest Level I.

Map: Map of Knik Arm region showing the major sewage outfalls  
(1"=10 miles).

Tables: Tables include data on: salinity; tidal height; phosphate  
concentrations; nitrate concentrations; and ammonia  
concentrations.

Description: The report describes the results of investigations of the  
following aspects of the Inlet Waters:

- 1) The currents effect on mixing and dispersion patterns  
of the waste materials.
- 2) Chemical quality.
- 3) Free-swimming microorganisms throughout Knik Arm.
- 4) Bacteriology, in order to determine organisms of  
sewage origin.
- 5) The bottom muds near the Chester Creek outfall, to  
assess the effects of waste discharge on the benthic layer.

Title: Water Quality Status Report (Annual Report).  
Department of Environmental Conservation; (February 1977),  
(30 p.)

Area: Statewide .

Interest: Interest Level 3.

Description: This report is prepared in accordance with the requirements of the Federal Water Pollution Control Act Amendments of 1972 (P.L. 92-500), Section 305 (b).

The Status Report presents background on current water quality and recent trends. General statements are made concerning the natural conditions of Alaska's waters and an overview of water pollution problems. A more detailed section discusses the status of compliance, and the status of attainment of water quality goals. A concluding section of the report highlights the costs and benefits of water pollution control programs.

Title: Regional Sediment Yield Analysis of Alaska Streams.  
Guymon, G.L.: Journal of the Hydraulics Division  
(January 1974), (10 p. illus.).

Area: Central and Southcentral Alaska.

Interest: Interest Level 1.

Map: Sediment Stations and Tributary Areas (1/2"-120 miles).  
(Map of Alaska lists 13 sediment stations.)

Tables: 1) Suspended sediment data for selected Alaskan Rivers.  
2) Parameters used in regional analysis  
3) (Graph) Particle size distributions for typical  
glacial-fed river and non-glacial river.  
4) (Graph) Average annual sediment yield in tons/miles.

Description: This paper's introduction states that USGS has maintained only six daily sediment stations with records of more than three years. Historically, through 1970, the USGS has collected about 1,500 miscellaneous suspended sediment measurements at about 150 stations, most of which are in central Alaska, south of the Alaska range.

The purpose of this paper is to examine the available historical suspended sediment data for Alaskan rivers and evaluate its usefulness in developing regional sediment yield relationships suitable for engineering analysis and design.

Thirteen stations were selected for analysis based on length and reliability of record. These stations are:

- 1) Susitna River near Denali
- 2) Matanuska River near Palmer
- 3) Gulkona River at Gulkona
- 4) Nenana River at Healy
- 5) Susitna River at Gold Creek
- 6) Knik River near Palmer
- 7) MacLaren River near Paxson
- 8) Copper River near Chitina
- 9) Chisana River at Northway
- 10) Tanana River near Tanacross
- 11) Tanana River at Nenana
- 12) Yukon River at Eagle
- 13) Chena River at Fairbanks.

#### D. FLOODING

**Title:** Final Environmental Impact Statement, Talkeetna River Project. Alaska District Corps of Engineers; (February 1977), (84 p. illus.).

**Area:** State Priority Area 2.

**Interest:** Interest Level 3.

**Maps:** Sketch maps included in this EIS are 1) location map (1"=40 miles), 2) area map, 3) project map (1"=400 feet), physiography of Alaska, and 4) climate data maps, (generalized of Southcentral Alaska).

**Tables:**

- 1) Volume of construction material
- 2) Flow data for the Susitna and Talkeetna Rivers.
- 3) Suspended Sediment Analyses, Susitna River and Talkeetna River.
- 4) Chemical Analyses, Talkeetna River.
- 5) Talkeetna and Susitna Rivers, Fish Migration Data.
- 6) Alternative structural methods for erosion control, Talkeetna.

**Description:** The project involves construction of a 600 foot dike, 740 feet of bank grading and seeding and 1,600 feet of rock revetment. The purpose is to prevent bank erosion by flood waters of the Talkeetna and Susitna Rivers.

Environmental impacts and adverse affects of the project are analysed. Alternatives to the proposed project are highlighted. Coordination with other agencies is documented in the form of correspondence and events leading up to this EIS.



Title: Flood Plain Information Talkeetna River, Susitna River, Chulitna River. Prepared for the Matanuska Susitna Borough by the Department of the Army, Alaska District, Corps of Engineers, (June 1972), (28 p. illus.).

Area: State priority area 2.

Interest: Interest Level 3.

Maps: 1) General map - flood plain information Talkeetna (1"=1 mile).

2) Flooded area map; Standard Project Flood, Intermediate Regional Flood and Stream Channel (1"=2,100 feet), (minimum contour interval is 50 feet). Base is a USGS Quad sheet Talkeetna B 1.

3) Flooded area map (same as above), based on BLM aerial photographs flown at 1500 feet in 1971.

Tables: 1) High Water Profiles (Graph) for Talkeetna and Susitna Rivers.

2) Supplemental High Water Profile (Graph), Talkeetna River Overflow.

3) Four Cross Sections, Talkeetna and Susitna Rivers.

4) Hydrograph Standard Project Flood, Talkeetna River at Talkeetna.

5) Hydrograph Standard Project Flood, Susitna River at Talkeetna.

Description: This report includes a history of flooding in Talkeetna and identifies those areas that are subject to possible future floods. Special emphasis is given through use of maps, photographs, profiles, and cross sections. The report does not provide solutions to flood problems. It does furnish a suitable basis for the adoption of land use controls to guide flood plain development. It will also aid in the identification of other flood damage reduction techniques.

**Title:** Magnitude and Frequency of Floods in Alaska South of the Yukon River. Berwick, V.K. Childers, J.H., and Kuentzel, M.A.; U.S. Geological Survey Circular 493, prepared in cooperation with Alaska State Highway Department and the U.S. Bureau of Public Roads. (1964) (15 p. illus.).

**Area:** Central, Southcentral and Southeastern Alaska.

**Interest:** Interest Level 2.

**Maps:** 1) Map of Alaska showing region covered by flood-frequency study, subdivided into hydrologic areas A, B, and C. (1:5,000,000 scale, 1"=80 miles, approximately.)

**Tables:** 1) Maximum stages and discharges at gaging stations.  
2) Unusual floods at short-term gaging stations.

**Description:** The report presents a method for evaluating the magnitude and frequency of floods on the basis of analysis of flood records.

The USGS method of flood frequency analysis is presented. Topography and climate of each region are briefly described in relation to stream runoff. The computation of flood frequency at gaging stations and the regional frequency are explained.

The report concludes that the magnitude of a flood (at any point, gaged or ungaged, in the region covered by the study and corresponding to a specified recurrence interval) can be obtained.

The following gaging stations within the Susitna River basins are included in the maximum stage and discharge table: Caribou Creek near Sutton, Matanuska River at Palmer, Little Susitna River, Susitna River near Denali, Maclaren River near Paxson, Susitna River at Gold Creek, and Chulitna River near Talkeetna.

Title: Flood Frequency in Alaska, Childers, J.M., U.S. Geological Survey Water Resources Division, Open File Report, 1970 (30 p. illus.).

Area: Statewide.

Interest: Interest Level I.

Maps: 1) Map showing location of all surface water gaging stations, both current and discontinued, with at least one water year of record (1"=100 miles, approximately).

2) Regional flood-frequency relations for Alaska (shows the equations used to estimate the flood characteristics for any location, by substituting values of the basin variables.)

3) maximum known floods in Alaska. (Includes: name of streams and place of determination, drainage area, period of record, date of maximum known flood, gauge height, discharges and other remarks.)

Description: Records of peak discharge at 183 sites were used to study flood frequency and are included in the report tables. Where adequate discharge data were available, peak stream discharges for 2-year, 5-year, 10-year, 25-year, and 50-year average recurrence intervals were analyzed.

Maximum known floods at more than 500 gauging stations and miscellaneous sites in Alaska were related to drainage-area size.

Besides a report abstract, definitions and introduction, description of geography in relation to floods, flood records, and maximum known floods are discussed in the report text.

**Title:** Floods of the Summer of 1971 in Southcentral Alaska.  
Lamke, Robert D.; USDI, U.S. Geological Survey,  
Water Resources Division (March 1972) Open File  
Report, Open File #542.

**Area:** All of Southcentral Alaska including Susitna River

**Interest:** Interest Level 1.

**Maps:** 1) Location of flood-data sites (1/2"=50 miles).  
2) Location of flood data sites near Anchorage and  
Palmer (1/2"=10 miles).  
3) Area inundated by Matanuska River near Bodenbug  
Butte, August 10, 1971 (1"=1mile; contour intervals  
50 and 100 feet).

**Tables:** 1) Precipitation, in inches, at selected stations during  
August 5-11, 1971.  
2) Flood stages and discharges, summer 1971 in south-  
central Alaska.  
3) Suspended sediment data collected during summer 1971  
within flood area of southcentral Alaska.

**Figures:** Discharge hydrography for selected streams in the Susitna  
River Basin, August 6-13, 1971. Selected streams are  
Little Susitna River, Maclaren River, Susitna River  
near Denali and Susitna River at Gold Creek.  
  
Summary of scour data at Bridge number 254 on Susitna  
River near Sunshine during summer of 1971.

**Description:** (Matanuska River Basin and Susitan River Basin only  
pages 17-30). These report sections describe the locations  
and time of the extreme flooding that occurred in the  
Matanuska Valley along the Glenn Highway east of  
Palmer, Kings River, Granite Creek Eska Creek, Moose Creek,  
and Matanuska River near Bodenbug Butte. 2) In the  
Susitna River Basin: the Little Susitna River, near  
Palmer, Hatcher Pass road, the Anchorage-Fairbanks  
Highway, Talkeetna River, Montana Creek, Goose Creek,  
the Susitna River near Denali, and the MaClaren River  
near Paxson.

Title: Small-Stream Flood Investigations in Alaska: A  
Compilation of Peak Data, May 1963 to September 1972.  
Jones, Stanley, H.; USGS Water Resources Division in  
cooperation with Alaska Department of Highways and  
Federal Highway Administration, 1973, (55 p.).

Area: Statewide

Interest: Interest Level 1.

Maps: 1) Map of Alaska showing location of gaging stations  
and hydrologic subregions listed in table. (scale:  
approximately 3/4"=100 miles)

Graphs: (7) Discharge Hydrographs. One hydrograph within  
Susitna Basin: Seattle Creek near Cantwell: Vertical  
axis discharge in c.f.s. Horizontal axis- time  
also annual maximum discharge in c.f.s.

Tables: Gaging station records: Southcentral (May 28-31 1972)  
pages 23-24.

Drainage basin characterisitcs (Southcentral page 49.)

Maximum known floods in Alaska (Southcentral pages  
52 and 53).

Description: The report contains the following sections: introduction,  
description of program, program operation, presentation  
of data, references, conversion table and gauging-station  
records by state regions.

The report compiles flood data on streams with drainage  
areas generally less than 100 square miles, emphasizing  
those areas of less than 50 square miles.

The gauging records stations table (Table 1) shows the  
annual maximum instantaneous stages and discharges.

The following drainage basin characterisitcs are shown in  
Table 2: 1) drainage area; 2) slope of main stream;  
3) length of main stream; 4) main elevation of basin;  
5) percentage of area in lakes, forest and glaciers;  
6) mean annual precipitation; and 7) precipitation  
intensity.

Title: Public Meeting: Report of Survey Harbors and Rivers  
of Alaska Matanuska and Little Susitna Rivers Flood  
Control. Alaska District Corps of Engineers,  
(January 5, 1972)

Area: State priority area 1. The Bodenburg loop area adjacent to the Matanuska River.

Interest: Interest Level 2.

Description: The main body of the report is the transcript of the public hearing. A record of attendance and the notice of the hearing are also included. Opening testimony by the Corps of Engineers explains the location and extent of flooding along the Little Susitna River near Houston, and the Matanuska River near the Bodenburg Butte in Palmer. Suggestions for improvement are discussed. The erosion on the left bank of the Matanuska River; and the removal of natural obstructions and erosions control along the north bank of the Little Susitna are discussed.

18 persons attended the hearing.

Title: Glacier Dammed Lakes and Outburst Floods in Alaska.  
Post, A. and Mayo, L.R.; USGS Hydrologic Investigations  
Atlas HA-455 (1971)

Area: Of interest to the Susitna Study: Beluga River,  
Yentna River, Kahiltna Glacier/River, Tokositna  
Glacier/River, Ruth Glacier, Eldridge, Glacier,  
Susitna River, Knik River and Matanuska River.

Interest: Interest Level 2.

Maps: 1) Map showing location of glaciers, glacier-dammed  
lakes, glacier-sheathed volcanoes and areas subject  
to outburst flooding in Southcentral Alaska. 1:1,000,000.

2) Photography illustrating the following: 1) the  
variability of glacier dammed lakes; 2) how temporary  
lakes are caused by periodically surging glaciers;  
3) the effects of an outburst flood due to volcanic  
activity, 4) damage caused by outburst floods.

3) Southeastern Alaska map.

Graph: Outburst floods and non-outburst floods on four rivers.  
For Knik River: Discharge in thousands of cubic meters per  
second, 1948-1966.

Description: The atlas narrative contains these sections: introduction,  
how the data were compiled, formation of glacier dammed  
lakes, how glacier dammed lakes release, characteristics of  
floods from glacier dammed lake outbursts, difficulties in  
flood prediction from glacier dammed lakes, histories of  
five rivers, some special outburst flood settings, summary,  
conclusion: a need for recognizing hazardous areas and for  
monitoring of glacier dammed lakes, and references.

E. HYDROPOWER RELATED



## BACKGROUND: SUSITNA RIVER HYDROPOWER REPORTS AND STUDIES

The impact of land inundation in the Upper Susitna River Basin has been evaluated by a number of governmental agencies; namely the Bureau of Reclamation, the U.S. Fish and Wildlife Service, the U.S. Bureau of Mines, the U.S. Bureau of Land Management, the National Park Service, the U.S. Army Corps of Engineers, the Alaska Department of Fish and Game and others. Because of the sheer quantity of information that has been prepared regarding the impact of land inundation and the hydropower potential of the Upper Susitna River Basin, this summary is presented to give a time-order sequence to these studies and reports. Detailed annotations of the current resource inventory reports and the most recent feasibility reports are included in the bibliography. Early surveys (pre-1960's) related to the hydropower projects of the Upper Susitna are not annotated in detail. Fisheries, wildlife and other resource reports or projects undertaken as a result of the potential for hydropower development in the Upper Susitna are included in other appropriate sections of this bibliography.

### SUMMARY OF REPORTS AND STUDIES

1. U.S. Bureau of Reclamation, A Reconnaissance Report on the Potential Development of Water Resources in the Territory of Alaska, (December 1948).

This report described the resources of the Territory of Alaska and indicated potential for power development at 72 sites. The territory was divided into five regions and potential hydropower sites were studied, of which five were in the Susitna River Basin.

2. U.S. Bureau of Reclamation, A Report on Potential Development of Water Resources in the Susitna River Basin of Alaska; (August 1952).

This report described the resource potentials of the Susitna River Basin. An ultimate plan of development of hydropower resources for the basin was described, and included 12 major dams.

In 1956 the Bureau of Reclamation resumed detailed feasibility studies of the Devil Canyon dam site.

3. U.S. Bureau of Reclamation, Devil Canyon Project, Alaska; (March 1961); and Vee Project Studies (1964).

The Commissioner of the Bureau of Reclamation recommended a Devil Canyon Project, which consisted of two major dams and reservoirs on the Upper Susitna River, a powerplant, and transmission lines and appurtenant facilities to deliver power and energy to Fairbanks and Anchorage. The largest structure would be the Devil Canyon Dam which would possess many advantages for development of hydroelectric power; however, storage capacity was not adequate. Therefore, a

second dam at the Denali site was proposed. The report suggested this would provide for a larger reservoir with a low earthfill dam. Based on the hydrologic data available at the time of the report, the estimated energy potential of the system which consisted ultimately of four dams with first-stage development of Devil Canyon and Denali were 7.0 and 2.9 billion kilowatt-hours, respectively.

The State of Alaska endorsed the U.S. Bureau of Reclamation Devil Canyon project in June, 1961.

4. Alaska Power Administration, Devil Canyon Status Report; (May 1974).

This report was a partial update of the March 1961 report of the U.S. Bureau of Reclamation on the Devil Canyon Project. This report included updating the designs for the project features, preparation of new cost estimates, brief analysis of the power market, environmental, considerations and economic aspects.

5. Alaska Power Administration, 1974 Alaska Power Survey, prepared for the Federal Power Commission, in five volumes.

The report included information and data on resources and electric power generation, economic analysis, load projections, environmental considerations, and consumer affairs.

Two reports providing information on the Susitna River, with regard to the hydroelectric potential, include work by a private company with a land-water resource consultant for the National Marine Fisheries Service. They are:

6. Henry J. Kaiser, Company, A Reassessment Report on Upper Susitna River Hydroelectric Development for The State of Alaska, (September 1974)

The company was considering the development of a large aluminum plant within the Railbelt area, contingent upon availability of large quantities of inexpensive energy. To meet this demand, Kaiser suggested a first-stage upper Susitna River development consisting of a single high dam (termed "Devil Canyon High" and/or "Susitna I") five miles upstream from the USBR Devil Canyon damsite. Subsequent development would include power projects both up and downstream from the high dam.

7. Bishop, D. of Environmental for the National Marine Fisheries Service, National Oceanic and Atmospheric Administration, A Hydrologic Reconnaissance of the Susitna River Below Devil's Canyon, (October 1974).

The report provides information on present and future physical characteristics of the Susitna River below Devil's Canyon. Particular attention was given to features relating to the fishery resource habitat.

8. Jones & Jones for the U.S. Army Corps of Engineers, An Inventory and Evaluation of the Environmental, Aesthetic and Recreational Resources of the Upper Susitna River, Alaska. (March 14, 1975).

As the report title suggests, the effects of the proposed four dams and their reservoirs upon the environmental, aesthetic, and recreational resources were inventoried and evaluated. The report, generally confirmed earlier studies finding the Upper Susitna project to have fewer adverse effects on fish and wildlife than other hydroelectric alternatives, although high impacts on the Nelchina Caribou herd were found. Areas were also identified where lack of information requires additional field study.

For several years during the late 1960s, attention to the development of hydropower was diverted. This was in part attributable to the 1967 flood in Fairbanks and the resultant need for flood controls measures -- not hydroelectric power.

To get a clear picture of the time sequence of subsequent reports, it's important to note Congressional action regarding the Susitna hydroelectric power studies. In January 1972 the U.S. Senate Committee on Public Works called upon the Corps of Engineers to again review the feasibility of hydropower to the Southcentral Railbelt, with particular reference to the Susitna River project area. In effect, the Corps was asked to review all of their own reports to date, the Bureau of Reclamation scheme and any other competitive alternatives.

In partial response to this Congressional resolution, the Corps of Engineers has prepared an Interim Report. This assemblage of information is presented in several volumes. An environmental statement accompanied this round of project study, however, since the study is in the feasibility stage, impacts are not exhaustively evaluated in this draft EIS. These reports are as follows:

9. Corps of Engineers, Southcentral Railbelt Area, Interim Feasibility Report - Hydroelectric Power and Related Purposes for the Upper Susitna with technical appendices as explained below, (December 1975).

- The Study and Report (the main report)
- Appendix 1, Part 1
- Appendix 1, Part 2
- Appendix 2.
- Revised Draft Environmental Impact Statement

The main report presents a nontechnical summary of the results of the interim feasibility study.

The first appendix is a technical report containing more detailed information on environmental and economic resources, plan formulation, and design considerations necessary for the technical reviewer to conduct an independent evaluation of the validity of the study results. Appendix 2 contains all pertinent correspondence affecting coordination among Federal, State, and local interests; and reports of other agencies.

The next step is the Corps current work on preparing a Plan of Study for Phase I of the Upper Susitna Hydroelectric Power Project. Phase I involves advanced engineering and design, an environmental impact statement, cost/benefit economic analysis, and evaluation of transmission corridors.

Actual construction or cancellation of the project will follow the completion of Phase I. If approved, the construction of the project will tentatively be financed by the sale of State revenue bonds and a Federal revolving fund used to guarantee State bonds. If Phase I study finds the project unfeasible, state funds committed to that date will be redeemed by the Federal government.

**Title:** Southcentral Railbelt Area, Interim Feasibility Report - Hydroelectric Power and Related Purposes for the Upper Susitna. Alaska District Corps of Engineers; (December 1975), (3 vols. and EIS).

**Area:** Upper Susitna Basin.

**Interest:** Interest Level 2.

**Description:** The purpose of this interim study is to determine the feasibility of providing electrical energy to the Railbelt area through the development of hydropower.

Each volume of the Interim Report will be described separately.

The Study and Report (125 p. illus) (revised 1 June 1976).

- Map of recommended improvement, includes reservoir, access road and transmission route from Watana Damsite (1"=10 miles).
- Watana Dam Detail Plan (1/2"=500 feet).
- Devil Canyon Dam Detail Plan (1"=300 feet).

The study and report are of feasibility scope. The report includes a systematic examination of the economic, social and environmental conditions. This report is a nontechnical summary of the study results. Most of information in the section outlining resources of the study area was taken from Resources of Alaska, compiled in July 1974 by the resource planning team of the Joint Federal-State Land Use Planning Commission for Alaska.

A good deal of the data contained in the section on the economy of the study area are taken from The Alaskan Economy, Department of Commerce and Economic Development, Mid-Year Review, 1975.

The summary report recommends the Watana and Devil's Canyon dams, and transmission facilities to provide hydropower, flood control, and recreation for south-central and interior Alaska.

## Appendix I, Part I

Section A Hydrology. Detailed available climatological and hydrologic data is included in this section of Appendix I. Data for streamflow records from these gauging stations are analyzed in detail: 1) Susitna River at Gold creek; 2) Susitna River near Denali; 3) McClaren River near Paxson; 4) Susitna River near Cantwell, sedimentation, evapotranspiration, water quality, probably maximum flood and flood control regulations.

Section B. Project Description and Cost Estimates: Alternative construction features and systems, and their anticipated costs are analyzed.

Section C. Power Studies and Economics. A broad range of energy resources, and the economic base of the Railbelt area is discussed.

Section D. Foundations and Materials: Regional and site geology, seismology and construction materials are the focus of this section.

Section E. Environmental Assessment: Each alternative source of power was tested for physical, political, financial, economic, environmental and social feasibility.

Section F. Recreational Assessment. Most input to this section is from the State's Comprehensive Outdoor Recreation Plan, and An Inventory and Evaluation of the Environmental, Aesthetic and Recreational Resources, by Jones and Jones for the Corps.

Appendix I Part 2, (Produced by the Alaska Power Administration as supporting studies to the Corps of Engineers.)

Section G. Marketability Analyses. This section of estimates of future power requirements, power sales, rates and cost analyses is provided by the Alaska Power Administration.

Section H. Transmission System. Four groups of transmission systems are outlined: 1) those that lead from Devil Canyon-Watana to Anchorage via the Susitna Watershed; 2) those that lead to Fairbanks via the Nenana and Tanana drainage; 3) those that lead to Fairbanks via the Delta and Tanana drainages; and 4) those that lead to Anchorage via the Copper and Matanuska drainages. Corridors are discussed within each of these drainage alternatives.

Section I. Environmental Assessment.

Support maps of the transmission corridor include (all at a scale of approximately 1cm=3 miles):

- Strip maps of each alternative transmission corridor route (7 maps).
- Soils maps for transmission corridor alternative; generalized soils (7 maps).
- Land Status maps for transmission corridors; corridors; generalized (7 maps).

Appendix 2 (65 p.)

This appendix includes all pertinent correspondence and Corps reports to other agencies.

Revised Draft Environmental Impact Statement (327 p.)

This EIS does not include an exhaustive evaluation of project impacts; but will be updated and refined during "pre-construction" planning contingent on Congressional approval. Environmental impacts with and without the project are included in the EIS.

Title: Upper Susitna River Alaska; An Inventory and Evaluation of the Environmental, Aesthetic and Recreational Resources. Jones and Jones for the Corps of Engineers, March 1975. (320 p. illus.).

Area: Upper Susitna sub-basin, State Priority area 3b.

The Upper Susitna basin area affected by the proposed Devil Canyon, Denali, Watana and Vee dam system.

Interest: Interest Level 2.

Maps: A total of 45 maps are included in the text. Many have no scale and are artist conceptions or inferred representations of area resources. The pertinent figures are listed below:

- 3) Geology of Upper Susitna River (no scale; aerial photo map).
- 5) Land ownership status - 1974 (1"=50 miles).
- 7) Physiographic sections and river channel types (no scale; aerial photo map).
- 9) River Viewshed classification (1"=15 miles, viewshed is the adjacent lands near the rivers and streams).
- 10) River Watershed classification. (1"=15 miles).
- 15) Seasonality (graph) - These factors are tabulated by seasons: Climatic - temperature, hours of sunlight, rainfall, snowfall; hydrologic - Devil Canyon, Denali; Biotic - fall color, Caribou seasons, insect surge; hunting season - water fowl, small game, fur bearing, big game; recreational seasons - land/snow, water/ice.
- 17) Existing Natural Value (1"=15 mile) Existing environmental, aesthetic and recreational values on the Upper Susitna are mapped to run and zone. Value/quality is a 6-rank indice from "very high" to "very low."
- 18) Existing Aesthetic Value (1"=15 mile) 28 runs and zones are given value/quality rank.
- 19) Existing Environmental Quality (1"=15 mile) 28 runs and zones are given value/quality rank.



Maps:  
(cont)

20) Existing Recreation Suitability (1"=15 miles)  
Runs and zones are given 3-scale suitability rank.

23) Natural Value after construction of dams.  
(1"=15 mile) Environmental, aesthetic and  
recreational values are depicted by color code  
after project.

35) Alaskan Rivers selected for inclusion in the  
National Wild and Scenic Rivers System.

Local area maps A-1 through A-7 show geology,  
local climatic stresses, hydrology, soils, vege-  
tation, mammals and waterfowl in the Upper Susitna  
dam areas.

Tables:

17 Tables, including the following:

1) Magnitude and Importance of Existing Natural  
and Cultural Resources. (This table is a color  
coded 7-level "magnitude of resource importance"  
matrix for 14 subareas for the following resources:  
geologic, climatic, hydrologic, biological, botanic,  
zoologic, cultural/human use, various use, various  
aesthetic values, and existing recreational suit-  
ability.)

2) Natural and Cultural Resources after Dam Con-  
struction: physical, biological and cultural (matrix  
organized as explained above.)

Description:

The report contains the following sections: intro-  
duction; Susitna basin description; study methodology;  
existing and future conditions within the study area;  
resources of regional significance; conflicts and  
interactions; matrixes; natural/cultural resource  
data coding is explained; geology; and bibliography.

The major physical, biological and cultural resources  
of the area (including after dam construction) are  
described in the text and displayed on a multi-  
region/resource matrix as well as on other maps and  
tables.

The river corridor was classified into 28 units or  
"runs" to aid analysis, to spatially locate effects,  
and to support site-specific recommendations.

Title: Devil Canyon Status Report Alaska Power Administration,  
May 1974 (77 p.).

Area: Upper Susitna sub-basin, state priority area 3b.

Interest: Interest level 3.

Maps: 1) Upper Susitna Basin location map (1"=50 miles,  
approximately.)  
2) River map, Upper Susitna Basin and Upper  
Susitna River Profile (3/4"=5 miles, approximately.)  
3) Existing Transmission Systems (1"=50 miles  
approximately.)  
4-8) Damsite layout; elevation and sections: power-  
plants.  
9) Land Status Map Federal Withdrawals (1"=50  
miles, approximately.)  
10) Land Status Map - Native withdrawals (1"=50 miles,  
approximately.)  
11) Land Status Map - State Selections (1"=50 miles,  
approximately.)

Description: The report is a plan for initial development of the hydro-  
electric resources of the Upper Susitna Basin and inter-  
connection of the major power markets of the Alaska Rail-  
belt. The report includes these sections: introduction,  
aspects of the power market, design update for the project  
features, and preparation of new cost estimates.

**Title:** Reassessment Report on Upper Susitna River Hydroelectric Development for the State of Alaska. By the Henry J. Kaiser Company, (September 1974), (70 p. illus).

**Area:** Upper Susitna sub-basin.

**Interest:** Interest Level 2.

**Maps:** 1) Site location plan (3cm=10 miles).  
2) General layout of Susitna I" hydroelectric project (1cm=200 feet, approximately.)

**Tables:** 1) Appendix Table 4: Stream Flow Summary (1950-1972, monthly discharge in acre-feet for Susitna River Basin.) Includes Gold Creek, Cantwell and Damsite B.

Other graphs and tables illustrate energy needs and sales, discharge, reservoir operation and power generation data, and various other power related information. (A total of 35 tables, graphs or other illustrations are included.)

**Description:** The State of Alaska contracted with Henry J. Kaiser Company for performance of the services accounted in this report. This study reassesses the U.S. Bureau of Reclamation scheme for development of the hydroelectric potential of the Upper Susitna River and presents an alternate concept for its development.

The main focus of the report is the study of a proposed hydroelectric development at a location five miles upstream from Devil Canyon, called "Susitna I". The Kaiser Company anticipated that a major energy-intensive industry could be attracted to the Susitna basin to utilize any long-term surplus.

The Kaiser Company report analyzes population and employment forecasts, applying projected needs for energy consumption. Energy sales per residential and commercial - industrial customer (1961-1973), and capacity and sales figures are tabulated.

Hydrologic information is included, based on mean monthly rivers discharges at USGS gaging stations and precipitation records of climatological stations.

A brief section on topography and geology includes descriptions of: glacial deposits, talus and swamp deposits, river terraces and gravel bars, bedrock, and engineering geology concerns.

Description: Consideration was given to three general types of  
(cont) dams: concrete arch, concrete gravity and compacted  
rockfill.

Other report considerations are cost estimates, a  
construction plan, financial and economic analyses.

In a discussion of energy-intensive industries  
utilizing "Susitna I" it is concluded that power is  
estimated to be higher than the ceiling which an aluminum  
manufacturer would consider at the time.

The Appendix is a useful summary of historic stream flow  
data from USGS gauging stations.

**Title:** A Hydrologic Reconnaissance of the Susitna River  
Below Devil's Canyon. Bishop, D.M.; Environaid  
A Land-Water Resource Consultant Group for NOAA,  
National Marine Fisheries Service, (October, 1975),  
(69 p. illus.).

**Area:** Upper Susitna Sub-basin

**Interest:** Interest Level 2.

**Tables:** Numerous tables are included in this report. Data  
in tabular form includes the following:

- Temperature differences (Little Susitna and Susitna Rivers).
- Average Width of Susitna River
- Factors summarizing the regulated stream temperature regime.
- Surface velocities
- Widths, gradients, velocities, and shoreline types.
- Evaluations of likelihood of Susitna River degradation between Talkeetna and Devil's Canyon.
- Summary of spring flows.
- River temperatures during field visit.
- Thermograph installation record.

**Description:** The report provides information on present and future (regulated) physical characteristics of the Susitna River below Devil's Canyon. The analysis is concentrated on features relating to the fishery resource habitat. Study concentration was given to the Susitna River above Talkeetna.

Data collected and included in the report was in response to the following objectives:

Description: a) Stream temperature: information on the river's present temperature regime and projections as to how this regime may change below the dam.

b) Stream velocity: Susitna River velocities and related stream flows under natural and regulated conditions are defined and evaluated.

c) Suspended sediment: sediments in the stream channel in relation to how suspended sediment may affect the fish population, rather than a concern for the rate of reservoir fills with sediment.

d) Re-grading of the Susitna River profile: Changes in river depth, gradient, meander patterns and other changes in the middle Susitna River's form were studied.

Title: Preliminary Report on Water-Power Resources of  
Little Susitna River and Cottonwood Creek.  
Lawrence, F.F.; USGS (March 1949) Open File  
Report #70 (13 p.)

Area: Priority Area 1.

Interest: Interest Level 2.

Illustrations: 1) Location map with proposed works on Little Susitna  
River and Cottonwood Creek. (scale 1"=2 1/2 mile, approx.)

2) 26 Black and white photos of resources of the area.

3) Temperature comparison, Matanuska Valley with North  
Central U.S.

4) Precipitation curves (1948 compared with mean).

5) Hydrograph, Little Susitna River (in C.F.S for 1948).

6) Flow duration curve, Little Susitna river (dis-  
charge in second feet-vertical axis; percent of  
time- horizontal axis.

Description: This report was based on field investigations made  
during a six month period in 1948. The purpose was  
to present an estimate of the water-power potentials  
of Little Susitna River and Cottonwood Creek.

The report contains these sections: introduction; geo-  
graphy; history; water supply, climatology, runoff, esti-  
mates of flow, quality of water; the water utilization  
plan; stream regulation, water power, undeveloped sites  
and the power market. The suggested power development  
plans include: diversion of 3 dam sites, a series of  
canals and pressure conduits to a powerhouse.

Title: A Report on the Potential Development of Water Resources  
in the Susitna River Basin. USDI, Bureau of Reclamation,  
(August 1952), (188 p. illus.).

Area: Susitna River Basin.

Interest: Interest Level 3.

Description: This 1952 report studied the potential for development of  
the natural resources of the Susitna Basin.

Known resource evaluations and economic activities are  
included. An ultimate plan of development of hydropower  
resources for the basin are described, and includes 12  
major dams. A total of 25 separate sites were examined and  
studied as possible projects.



## F. WATER RESOURCE MANAGEMENT

**Title:** The Cook Inlet Environment: A Background Study of Available Knowledge. Evans, C.D.; et. al. for U.S. Army Corps of Engineers, as part of University of Alaska Resource and Science Center, Alaska Sea Grant Program, (August 1972), (113 p. illus.).

**Area:** Cook Inlet, inclusive of Susitna River lowlands.

**Interest:** Interest Level 1.

**Maps:** All information depicted on maps is either on a generalized State map or a Cook Inlet Regional map at a scale of approximately 1"=200 nautical miles.

Information shown on maps includes, but is not limited to, the following:

- 1) Structural features and location of producing oil and gas fields.
- 2) Generalized Isopachs.
- 3) Tectonic map; earthquakes (with magnitude greater or equal to 6.0); seismic zones; existing and planned seismograph stations.
- 4) Bottom sediments in Cook Inlet.
- 5) Surface circulation patterns and maximum tidal-current contours.
- 6) Surface salinity distribution.
- 7) Surface phosphorous, nitrate concentrations, silicate concentrations, and suspended sediment concentrations.
- 8) Sockeye Salmon spawning systems.
- 9) Halibut, King Crab, Tanner Crab, Shrimp and Scallop distribution or abundance in Lower Cook Inlet.
- 10) Volcanoes.
- 11) Recognized recreation or management units.
- 12) Petroleum installations in Cook Inlet Basin.
- 13) Distribution of oil from spill at Drift River, December 30 1967.
- 14) Principal areas of conflict and competition between major resource users

Tables: Subject matter similar to the above listed maps are included in the report.

Description: This report was prepared to provide a basis for environmental impact statements that the Corps of Engineers anticipates will be required for activities relating to the exploration, development and production of petroleum in Cook Inlet.

The report consists of three phases:

Phase 1 is a discussion of the environment, resources and cultural activities in the Inlet that would affect, or would be affected by, petroleum operations.

The report area includes all water and submerged land below the mean high water of Cook Inlet; and includes some aspects of adjacent lands.

Phase 1 section headings are as follows:

- 1) Physical characteristics
- 2) Estuary characteristics
- 3) Plankton and intertidal organisms, fisheries, shellfish, shrimp, birds, marine mammals, and endangered species.
- 4) Geologic fish phenomena
- 5) Other competing resources: recreation, transportation, coastal facilities, transportation conflicts, tidelands and tideland management, and potential mineral resource development.

Phase 2 is a discussion of the economics of petroleum competing resources, and the socioeconomic effects of petroleum development on the community. The impacts this economic activity has had on selected communities in the area is briefly discussed.

Phase 3 is a series of descriptions of what could occur in a given set of circumstances - effects of the environment on structures and operations in the resulting impact on the environment.

**Title:** A Program for Cook Inlet Alaska for the Collection, Storage and Analysis of Baseline Environmental Data.  
Institute of Water Resources, University of Alaska,  
Report No. IWR-7, (no date), (284 p. illus.).

**Area:** Cook Inlet, including Susitna Lowlands.

**Interest:** Interest Level 2.

**Maps:** 1) Sampling Station (Terrestrial, intertidal, offshore) locations (1"=15 miles, plate).

A total of 45 other maps, tables and other miscellaneous illustrations are included in the report. All are on generalized area maps of the entire Cook Inlet region, or area maps.

**Description:** The objectives and contents of the report are as follows:

- 1) Descriptions of the existing environmental conditions of Cook Inlet in the areas of hydrology, hydraulics, biology, physical and chemical characteristics of the water, sediment characteristics, and seasonal variations of the above characteristics.
- 2) Waste discharge inventory to describe the quantity and type of municipal, industrial and agricultural waste inputs to the Inlet.
- 3) Optimum locations of waste effluent discharge to Cook Inlet.
- 4) Investigation of special problems occurring due to oil spills and existing and proposed waste discharge.
- 5) A framework for directing and evaluating estuarine data collection programs.
- 6) Discussion of a data storage facility for cataloging, storing, analyzing and publishing data collected from estuarine data collection programs.

Title: Alaska Water Resources Research Needs for the 70's.  
Institute of Water Resources, University of Alaska,  
Report Number IWR-39, (September 1973). (155 p. illus).

Area: Statewide

Interest: Interest Level 3.

Description: This report is based on a seminar by the same title held in Anchorage, Alaska October 27-28, 1973. The objectives of the seminar were to identify the water resource problems peculiar to Alaska of the 70's, to delineate the "State of the art," and to establish directions for future research.

Representatives from each of the predominant water-using industries -- fishing, mining, forest products, and engineering -- together with leaders in water management and research took part in the seminar.

Panel discussions were held on the following four topics: 1) Water quality; 2) water resources control; 3) resources development; and 4) resources administration.

Title: Water Resource Management for the Cook Inlet Basin  
Kenai Peninsula Region: A Study of Existing Practice  
with Recommendations for a Comprehensive Plan (Vol. I,  
Final Report). Prepared by David L. Peterson and  
Associates, Engineering Science, Inc., and Clark and  
Groff Engineers, Inc.; for the Department of Natural  
Resources, (May 1971), (85 p. illus.).

Area: Cook Inlet Basin, including all of Susitna Basin,  
and Kenai Peninsula.

Interest: Interest Level 3.

Tables: 1) Flow data for Rivers of the Cook Inlet Basin.  
2) Groundwater quality from selected wells in the  
Cook Inlet/Kenai Peninsula Study Area.  
3) Estimated percentage increases in major economic  
sectors, 1967-1980.

A total of 39 figures depicting employment, wage  
and salaries, and other economic indices are  
included.

Description: The study places emphasis on: 1) Definition of  
interactions between different types of economics  
and water resource uses; 2) consequences of pursuing  
various economic and water resource management  
alternatives; 3) characterization of the existing  
economy and water resource management; and 4) defin-  
ition of alternatives for achieving water resource  
management.

The report results are characterized as a "plan  
for a plan."

The content of the report is organized in the following  
manner: 1) conclusions and recommendations; 2) frame  
work and context for study; 3) study area; 4) economic  
development; 5) needs and interactions in water  
resource management; 6) alternatives and approaches  
for water resource management; and 7) references.

## V. ONGOING PROJECTS

**Project:** Upper Susitna River Basin Hydropower Studies, Advanced Engineering and Design.

**Contact:** Eric Yould, Susitna Project Coordinator and Chief, Hydrologic Engineering Section; U.S. Army Corps of Engineers; District Engineer; Anchorage, Alaska.

**Area:** Upper Susitna sub-basin.

**Description:** As a result of the Interim Feasibility Study, (published December 1975) the Corps presented to Congress a \$1.5 billion project composed of a 635 foot concrete dam at Devil Canyon, 14.5 miles east of the Alaska Railroad at Gold Creek; and a 810 foot earthfill dam at the Watana site, 31 miles upstream from Devil Canyon.

The Corps is presently preparing a Plan of Study that will outline the work program, cost estimates and schedule for the Phase I - Advanced Engineering and Design of this two-dam project.

The Corps would like stream gauging stations at the following locations to augment the three existing stations on the Susitna mainstream: 1) Confluence of the Susitna and Chulitna, 2) Alaska Highway bridge where it crosses the Susitna below the Talkeetna, 3) Tyone River, 4) Susitna River at Cantwell, 5) Devil's Canyon site, and 6 Watana dam site.

**Status:** The Plan of Study is expected to be completed by October 1977.

Other anticipated work products will include detailed hydrology, transmission corridors, additional fish and wildlife inventories, and an environmental impact statement (draft, revised and final versions thereof).

**Duration:** Following completion of the Plan of Study in October, 1977 through 1981.



Project: Surface Water Quality Sampling, Capital Site Area.

Contact: Department of Environmental Conservation;  
Regional Environmental Supervisor:  
Kyle J. Cherry; 274-5527.

Area: State Priority Area I.

Description: A series of chemical/bacteriologic tests will be made of the waters of Willow Creek, Deception Creek, Little Susitna River and any large lakes in the Capital Site vicinity. Subsequent water quality testing will probably be narrowed to important bio-chemical parameters.

Status: Ongoing.

Duration: July - October 1977.

Project: Nancy Lake Water Quality Monitoring.

Contact: Department of Environmental Conservation;  
Regional Environmental Supervisor;  
Kyle J. Cherry; 274-5527.

Area: State Priority Area I.

Description: A full range of bacteriologic and chemical water tests will be made of Nancy Lake waters. Samples will also be taken from the lake's four inlets and one outlet. Raw data from the water quality monitoring project will be presented in published form. Problem areas and data collection conclusions regarding the lake's water quality will be included.

Status: Ongoing.

Duration: July - October 1977.

Project: Hydrological Studies related to Coal Mining.

Contact: Dave Scully; U.S. Geological Survey;  
1209 Orca Street; Anchorage, Alaska; 279-1563.

Area: State priority area 4a and 4b, Beluga area, and  
State priority area 2, Peters Creek area.

Description: As part of a Statewide Alaska coal resource project,  
this project collects data that characterizes present  
hydrologic conditions in areas of known potential for  
coal development and in an area of active mining.  
Information obtained includes: 1) quantity and seasonal  
distribution of water discharge; 2) seasonal and areal  
variations in surface water quality, including organic  
and inorganic constituents, minor element concentrations,  
sediment load, turbidity, some temperature measurements;  
and 3) stream-basin characteristics.

In the Beluga area, stream measurement stations are at the  
following locations: 1) Chuitna River near Tyonek; 2) Chuit  
Creek, 1.6 miles above mouth; 3) Chuit Creek, 5.4 miles above  
mouth; 4) Chuitna River, below Wolverine Fork; 5) Capps  
Creek near Tyonek; 6) Bishop Creek near Tyonek; 7) Chuit  
Creek at the mouth; and 8) Chuit River above Chuit Creek.

In the Peters Creek area, stream measurement stations are  
on Peters Creek near Petersville and Peters Creek above  
Martin Creek.

Status: Field investigations were made in April, May, July, August,  
and October 1975 thru 1977 at the Beluga, Peters Creek  
and Healy mineral areas. The project is being conducted  
in cooperation with the Environmental Protection Agency.

Duration: Data collection will continue through the 1979 season.

**Project:** Hydrologic Data Compilation for the Cook Inlet Area.

**Contact:** Geoffrey Freethey/Larry Leveen; U.S. Geological Survey; Water Resources Division; 1209 Orca Street; Anchorage, Alaska; 279-1563.

**Area:** For purposes of the hydrologic data compilation, the Cook Inlet area is divided into three geographic areas:

a) Northwest Cook Inlet area encompassing Knik, Matanuska, Little Susitna, and Susitna River basins, including the drainage into the west shore of Cook Inlet.

b) Knik Arm to Turnagain Arm.

c) Kenai Peninsula.

**Description:** The purpose of the project is to collect, compile and make available to cooperating agencies existing hydrologic data for the Cook Inlet area.

Agencies cooperating in the data compilation include: the Department of Environmental Conservation; Department of Natural Resources; Division of Geological and Geophysical Surveys; Kenai Peninsula Borough; and the Municipality of Anchorage.

The hydrologic data compilation includes all groundwater, surface-water, and water quality data in files and publications of USGS, the Department of Environmental Conservation, and the Department of Natural Resources, as well as new data to be collected during field inventories.

The data base for area "a" above includes information on 20 springs, 1100 wells, 250 ground water sites with water quality information, and surface water sites. Surface water data ranges from a single miscellaneous discharge measurement, to long-term continuous stream-flow records including sediment loads and a wide range of water quality parameters. Surface-water data is being analyzed in terms of flood frequency low flow, and the projection of these characteristics to selected ungaged streams in the Susitna Basin (using a multiple-regression method adapted for Alaska).

Groundwater data is being compiled on 1:250,000 scale and 1:63,360 scale maps. The maps will indicate the geographic points at which information is available.

Description: All data is being placed into the WATSTORE computer system and may be retrieved for interpretive analysis. It will be possible, when all data has been amassed, to obtain printouts of specific analytical values for samples collected from locational entries by:  
a) indicating the latitude and longitude of desired information, b) by township and range down to the quarter-quarter-quarter section (10 acres), and  
c) eventually it is anticipated adapting data retrieval by river-mile or drainage basin basis.

Status: Data collection and compilation for the Matanuska, Susitna and Knik drainage basins, the west shore of Cook Inlet, and the Kenai Peninsula are approximately 75 percent complete.

Compilation of hydrologic data for the Anchorage Municipality has been a part of other ongoing projects and data has yet to be entered into WATSTORE.

Duration: Maps of groundwater data are expected to be published by winter 1977, and written data interpretation to follow in about one year (1978).

The hydrologic data collection is an ongoing process.

Project: STORET Computerized Data Base System.

Contact: Alaska Department of Environmental Conservation.

Area: Statewide.

Description: STORET is a computerized data base system maintained by the U.S. Environmental Protection Agency (nationally) for the STORage and RETrieval of water quality data.

The purpose of STORET is to store and retrieve water quality data relating to rivers and streams. It is intended to provide an open-ended system available to many agencies as a repository and/or dispersing mechanism to optimize water data use and handling.

The Alaska Water Laboratory has the responsibility of establishing the STORET system on a functional basis in Alaska. Data is stored by location, date and parameter. Numerous water quality parameters are included.

To help facilitate the utilization of STORET in Alaska the Institute of Water Resources prepared a set of coded maps (1:63,360 or 1:250,000 scale) from which any stream (or sampling point) can be located and indexed for the storage and subsequent retrieval of water quality or related information.

Status: Continuing Project.

Duration: Ongoing.

Project: WATSTORE Computer System.

Contact: Richmond Brown; U.S. Geological Survey; 277-5526.

Area: Statewide.

Description: WATSTORE is a computerized storage and retrieval system for water resources data maintained by the Water Resources Division of the U.S. Geological Survey. The central computer is in Reston, Virginia and is accessed through terminals around the country. In Alaska there is one terminal at the USGS offices in Anchorage, and a terminal in Juneau which USGS shares with the Forest Service, National Marine Fisheries Service and Bureau of Mines. The Alaska terminals are hooked into the system via a telecommunications network. Data is filed in the system according to common characteristics (i.e. groundwater sites, stream gaging stations, etc.) and data collection frequencies (i.e. daily, annual etc.).

Daily Values File. This file stores data collected on a daily basis or through the use of continuous recording devices whose data can be reduced to a daily value. The type of information entered in the file includes streamflow measurements, reservoir volumes, water temperatures, sediment concentrations, water tables, and others.

Peak Flow File. This file stores annual maximum streamflow data and water levels at (a scale graduated in meters or feet) for surface water stations operated USGS and other agencies (Forest Service, National Oceanic and Atmosphere Administration, etc.) in Alaska.

The data can be returned on an entering agency basis (i.e. one could retrieve only that information entered by Department of Natural Resources) or on a collective basis (i.e. all the information entered by USGS, Department of Environmental Conservation, Department of Natural Resources, Department of Fish and Game, etc, on a specific area.)

Water Quality File. This file is maintained in WATSTORE independently of the previously mentioned files. However, lab analyses are capable of being cross-referenced to the Water Quality File and water table levels cross-referenced to the Daily Value Files.

Common forms of WATSTORE output include the following:

Computer Printed Tables which list actual data are the most common output.

Description: Computer Printed Graphs such as bar graphs, line graphs and site-location maps can be produced by the line printer  
(cont)

Statistical Analyses such as regression analyses, Variance, and correlations can be performed.

Digital Plotting can be done with an off-line printer to produce hydrographs, contour maps of water table levels, x-y point plots, and others. (NOTE: This capability is not available at the Alaska terminals due to the cost of the telecommunications link and the slow speed of the off line plotter as compared to the line printer. However, the local USGS offices can have digital plotting performed at their regional offices at Melo Park then mailed to Alaska.)

Primary locational entires into the WATSTORE files are by latitude and longitude but they are also designated by township and range down to the quarter-quarter-quarter section (10 acres).

Investigations are underway to determine if stream hydrology information could be stored and retrieved on a river-mile or drainage basin basis. All streams appearing on the Alaskan topographic maps have been catalogued according to EPA's STORET stream coding system

USGS has an agreement with EPA whereby all the WATSTORE water quality data is transferred into EPA's STORET system. However, STORET is not transferred into WATSTORE. An interface has been developed which will permit the access of STORET through a WATSTORE terminal and should be operable in Alaska by June of 1977.

All water quality measurements put into the system as a USGS entry must meet USGS standards. For example, information on nitrates or phosphorus in waters must be done by the standard chemical analysis procedures for those parameters which are accepted by USGS. If a chemical, measurement was entered by ADNDR, ADEC, or ADF&G, for example, and if it was not known that their analytical standards were the same as USGS, then that data would be tagged ADNDR, ADEC, or ADF&G in the output since they were the originating agencies. This would be of value in any event since a user may wish to go directly to information and the tagging would serve as a type of index.



Description: It is possible to have USGS produce a copy of the magnetic  
(cont) tape which includes all the water data stored for Alaska  
at any given time.

Status: Computerized storage for the Matanuska, Susitna and Knik  
drainage basins, the west shore of Cook Inlet and the  
Kenai Peninsula is approximately 75 percent complete.

Anchorage Municipality data has not been entered into  
WATSTORE to date.

Duration: This is an ongoing, cooperative system for storage and  
retrieval of data that requires continual input.

Project: (Proposed) Matanuska-Susitna Borough-wide Flood Insurance Study.

Contact: Paul Pinard; Corps of Engineers; 752-3246.

Area: Entire Matanuska-Susitna Borough, communities over 100 population.

Description: In compliance with the Flood Disaster Protection Act (1973) the Flood Insurance Administration has requested the Corps of Engineers to conduct the flood insurance study.

Detailed hydrologic computations will depend on funding; but delineation, extent and magnitude of the 100 year flood is anticipated.

Previous flood insurance investigations have relied on available mapping, photos or testimony to delineate the 100 year flood.

Status: Project has not started and further investigation will take place in August 1977.

Duration Ongoing.

Project: Reclamation Considerations for Potential Development of the Cook Inlet Coal Fields.

Contact: Ralph Bell; USDA, Soil Conservation Service.

Area: State priority areas 4a and 4b, and Matanuska Valley Coal Fields.

Description: This is a joint proposal between the Agricultural Experiment Station, University of Alaska and the SCS to determine the impacts of development of Cook Inlet coal resources, and the best methods for reclamation of disturbed areas

The SCS intends to conduct field evaluations at a site in the Beluga coal fields. AES-field evaluations are proposed for the Sutton site in the Matanuska Coal fields.

Extensive expansion of surface and ground water data collection systems is proposed. Programs are proposed that would entail gathering data on the following: a) surface water quantity and quality; b) ground water quantity and quality; c) soil sampling analysis; d) adaption of vegetation, including greenhouse experiments and field studies; 3) evaluation of revegetation alternatives.

Status: Proposed.

Duration: 1977 - 1981, (tentative).

Project: Sediment Stations.

Contact: Pat J. Stills; U.S. Geological Survey, 218 E Street;  
277-5526

Area: Statewide.

Description: A network of sediment stations is maintained to provide information on sediment in streams, lakes and estuaries by determining: 1) seasonal normal concentrations and particle-size distribution of suspended sediment; 2) sediment yields; 3) particle size distribution of bed and bank material; 4) bedload transport; and 5) ranges of turbidity.

Suspended-sediment concentrations are determined from samples collected by using depth-integrating samplers. Samples usually are obtained at several verticals in the cross section or a single sample may be obtained at a fixed point and a coefficient applied to determine the mean concentration in the cross sections.

At some stations, suspended-sediment samples are collected periodically at many verticals in the stream cross section. Although data collected periodically may represent conditions only at the time of observation, such data are useful in establishing seasonal relations between quality and streamflow in predicting long-term sediment-discharge characteristics of the stream.

The following is a list of sediment station sites; however, this list is not all inclusive of samples sites:

- Caribou Creek near Sutton
- Matanuska River at Palmer
- Susitna River at Susitna Station
- Susitna River near Denali
- Susitna River at Gold Creek

Status: Continuing Project.

Duration: Continuing.

Project: Wasilla Water and Sewer System.

Contact: William Conyers, Branch Manager; R & M Consultants;  
Box 1240; Wasilla, Alaska; 376-5288.

Area: State Priority area I, City of Wasilla.

Description: Alternative plans for a sewage disposal system and water supply system are being prepared for the Wasilla area in response to community needs and Section 201 of Public law 92-500, the Federal Water Pollution Control Act. The area of study consists of 18 square miles of land within the city limits and to the Northwest surrounding Wasilla Lake.

The following preliminary information has been prepared by the Consultant.

- 1) Land use patterns map; includes residential (single, and multi-family) business-commercial, light industrial, mixed use business/residential, agricultural, public parks/open space (no scale).
- 2) Terrain unit map; includes creek flood plain, creek terrace, outwash, outwash terrace, ice contact features, and glacial moraine (no scale).
- 3) A table gives properties of major land form units and engineering interpretations.
- 4) A vicinity map (at 1"=1 mile scale) indicating tentative locations of alternative treatment plant sites and sewer outfall alternatives.
- 5) Water System Master Plan map; indicates proposed 8 inch areawide line and 8 inch domestic flow lines, and water storage tanks.
- 6) Two alternative water facilities systems. (no scale).
- 7) Two alternative sewer facilities; including interceptor, trunk line and laterals.

A 3 page paper describes the technique of terrain analysis used which consisted of identifying land forms and terrain units by air photo interpretation. Terrain units are described as the landform type expected to occur from the ground surface to a depth of 25 feet.

Status: The first draft of the Wasilla Water and Sewer Report will be released in late September. The final report will be published in November.

Duration: Present to November 1977.

Project: Public Participation 208 Planning Mat-Su Borough.

Contact: Mike Klepinger; Alaska Center for the Environment;  
913 West 6th Avenue; Anchorage, Alaska 99501; 274-3621.

Area: Mat-Su Borough.

Description: In compliance with Public Law 92-500, the Alaska Department of Environmental Conservation has asked Mike Klepinger to oversee the public participation program in the Mat-Su Borough.

The first meeting of this group was scheduled to be held September 14, 1977 in Palmer.

The objectives of the public participation program are:

- 1) Inform the public of the extent of the problems.
- 2) Seek input in the development of technical and institutional solutions.
- 3) Seek public input on perceptions and definitions of future problems to be solved.
- 4) Make recommendations for solutions in accordance with the best available management practices.

Status: First meeting to be held September 1977.

Duration: Continuing.

Project: Alaska 208 Program for Undesignated Area.

Contact: Ron Hansen, Water Pollution; 465-2644;  
Elliott Lipson, Program Coordinator; 465-2684;  
Jan Wrentmore, Public Coordinator; Department of  
Environmental Conservation; Pouch 0; Juneau, Alaska 99811.

Area: Statewide.

Description: Area-wide waste treatment management planning (Section 208, P.L. 92-500) for the undesignated area of the State, (that is all areas outside the Municipality of Anchorage), is the responsibility of the Department of Environmental Conservation.

The Alaska 208 program for undesignated area planning will consist of five technical work programs - all being conducted by consultants under contract to ADEC. They are;

1. Village Sanitation
2. Waste Oil Disposal
3. Silviculture
4. Transportation Corridors
5. Surface Mining

Several surface mining locations within the Susitna Basin will be considered. Physical or chemical pollutants as a result of placer and gravel mining operations (non-point discharge) are evident in the basin. Specifically, the Peters Creek, Cache Creek and Birch Creek mining areas will be considered in the analysis. Funding may not be sufficient to provide sediment analysis of water quality sampling.

Status: In December 1976, DEC published the Final 208 Work Plan, (77 p.).

Consultants were chosen in April 1977 for the five technical work programs; work on each program has progressed throughout the summer 1977.

Duration: 1977 - 1978.



Project: Alaska 303E River Basin Planning. Susitna Basin.

Contact: Charlotte Chastin 465-2644  
Department of Environmental Conservation  
Pouch O  
Juneau, Alaska 99811.

Area: Susitna River Basin.

Description: In compliance with the requirements of Public Law 92-500, the Federal Water Pollution Control Act, the State Department of Environmental Conservation is in the process of providing plans for river basins as designated in Section 303E basin planning has not been clearly outlined.

A basin plan of general application is underway for the Susitna Basin, but further contact should be made with the DEC, Juneau to clarify the purpose, scope and timeframe of the plan.

Status: No further information is known.

Duration Unknown.

Project: Southcentral Level B Study.

contact: Frank Urabeck, Study Manager.

Area: Southcentral Region.

Description: The Level B Study Team involves Federal, State, local and private entities in evaluating past and present land and water related issues in order to implement programs in areas where resource data are not adequate, or do not meet management needs.

The direction of future Level B-funded tasks is not sufficiently clear for explanation within the context of this bibliography.

It is suggested that constant contact and coordination be maintained between the Level B Study and any other land and water management study in Southcentral Alaska.

Status: A second draft of the Plan of Work was published and distributed for review in October.

Project: Willow Creek Companion Study.

Contact: Paul Pinard, Project; U.S. Army Corps of Engineers;  
District Engineer; Anchorage; 752-3246.

Area: State Priority Area I.

Description: The purpose of the study is to delineate the flood-  
plains immediately adjacent to Deception Creek,  
Willow Creek and the Little Susitna River. An  
attempt will be made to delineate the 10-, 50-,  
100-, and 500-year floods.

Development schemes ranging from complete develop-  
ment of the floodplain, to no development of the  
floodplain, will be studied to determine the rami-  
fications of various potential growth schemes.  
The State will be asked to provide the criteria  
for the growth scenarios; for example 20- and  
50-year levels of potential development  
within the study area. In return, the Corps will  
model basin changes in hydrology economics and  
other environmental factors based on the growth  
criteria. The Capital Site Planning Commission  
will be asked for input into the potential growth  
scenarios.

The Companion Study will incorporate data and maps  
generated for the unpublished Little Susitna Flood  
Plain Information Report.

During the 1977 field season the Corps, in  
cooperation with the Capital Site Planning Com-  
mission, shall contract for aerial photographs, mapping,  
and river cross sections along Willow and Deception  
Creeks. Mapping shall be plotted at 1"-200 feet  
with 5 foot contours; drawings shall also include  
planimetric features, spot elevations and locations  
of all river cross sections.

Status: The Alaska District, Corps of Engineers has re-  
ceived approval from the Office of the Chief of  
Engineers (OCE) to proceed with the Companion Study.

Duration: The project is expected to be concluded by October  
1978.

The "Plan of Study", which is scheduled to be com-  
pleted by October 1977, will provide the guidelines and  
procedures for accomplishing the Willow Companion Study.

Project: Metropolitan Anchorage Urban Study (MAUS).

Contact: Bill Lloyd, Army Corps of Engineers, 274-0032

Area: Municipality of Anchorage, the Chugiak-Eagle River area, the Point MacKenzie to Palmer-Wasilla portion of the Mat-Su Borough.

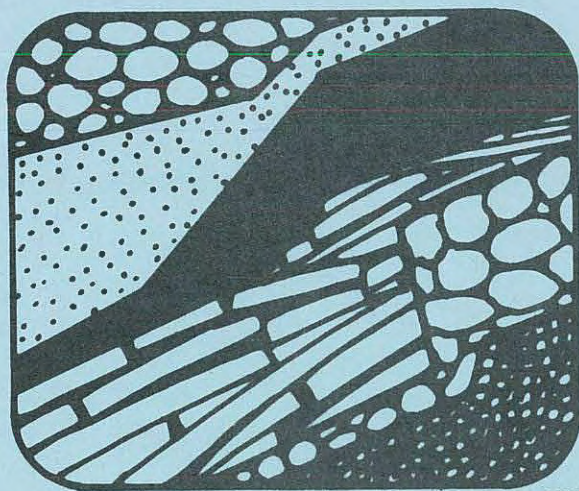
Description: The MAUS report is a compilation and interpretation of the data being used to plan alternative solutions for:

- 1) Adequate and dependable water supply sources.
- 2) Improved and expanded wastewater collection and treatment facilities.
- 3) Water quality in Cook Inlet, the receiving waters for our wastewater treatment facility.

The MAUS estuary study examines water quality, oceanography and biology at the Point Woronzof vicinity of Upper Cook Inlet. The investigation determines effects of wastewater effluent discharges, as defined by PL 92-500, on Knik Arm and Cook Inlet water quality.

Status: MAUS Stage 2 Report was printed in June and available for examination.

Duration: Upon completion for the next year the MAUS Wastewater Treatment Facility Plan will be given to the Municipality whose decision it will be whether or not to use it in compliance with EPA enforcement of PL 92-500.



AND KIRK

# soils

CONTENTS: SOILS

	<u>Page</u>
I. INTRODUCTION & SUMMARY	185
II. INDEX	186
III. PUBLISHED INFORMATION	187
IV. MAPS	197
V. ONGOING PROJECTS	198

## 1. INTRODUCTION & SUMMARY: SOILS

## I. INTRODUCTION & SUMMARY: SOILS

The U.S. Department of Agriculture, Soil Conservation Service is the primary agency responsible for conservation, management and investigation of soil properties. In Alaska, SCS works closely with the University of Alaska, Institute of Agricultural Sciences, and various Federal and State agencies, often on a cooperative work basis.

Soil surveys are made at several levels of intensity - detailed, reconnaissance and exploratory. Each soil survey consists of a map showing the location of the various soils, and a report which describes soils within each mapping unit, interpreting soil characteristics for a variety of uses.

The entire State of Alaska is covered by exploratory soil survey. Detailed soil surveys exist for the Matanuska - Susitna Valleys, and for the Susitna Experimental Forest. However, the entire Mat-Su Valley is not included in these surveys. Additional detailed work is in progress in the Willow, Denali and Skwentna regions.

Due to the limited quantity of detailed information available, nearly all studies annotated are considered of primary interest level.

The distribution of eolian (wind-blown) silt and sand in the agricultural areas of the Mat-Su Valley is discussed in a report by the Geological Survey.

Another important report discusses the distribution of clay minerals, of relevance because of potential petroleum deposition sedimentary formations.



## II. INDEX: SOILS

## II. INDEX: SOILS

### PUBLISHED INFORMATION

1. Susitna Valley Area Soil Survey.
2. Matanuska Valley Area Soil Survey.
3. Soils of the Susitna Experimental Forest Area.
4. Eolian Deposits of the Matanuska Valley Agricultural Area.
5. Contributions to Clay Mineralogy and Petrology, Cook Inlet Basin.
6. Soil Development in Recent Loess in the Matanuska Valley.
7. Cryorthods of the Cook Inlet-Susitna Lowland, Alaska.

### MAPS

1. Soil Survey Area Map.

### ONGOING PROJECTS

1. Denali Area Soil Survey.
2. Skwentna Soil Survey.
3. Willow Area Detailed Soil Survey.

### III. PUBLISHED INFORMATION: SOILS

**Title:** Soil Survey: Susitna Valley Area, Alaska. Schoenhorster, Dale B. and Hinton, Robert, B.; USDA Soil Conservation Service and the University of Alaska Institute of Agricultural Sciences, (December 1973). (71 p. illus.).

**Area:** State Priority Areas 1,2 and 3a. This survey area includes a band along the Susitna River (from 8 to 18 miles wide), from the confluence of the Chulitna, Susitna and Talkeetna Rivers on the north, to Cook Inlet. The southern half of the survey area does not extend west of the Susitna River.

**Interest:** Interest Level 1.

**Maps:** 1) General Soil Map, (1:380,160 scale).  
2) Index to Map Sheets (1:380,160 scale).  
3) Sheets 1-42, aerial photos with soil names, slope, drainage, relief and soil survey data, (1:31 680 scale).

**Tables:** 1) Approximate acreage and proportionate extent of the soils.  
2) Estimated average yields per acre of principal crops under two levels of management.  
3) Woodland suitability grouping of soils.  
4) Ratings and limitations of soils for recreational purposes.  
5) Engineering test data (includes parent material, depth from surface, moisture density, mechanical analysis, liquid limit, plasticity index, and classification).  
6) Estimated engineering properties of the soils (includes depth to seasonal high water table, depth from surface of typical profile, classification, permeability, available water capacity, reaction, and shrink-well potential).  
7) Engineering interpretations of the soils.  
8) Classification of soil series of Susitna Valley Area.  
9) Temperature and precipitation data.  
10) Probability of specified temperatures in spring and fall.

Description: The report contains the following sections:  
how the survey was made; an explanation of the general soil map; a soils description; use and management of the soils; formation and classification of the soils; general nature of the area; literature cited; and glossary and guide to mapping units used.

The report and the general soil map describe soil associations, or proportional patterns of soils, which serve as a suitable tool for judging large tracts of land. The report and the aerial maps also describe and illustrate in detail the soil horizons, color, texture, structure and boundaries. Factors that have affected formation of soils and processes in differentiation of soil horizons are described.

The Soil Survey report contains information that can be applied in a perfunctory manner to the managing of farms, ranches and woodlands; in selecting sites for structures; and in judging the suitability of tracts of land for agriculture, industry and recreation. The interpretations utilized in this report do not serve as a substitute for sampling and testing needed at a site chosen for specific engineering work.

**Title:** Soil Survey: Matanuska Valley Area, Alaska. Schoephorster, D.B.; USDA Soil Conservation Service in cooperation with the Alaska Agricultural Experiment Station, (June 1968), (67 p, illus.).

**Area:** State Priority areas 1 and 3a; Matanuska Valley north-east to Chickaloon and south to Knik River.

**Interest:** Interest Level 1.

**Maps:**

- 1) General Soil Map: Matanuska Valley Area (1"=5 miles). Colored map of 12 soil associations.
- 2) Index to Map Sheets, 1-72 (1"=5 miles).
- 3) Sheets 1-72, aerial photos with soil names (symbolized) drainage, relief and soil survey data. (1:20,000 scale).

**Tables:**

- 1) Temperature and precipitation in the Matanuska Valley Area.
- 2) Average dates for beginning and end of seasons during which temperature is equal to or above that specified.
- 3) Two graphs: Probable number of days per year that temperature will not drop below specified degrees at a) Matanuska Agricultural Experiment Station, Matanuska; and 2) Palmer.
- 4) Acreage and proportionate extent of the soils.
- 5) Estimated acreage yields of principal crops under two levels of management.
- 6) Estimated properties of soils.
- 7) Engineering interpretations of soil properties.
- 8) Engineering test data.
- 9) Classification of soil series according to current and 1938 systems of classification.

Description: The report includes the following descriptive sections:

- 1) The general nature of the area: geology, climate, vegetation, farming, history, settlement and industry.
- 2) The 12 soil associations in the area.
- 3) Soil series and their component mapping units.
- 4) Land clearing, fertilization, irrigation, suitable crops, and estimated yields are covered by the first part of this section. The second part contains a description of the capability classification system by which soils are grouped according to management they need. Each management group is described and suggestions are given for use and conservation of soils.
- 5) Abundance of wildlife is described in relation to vegetation types in each soil association, and animals frequenting described habitats.
- 6) Use of soils as material in construction. This information can be used by engineers to:
  - a) Aid in industrial, business, residential and recreational site selection.
  - b) Preliminary evaluations to aid in selecting locations for highways, airports, and pipelines and in planning detailed soil surveys.
  - c) Develop information for soil and water conservation.
  - d) Locate sources of sand and gravel.
  - e) Correlate performance of structures with soil mapping units.
  - f) Determine suitability of soils for off-road movement of vehicles.
  - g) With supplemental information, make maps and reports that can be used readily by engineers.

Description:  
(cont)

7) Formation and Classification of Soils. Five major factors influence the formation of soil - climate, living organisms, parent material topography, and time. Soils are classified so that we may more easily identify their significant characteristics. Soils are placed in six categories: order, suborder, great group, subgroup, family and series.

8) Report references and glossary of terms.



Title: Soils of the Susitna Experimental Forest Area. Furbush, C.F., and Schoenhoster, D.E.; USDA Soil Conservation Service, (1973), (31 p.).

Area: State Priority Areas 1 and 2.

Interest Interest Level 1.

Map: Susitna Experimental Forest Maps 1-14, with soil or land type shown on maps. (1"=1,000 feet: 1:12,000 scale)

Table: 1) Mean monthly temperature, precipitation, and snowfall at Talkeetna Alaska.

2) Soil series of the Susitna Experimental Forest Area arranged according to the Soil Taxonomy of the National Soil Survey.

Description: The report is organized to include the following general descriptions: physiography, climate, how the soils are named and mapped, 19 soils series, soils classification and a legend of the mapped soil series.

#### How Soils are Named and Mapped

A soil profile is the sequence of horizontal layers, or horizons. Soils that have profiles almost alike make up a soil series. Each soil series is named for a town or other geographic feature near where it was first observed. Soil series are further subdivided on the basis of external features that are important in use and management of the soil.

The location and distribution of the 19 soil series and one land type recognized in the area are shown on the soil maps for this area. More detailed descriptions and interpretations for many of the soils are in the Susitna Valley Area Soil Survey

**Title:** Eolian Deposits of the Matanuska Valley Agricultural Area. Trainer, F.F.; U.S. Geological Survey Bulletin 1121-C, (1961), (34 p. illus., copy of original).

**Area:** State priority area 1, and Matanuska Valley area.

**Interest:** Interest Level 2.

**Maps:** 1) Map of Matanuska Valley agricultural area. Index map and detailed area are indicated. (Scale: 1/2"=5 miles approximately.)

2) Percentage of sand in eolian sediment near Palmer. (Scale: 1/2"=2 miles, approximately.)

3) Contours showing the thickness, in inches, of the eolian silt and sand near Palmer (Scale: 1/2"=2 miles, approximately.)

**Tables:** 1) Particle-size distribution in samples of eolian sediment.

2) Relation of thickness of the eolian mantle to distance from the present bluff of the Matanuska River north of Palmer.

**Description:** The report discusses in detail the wide-spread distribution of eolian (wind-blown) silt and sand in the Matanuska Valley agricultural area. The area includes the lowland north and east of Knik Arm, including Wasilla and Palmer.

The source areas, winds and deposition forming the modern eolian sedimentation are discussed. Also included are discussions of the eolian mantle and its erosion, and the history of the eolian deposits. The flood plain and its historic significance to these wind blown deposits is analyzed by the author.

Title: Contributions to Clay Mineralogy and Petrology, Cook Inlet Basin. Triplehorn, D.J.; DGGS Alaska Open File Report 102 (August 1976 release date), (18 p illus.). Studies for this report were originally conducted at the Tulsa Research Laboratory (now Atlantic Richfield Company) and issued as company reports in 1966.

Area: Willow, Talkeetna and Beluga sub-basins (portions thereof).

Interest: Interest Level 2.

Map: 1) Map showing clay mineral distribution in recent sediment samples. (2"=50 miles, approximate; this is a generalized map of the entire Cook Inlet Basin.)

Tables: 1) Samples listed for regional provenance study.

2) Samples collected for detailed study of lower Susitna area. Location, description and percentage of clay minerals (montmorillonite, chlorite and illite) are shown for 38 samples.

3) Miscellaneous samples. Location, description and percentage of clay minerals are shown for 14 sample sites. Many of the sample sites are in the Little Susitna River or Beluga River areas.

Description: The report includes two studies on clay mineralogy and petrology of sediments from the Cook Inlet basin: 1) modern sediments, and 2) Tertiary sediment rocks in the area.

The first section includes: introduction, methods of investigation, results, miscellaneous samples, relationship to Tertiary sedimentary rocks, and conclusions.

Part 2, Clay mineralogy and petrology of Tertiary mudrocks includes: introduction, Kachemak Bay, Beluga and Chuitna Rivers, Swanson River field cores. Winding Creek Sections, final summary and conclusions.

**Title:** Soil Development in Recent Loess in the Matanuska Valley. Rieger, S. and Jave, R.L.; reprinted from Soil Science Society of America Proceedings, (May-June 1961), Vol. 25, No. 3 (Pgs. 243-248).

**Area:** The easterly portion of State priority area I, and the lower Matanuska Valley.

**Interest:** Interest Level 2.

**Tables:** 1) Mean monthly temperature and precipitation at three stations in the Matanuska Valley: Palmer, Matanuska Experimental Station and Wasilla.

2) Particle size distribution of paired profiles of three soils of the Matanuska Valley.

3) Chemical characteristics of paired profiles of the Matanuska Valley.

**Description:** In this paper, three principal soils of the area are described, results of physical and chemical analyses are presented, and probable trends in horizon (horizontal layer) differentiation are explained.

Descriptions of Matanuska Valley area include physiography climate, and important factors in the formation of soils. Origin, location and thickness of the loess is given.

Profile descriptions of three soils -- the Bodenberg, Knik and Homestead series -- are included. Results in particle size and chemical properties are analyzed, pronounced differences in morphology are outlined, and color variations are discussed.

Title: Cryorthods of the Cook Inlet - Susitna Lowland.  
Reiner, S. and DeMent, J.A.; reprinted from Soil Science  
Society of America Proceedings, Vol. 29, No. 4 (August 1965).  
(Pgs. 448-453).

Area: All lowlands of the Susitna River Basin.

Interest: Interest Level 3.

Description: This paper describes the study of the physical and chemical  
properties of four Cryorthods (zone soils that develop in  
moist climate) developed in silty materials in Cook Inlet -  
Susitna lowland. Intensity of development of soils was  
found to be directly related to precipitation rates.  
Representative Cryorthods from various parts of the lowland  
are described, and relationships between the characteristics  
of these soils and features of their environment are  
noted.

#### IV. MAPS: SOILS

Title: Soil Survey Area Map. USDA, Soil Conservation Service,  
(July 1975).

Area: Statewide.

Interest: Interest Level 3.

Map: Soil Survey Area Map (1:5,000,000 scale)

Description: Statewide two-color shaded map that indicates; 1) detailed soil survey areas and 2) reconnaissance soil survey areas. An accompanying list (October 1976) gives the name of areas where soil survey exists, and acreages mapped. Total acreages in each type of soil survey are given.

All of Alaska is covered by exploratory soil study.

## V. ONGOING PROJECTS: SOILS



Project: Denali Area Soil Survey.

Contact: Sam Reiger; USDA Soil Conservation Service;  
824 South Chuqach; Palmer, Alaska; 745-4271.

Ken Brakken; Watershed Program Manager;  
Bureau of Land Management; 277-1561.

Area: Upper Susitna Sub-basin.

Description: The Soil Conservation Service is conducting soil investigations in the Denali Highway (Alaska Highway 8) area as part of a cooperative agreement with the Bureau of Land Management.

The primary purpose of the soil study is to provide information on area soil properties to assist in the management of off-road vehicle use in this remote area. The soil studies will help in assessing suitability of relocating off-road trails or roads to other routes of less impact, and in assessing the problems found in existing locations (i.e. permafrost, ground instability, etc.). Soil limitations are based on features of undisturbed soil.

The soil study may serve the secondary purpose of assisting the BLM in testing the correlation between LANDSAT imagery and soil patterns, as part of an ongoing remote sensing BLM project in the same area.

The SCS soil surveys include the following:

a) The Butte Lake Trail, 4,500 acres; b) Butte Creek Trail, 5,000 acres; c) Hatchet Lake area, 1,500 acres; d) a large area from the Denali Highway north to Seven Mile Lake including Land Mark Gap Lake, 40,000 acres; e) Phalarope Lake area, 1,000 acres; f) Maclaren Summit area, 1,000 acres; and g) Maclaren River site, 640 acres. Geomorphic features in several areas along the Denali are also being mapped.

The BLM is providing funding and transportation (via helicopter), and SCS is providing the manpower for the cooperative project.

Status: Preliminary maps are near completion, and no text has yet been prepared.

Duration: The project began in June 1977 and is scheduled for completion in April or May 1978.

Project: Skwentna Soil Survey.

Contact: Sam Reiger; USDA Soil Conservation;  
824 South Chuquach; Palmer, Alaska; 745-4271.

Area: State Priority Area 4b.

Description: The Soil Conservation Service (SCS) is conducting a remote  
area soil study in the Skwentna area.

The soil patterns of 11,418 acres in the Skwentna region  
are being mapped.

Status: Acreage measurements are necessary to complete the  
Skwentna survey.

Additional soil surveys west of the Susitna River are  
tentatively planned for next field season (summer 1978).

Duration: Skwentna Soil Survey is scheduled for publication in  
October 1977.

Project: Willow Area Detailed Soil Survey.

Contact: Sam Reiger; USDA Soil Conservation Service;  
824 South Chugach; Palmer, Alaska; 745-4271.

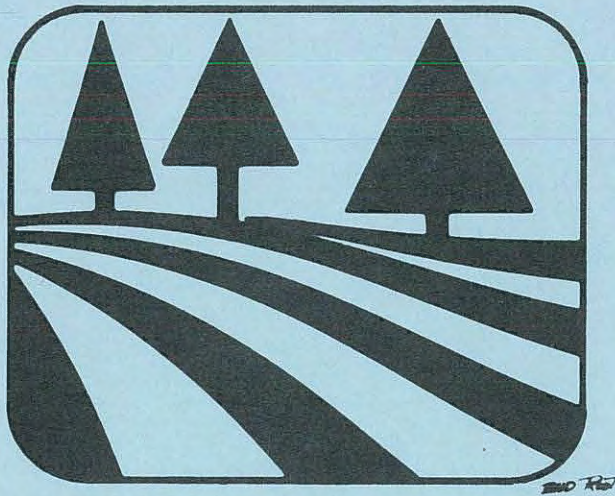
Area: State Priority Area I.

Description: The Willow Area Soil Survey will provide evaluations of soil conditions to aid in selecting locations for highways, buildings, recreation sites, airports. Basic engineering properties of soils will be given.

The Soil Conservation Service (SCS) will attempt to complete a preliminary survey from the north boundary of the capital site to the south side of Kaskwitna by fall 1977.

Status: Willow Survey will be published early in 1978. Northern extension of this survey would begin late summer 1977. there is no estimate on when mapping for this area would be complete.

Duration: Field season 1977, through 1978.



# vegetation

CONTENTS: VEGETATION

	<u>Page</u>
I. INTRODUCTION & SUMMARY	202
II. INDEX	203
III. PUBLISHED INFORMATION	204
IV. ONGOING PROJECTS	211

## 1. INTRODUCTION & SUMMARY: VEGETATION

## I. INTRODUCTION & SUMMARY: VEGETATION

Agricultural or forest-related reports comprise most of the Vegetation Section. The Susitna Valley's agricultural potential is based on small scale maps with generalized, regional data. Forest lands west of the Susitna River are not thoroughly inventoried.

Other, more technical or more site specific vegetation information may be available and several ongoing projects related to habitat will produce additional information on vegetation types.

## II. INDEX: VEGETATION



## II. INDEX: VEGETATION

### PUBLISHED INFORMATION

1. Alaska's Argicultural Potential.
2. Forest Resources of the Susitna Valley, Alaska.
3. Estimated Allowable Cut for Alaska's Timber Resource on State Lands.
4. Lumber Grade Yields from Paper Birch and Balsam Poplar Logs in The Susitna Valley.
5. Marketing Hardwoods from Alaska's Susitna Valley.
6. A Vegetative Guide for Alaska.

### ONGOING PROJECTS

1. Denali Planning Unite Remote Sensing Project.
2. Vegetation Mapping - Back Country Recreation Use.
3. Timber Type Maps.
4. Willow Experimental Forest.
5. Survey Regarding Preservation of Agricultural Values.

### III. PUBLISHED INFORMATION: VEGETATION

Title: Alaska's Agricultural Potential. Alaska Rural Development Council (March 1974). (151 p. illus.).

Area: Statewide.

Interest: Interest Level I.

Maps:

- 1) Soils with agricultural potential (1:6,000,000).
- 2) Mean annual precipitation - inches (no scale).
- 3) Mean annual snowfall - inches (no scale).
- 4) Zonation of permafrost and location of present glaciers (1cm=150 miles).
- 5) Mean annual runoff (1cm=150 miles)
- 6) Mean annual low monthly runoff (1cm=150 miles).
- 7) Representative pie diagrams showing chemical quality of surface waters; and showing quality of ground water. (1"=200 miles).
- 8) Generalized availability of ground water (1"=200 miles).
- 9) Vegetation types (multi-color map), (1:5,000,000; 1"=80 miles).
- 10) Grazing lands of Alaska (multi-color map), (1:6,000,000; 1"=100 miles, approximately).

All maps are statewide maps.

Tables: Numerous tables present climatic data affecting crops at selected locations, and present or projected economic potential of Alaskan agriculture.

Description: The report is organized according to the following four sections:

Section I The progression and regression of Alaskan agriculture from the Russian era to the present is reviewed. Agricultural efforts throughout the circum-polar area (between 55 and 70 degrees north latitude) are discussed.

Description:  
(cont)

Section 2: Soil with agricultural potential throughout the State is classified and pinpointed on a map according to whether it is upland or lowland soil. The percentage of the area shown which is tillable is given. Climatic data tillable areas is detailed. Growing degree days, growing season length and chances of summer frost are summarized in tables and graphs.

Availability, quality, distribution, seasonality and quantity of runoff water and ground water is provided for areas with agricultural soils.

Section 3: The present state of Alaskan agriculture, the types of crops and livestock presently being grown, and research in progress are charted. Methods of caribou and reindeer control and harvest are discussed. Forest production and projections for future utilization are tabulated. Potentials for animal production, including controlled environment housing, is discussed.

Section 4: Factors outside Alaska, and internal marketing systems are described and conclusions are drawn about future agricultural development.

**Title:** Forest Resources of the Susitna Valley, Alaska.  
Hegg, K. M.; USDA, Forest Service, Resource Bulletin  
PNW-32 (1970), (42 p. illus).

**Area:** All of Susitna Basin forested area.

**Interest:** Interest Level 2.

**Maps:** 1) Generalized soil map of the inventory area (no scale).  
2) Forest type map of Susitna Valley (no scale).

**Tables:** 28 Tables present numerical values for volume of timber  
by types, gross annual growth and other factors.

**Description:** The report summarizes data from the first intensive inventory  
of the forests in the Susitna Valley conducted during 1964-  
1965. (The inventory from the Susitna forest plots is stored  
on computer at the Forest Science Laboratory in Juneau. Some  
plots date to 1962-1963.)

In the description of the forests, lands are classified as  
noncommercial, subcommercial or commercial. The uses of  
the forest products are also described. Commercial forest  
lands are studied in detail for ownership patterns,  
stand conditions, forest types, quality, growth, volume  
loss by defect, mortality, and future allowable cut.

The report appendix includes discussions of the forest survey  
methods, sampling error, tree species, terminology, expanded  
description of the soils, and various tables.

Title: Estimated Allowable Cut for Alaska's Timber Resource on State Lands. USDA Forest Service Resource Paper PNW-51, (30 p. illus.) 1967.

Area: All State priority areas, and Talkeetna sub-basin.

Interest: Interest Level 2.

Table: Allowable Annual Cut  
This table enumerates by species, the net volume allowable annual cut in cubic feet and board feet.

Description: The paper is a statewide analysis of the estimated allowable cut for the Tanana Valley, Matanuska-Susitna Valley, Kenai Peninsula, Kodiak, Yakutat, and Haines-Skaqway areas.

The Matanuska-Susitna Valley description includes commercial forest acreage by species.

The paper is an update of the 1970 publication "Forest Resources of the Susitna Valley".

**Title:** Lumber grade yields from Paper Birch and Balsam Poplar  
Logs in the Susitna Valley. USDA Forest Service Resource  
Paper PNW-51, (30 p. illus.), (1967).

**Area:** Susitna Valley forested area.

**Interest** Interest Level 3.

**Description:** Volumes of commercially valuable paper birch and balsam  
are tabulated according to lumber grades. The report  
tabulations are more useful in estimating quality,  
than overall quantity of Susitna Valley forests.

**Availability:** Forestry Library, Alaska Division of Lands.

Title: Marketing Hardwoods from Alaska's Susitna Valley.  
Massie, Michael, R.D.; University of Alaska, SFG report  
9, (162 p.), (November 1966).

Area: Susitna Valley forested areas.

Interest: Interest Level 3.

Tables: 1) Known mature paper birch stands in the Susitna Valley,  
location, accessibility, acreage and volumes.

2) Estimated annual allowable cuts, accessible stands,  
Susitna Valley, 1966.

3) Sale and cut, location of paper birch timber in the  
Susitna Valley to January 1, 1966.

4) Estimated cull deductions for selected stands of mature  
paper birch in the Susitna Valley.

Description The report includes the following sections: introduction,  
summary and conclusions, forest resources, harvesting hardwood  
timber, primary manufacturing, product specifications and  
shipping alternatives, hardwood markets, and estimated  
returns for lumber manufacture.

The report describes the various markets now using hardwood  
forest resources similar to Susitna Valley hardwoods,  
and suggests potential industry development compatible  
with resources and markets. The report cautions that  
estimates are conservative until more accurate figures  
become available.

The document is more valuable as a hardwood industry  
development and marketing tool, than as a detailed forest  
inventory.



Title: A Vegetative Guide for Alaska. Soil Conservation Service  
in cooperation with University of Alaska Institute of  
Agricultural Sciences, Cooperative Extension Service;  
(September 1972).

Area: Statewide: recommendations and data for regions including  
Cook Inlet-Susitna Area.

Interest: Interest Level 3.

Description: The report contains the following sections: 1) introduction,  
2) culture and management for establishing grasses and legumes;  
3) soil and site groups; 4) seeding recommendations for geo-  
graphic areas; 5) woody and herbaceous groundcoverings; and  
6) appendices.

Relevant to the Susitna River Basin is the section on seeding  
recommendations. The Cook Inlet-Susitna Area is one of six  
geographic areas described. Tables for the Susitna area  
indicate soils and sites with severe limitations due to  
excess moisture. After determining the basic soil group,  
seeding and fertilizer recommendations can be developed  
from the report information.

#### IV. ONGOING PROJECTS: VEGETATION

Project: Denali Planning Unit Remote Sensing Project.

Contact: Lou Waller, Project Manager  
Anchorage District Office  
Bureau of Land Management  
4700 East 72nd Avenue  
Anchorage, Alaska 99507.

Dr. John Miller  
Geophysical Institute  
University of Alaska, Fairbanks.

Area: Upper Susitna sub-basin.

Description: This is a joint remote sensing (LANDSAT) project designed to provide inventory of wildland vegetation and geologic features of the Denali area. The Denali Planning Unit was chosen as one of three test sites on land managed by BLM (nationwide), because of its road access, its many many resources and accompanying management problems. Geologic features, mineral deposits, wildlife, a variety of soils from gravel to permafrost, archaeological sites, and recreation opportunities such as fishing, hiking and canoeing are being considered.

The remote sensing project began with development of a project plan by BLM and National Aeronautic and Space Administration (NASA) personnel. The plan is titled "Applications Systems Verification and Transfer" (ASVT). BLM and NASA have since been joined by Earth Resources Observation Systems (EROS), administered by USGS, and the main contractor for the project, Electro-magnetic Systems Laboratories, (Sunnyvale, California). The University of Alaska Geophysical Institute has sub-contracted to do verification and correlation of vegetation and geologic features inventoried during the summer (1977).

The Applications Systems Verification Test has two primary (national) objectives.

1) To test and demonstrate feasibility and cost of LANDSAT with high and low level photography and ground observations to inventory wildland vegetation and geologic features.

2) To train BLM personnel in use of LANDSAT technology.

Data gathered during the Denali area study and future projects will be maintained in an information center of the BLM, Anchorage District Office.

Description: LANDSAT (formerly Earth Resources Technology Satellite, ERTS) digital images taken August 30, 1974, August 1, 1976 September 6, 1976 and July 10, 1975 are being utilized.

Aerial Photography at 1:1,200 scale; RB 57 photos at 1:120,000 scale; and 1:30,000 scale photography will be used to study special interest areas, (such as the Tangle Lakes). Strip aerial photography at a scale of 1:32,000 will also be evaluated.

Duration: The BLM and NASA staffs met to explore the remote sensing project in May 1975.

By November 1976, the ASVT project plan had been developed and accepted by participating agencies.

By June 30, 1977, "Background Information on Remote Sensing and Its Use in the BLM Denali Planning Unit, Alaska", Anchorage District Office, BLM was published. (10 p. illus.). Published as background document for the remote sensing project, this report includes a map of the Denali Study area and an organizational chart. Information for the bibliography annotation is extracted from this report.

The remote sensing project is designed as a three-year program.

**Project:** Vegetation Mapping - Back Country Recreation Use.

**Contact:** Dr. Fred Dean; Alaska Cooperative Park Study Unit;  
University of Alaska; Fairbanks. Alaska; 479-7672.

**Area:** Talkeetna Sub-basin; Broadpass, Windy Creek and Foggy  
Pass areas; also north of the Alaska Range.

**Description:** The project objective is to develop vegetative maps in  
accordance with the provisional Alaska Vegetation  
Classification scheme (in progress), utilizing satellite,  
high level and low level aerial photography, and  
extensive field checking.

Maps at 1:250,000 and 1:63,360 scale will be prepared.

**Status:** Vegetation samples were scheduled to be taken during  
the summer 1977 to assist in checking aerial photographs.

**Duration:** Not known.

Project: Timber Type Maps.

Contact: Forestry Section, Division of Land and Water Management,  
Department of Natural Resources.

Area: State priority areas 1, 3a and 4a.

Description: Completed timber type maps (at a scale of 30 chains to an  
inch) exist for the following (general) areas:

- 1) Trading Bay, 12 townships, or approximately 275,000  
acres. Maps indicate forest types and basic land contours.

Note: logging operations have been in full operation in  
this area since approximately 1976.

- 2) Goose Bay Timber type maps indicate this information:  
Birch, white spruce aspen, black spruce, shrubs, swamp,  
agricultural land, lakes, trails and land ownership.
- 3) Certain Cottonwood types for the Susitna Valley are  
complete.

Status: (As detailed above). All maps are on file in the Forestry  
Section.

Duration: Ongoing project.

Project: Willow Experimental Forest.

Contact: Alaska Division of Lands  
Forestry Section or Institute of Northern Forestry,  
U.S. Forest Service  
323 East 4th Avenue, Anchorage, Alaska 279-5577.

Area: State Priority area I; Little Susitna River Valley.

Description: Plots have been established in order to study birch and white spruce regeneration and spacing. The birch stand is thinned to various specified spacings and cleared areas are planted with white spruce. Plantings and the existing crop will be monitored over the next ten years and compared with established, collected data.

Status: Ongoing project.

Duration: At least through 1986, possibly longer.

Project: Survey Regarding Preservation of Agricultural Values.

Contact: Bill Mattice, Student  
University of Alaska, Anchorage.  
Matanuska-Susitna Borough.

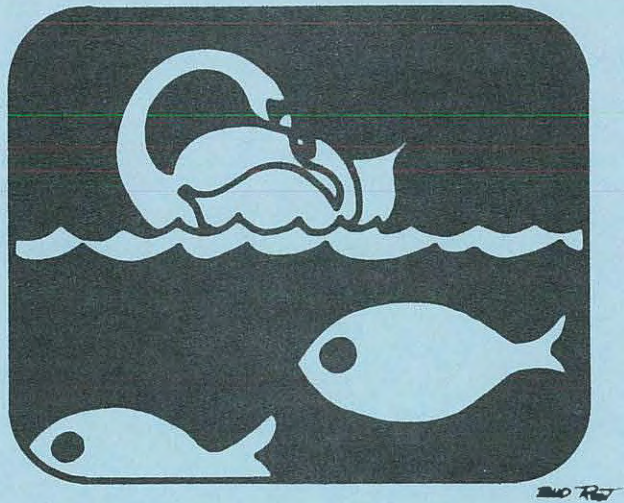
Area: Matanuska Valley.

Description: A public opinion survey on land use and preservation of agricultural values in the Matanuska Valley is being conducted as part of a University class requirement. Questionnaires will be mailed to approximately 300 Valley residents. The results of the survey will be made available to the Mat-Su Borough Planning Department and to other interested parties.

Status: A report is expected to be published based on the results of the survey.

Duration: Summer - Fall 1977.





# fish & wildlife

CONTENTS: FISH & WILDLIFE

	<u>Page</u>
I. INTRODUCTION & SUMMARY	218
II. INDEX	219
III. CROSS INDEX	220
IV. PUBLISHED INFORMATION	221
V. ONGOING PROJECTS	237

## I. INTRODUCTION & SUMMARY: FISH & WILDLIFE

## 1. INTRODUCTION & SUMMARY: FISH & WILDLIFE.

The reports annotated in this section provide information of varying detail, on large game, anadromous and resident freshwater fish. Little or no published information was found on small game, furbearers, waterfowl, and marine animals, which suggests a need for further inventory concerning small game and waterfowl.

A large part of the readily available fish and wildlife reports concentrate on the area of the Upper Susitna River. This long line of past and ongoing studies is being conducted because of potential development of the Devil's Canyon/Watana Dam project, and the project's impact on fish and wildlife of the region. A summary of reports published from 1952 - 1960 by the U.S. Fish and Wildlife Service on the Upper Susitna is included.

Other studies provide: 1) description of current and projected management techniques and goals for each species by population or game management unit; 2) estimates of population by species; 3) historical information on population, harvests, etc.; 4) economic values associated with uses; 5) distribution maps; 6) identification of important critical habitat areas (limited) migration routes and spawning area.

SOURCES - The U.S. Fish and Wildlife Service and the Alaska Department of Fish and Game were the primary sources of information. Further valuable information is available from individual area game and fisheries biologists with Alaska Department of Fish and Game. Annual reports by the Sport Fish Division are referenced, but all such reports are not annotated. The Commerical Fish Division also has useful information,

## II. INDEX: FISH & WILDLIFE

## II. INDEX: FISH & WILDLIFE

1. Background: Fish and Wildlife Studies Related to Susitna River Hydropower Project.

### PUBLISHED INFORMATION

1. A Detailed Report on Fish and Wildlife Resources Affected by Vee Project, Susitna River.
2. A Detailed Report on Fish and Wildlife Resources affected by the Devil Canyon Project.
3. Fish and Wildlife Studies Related to the Corps of Engineers Devil Canyon, Watana Reservoir Hydroelectric Project (Three Reports).
4. Pre-Authorization Assessment of the Proposed Susitna River Hydroelectric Projects: Preliminary Investigations of Water Quality and Aquatic Species and Composition.
5. An Assessment Study of the Anadromous Fish Populations in the Upper Susitna River Watershed between Devil Canyon and the Chulitan River.
6. Spring 1974 Moose Parturition Counts of the Proposed Devil Canyon Dam Area.
7. Southcentral Railbelt Area, Upper Susitna River Basin Hydroelectric Project, Two Dam Plan.
8. Annual Performance Report for Inventory and Cataloging.
9. Annual Performance Report for Inventory and Cataloging and Population Sampling of the Sport Fish and Sport Fish Waters in Upper Cook Inlet.
10. Summary: Annual Performance/Progress Reports, ADF&G.
11. Alaska Wildlife Management Plans - Southcentral Alaska.
12. Big Lake Analysis.

### ONGOING PROJECTS

1. Anadromous Fish Population Studies, Mat-Su Valley.
2. Coastal Fish and Wildlife Resource Profile of Southcentral Alaska.

### III. CROSS INDEX: FISH & WILDLIFE

III. CROSS INDEX - FISH & WILDLIFE

Page

See HYDROLOGY Section:

A Hydrologic Reconnaissance of the Susitna River Below Devil's  
Canyon.

154



IV. PUBLISHED INFORMATION: FISH & WILDLIFE

## BACKGROUND: FISH AND WILDLIFE STUDIES RELATED TO SUSITNA RIVER HYDROPOWER PROJECT

Beginning in the 1950's, the U.S. Fish and Wildlife Service has conducted preliminary investigations of the fish and wildlife species in the Susitna basin region and its tributaries. The reconnaissance studies were in response to the potential for hydropower development in the upper basin. Additional studies have been conducted by the Alaska Department of Fish and Game to collect baseline aquatic, biological and water quality/quantity data in the Devil's Canyon/Watana project area.

The following paragraphs summarize the preliminary U.S. Fish and Wildlife Service reports of the Upper Susitna Basin.

### SUMMARY OF REPORTS AND STUDIES

1. U.S. Fish and Wildlife Service, A Preliminary Statement of Fish and Wildlife Resources of the Susitna Basin in Relation to Water Development Projects; 1952.

2. U.S. Fish and Wildlife Service, A Progress Report on the Wildlife Resources of the Susitna Basin; 1954.

This report is a genesis for future evaluation, and includes average harvest and monetary value of species by calculating the game harvest of the Susitna Basin as a percentage of the total Alaska game harvest.

3. U.S. Fish and Wildlife Service A Progress Report on the Fishery Resources of the Susitna River Basin; 1954.

In 1956, the Bureau of Reclamation resumed detailed feasibility studies of the Devil Canyon, Denali and Vee Canyon dam sites. In order to keep pace with their investigations, the Fish and Wildlife Service began detailed studies of project affects. The result -- three more progress reports, 1956, '57 and '58 field investigations.

4. U.S. Fish and Wildlife Service, Progress Report, 1956 Field Investigations Devil Canyon Damsite, Susitna River Basin; 1957.

This report includes stream surveys of tributaries downstream from Devil Canyon, and of Jay Creek located upstream. Information is very general for Gold Creek, Indian River, Jack Long Creek, Portage Creek and Devil Canyon. The objective of this study was to determine the extent anadromous species utilize the watershed and the magnitude and distribution of resident fish populations. Work during the 1956 field season was devoted to test netting.

5. U.S. Fish and Wildlife Service, Progress Report, 1957 Field Investigations Devil Canyon Damsite and Reservoir Area, Susitna River Basin; April 1959.

This report includes investigation of the streams upstream of the proposed Devil Canyon damsite, from Deadman Creek to Jay Creek. Gill nets were set to survey the species and location of the anadromous and resident fish populations.

6. U.S. Fish and Wildlife Service, 1958 Field Investigations, Denali and Vee Canyon Damsites and Reservoir Areas, Susitna River Basin; June 1959.

The report includes information on trapping pressure, game harvest, stream surveys, fish collections on the lower sections of most streams, and aerial inspections to count game.

In 1960 and 1965 the Fish and Wildlife Service prepared detailed reports under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). These reports are annotated in detail in the Wildlife Section of this Bibliography. They are as follows:

7. U.S. Fish and Wildlife Service, A Detailed Report on Fish and Wildlife Resources Affected by the Devil Canyon Project; May 1960

8. U.S. Fish and Wildlife Service, A Detailed Report on Fish and Wildlife Resources Affected by the Vee Project; February 1965.

Title: A Detailed Report on Fish and Wildlife Resources Affected by Vee Project, Susitna River. U.S. Fish and Wildlife Service, (February 1965), (16 p.).

Area: Upper Susitna Sub-basin.

Interest: Interest level 3.

Map: Vee Canyon Dam and reservoir, (1"=10 miles).

Description: The report describes fish and game species present and effects of construction on wildlife in the project area. The report includes reported occurrences of black bears, small game and the Nelchina caribou herd.

Title: A Detailed Report on Fish and Wildlife Resources affected  
by the Devil Canyon Project. U.S. Fish and Wildlife Service,  
(May 1960), (26 p.).

Area: Upper Susitna Basin.

Interest: Interest level 3.

Description: Big game, small game, fur bearers, waterfowl, and both  
resident and anadromous fish were found to be affected  
by construction of the project. Loss of habitat and  
expected migration are included in this report.

Title: Fish and Wildlife Studies Related to the Corps of Engineers Devil Canyon, Watana Reservoir Hydroelectric Project (Three Reports). Alaska Department of Fish and Game, under a contract agreement with the U.S. Fish and Wildlife Service. (February 1976).

Area: Upper Susitna Sub-basin.

Interest: Interest level I

Description: Biological studies were conducted and resulted in three separate report segments. These are described separately below.

Anadromous Fish Population of the Upper Susitna River Watershed; Friese, N.V. (November 1975), (108 p.).

The study involved continued monitoring of spawning distribution, relative abundance and representative age-length-sex composition by species and surveys of juvenile rearing areas. Methods of investigation and results are detailed. Climatological observations, water temperature, and water fluctuation at the fishwheel campsite are included.

Diagrammatic sketches of each slough and certain clear water stream flows in the Susitna, Talkeetna and Chulitna Rivers area are included. The drawings are not to scale and define the relative size, substrate composition, and spawning areas of the sloughs. Escapement survey results are included in tables.

Preliminary Investigations of Water Quality and Aquatic Species Composition, Riis, J.C.

The purpose of the investigation was to obtain baseline data on indigenous fish populations, aquatic habitat, and water quality to define biological areas of concern within the hydropower project area.

Limnological investigations were taken at the Parks Highway Bridge downstream on the Susitna River and at all major east side tributaries. Definition of flows, i.e. minimum seasonal flows, are necessary to insure access in and out of slough by fish.

Aerial photographs (July 1975) indicate location of sample sites and the type of fish found at each site.

Description: A Limited Wildlife Study. McKlroy, C. and Sparker, T.  
(cont)

This report supplements a 1960 Fish and Wildlife Service. It reports on big game distributions observed during the spring and winter, reevaluates effects on wildlife by the proposed project, and suggests mitigating actions and future studies. Caribou distribution and trails crossing the Susitna River were observed and noted. Tables indicate game harvest counts. Maps indicate the distribution of moose, sheep, caribou, and indicate levels of game utilization.

**Title:** Pre-Authorization Assessment of the Proposed Susitna River Hydroelectric Projects: Preliminary Investigations of Water Quality and Aquatic Species Composition. Riis, J.C.; Alaska Department of Fish and Game, (May 1977) (91 p.).

**Area:** Upper Susitna Basin.

**Interest:** Interest Level 1.

**Maps:** Two maps depict the Devil's Canyon Project, one in relation to the watershed and northern Cook Inlet and the other in relation to the Upper Susitna River.

**Tables:** 56 tables or other illustrations illustrate discharge at eight locations, water temperature at four locations, suspended solids, turbidity, and escapement surveys at various locations.

**Description:** Biological, water quality and water quantity investigations were conducted from July 1, 1976 through September 30, 1976 to obtain data on indigenous fish populations and the existing aquatic habitat. The data will add to ongoing environmental studies to assess the potential impacts of the proposed Watana/Devil's Canyon hydroelectric project.

The report organization discusses methodology used for sampling, and findings. Flow regimens, temperature, suspended solids, turbidity, water chemistry, benthic invertebrates, and fisheries are all explained in detail.



Title: An Assessment Study of the Anadromous Fish Populations  
In the Upper Susitna River Watershed between Devil Canyon  
and the Chulitna River. Barrett, B.H.; Alaska Department  
of Fish and Game, Division of Commercial Fisheries,  
(November 1974) (56 p. illus.).

Area: Talkeetna sub-basin and Upper Susitna sub-basin.

Interest: Interest Level I.

Maps: 1) Map of the Devil's Canyon Study area on the Upper  
Susitna River; also indicates location of sloughs  
inventoried as spawning areas. (1½"=5 miles).  
2) Figure 1-14: Sketch maps of 21 sloughs, includes  
composition of bottom material and riffles. All  
spawning areas are located.

Tables: Tables show escapement data, fish tagging results, and  
climatological observations.

Description: An inventory program was initiated in 1974 to determine  
spawning distribution, relative abundance, migrational  
timing, age-length-sex composition by species, and juvenile  
nursery areas on anadromous fish habitat in the Upper Susitna  
River, between the proposed Devil's Canyon hydropower site  
and the Chulitna River. This report is a summary of the  
techniques employed and the results obtained during the  
1974 field season (July 1 - September 27).

Title: Spring 1974 Moose Parturition Counts of the Proposed Devil Canyon Dam Area. Calkins, D.; Alaska Department of Fish and Game ( 1974), (10 p. illus.).

Area: Upper Susitna Sub-basin.

Interest: Interest Level 2.

Map: Susitna River showing areas surveyed and approximate locations of moose sighted, June 1974 (no scale).

Tables: 1) Results of the Moose Survey from Devil Canyon Dam site to Susitna Glacier.

2) A comparison of moose counts from spring 1974 with fall 1973 composition counts by location.

Description: The purpose of this survey was to delineate moose distribution with emphasis on calving area locations within the impoundment area. This report is a summary of techniques employed and results obtained.

Title: Southcentral Railbelt Area, Upper Susitna River Basin  
Hydroelectric Project, Two Dam Plan. U.S. Fish and Wildlife  
Service (October 1975), (18 p ).

Area: Upper Susitna Sub-basin.

Interest: Interest Level 3.

Description: The report is prepared by U.S. Fish and Wildlife Service  
for the Corps of Engineers, and is a cursory summary of fisheries  
and wildlife within the hydroelectric project area. Data  
used are compendiums of field investigations by the Alaska  
Department of Fish and Game and National Marine Fisheries  
Service.

Title: Annual Performance Report for Inventory and Cataloging.  
Alaska Department of Fish and Game, Division of Sport  
Fish, (Vol. 16; July 1, 1974 through June 30, 1975).

Area: Project areas as outlined below; all are within the Susitna  
River Basin.

Interest: Interest Level 1.

Description: Research projects undertaken during the fiscal year are  
explained in this annual Federal Aid in Fish Restoration  
report.

(Analysis of all previous Inventory and Cataloging reports is  
not included in this Bibliography.)

Research project reports are organized to include abstract,  
recommendations, project objectives, techniques, findings,  
and literature cited.

Each pertinent research project of the FY '75 report is  
summarized below:

Inventory, Cataloging and Population Sampling of the Sport  
Fish and Sport Fish Waters in Upper Cook Inlet, by David  
Watsjold, Fishery Biologist. (Project F-9-7)

Sixteen lakes were inventoried in the Matanuska-Susitna  
Valleys for physical and chemical characteristics. Sampled  
waters, ranging from 9 to 300 acres in size, were of the  
bicarbonate type and varied from very soft to hard. Water  
analyses gave mean values for Ca, Mg, K and Na; other  
determinations included conductance, alkalinity, and  
hardness. (Water samples were processed by the U.S.  
Geological Survey, Salt Lake City, Utah.)

Growth and survival, as defined by gill net sampling, were  
determined for stocked game fish in 22 lakes.

Monitoring of monthly features in 11 lakes began in 1973  
and was continued on nine lakes throughout the summer of  
1974. (Shown in Table.)

Morphometric features - subsurface acres, depth, elevation,  
location - of 16 lakes are presented in tabular form.

Inventory and Cataloging of Sport Fish Waters of the Copper  
River, Prince William Sound, and the Upper Susitna River  
Drainages, by Fred Williams, Fishery Biologist.

(Only Upper Susitna study is summarized herein.)

Description: Basin data such as stream flow transparency, gradients, fish life, and bottom types were gathered on as many of the tributaries of the Upper Susitna as possible. (The data have been submitted to the appropriate agencies in a separate report.)

Aerial surveys indicated at least 117 tributary streams could be affected by the four-dam hydroelectric proposal. Based on aerial and ground observations the streams were given one of the following classifications:

I Stream - those that appear to have year-round flow, clear water color, cover, holes, clean riffle areas.

II Streams - water color brown or gray, current fast or torrential, few pools.

III Streams - small streams, flow less than 3 c.f.s., torrential flow, high silt loads.

Dry - those streams without water at date of survey.

Inventory and Cataloging of Sport Fish and Sport Fish Waters of the Lower Susitna And Central Cook Inlet Drainages, by Stanley Kubick and Robert Chlupach.

A Study on the Talachulitna River was conducted to provide population estimates growth information, and age data for Arctic grayling. Other fish species were noted by species and number. The study area receives heavy float fishing pressure.

Enumeration of chinook salmon escapement was conducted in 1973 and 1974 in the following key, west-side tributaries to the Susitna:

Deshka River System	Chuit River
Alexander Creek System	Theodore River
Lake Creek System	Lewis River
Talachulitna River	Peters Creek
Canyon Creek	Nakochna River
Martin Creek	

The Department of Fish and Game submitted requests, and subsequently received favorable action, to set aside water-oriented sites for public access. Requests to the Mat-Su Borough were for easements on Coal Creek, Coal Creek Lake and Talachulitna Creek. A request to the Department of Natural Resources was made for an easement on the shores of Talachulitna Lake.

**Title:** Annual Performance Report for Inventory and Cataloging and Population Sampling of the Sport Fish and Sport Fish Waters in Upper Cook Inlet. Watsjold, D.A.; Alaska Department of Fish and Game, Sport Fish Division. (Volume 18; July 1, 1976 through June 30, 1977); Project F-9-7; (47-93 p.).

**Area:** Project areas as outlined below, are all within the Susitna River Basin.

**Interest:** Interest Level 1.

**Maps:** 1) Big Lake watershed showing locations of index areas on Fish and Meadow Creeks.

2) Caswell Lakes area showing drainage patterns connecting the surveyed lakes, 1976 (1"=1 mile).

**Description:** Big Lake - This project and the resultant data was gathered from the Big Lake watershed to determine life history of salmonids. The data are useful in efforts to increase salmonid populations through artificial enhancement practices. In 1976, the Youth Conservation Corps assisted the field work. Rearing fish species were captured to determine migrational movements, age and growth data, population densities, and species composition in various habitat types. Detailed minnow sampling results are described in the report.

Caswell Lakes - A preliminary survey of five lakes was conducted during the 1976 summer season in the Caswell Lake area. The purpose of the study was to determine the present condition of the salmoid populations and whether a salmon enhancement program would be beneficial. Morphometric data for the five lakes are presented in tabular form. Water chemistry data include pH, hardness, alkalinity, and conductivity.

Dissolved Oxygen Sampling - A total of 14 lakes were checked during the 1975-76 winter for dissolved oxygen levels. The lakes were: Seymour, Visnaw, Lalen, Lucille, Canoe, Memory, Matanuska, Meirs, Little No Luck, Big No Luck, Johnson, Victor, and Harriet.

Chinook Studies - Escapement surveys on the east side Susitna River tributaries, and tributaries of the Talkeetna and Chulitna Rivers are analyzed in detail. 1969-1976 annual escapement counts on Willow, Montana, Moose and Prairie Creeks are tabulated.

Ongoing, detailed testing is underway on Montana, Rabideux, Willow, and Prairie Creeks and the Chulitna River.

Summary: Annual Performance/Progress Reports, ADF&G

In compliance with the Federal Aid in Fish Restoration program, the Sport Fish Division, Department of Fish and Game, compiles annual reports of progress and/or performance. The objectives of these programs have been the same over the years. However, the data collected as a result of field work may have had different formats as a result of sampling techniques and a number of other factors. Therefore, the following research project segments (for 1969 through 1974 only) are listed, but not annotated.

Williams, F.T. 1969. Inventory and Cataloging of Sport Fish and Sport Fish Waters of the Copper River and Prince William Sound Drainages, and the Upper Susitna River. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress, 1968-1969, Project F-9-1, Volume 10 (275-289 p.).

\_\_\_\_\_. 1971. Volume 12: Project F-9-3, (117-136 p.).

\_\_\_\_\_. 1972. Volume 13: Project F-9-4, (85-110 p.).

\_\_\_\_\_. 1973. Volume 14: Project F-9-5, (1-29 p.).

Watsjold, D.A. 1973. Population Studies of Game Fish and Evaluation of Managed Lakes in the Upper Cook Inlet Drainage. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress 1972-1973, Project F-9-5, Volume 14 (G-111-D); (1-17 p.).

Engel, L.J. 1974. Inventory, Cataloging and Population Sampling of the Sport Fish and Sport Fish Waters in Upper Cook Inlet. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Performance, 1973-1974, Project F-9-6, Volume 15 (G-1-D); (67-91 p.).

Kalb, C.J. 1974. Population Studies of Game Fish and Evaluation of Managed Lakes in the Upper Cook Inlet Drainage. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual Report of Performance, 1973-1974, Project F-9-6, Volume 15 (G-111-D); (23 p.).

Watsjold, D.A. 1974. Anadromous Fish Population Studies Matanuska-Susitna Valleys. Alaska Department of Fish and Game. Federal Aid in Fish Restoration Annual Report of Performance, 1973-1974, Project F-9-6, Volume 15 (G-11-H); (49-57 p.).

Title: Alaska Wildlife Management Plans - Southcentral Alaska,  
Alaska Department of Fish and Game, (1976) (291 p. ),  
(One of Seven Volumes.)

Area: Southcentral Alaska.

Interest: Interest Level I.

Description: The purpose of the report is to compile information on the status, distribution, and uses of wildlife populations. Current and projected land use patterns, and natural resource potentials are also considered.

Part I of the report presents a brief discussion of wildlife management in Alaska, reviewing the formal structure of management, the biological bases for wildlife use, and problems encountered.

Part II contains the individual species/area management recommendations. The following is a list of individual species management plans that include or overlap into the Susitna River Basin:

- Susitna-Nelchina Black Bear Management Plan
- Upper Cook Inlet Brown Bear Management Plan
- Lower Mananuska-Susitna Valley Brown Bear Management Plan
- Western Talkeetna Mountains Sheep Management Plan
- Talkeetna River Moose Management Plan
- Matanuska Glacier Moose Management Plan
- Matanuska Valley Moose Management Plan
- Talkeetna Mountains Moose Management Plan
- Skwentna Moose Management Plan
- Palmer Hay Flats Moose Management Plan
- Upper Cook Inlet Goat Management Plan
- Cook Inlet Furbearer Management Plan

Each management plan is organized to include the following information:

- 1) Location by Alaska Department of Fish and Game, game management units, and drainages.
- 2) Primary management goal.
- 3) Secondary management goal.
- 4) Examples of management guidelines.
- 5) Species (detailed description).
- 6) Problems.
- 7) Impacts

Availability: Department of Fish and Game.



Title: Big Lake Analysis. Ward, R.A.; Alaska Department of Fish and Game, Division of Fisheries, Rehabilitation Enhancement and Development (FRED), (September 30, 1974), (pgs extracted from other sources unnumbered). Technical support material in raw data form.

Area: State Priority area I

Interest: Interest Level 3.

Description: The report is a compilation of previous unidentified works. drawn together to provide history, past research data, and site location data for the purpose of locating a prototype sockeye salmon egg incubation rearing facility in the Big Lake Watershed.

The report brings together from other (unidentified) reports and sources, the following types of information for the Big Lake Watershed:

- 1) As background data, interviews with area homesteaders during a 1962 survey, and letters regarding a water stabilization project proposal are included.
- 2) Work sheets, sketch maps, tables and other types of unexplained data are included in a summary titled "Analytical, biological, chemical, and physical determinative summary of the Big Lake System - 1936 1974."
- 3) Portions of Fish Creek smelt investigations, lake productivity, stream sampling, netting results, and egg deposition studies from a "Cook Inlet Inventory Report" (1973) by other Alaska Department of Fish and Game personnel are included.
- 4) A prospective site location and rearing facility is described.
- 5) An appendix includes correspondence, project cost estimates and project status information.

## V. ONGOING PROJECTS

**Project:** Anadromous Fish Population Studies, Mat-Su Valley.

**Contact:** David Watsjold/Larry Engel;  
Fisheries Biologists, Alaska Department of Fish and Game,  
Box 26; Palmer; 745-3178.

**Area:** East tributaries Susitna River, specifically Willow Creek,  
Little Susitna, and Montana Creek.

**Description:** This is an ongoing project to study the life history,  
including evaluation of population trends, abundance  
and densities, of anadromous fish species. Recommendations  
for proper management are made as a result of the studies.  
A summary of escapement surveys published as a result  
of this work is available (Alaska Department of Fish and  
Game, Federal Aid in Fish Restoration Sport Fish Division,  
Study G-1: Inventory and cataloging, various volumes.)

Specific projects currently underway include the following:

Willow Creek: Clipping of King Salmon to follow movement,  
determine abundance, evaluate returns of hatchery chinook  
and level of density at various periods of the migration,  
began in July - August 1977. Laboratory tests are being  
conducted to determine disease problems present in Willow  
Creek King Salmon. Some temperature and flow measurements  
are being conducted in the study area.

Area biologists have explicit knowledge of the spawning areas  
of Willow Creek, Deception Creek and the Little Susitna River.

Montana Creek: The habits of King Salmon, including  
up and downstream movements are under study. Water  
temperature data has also been collected as a part of  
this study.

**Status:** Status report in Inventory and Cataloging report 1977 by  
Alaska Department of Fish and Game.

**Duration:** Ongoing.

Project: Coastal Fish and Wildlife Resource Profile of Southcentral Alaska.

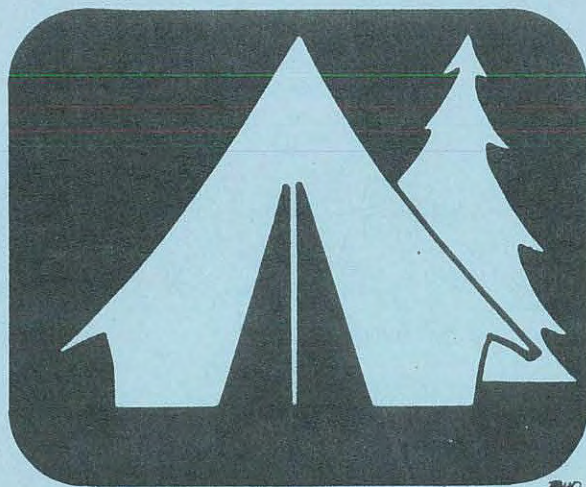
Contact: Greg Konkell; U.S. Fish and Wildlife Service, 265-4896.

Area: Southcentral Alaska.

Description: The purpose of this project is to develop a visual presentation of fish and wildlife resources, with emphasis on the coastal zone. A good deal of information for the project will be synthesized from existing mapped and published or unpublished information developed by other agencies. All species for which data is available will be treated in the study.

Status: Anticipated start-up date is October 14, 1977. A pre-solicitation conference was held July 12, 1977.

Duration: October 1977 - February 1979.



# recreation & archeology

CONTENTS: RECREATION & ARCHAEOLOGY

	<u>Page</u>
I. INTRODUCTION & SUMMARY	240
II. INDEX	241
III. PUBLISHED INFORMATION	242
IV. ONGOING PROJECTS	265

## I. INTRODUCTION & SUMMARY: RECREATION & ARCHAEOLOGY

## I. INTRODUCTION & SUMMARY: RECREATION & ARCHAEOLOGY.

Some of the most developed recreational areas in Alaska are within the Susitna Basin boundary; the Big Lake area, Nancy Lakes recreational area, Mt. McKinley Park and Lake Louise are examples. Classified recreational lands or lands considered for inclusion in the State Park System include such areas as the Hatcher Pass recreational area, the Talachulitna River, and the Little Susitna River. Other high use areas, such as the Denali Highway, the Burma Road area west of Big Lake, and Alexander Creek, are not necessarily classified as recreational lands, but because of their proximity to urban areas, roads, or outstanding natural features they receive heavy public use.

Reports have been prepared and annotated on most all the aforementioned recreational use areas. Physical setting and natural features of recreational areas are described and mapped in these reports.

The "Heritage Resource Inventory" series is annotated in this section of the bibliography. Volumes within this series describe the following:  
1) Historical antecedents and legislative background for preservation planning. 2) Statewide survey of historical and archaeological resources. 3) Long-range planning and projected needs for Alaska's heritage resources.

Archaeological investigations which have taken place in the Susitna region (and annotated) include those at the Knik site, the Denali Highway region, and various locations in the upper Susitna Basin.

SOURCES - The State Division of Parks, U.S. Bureau of Outdoor Recreation and the University of Alaska are the primary information sources cited in the Recreation and Archaeology Section.



## II. INDEX: RECREATION & ARCHAEOLOGY

## II. INDEX: RECREATION & ARCHAEOLOGY

### PUBLISHED INFORMATION

1. Alaska Outdoor Recreation Plan 1976-1980.
2. Hatcher Pass.
3. Proposed Hatcher Pass State Recreation Area.
4. An Act Establishing the Hatcher Pass State Recreational Area.
5. Hatcher Pass Study Area Technical Support Material.
6. Lake Louise: A Summary Development Guide.
7. Lake Louise Study Area Technical Support Material.
8. Environmental Planning for an Alaskan Water-Oriented Recreation Area: Nancy Lake.
9. The Talachulitna River, A Wild and Scenic River Analysis.
10. Alaska Recreational Lands and Resources: A Priority Listing.
11. Denali State Park: A Master Plan.
12. The Denali Highway Information Plan.
13. Heritage Resources along the Susitna River.
14. Alaska Heritage Resource Inventory.
15. An Archaeological Survey Along Knik Arm.
16. Archaeological Discoveries on the Denali Highway.
17. An Archaeological Survey of the Susitna Valley.
18. Other Archaeological References.
19. Historic Preservation Publications for Alaska

### ONGOING PROJECTS

1. Wild and Scenic River Analyses - Little Susitna, Deshka, Alexander Creek.
2. Community Recreation Resource Assessment - Willow.
3. Archaeological Investigation Nancy Lake Area.
4. Stephen Lake Archaeological Investigation.

III. PUBLISHED INFORMATION: RECREATION & ARCHAEOLOGY

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Title: Alaska Outdoor Recreation Plan 1976-1980.  
Alaska Department of Natural Resources, Division of Parks.  
(September 1976), (145 p.).

Area: Statewide; section on Southcentral Alaska.

Interest: Interest Level 2.

Maps: All seven maps are statewide maps divided by the five State regions: Southeastern, Southcentral, Southwestern, Interior and Northwestern.

Tables: Numerous tables and other graphic presentations are included in this report. Significant tables are as follows:

- 1) Land Management Responsibilities in Alaska  
(as of November 30, 1973).
- 2) Future Land Management Responsibilities (proposed)
- 3) Inventory of Recreation Acreage and Facilities:  
a) Federal Agencies; b) State Agencies; c) Local Communities;  
d) private sector (As of June 30, 1973).
- 4) List of Alaska properties on the National Register of Historic Places, as of June 1, 1976. In the Susitna Basin these include the Knik site and Independence Mine.
- 5) Resident and nonresident participation in outdoor recreation activities: by activity and region; projected resident recreation participation (1980, 1985, and 1990).
- 6) Multimodal Transportation and Utility Corridor Systems; a listing of proposed routes, environmental impacts, purposes, and villages.
- 7) Summary of public and private funding sources for outdoor recreation.
- 8) Schedule of development by federal agencies; by state agencies (July 1, 1973 - June 30, 1978).
- 9) Schedule of acquisition by local communities; schedule of development by local communities (July 1, 1973 - June 30, 1978).

Description: The Plan includes the following sections: introduction, supply of recreational resources, demand for outdoor recreation, outdoor recreation needs, critical issues, program proposals, policy recommendations, implementation programs, summary of major findings and recommendations.

The principal outdoor recreational resources are discussed by planning regions. Areas within the Susitna River basin discussed include Denali State Park, and the Nancy Lake Recreation area. Recommendations relevant to the Susitna region are to add the Hatcher Pass-Talkeetna Mountain area to the State Park System, and to add a Tokositna parcel to Denali State Park.

Title: Hatcher Pass, Prepared under contract by the State Division of Parks to the Alaska Environmental Group, a joint venture of Engineering Services, Seth V. Yerrington and Associates and Jara Applied Sciences, Inc., (no date of publication), (45 p. illus.).

Area: State priority area 1. The Hatcher Pass area.

Interest Interest Level 1.

Maps

- 1) Environmental Sensitivities (approximately 1"=3 miles)  
These five sensitivities are depicted in a four - degree color range: a) extreme wind exposure, b) areas of cold air ponding, c) slopes over 20%, d) winter moose range, and e) areas of potential flooding.
- 2) Topography. (Approximately 1"=3 miles).
- 3) Geology. (Approximately 1"=3 miles).  
Color shading indicates the following geologic formations: alluvium; glacial deposits; lava flows; arkose, shale and sandstone; granitic intrusives; gneiss; and mica schist. Fault lines, and probable fault contact lines are also indicated
- 4) Mines of the Willow Creek District. (Scale reduced in size for report reproduction.)
- 5) Recommended Land Use Map. (approximately 1"=3 miles).  
The following recommended uses are shown on the map: park headquarters, information center and control point, ski resort area, view points, camping areas, summer roads, all season roads, foot trails, bike trails, snow machine area, and proposed park boundary.
- 6) Wildlife (approximately 1"=3 miles). Moose range, brown bear denning and beaver ponds are shown.
- 7) Slope Steepness (approximately 1"=3 miles). Shaded areas indicate slope of 0-10%, 10-20%, 20-30%, and greater than 30%.

All maps are of the same base (with contour intervals of 400 feet), and appear to be reduced for reproduction in this report.

Tables:

A "Facilities Development Schedule" indicates the description, location and five year development phasing for such facilities as management facilities, park roads, park picnic units, camping units, trails, parking lots, rest stops, view points, resort development and restoration of two mines in the proposed park vicinity.

Estimated costs for personnel and equipment for the proposed park area are included in a maintenance and operations schedule.

Description:

The report is divided into three main sections. They are: 1) an inventory of the natural and cultural environment of the area; 2) a summary of the recommended uses of its lands, waters and other recreation resources; and 3) a set of guidelines for implementation of the recommended plan.

The report serves as a summary of the planning effort undertaken to assist in deciding the ultimate development and use of the Hatcher Pass area. Approximately 107,500 acres--the southern most edge of the Talkeetna Mountains--are under consideration by this study. The State is considering parts of this region for inclusion as a State recreation area.

Brief paragraphs give an overview of the following environmental factors of the region: geology, physiography and soils, climate, hydrology and water quality, vegetation, fish and wildlife, archaeology and history, existing development patterns, recreational trends, and demography. A number of noteworthy environmental sensitivities of the region are summarized in concluding remarks to this section.

The environmental resource data presented in the first section are analyzed and interpreted in terms of the special limitations and opportunities they pose. These limitations and opportunities are presented as a series of environmental form determinants upon which the recreational use concepts and land use plan are based. The chapter concludes with a discussion of potential boundary adjustments that will promote better management of the recreational and environmental resources of the area, and recommendations concerning special environmental interpretive programs suitable to the study area.

Description:  
(cont)

General guidelines for implementation of the recommended Plan include the following measures: a) General construction guidelines, including materials with regard to soils and stone, suggested construction methods and special considerations (animals, winds, snowfall).

b) Grading and drainage guidelines for various recommended park facilities.

c) Water supply and waste disposal guidelines.

d) Recommended monitoring program with respect to many aspects of environment and recreational development.

A final section includes a brief discussion of maintenance and operation, on a seasonal basis, of the proposed park area.



Title: Proposed Hatcher Pass State Recreation Area.  
Planning Section, Alaska Division of Parks,  
(1977), (7 page informational brochure, illus.).

Area: State Priority area 1. Hatcher Pass vicinity.

Interest: Interest Level 2.

Maps: Proposed Hatcher Pass State Recreation Area (1"=4 miles).  
This topographic map indicates the proposed recreation  
area boundaries, existing road system, and area/place  
names in the vicinity.

Description: The publication is designed to inform (the public) of  
the Hatcher Pass Recreation Area proposal, and explain  
the legislation which provides for the continuation of  
existing mining and grazing activities.

Brief descriptions of the region's natural resources;  
topography, vegetation, and wildlife; climate;  
cultural features; and recreation demands are included.

A summary of the results of a visitor survey (administered  
to people travelling by vehicle on the Fishhook-Willow  
Road in August 1976, by members of the Alaska Youth  
Conservation Corps) is included in the pamphlet.

Hydrographic watershed management, the Willow capital  
site, and other developable lands were considered in  
drawing boundaries of the proposed recreation area.

Provisions for mining and livestock grazing are thought  
to be compatible with the recreation use proposal and  
are allowed by the legislative proposal.

Title: An Act Establishing the Hatcher Pass State Recreational Area. (A copy of recommended State Legislation, Eighth Legislature, Second Session, suggested for House Bill 748 and Senate Bill 436), (2 p. copy).

Area: State Priority area 1.

Interest: Interest Level 1.

Description: The two page legislative proposal explains the purpose of the proposal to dedicate lands and waters within the Hatcher Pass Recreation Area to recreational uses. It recognized that mining may be undertaken in the area under lease and that mining activity outside the mineral zone be permitted, if compatible with recreation use.

The proposed legislation notes that a land classification map for the Hatcher Pass area is on file with the Department of Natural Resources, and that map changes are effective only upon approval by the Commissioner, Department of Natural Resources.

Title: Hatcher Pass Study Area Technical Support Material.  
Prepared under contract by the State Division of Parks to the Alaska Environmental Group, a joint venture as explained below. (An unpublished compilation of material on file with the Planning Section, Alaska Division of Parks.) (No date.).

Area: State Priority Area 1. Hatcher Pass vicinity.

Interest: Interest Level 1.

Description: This is a large notebook containing technical and supplemental reference material, organized in accordance with the Hatcher Pass Study Area summary report. (See - "Hatcher Pass" annotation this section.)

The information in this volume is organized as follows:  
1) The natural environment; prepared by the Murray-McCormick Environmental Group; 2) recreation land use; prepared by Seth Yerrington and Associates; 3) engineering implementation; prepared by Engineering Services. Other sections include 4) impact assessment; 5) acknowledgements and communications; and 6) supplemental references.

Some environment aspects considered include the following: geologic history and processes; physiography, soils, faulting and stability; mineralization; climatology; hydrology, water quality; vegetation (interior forest, subalpine, marshes and bogs); fish and wildlife; and mammals.

Availability: Unpublished report; original on file with the Planning Section, Division of Parks.

**Title:** Lake Louise: A Summary Development Guide. The Alaska Environmental Group under contract by the Division of Parks, (no date), (42 p. illus.).

**Area:** Upper Susitna Sub-basin.

**Interest** Interest Level 1.

**Maps:** Environmental Sensitivities; (1/4"=1 mile) contour intervals 100 feet.

Physiographic Features, (1/4"=1 mile).

Lake Louise: Depth Contours and Bottom Conditions, (1/4"=1/2 mile).

Vegetative Associations, (1/4"=1 mile).

Fish and Wildlife Resources, (1/4"=1 mile).

Recommended Land Use Map (1/4"=1 mile).

Slope Steepness, (1/4"=1 mile).

**Description:** The report material is presented in three main sections: 1) inventory of the natural and cultural environment of the study area; 2) summary of recommended uses of lands, waters and other recreational resources; and 3) a set of guidelines for implementation of the recommended plan.

Water and land related sensitivities, such as trumpeter swan habitat, prime unforested wildlife habitat, marshes and bogs are shown on the Environmental Sensitivities map.

Study area descriptions include geology, physiography, soils, climatology, hydrology, water quality, vegetation, fish, wildlife, archaeology, history and land use patterns. Environmental form determinants are also analyzed by the above listed resource subjects.

The following concerns are discussed under special interpretive programs: glaciation, extreme weather conditions, liminology of lakes, the role of wildlife in the native society, and the structure of the native society.

Title: Lake Louise Study Area Technical Support Material.  
Prepared under contract by the State Division of  
Parks to the Alaska Environmental Group, a joint  
venture. (This is an unpublished compilation of  
material on file with the Planning Section, Alaska  
Division of Parks.) (No date).

Area: Upper Susitna Sub-basin Lake Louise vicinity.

Interest: Interest Level I.

Description: This is a large notebook containing technical  
and supplemental reference information in  
accordance with the headings of the published  
report "Lake Louise: A Summary Development  
Guide." (See annotation this section.)

The headings in this technical support document  
are as follows: 1) natural environment,  
2) recreation land use, 3) engineering imple-  
mentation, 4) impact assessment, 5) acknowledgements  
and commun-cations, and 6) supplemental references.

The natural environment baseline, prepared by the  
Murray-McCormick Group includes the following  
area descriptions or field note records:

- 1) Physiography: six soil associations. geology  
permafrost and seasonal frost.
- 2) Faulting, and minerals.
- 3) Implementation for recreation development, climatology,  
hydrology and water quality.
- 4) Vegetation fish and wildlife including mammals, birds  
and fish.

Availability: Unpublished report; original on file with the Planning  
Section, Division of Parks.

Title: Environmental Planning for an Alaskan Water-Oriented Recreation Area: Nancy Lake. Smith D.w.: Institute of Water Resources University of Alaska, Fairbanks. Report No. LWR-64 (June 1975).

Area: State Priority Area 1, Nancy Lake Recreational Area

Interest: Interest Level 2.

Description: The purpose of this project was to evaluate the environmental condition of the project site. This, in turn, would provide information on the status of aquatic systems and effects on sports fisheries, of increased recreational activity.

The Institute of Water Resources began the project in July, 1973 as a joint project with the U.S. Office of Water Research and Technology (OWRT) and the Alaska Division of Parks. The Division of Parks withdrew their participation in the three-way agreements and this report is restricted to limnological data collected from the Nancy Lakes area prior to cancellation of the agreement.

Included, then, are the following sections:

- 1) Data folder of lakes in the study area. For each lake in the Nancy Lakes complex is a data sheet including: surface acres, fish species, discharge, invetebrates, waterhsed type, accessibility pollution and use sites.
- 2) A Master of Science Thesis by F.L. Smith, University of Alaska is included, ("Effects of Nutrient Addition on Algae Production and an Evaluation of a Method of Measuring Algae Produciton").
- 3) IWR report (number 63) by Jacqueline LaPerriere, ("Evaluation of Trophic Types of Several Alaskan Lakes by Assessment of Benthic Fauna.")

Availability: Unpublished report; original on file with the Planning Section, Division of Parks.

Title: The Talachulitna River, A Wild and Scenic River Analysis. Bureau of Outdoor Recreation, Alaska Field Office, (October 1976), (revised April 1977), (45, p. illus. copy).

Area: State Priority Area 3a.

Interest: Interest Level 1.

Maps: 1) Regional map (poor quality copy; Talachulitna outlined; (1"=25 mile scale).

2) Area map copy of USGS topographic quadrangle (poor quality, for location purposes only, 1"=4 mile scale).

3) Species abundance - sockeye, pink, chum, Cohoe, King: 1973-1975.

Description The report was prepared by the Bureau of Outdoor Recreation in response to a request by the Division of Lands for analyses of river-related resources on State lands, (similar to those being conducted by the Bureau of Outdoor Recreation on Federal Lands).

The river's setting is described in detail as to direction of flow, tributaries, topography, depth and width at various points, drainage area, and water temperatures (recorded August 1-6, 1976). No stream flow data is available but the time of maximum and minimum flow is indicated.

Climate of the drainage area is described, with summary data from the U.S. Weather Service at Skwentna provided for comparison.

Water quality data are lacking but the presence of several lodges and seasonal residences is indicated.

A substantial portion of river users are guided or flown in and most land use is for recreational purposes. Lodges and cabins along the Talachulitna are described.

The report indicates that the Alaska Power Administration has identified a system of three potential dam sites for hydroelectric development along the Yentna and Skwentna Rivers; such a project would affect the lower Talachulitna.

The report discussion of land ownership indicates: 1) the Talachulitna land area patented to the State; 2) approximate acreage of Mat-Su Borough selected land; 3) private land parcels and "open to entry" parcels; and 4) coal prospecting permits.

Description:  
(cont)

Water rights, navigability and streambed ownership as well as seasonal accessibility by a variety of modern and traditional transportation modes are described.

The following resource topics are included in the Talachulitna report: soils (Alaska Exploratory Soil Survey), vegetation and timber, geology, and minerals. Areas of wildlife concentration, including denning areas and nesting areas are generally indicated. Area fisheries are described by species, and fishery is noted as the most outstanding recreation resource of the river. The recreation value of the area for floating, hiking existing recreational use, future use and limitations to recreational use are given.

The BOR concludes that the Talachulitna meets the criteria established by the National Wild and Scenic Rivers Act as a "wild river area", and recommends the area be identified as a wild or scenic river within a State river system.



Title: Alaska Recreational Lands and Resources: A Priority Listing. Johannsen, N.C. and Meiners, A.H.; Planning Section, Division of Parks, (April 1976), (135 p. illus.).

Area: Statewide.

Interest: Interest Level 3.

Description: As part of a unified approach to evaluating the State's resources for use in making critical land use decisions, statewide parks, recreation and historic resources were given a "priority" ranking. The Parks Planning Section prepared an assessment sheet which identifies and scores five major demand elements, and seven natural and cultural resource elements.

The following topics were evaluated to provide input to the recreation resource assessment form:

- a) Demographics; including desires of people and levels of participation.
- b) Access: transportation modes and their proximity to recreation resources.
- c) Attractiveness of a recreation resource, or its user appeal.
- d) Activity potentials (adopted from State Comprehensive Outdoor Recreation Plan).
- e) Recreational needs presently accommodated as an indicator of lack of designated and established recreation areas.

These values were incorporated into the evaluation of natural and cultural resource values.

A brief (one page or less) description of each resource area, its location, setting and recreation value is given. A percentile rating of demand factors, resource values, and a combined score is given. Also included is a topographic map indicating the boundary of the resource area.

Areas within the Susitna River Basin included in the priority listing follow: Denali State Park expansion, Nancy Lake Recreation Area, Alexander Creek fly-in Wayside, Tangle Lakes State Historical Park, Talkeetna Mountains State Park, and Mt. McKinley National Park additions.

This report should not be used apart from other information in making critical land use decisions.

⊖

Title: Denali State Park: A Master Plan. Department of Natural Resources, Division of Parks; (1975), (49 p. illus.).

Area: State priority area 3b, and Talkeetna sub-basin.

Interest: Interest Level I.

Maps:

- 1) A statewide location map (no scale).
- 2) Regional map (1"=30 miles, approximately).
- 3) Slopes over 15 percent (1"=4 miles).
- 4) Soils (1"=4 miles).
- 5) Vegetation, (1"=4 miles).
- 6) Wildlife (1"=4 miles).
- 7) Sport Fish Occurrence, (1"=4 miles).
- 8) Land Status (1"=4 miles).
- 9) Proposed Boundary Change (1"=4 miles).

Description: The Plan contains the following sections: introduction, physical elements, social, cultural and economic elements, the plan, implementation guidelines, operations plan, and appendix. The plan establishes guidelines for area development.

Title: The Denali Highway Information Plan. Colorado State University, for the Bureau of Land Management, (1976), (125 p. illus.).

Area: Upper Susitna Basin.

Interest: Interest Level 1.

Maps: 1) Denali Highway Geology (1/2"=4 miles).  
2) Denali Highway Vegetation (1/2"=4 miles).  
3) Denali Highway Wildlife: Caribou and Dall Sheep, Moose, Fishing locations.  
4) Trail map with hiking and canoe trails (1:250,000 and 1:63,360 scale).

Description: This report includes a comprehensive inventory of Denali Highway visitor interests and desires.

Natural resources, historic and cultural resources, recreation opportunities, and available services, are inventoried. Objectives and recommendations were developed from this inventory.

The plan synthesizes information and recommendations into media and designs to communicate information to users. Emphasis is on geology of the area.

Availability: One report copy on file at Bureau of Land Management.

Title: Heritage Resources along the Susitna River. Alaska Division of Parks, Misc. Publications History and Archaeology Series No. 14 (August 1975), (62 p. illus.). (A study prepared for the Corps of Engineers.)

Area: Upper Susitna Basin.

Interest: Interest Level 1.

Maps: 1) Placer claim map of the Valdez Creek Mining District (1"=5,000 feet).

2) Sketch map of Upper Susitna and Chistochina River Basins (1:750,000 scale).

Tables: 1) Heritage Resource Salvage Program Allocations.

2) Correlation between climate periods and archaeological periods.

Description: The report describes findings of a historical and archaeological survey made of the water impoundment area of the proposed Upper Susitna River hydroelectric project.

An ecotone model (a model stressing that human activity centered in areas with the most diverse habitat) was used to identify areas where probability of encountering archaeological sites was greatest.

The report summarizes knowledge of the early historical developments of the project area and reviews known aboriginal exploration of the region. Recommended courses of action for preservation of known and expected heritage resources are presented.

Title: Alaska Heritage Resource Inventory. Hannable, W :  
Alaska Division of Parks, 3 Volumes.

Area: Statewide

Interest: Interest Level 2.

Description: The Statewide historic preservation master plan for Alaska, of which this resource inventory is a major part, is prepared in three separate sections:

Volume I - Historical Background presents historical antecedents and legislative background for preservation in Alaska; the State's philosophy and policy on heritage resources and their use; an analysis of preservation planning's relationship to other State planning; a discussion of major preservation problems; and a description of the criteria and methods of the Statewide survey of historic and archaeological resources.

Volume II - The Statewide Inventory, describes the purpose and scope of the historic and archaeological resource inventory. It also lists the thematic framework, with properties recorded in the Statewide survey classified by theme and geographic location. Appearing in the Alaska Heritage Resource Survey Index (miscellaneous publication, History and Archaeological Series No. 3) is a computer generated (quarterly) appendix of site information useful to planning agencies.

Volume III - The Annual Preservation Program is both a status report on the existing State historic preservation effort, a discussion of long range planning and projection of needs during the next three fiscal years. (FY-76, FY-77, and FY-78). This volume of the Statewide historic preservation plan is revised annually. (This is the 4th edition).

Another survey that compliments these resource inventory volumes is the Alaska Heritage Resource Survey - A Photograph Catalogue, (Miscellaneous Publications, History and Archaeological Series No. 4, May 1974), which gives the location, subject and date of the historical site photograph collection.

Availability: All of the Alaska Heritage Resource Inventory publications are available for review at the Alaska Room, UAA Consortium Library, or at the State Division of Parks.

Title: An Archaeological Survey Along Knik Arm. Dumond, D.E.,  
and Mace, R.L.A.: Anthropological Papers of the University  
of Alaska, Volume 14, Number 1 (1968) (p. 1-21).

Area: State Priority Area 1.

Interest: Interest Level 1.

Map: Map shows Knik Arm sites and vicinity (1"=2 miles).

Description: Four sites are described in detail and sketches of artifacts  
are included. Conclusions are drawn, based on the minimal  
evidence, that Pacific Eskimos (A.D. 1000) and Tanaina  
(Athapaskan Indians, A.D. 1650) occupied the region.

Title: Archaeological Discoveries on the Denali Highway.  
Skarland, I. and Keim, C.J.; Anthropological Papers  
of the University of Alaska, Volume 6, No. 2 (p. 79-88).

Area: Upper Susitna Basin.

Interest: Interest Level 2.

Description: Sites along the Denali Highway are described and photographs of flint specimens are included. The finds are believed to be from the Atna Indians (Ahtena) who used this region as a hunting grounds. No means of dating was found but the specimens are judged to be at least 2,000, perhaps more than 4,000 years old.

Title: An Archaeological Survey of the Susitna Valley  
Irving, W.H.; Anthropological Papers of the University of  
Alaska, 1957, Vol. 6, No. 1. ( p. 37-52).

Area: Upper Susitna Basin.

Interest: Interest Level 3.

Description: Sites within the area along the shores of Lake Susitna,  
most of Tyone Lake, and the Tyone River to the point where  
it is entered by Tyone Creek were surveyed and are described.  
The hills on the southwest side of Lake Louise were also  
examined.



OTHER ARCHAEOLOGICAL REFERENCES (not annotated in this bibliography)

Archaeological Field Studies: Kachemak Bay, Chugach, Hatcher Pass, Lake Louise Study Area. Mary Ann Kegler (1971).

Archaeological Reconnaissance of Denali State Park.  
Alaska Division of Parks (1971), (9 p.).

Old World Affinitites of Archaeological Complexes from Tangle Lakes, Central Alaska. Khabarovsk (1973): a paper read at International Congress on the Bering Land Bridge.

## HISTORIC PRESERVATION PUBLICATIONS FOR ALASKA

### Planning Documents

Alaska's Plan for Management and Conservation of Heritage Resources, 1973-1983, Volume I, Historical Background. Alaska Division of Parks; Anchorage, 1974.

Alaska's Plan for Management and Conservation of Heritage Resources, 1973-1983, Volume II, Inventory. Alaska Division of Parks; Anchorage, Revised 1975.

Alaska's Plan for Management and Conservation of Heritage Resources, 1973-1983, Volume III, Annual Preservation Program 75/76. Alaska Division of Parks; Anchorage, 1975.

### Survey and Studies

\*Alaskan Archaeology: A Bibliography. Miscellaneous Publications, History and Archaeology Series No. 1, 2nd Ed., Alaska Division of Parks; Anchorage, 1974.

\*Alaska's Abandoned Towns: Case Studies for Preservation and Interpretation. Miscellaneous Publications, History and Archaeology Series No. 2, Alaska Division of Parks and Western Interstate Commission on Higher Education, Anchorage, 1972, \$5.00.

Alaska Heritage Resource Survey Index. Miscellaneous Publications, History and Archaeology Series No. 3, Alaska Division of Parks; Anchorage, 1974. Out of Print.

Alaska Heritage Resource Survey: A Photograph Catalogue. Miscellaneous Publications, History and Archaeology Series No. 4, Alaska Division of Parks, Anchorage, 1974. Out of Print.

The Lower Copper and Chitina Rivers: An Historic Resource Study. Miscellaneous Publications, History and Archaeology Series No. 5, Alaska Division of Parks; Anchorage, 1974.

\*Alaska's Historic Roadhouses. Miscellaneous Publications, History and Archaeology Series No. 6, Alaska Division of Parks and Western Interstate Commission of Higher Education; Anchorage, 1974. \$4.00.

Aids to Navigation in Alaska History. Miscellaneous Publications, History and Archaeology, Series No. 7, Alaska Division of Parks; 1974. Out of Print.

Copies of publications listed above with an asterisk (\*) may be obtained in reprint from the Alaska Historical Society, Box 2108, Star Route A, Anchorage, for a handling fee as indicated. Others in print may be obtained, at no cost, from Alaska Division of Parks.

#### IV. ONGOING PROJECTS: RECREATION & ARCHAEOLOGY

Project: Wild and Scenic River Analyses - Little Susitna, Deshka, Alexander Creek.

Contact: Bill Thomas, Area Director; Bureau of Outdoor Recreation; 540 West 5th Avenue; Anchorage, Alaska; 265-5345.

Area: State priority areas 1 and 3a (Little Susitna River).  
State Priority area 2 and Talkeetna Sub-basin (Deshka and Alexander Creek).

Description: The Bureau of Outdoor Recreation, in cooperation with the State as part of their technical assistance program, is providing resource investigations of rivers which have some potential for inclusion in a national system of free-flowing streams. In 1975 immediate assistance was specifically requested for analyses of the Talachulitna and Deshka Rivers. Preliminary studies on these rivers have been completed.

The Bureau of Outdoor Recreation, is in the process of preparing a preliminary report on the Little Susitna River. These analyses are expected to be completed in 1978.

Other rivers within the Susitna Basin included as State priority concerns for possible inclusion as Wild and Scenic Rivers are the Deshka (Kroto Creek), and Alexander Creek.

Status: Little Susitna preliminary report summer 1978.  
Deshka and Alexander Creek will tentatively be completed after the 1979 field season.

Duration: July 1975, Mike Smith, Director of the Alaska Division of Lands requested the Bureau of Outdoor Recreation to assist in the analyses of river-related resources on State lands.

Completion date of all analyses is not known.

Project: Community Recreation Resource Assessment - Willow.

Contact: Nat Goodhue; Division of Parks.

Area: State priority area 1.

Description: During the 1977 summer field season, the Youth Conservation Corps undertook the project, (through thorough field inventories) to identify a system of parks, greenbelts, wildlife habitat, and other areas at the future capital site. These regions would be areas of possible conservation because of their natural features.

The Division of Parks, statewide outdoor planning staff provided inventory forms for existing and potential recreation areas. The results of the YCC assessment are to be forwarded to the Capital Site Planning Commission.

Status: Unknown.

Duration: Summer 1977.

Project: Archaeological Investigation Nancy Lake Area.

Contact: Doug Reger, State Archaeologist; Alaska Division  
of Parks.

Area: State priority area I Nancy Lake area.

Description: The Division of Parks anticipates beginning a historical  
and archaeological investigation in the Nancy Lake area  
during 1978.

Status: No further information is available.

Duration: Summer 1978 ( tentative).

Project: Stephen Lake Archaeological Investigation.

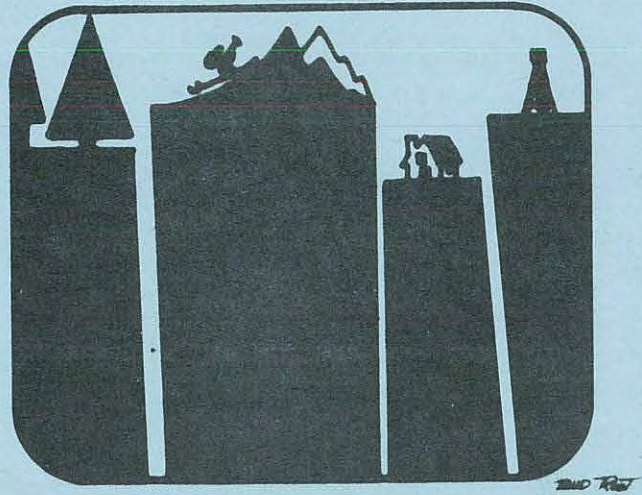
Contact: Dr. Frederick Hadleigh-West.

Area: Stephen Lake is a 4.2 mile-long lake at the head of  
Prairie Creek, 45 miles northeast of Talkeetna.

Description: An archaeological investigation will be made of the  
Stephen Lake area.

Status: For further information on the progress of the investi-  
gation, contact Doug Reger, State Archaeologist,  
Division of Parks.

Duration: Summer 1978.



# land use & land status



CONTENTS: LAND USE & LAND STATUS

	<u>Page</u>
I. INTRODUCTION & SUMMARY	270
II. INDEX	271
III. CROSS INDEX	273
IV. PUBLISHED INFORMATION	274
V. ONGOING PROJECTS	283

## 1. INTRODUCTION & SUMMARY: LAND USE & LAND STATUS

## 1. INTRODUCTION & SUMMARY: LAND USE AND LAND STATUS

At present the status of public land in Alaska is relatively fluid and will remain so until Congress finalizes decisions on the land which is withdrawn for National Forest, Park, Wildlife Refuge and Wild and Scenic River Systems. In the early years of statehood, portions of the Matanuska and Susitna Valleys were included in State land selections because of their attractiveness for human use and settlement. Currently land trades, relinquishments, and reselections are occurring in the Susitna region, and will probably continue as land ownership patterns are readjusted to make better alignments between government objectives and the potential of various natural regions. Because of the nature of the Susitna Cooperative Study, and other work tasks underway by the Department of Natural Resources, Planning and Research Section, there has been no systematic effort to collect all information generated on land use and land status in the Susitna Basin. A land use inventory utilizing aerial photographs and field checking, and a land status mapping project using State and Federal status plats are two projects currently underway that will provide a thorough and systematic approach to any future land management, use or classification actions.

SUMMARY OF FINDINGS - At the time of its completion in 1973, the Federal-State Land Use Planning Commission resource inventory offered a collection of mapped resource information of particular value. A summary of the land classification actions pending (as of the close of the research of this bibliography), are included in the Ongoing Projects section. Within the context of land use planning, classification is perhaps best described as the process which refines general use recommendations in areas where land use activity is imminent. Other information contained in the Land Use/Land Status section includes such reports as solid waste disposal studies, new lands development, and several investigations into the feasibility of a Point MacKenzie seaport.

Again, it should be emphasized, thorough investigation of all available land use and land status studies of the Susitna Basin was not undertaken, but the information contained within should indicate the level of detail and completeness of information to date.

## II. INDEX: LAND USE & LAND STATUS

## II. INDEX: LAND USE & LAND STATUS

### PUBLISHED INFORMATION

1. Development of New Lands in Matanuska-Susitna Borough.
2. 20 Composite Maps of Resource Overlay Collection, Prepared by Joint Federal-State Land Use Planning Commission, Resource Planning Team.
3. Preliminary Feasibility Report, Point MacKenzie Seaport.
4. Point MacKenzie Land Use Report.
5. Solid Waste Disposal Study.
6. Palmer Comprehensive Development Plan.
7. Identification of Phenological Stages and Vegetation Types for Land Use Classification: Final Report.

### ONGOING PROJECTS

1. Land Disposals/Classification Cases - Susitna Summary.
2. Mt. McKinley Cooperative Planning and Management Study.
3. Alaska Coastal Zone Atlas.

Other References: LAND USE & LAND STATUS (not annotated in this bibliography)

Matanuska Susitna Borough Comprehensive Development Plan:  
Phase I, Survey and Analysis (March 1968)  
Phase II, Recommendations.

Kenai Peninsula Borough: Tyonek Comprehensive Plan (September 1972).

McKinley National Park, USDI, Alaska Planning Group.

Knik Arm Highway Crossing, Department of Highways (January 1972).

### III. CROSS INDEX: LAND USE & LAND STATUS

### III. CROSS INDEX: LAND USE & LAND STATUS

#### Page

See GEOLOGY Section for:

Minerals Resources of Alaska and the Impact of Federal  
Land Policies on Their Availability: Coal. 19

Geology and Coal Resources of the Beluga-Yentna Region. 25

See RECREATION Section for:

Hatcher Pass. 244

The Talachulitna, A Wild and Scenic River Analysis. 253



IV. PUBLISHED INFORMATION: LAND USE & LAND STATUS

**Title:** Development of New Lands in Matanuska-Susitna Borough.  
USDI, Alaska Power Administration, February 1970.

**Area:** All of Mat-Su Borough.

**Interest:** Interest Level 2.

**Maps:** Borough land with high agricultural potential,  
(Scale; 1"=1 mile).

Land Ownership maps and land classification maps for the following areas: Palmer, Wasilla, Montana-Sunshine, Horseshoe Flat area, (1"=1 mile scale).

**Tables:** Potential Agricultural Lands - land tracts (shown on agricultural potential map) estimated acres, average soil depths, substratum, lime needs and topography.

**Description:** The report includes: introduction, Borough economy present agriculture, agricultural potentials, actions meriting early consideration, appendices, list of tables and figures. Some detail about climate is included for the special study areas of Palmer, Wasilla, Montana-Sunshine and Horseshoe Flat.

Title: 20 Composite Maps of Resource Overlay Collection, Prepared by Joint Federal-State Land Use Planning Commission, Resource Planning Team. (1973).

(Scale 1:250,000).

Area: Talkeetna, Talkeetna Mountains, Tyonek and Anchorage  
USGS Quadrangles.

Interest: Interest Level 1.

Description: A summary describing the information on each of the overlays is available at FSLUPC.

Information is presented on map overlays by ratings of "potential" or quality", i.e. high, medium or low potential for various resources.

Availability: Alaska Division of Lands Library, or Joint Federal-State Land Use Planning Commission.

**Title:** Preliminary Feasibility Report, Point MacKenzie Seaport.  
Matanuska-Susitna Borough Planning Department, (April 12, 1972),  
(103 p.).

**Area:** State priority area 3a (Point MacKenzie).

**Interest:** Interest Level 3.

**Maps:** 1) (Proposed) Development Plan, MacKenzie Point Region  
(1/2"=1 mile). Other minor statewide maps of lesser  
quality.

**Description:** Advantages and potential industrial users of a Point  
MacKenzie Seaport are summarized. Present Anchorage  
facilities and growth indicators are presented relative  
to the need for another port facility. Natural resource  
development potential (i.e. coal reserves) are discussed;  
as are other nonmetallic metals such as limestone, petro-  
leum. Forest products and metallic mineral potential of  
the region are included. The Matanuska-Susitna Borough's  
economy, interior Alaska's potential, economics of  
transportation types, socioeconomic projections of the  
region, oceanographic information, and a summary and  
conclusions are included in the report.

**Availability** The report is available for check-out from the Matanuska-  
Susitna Borough Planning Department library.

Title: Point MacKenzie Land Use Report. Matanuska-Susitna Borough Planning Department, (October 1974), (186 p. illus.).

Area: State Priority area 3a (Point MacKenzie).

Interest: Interest Level 2.

Description: The unfinished report was prepared to provide data for the proposed port facility and industrial development in the Point MacKenzie area.

These sections are included: justification of the port, industrial park and seaport, recommendations, proposed land use plan, proposed transportation corridor wharf and docking area, population and employment forecast, natural crossing data, proposed international airport, geologic soils and foundation investigations, estimated cost of project development.

Maps and tables: Maps are of generally poor quality, with no scale. They represent, to a large degree, proposed development plans. Other tabulated information such as workforce estimates, wages, salaries, livestock and agricultural inventories are of southcentral region or statewide focus.

Climatological data includes tables or graphs of the following:

- Weather stations and basic wind patterns
- 32° F occurrences
- Temperature data
- Precipitation data
- Wind direction and velocity extremes
- Wind velocity by height
- Wind chill index
- Daylight hours
- Elevation conversion factors
- Tidal ranges at Anchorage
- Comparison of tide data

Most climate data is from established recording stations in Palmer, Wasilla, Anchorage, the Matanuska Experiment Station and Elmendorf Air Force Base.

Availability: The report is available from the Matanuska-Susitna Borough Planning Department Library.

Title: Solid Waste Disposal Study. Arctic Environmental Engineers for Matanuska-Susitna Borough (May 13, 1977) (40 p. illus.).

Area: Entire Mat-Su Borough.

Interest: Interest Level I.

Illustrations: 1) Matanuska-Susitna Borough Population - Time graph.

2) Mat-Su Borough Solid Waste Study site designation map (no scale).

3) Total cost to public for transporting personal garbage and wastes to nearest facility, not including: landfill, bulk transport, or site amortization costs. (Without consideration of capital move.)

4) Same graph as above with capital move initiated in 1982.

5) Total Borough cost to amortize and operate solid waste disposal system without capital move.

6) Same as above with capital move.

7-10) Possible routes or approaches for each of four implementation programs.

Description: The study report includes: introduction, schedule of recommended improvements and cost estimates for these improvements, scope of study, population study, landfill review, solid waste production, 12 plan alternatives, implementation programs of four plans, and discussion of implementation programs.

The contractor spent a considerable portion of study time estimating future population trends in the Mat-Su Borough and developed a computer model to calculate the adjusted population increase and distribution.

Each square mile of the Borough was assigned a growth factor, from 0 to 6, with 4 being the average annual growth rate; maximum population limit for each square mile, based on land usage and geographic limitations was computed.

A detail of population by square miles, and for capital move years 1981 through 1987 is in Appendix B-1 and B-2, available in the Mat-Su Borough offices or at Arctic Environmental Engineers. The appendix is in the form of computer printout that can overlay a mylar map of the Borough.

Title: Palmer Comprehensive Development Plan. Bomhoff and Associates, Inc. updated for the Matanuska-Susitna Borough, (1973), (80 p.).

Area: Palmer.

Interest: Interest Level I.

Maps:

- 1) Existing Land Use (1cm=4,000 feet)..
- 2) Proposed Land Use (1cm=5,000 feet, approximately).
- 3) Commercial expansion plan (no scale).
- 4) Proposed industrial park (1cm=2,200 feet approximately).
- 5) Four maps: Airport development plan, Phase II, Phase III, and an Airport Master Plan.
- 6) Existing and proposed paving (1cm=5,000 feet, approximately).
- 7) Existing and proposed water lines (1cm=5,000 feet, approximately).
- 8) Existing and proposed sewer lines (1cm=5,000 feet, approximately).
- 9) Community facilities plan (1cm=5,000 feet approximately).

Description: The history of Palmer, 1917-1973 is included as a part of the comprehensive plan.

Recommendations are given for strengthening commercial, industrial, residential and airport development plans.

Transportation and utility systems in the city are described and suggestions for development are made.

A cursory description of parks and recreational facilities, and government buildings is included.

The background for planning includes a discussion of physiography and existing conditions.

Suggestions for subdivision regulations and zoning are given; the Borough's power to enact and enforce these regulations is briefly described.

**Title:** Identification of Phenological Stages and Vegetative Types for Land Use Classification: Final Report. McKendrick, J.D., Scorup, P.D., Mitchell, W.W. and Branton, I.C.; Institute of Agricultural Sciences, University of Alaska, Palmer. Prepared for: National Aeronautics and Space Administration (NASA-21833 ERTS-I Project 110-2); (July 26, 1974), (95 p. illus.).

**Area:** Test areas include: the Kenai Peninsula, Matanuska Valley, Susitna Valley, and Bonanza Creek Forest (near Fairbanks).

**Interest:** Interest Level I.

**Maps:** A total of 26 maps--most are color infrared remote sensing, high altitude or aerial views--are included in the text. For purposes of this bibliography, the Susitna and Matanuska Valley maps are listed as follows: (map scales are given if available.)

- 1) A reduction from 1:40,000 scale color infrared ground truth and a display of uncorrected classified data from the Houston locality.
- 2) A visual interpretation of vegetation types from ERTS of the Anchorage and lower Mat-Su Valley areas.
- 3) Spetzman's vegetation map as interpreted by the Land Use Planning Commission (black and white). (Anchorage, Mat-Su vicinity.)
- 4) Aircraft ground truth manually interpreted, (lower Mat-Su vicinity.)
- 5) Photo reductions of vegetation maps prepared by manually transferring computer classified data, ERTS scenes onto a base map via the Zoom Transfer System, (1"63,360 scale).
- 6) Four views of a 530 square mile portion of the Matanuska Valley through the Zoom Transfer System (1"250,000 base map).
- 7) Visual interpretation of vegetation types from ERTS imagery superimposed on USGS base map.
- 8) A computer classified vegetation map showing 500 square miles in the Mat Valley; 10 colors correspond to vegetation types and water.
- 9) A false-color image of the Mat Valley; colors correspond to infrared aerial photographs.
- 10) A photograph of a 1:18,800 scale computer printer-plot map of the Matanuska Valley. This is a symbol-coded vegetation map.
- 11) A geometrically-corrected false-color image for an approximately 500 square mile area in the Susitna Valley.



Tables:

A total of 19 tables are included; a few of the most pertinent tables are listed as follows:

- 1) Listing of 59 potential users of ERTS data for resource management and development in Alaska.
- 2) Multispectral scanner (MSS) for 13 features identifiable in ERTS data from the Matanuska Valley (August 1973); from the Susitna Valley (August 1972).
- 3) Classification accuracies by MSS bands for 13 features from the Matanuska Valley (August 1973); for eight features from the Susitna Valley (August 1972).

Features are as follows: clear water, silty water, tundra, alder and grain fields, scrubby spruce, commercial spruce, mixed forest, deciduous forest, base ground rock (north and south slope), wetlands and grass.

- 4) MSS classification accuracy percentages for similar features for Susitna Valley Area (August 1972). Features are clear water, silty water, wetlands, scrubby spruce, deciduous forest and alder.

Description:

This project was developed to apply ERTS-I sensing technology to the mapping of natural vegetation types and to observing of "green wave" phenomenon (vegetation phenology). Test areas were the Kenai Peninsula, the Matanuska Valley and the Susitna Valley. The objectives related directly to identifying and locating lands suitable for agricultural development.

Vegetation types were mapped at accuracies of 66% to 99% by automated processing of multispectral scanner (MSS) digital data for the Homer, Palmer, Petersville, and Bonanza Creek forest areas.

The methodology is described in accordance with the chronological approach taken by the researchers to a) analyze imagery, b) the problems encountered in relating data to specific ground truth, c) computer analysis of data, d) use of a Zoom transfer Scope to aid their work and e) adapting frequency distributions. The chronological account of the project concludes that the researchers developed a "relatively efficient procedure for mapping Alaskan vegetation types."

The selection of data format, the method of correlating ground truth to the ERTS data and the production of useful "hard copy" products are discussed.

The results of the test data are described for each geographic area, including the success of the test project for future application.

Description: Report conclusions include calculated costs for producing camera-ready, fully colored vegetation maps and false color digital prints. Recommendations for further use of the data are given. The report also includes a list of publications, references and acknowledgements.

Availability: The original text, maps, false-color and color-coded thematic maps from digital data are on file with the Institute of Agricultural Sciences, University of Alaska, P.O. Box AE, Palmer, Alaska 99645.

Copies of text (no maps) are on file with the Matanuska Susitna Borough.

V. ONGOING PROJECTS: LAND USE & LAND STATUS

Project(s): Land Disposals/Classification Cases - Susitna Summary.

Contact Southcentral District, Division of Land & Water Management.

Classification Section, Division of Land & Water Management.

Area: Various areas listed, all within Susitna River Basin.

Description: Because of the number of pending activities related to land disposals by sale and lease, retention for multiple use management, reservation for recreation areas, agricultural lands, and other types of classification actions, this analysis is only an attempt to list locations of pending classification actions.

Further information regarding exact action, area, status, etc. should be obtained from the appropriate land officers, and/or land planning report

Cases pending in the Susitna River Basin include the following:

1) Borough-State three-way trade which would tentatively involve the following locations/ agencies:

- Knik School Site 80 acres, possibly 120 acres to the Matanuska-Susitna Borough for school lands (presently State-owned).
- 160 acres adjacent to the Palmer Plant Materials Center to the Division of Agriculture for possible expansion. (Presently Borough-owned).
- South of Nancy Lake, suitable for recreation-residential development; to the State (Division of Land and Water Management).

2) Eska. Preference rights have been granted to five and possibly more people. The State will adhere to Borough standards in laying out a subdivision for these five homesites.

3) Skwentna Federal Aviation Administration station to be considered as a Skwentna School.

4) Talkeetna area agricultural classification. Classification is delayed at least one year pending timber evaluation to take place this winter (1977-78). Timber sale may precede agricultural classification.

Description: Agriculture classification actions are suspended in the  
(cont) Kashwitna area and near Susitna Station. Another area near  
Shrock Road is considered for an agricultural classification.

5) Cheri Lake subdivision and Shrock Road subdivision;  
pending clarification and interpretation of State lease-  
land law.

6) Beluga area, resource management action.

7) Matanuska-Knik River area, resource management action.

8) Cook Inlet Trade. To assist parties involved in the  
Cook Inlet Land Trade, a complex three-way exchange of  
large plots in the Susitna Basin and on the Kenai Peninsula,  
a brief synopsis of the agreement has been prepared.  
Official maps used in the Land Trade Negotiations are on  
file with the Division of Land and Water Management,  
Title Administrator (1"=1 mile scale). The State-Federal-  
Cook Inlet Land trade in the Susitna Basin includes plots in  
these areas:

The vicinity of Point MacKenzie, Knik, Kashwitna, Chickaloon,  
and the Beluga area.

For detailed information contact the following:

Sue Wolf, Bureau of Land Management  
Carl Mars, Chief of Lands, Cook Inlet Region  
Ron Swanson, Title Administrator, Department of Natural  
Resources.

Status: Many of the above classification actions will occur in the  
next 18 months.

Duration: Ongoing. Classification actions occur constantly. This  
Summary is by no means meant to be all-inclusive of actions  
within the Susitna Basin.

Project: Mt. McKinley Cooperative Planning and Management Study.

Contact: Paul Steucke  
Land Use Planning Commission (LUPC)  
733 West 4th Avenue, Suite 400  
Anchorage, Alaska 99501.

Area: Talkeetna sub-basin.

Description: In October 1974, a cooperative planning effort was initiated by the LUPC involving private landowners, Native corporations, the Matanuska-Susitna Borough, State and Federal agencies. The cooperative management zone on the lands south and east of Mt. McKinley involves important foreground and threshold lands to the national park.

Committees on land use, nonrenewable resources, renewable resources, and recreation, met several times often with participating private individuals, to discuss and prepare background information, concepts and maps for use in preparing the area plan.

Status: Public meetings were held in February and April 1975 at Trapper Creek, Cantwell, Healy, Anchorage and near Healy, Talkeetna and Fairbanks.

Extensive information compiled for the Mt. McKinley Cooperative Planning and Management Committee is on file at the LUPC offices, including reports identifying concerns, problems and conflicts that have resulted or may result from land use activities in the area, and land use maps. The cooperative planning project has been terminated.

Duration: October 1974 through 1975.

Project: Alaska Coastal Zone Atlas.

Contact: Planning and Research Section; Department of Natural Resources  
323 East 4th Avenue; Anchorage, Alaska; 279-5577.

Area: The Atlas includes a total of 96 quadrangle maps; the Tyonek and Anchorage Quadrangles are pertinent to the Susitna River basin study area.

Description: The Atlas is composed of a series of three overlays, each showing resource uses and jurisdiction boundaries. These are as follows:

Land Status - 1) Federal lands; including park, forest, monument and wildlife refuge boundaries. 2) State lands; including parks, game refuges, game sanctuary, recreation areas, critical habitat, tentatively approved/patented land boundaries. 3) Borough/City lands - Borough boundaries, city boundaries, management rights, and tideland patents. 4) Private Lands: Interim conveyance (patented) and tideland patents.

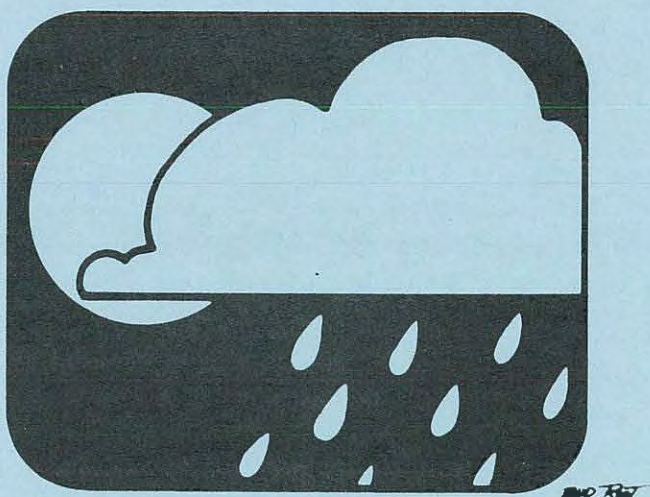
Subsurface Use - 1) Uplands; including boundaries of permits (coal), leases (coal and oil), mining claims, rights-of-way and classification (oil and gas). 2) Tidelands; permits (offshore prospecting), leases (oil and gas), and classifications (oil and gas).

Surface Use - 1) Uplands: including permits leases, public interest lands, and classified lands. 2) Tidelands with permits, leases and classifications.

All of the above information is mapped at 1:250,000 scale suitable for overlaying U.S. Geological Survey quadrangles.

Status: The Coastal Zone Atlas is near completion (October 1977) and four color copies and numerous black copies will be published for distribution.

Duration: February through November 1977.



climate



CONTENTS: CLIMATE

	<u>Page</u>
I. INTRODUCTION & SUMMARY	288
II. INDEX	290
III. CROSS INDEX	291
IV. PUBLISHED INFORMATION	292
V. ONGOING PROJECTS	300

## I. INTRODUCTION & SUMMARY: CLIMATE

## I. INTRODUCTION & SUMMARY: CLIMATE

Climate -- the average weather of an area -- is a basic natural resource that affects and limits many of man's activities. An understanding of this multi-faceted influence is essential in planning for the best use of an area.

In Alaska, most weather record responsibility has been taken by the National Oceanic and Atmospheric Administration (NOAA) and the National Weather Service, both agencies within the U.S. Department of Commerce. Until 1973, the National Weather Service funded a state climatologist; now however, the state climatologist is part of the Arctic Environmental Information and Data Center (AEIDC) where most weather records for the state are maintained. AEIDC serves as a depository for information provided by National Weather Service stations.

The Alaska State Climatologist maintains detailed records of precipitation, maximum-minimum temperature, snowfall and snow depth data provided by a network of "cooperative observers" throughout Alaska.

A number of other agencies maintain climate data, but usually for specialized requirements within their discipline. These include the Forest Service, Soil Conservation Service, National Park Service, Bureau of Land Management and Geological Survey. Of special relevance are the Soil Conservation Service's snow depth and streamflow forecast surveys. The Alaska Agricultural Experiment Station conducts a continuing basic and applied research program including a considerable amount of climatic data in connection with various agriculture related research projects.

Military stations are also maintained by the Scientific Service Office of the Air Force. Wind data are generally the by-product of these aviation weather observations, and were not considered as part of this information gathering effort.

Summary of Findings. A review of information collected reveals that precipitation, local wind, elements of temperature and sunshine data lead the list of climatologic data recorded and analyzed in detail.

Normals, means, extremes and most parameters of weather have been recorded, or may be synthesized from available information depending upon need.

The following type of information assists in defining growing season in the Mat-Su Valley. This type of climatological data may be useful in assessing the agricultural potential of the Susitna Valley:

- Soil temperature
- Heating and cooling degree days
- Growing degree days
- Cloudiness
- Day length on the basis of latitude

Such topics as drought, evaporation and solar radiation have been analyzed in a more cursory manner.

Future projects will include solar energy related research, continuing air quality monitoring programs, and the expansion of weather observation stations.

All of the of the climate information is limited, not by historic record, but more by distribution within the vast Susitna Basin. Records, in some instances, pre-date this century. In general, weather records for precipitation and temperature are continuous from the 1940s. Weather recording stations however, are few and far between.

Index. The title of publications included in this section of the bibliography are listed to assist the user in scanning the information collected.

Cross Index. Relevant material not included in the Climate Section, but described in other sections of this bibliography are referenced in this cross index. These reports include discussions on climate, but primary focus is on some other resource topic.

## II. INDEX: CLIMATE

## II. INDEX: CLIMATE

### PUBLISHED INFORMATION

1. Local Climatological Data.
2. Snow Surveys and Water Supply Outlook for Alaska.
3. Climatic Characteristics of Selected Alaskan Locations.
4. Potential Evapotranspiration and Climate in Alaska.
5. A Summary of Seasonal Temperature and Precipitation Data for the Interior Forested Area of Alaska.
6. Probable Maximum Precipitation and Rainfall-Frequency Data for Alaska, for Areas to 400 Square Miles, Durations to 24 Hours and Return Periods From 1 to 100 Years.
7. The Climate of the Matanuska Valley.
8. Ten Year Comprehensive Plan for Climatologic and Hydrologic Data.

### ONGOING PROJECTS

1. Record of River and Climatological Observations.
2. Weather Satellite.
3. Air Quality Control Plan Revision.
4. Solar Energy Meterology.

III. CROSS INDEX: CLIMATE

### III. CROSS INDEX: CLIMATE

Page

See GEOLOGY Section:

Geology and Ore Deposits of the Willow Creek Mining District. 41

See LAND USE/LAND STATUS Section:

Point MacKenzie Land Use Report. 277

See SOIL Section:

Soil Survey: Susitna Valley Area. 187

Soil Survey: Matanuska Valley Area. 189

See VEGETATION Section:

Alaska's Agricultural Potential. 204



#### IV. PUBLISHED INFORMATION: CLIMATE

Title: Local Climatological Data (Summary of data sheets from U.S. Weather Bureau unpublished files.)

Area: Susitna Valley.

Interest: Interest Level I.

Description: Annual climatological summaries with comparative data; tables give monthly and annual readings for the following:

- 1) Normals, means and extremes.
- 2) Current year meteorological data.
- 3) Average temperature (annual summary since records have been kept).
- 4) Precipitation (annual summary).
- 5) Heating Degree Days (1956-1977).
- 6) Cooling Degree Days (1969-1977).
- 7) Snowfall (1940's-1977).

The above detailed climatological summaries are for Talkeetna Summit, Anchorage, Matanuska, Palmer and Tyonek.

Additional supplemental data for other areas in the Mat-Su basins includes: wind, relative humidity averages, number of days with precipitation, monthly and daily precipitation, daily temperatures, daily soil temperatures, snowfall, snow on ground, and index to all stations with recorded information.

Title: Snow Surveys and Water Supply Outlook for Alaska.  
(Summary of all bulletins) USDA, Soil Conservation Service.

Area: Statewide.

Interest: Interest Level 2.

Description: Snow depth and streamflow forecasts in drainage basins and/or snow courses have been made in March and April since 1963. Measurements have been made three times annually, in March, April and May since 1965; measurements four times annually -- February, March, April and May -- have been made since 1973.

Snow courses in the Matanuska-Susitna drainages are at the following locations:

Alexander Lake	Monahan Flat
Bald Mt. Lake	Oshetna Lake
Chelatna lake	Peters Hills
Clearwater Lake	Sheep Mountain #2
Devil's Canyon	Skwentna
Fog Lakes #2	Talkeetna
Independence Mine	Willow Airstrip
Lake Louise	

Availability: Copies of all snow survey bulletins are on file with the Soil Conservation Service.

Title: Climatic Characteristics of Selected Alaskan Locations.  
University of Alaska, Institute of Agricultural Sciences,  
Tech. Bull. No. 2, (August 1971), (56 p.).

Area: Statewide (data applicable to Susitna Basin).

Interest: Interest Level I.

Description: Climatic data are presented in a series of tables and charts as explained below.

1) Cumulative hours of possible sunshine on the basis of latitude for any location between 50° and 72° No. Latitude.

2) Heating degree days for two temperature levels - "Degree Days 65°" and "Degree Days 35°" are tabulated.

3) The third table provides details concerning the duration of warmth needed in the tabulation of "Growing Degree Days". This table also provides mean weekly cumulative data on precipitation.

4) The need for a well defined "growing season" is vital to agriculture. Therefore, the average number of days that the temperature remains above 20°, 24°, 28° and 32° at specific locations is shown.

5) Other tables show the mean deviations of days from the average dates for (last) spring and (first) autumn occurrence.

Stations within the Susitna Basin evaluated for all the above mentioned parameters include Matanuska and Talkeetna.

Title: Potential Evapotranspiration and Climate in Alaska by  
Thornwaite's Classification. USDA, Forest Service Research  
Paper PNW-71, (1968) (28 p.).

Area: Statewide.

Interest: Interest Level 3.

Description: Climatic records for 315 stations in Alaska, varying in length from 1 year to about 100 years, were manually computed or processed in a computer program. Water balances, temperature and precipitation data were utilized for classifying climates.

Water availability (precipitation) is compared with water need. Where precipitation exceeds water need, the climate is arid. Indices of humidity and aridity are expressed as percentages, and all data are presented in tabular form.

Title: A Summary of Seasonal Temperature and Precipitation  
Data for the Interior Forested Area of Alaska.  
Funisch, R.W.: USDA, Northern Forest Experiment Station  
NOR-9, (December 1964), (50 p.).

Area: Southcentral and Interior Alaska.

Interest: Interest Level 2.

Description: Information on mean growing season temperatures and precipitation, and the magnitude of departure from these means, is presented in tabular form. Data are based on 16 years of record, 1946 through 1961, summarized from U.S. Weather Bureau records of 22 weather stations.

Stations included in the summary lying within the Susitna River Basin are as follows: Matanuska Agricultural Experiment Station, Skwentna, and Talkeetna.

Title: Probable Maximum Precipitation and Rainfall-Frequency Data For Alaska, for areas to 400 Square Miles, Durations to 24 Hours and Return Periods from 1 to 100 years.  
U.S. Weather Bureau, Technical Paper No. 47 (1963), (69 p. illus.).

Area: Statewide.

Interest: Interest Level 3.

Maps: All maps are State maps at a scale of approximately 1/2"=100 miles.

Description: The report was prepared for the Soil Conservation Service to provide generalized rainfall information. The data consists of generalized estimates of 1) probable maximum precipitation, and 2) rainfall - intensity - frequency data for return periods from 1 to 100 years. The results have a relatively low degree of accuracy compared with data presently available.

**Title:** The Climate of the Matanuska Valley. U.S. Weather Bureau,  
Technical Paper No. 27, (1956).

**Area:** Matanuska Valley.

**Interest:** Interest Level 3.

**Description:** This study was based primarily on records of nine weather stations in the valley. General geographical and climatic factors are briefly described. More detailed discussions follow on temperature, precipitation, drought, evaporation, cloudiness, solar radiation and day length, local winds, and eolian soil deposits.

**Availability:** National Weather Bureau or libraries.



Title: Ten Year Comprehensive Plan for Climatologic and Hydrologic Data. Inter-Agency Technical Committee for Alaska, (August 1967).

Area: Statewide.

Interest: Interest Level I.

Maps: All maps statewide, indicating locations of climatological and hydrologic stations or data sites.

Description: All existing (as of date of publication) climatological programs are listed in tabular form for every station in the State. All the existing surface water data collected at 125 regular hydrologic stations, 92 crest-stage gauges, and lake-stage station are tabulated. Sediment, water quality and pollution control water stations are listed, (this includes Air Force potable water sampling sites).

Groundwater data in 1966 consisted of 79 observation wells -- 13 of which were equipped with automatic recorders. The snow survey program and the type of data gathered are analyzed.

Soil moisture and temperature stations were proposed for the Matanuska-Susitna watersheds.

Other program summaries include: glacier studies, tidal estuaries and the continental shelf, centralized data control, and instrumentation and data collection programs.

## V. ONGOING PROJECTS: CLIMATE

Project: Record of River and Climatological Observations.

Contact: Tom Bowers or Dave Street; National Weather Service;  
Anchorage 265-5561.

Area: State Priority area I.

Description: The National Weather Service collects daily data on the height of the rivers and 24 hour precipitation readings from observers. Continuous records vary somewhat from different observers but the following rivers have been monitored:

- 1) Willow Creek (at the highway): August, 1973 - present
  - Daily gauge readings of river height/relative to time
  - 24 hour precipitation reading
- 2) Montana Creek: August 1973 - Present
  - Daily gauge readings (low-flow readings not available)

Daily river stage readings for the past 4 or 5 years from the following rivers:

- 3) Little Susitna River near Palmer (Stage hydrographs available).
- 4) Matanuska River near Palmer (Stage Hydrographs available).

Status: Compilation of hydrologic data summary is in progress

Duration: Ongoing.

Project: Weather Satellite.

Contact: National Climatic Center; Federal Building; Asheville,  
North Carolina 28801; (704) 258-2850.

Area: Statewide.

Description: Satellite imagery taken from the NOAA 5 Resolution  
Satellite is available for Alaska. The imagery may  
be useful in studying the sequence of events of specific  
occurrences, such as outburst lake or spring flooding due  
to ice jams. Imagery is not as detailed as LANDSAT, but  
may be helpful in studying natural occurrences.

Status: Continuous.

Duration: 1974 - present.

Project: Air Quality Control Plan Revision.

Contact: Thomas Hanna, Air Quality Control Supervisor  
Tim Gilmore, Air Quality Control Engineer  
Department of Environmental Conservation  
Pouch O  
Juneau, Alaska 99811; 465-2631 or 465-2629.

Area: Statewide; urban centers.

Description: The Air Quality Control Program is responsible for insuring desirable air quality throughout the State.

The Statewide Air Quality Control Plan is to be updated.  
This plan will describe:

1) Possible actions by local air pollution control programs, the State, the Federal government, and communities for reducing carbon monoxide levels in Anchorage and Fairbanks.

2) Revised Air Quality Control regulations to insure that new air contaminant emission sources will be adequately controlled to maintain desirable air quality.

3) An effective air monitoring network and analysis capability which will accurately and effectively measure Alaskan air quality.

4) An inspection and surveillance program to ensure existing sources will continue to be well controlled.

5) A mechanism to ensure that existing noncomplying sources comply with regulations.

Status: Unknown.

Duration: Initiated in the Summer of 1976.  
Completion of plan update--early 1977.

Project: Solar Energy Meterology.

Contact: Jim Wise, State Climatologist; Arctic Environmental  
Information Data Center; 707 A Street; Anchorage;  
279-4523.

Area: Statewide.

Description: A new study on solar energy is planned which will  
include planning for solar energy collection, and  
studying amount of solar energy on incline surfaces.

The program is designed to evaluate (and establish)  
research and training sites for solar energy meterology.

The program is funded by the Energy Research and  
Development Administration (ERDA).

Status: Unknown.

Duration: October 1977, is the start up date; completion date is  
unknown.

# miscellaneous references

CONTENTS: MISCELLANEOUS REFERENCES

	<u>Page</u>
I. INTRODUCTION & SUMMARY	305
II. INDEX	306
III. PUBLISHED INFORMATION	307
IV. ONGOING PROJECTS	314



## I. INTRODUCTION & SUMMARY: MISCELLANEOUS REFERENCES

## I. INTRODUCTION & SUMMARY: MISCELLANEOUS REFERENCES.

Reference sources used in the course of this information search are listed in this section. Some of these sources are updated annually, and new editions may prove helpful in any future update of this bibliography.

In addition, the miscellaneous information that did not fit the other established subject categories are located in this section of the resource bibliography. As socio-economic information was not included as a resource subject because the data search was focused on natural resources, the collected socio-economic references are included in this section.

## II. INDEX: MISCELLANEOUS REFERENCES

## II. INDEX: MISCELLANEOUS REFERENCES

### PUBLISHED INFORMATION

1. Other Bibliographies/References.
2. Evaluation of Feasibility of Mapping Seismically Active Faults in Alaska.
3. Matanuska-Borough 1976 Census.
4. Clean Energy From Alaskan Coals.
5. Aerial Photography Available from North Pacific Aerial Surveys.

### ONGOING PROJECTS

1. LANDSAT Imagery and Applications in Alaska.
2. Matanuska Electric Association 115 KV Transmission Line.
3. Cartography on the Northern Approaches to Mt. McKinley.

### III. PUBLISHED INFORMATION: MISCELLANEOUS REFERENCES

## OTHER BIBLIOGRAPHIES/REFERENCES

Recreation and Scenic Resources in Alaska: An Annotated Bibliography.  
Pacific N.W. Forest and Range Experiment Station USDA Forest  
Service, General Technical Report PNW-50. (78 p.)  
Availability: Alaska Division of Lands (ADL) library.

Research-in-Progress; A Compilation of Research Project Currently Being  
Conducted by Alaska's State Agencies.  
Legislative Affairs Agency, January 1977.

Organized by subject, the report provides a synopsis of projects, completion  
dates, funding and principal contacts.

USGS Bibliography of the Literature through 1960 on groundwater in permafrost  
regions.  
July 15, 1963; revised version being considered; includes a glossary  
of terms.

Ecoclass - A method for Classifying Ecosystems.  
USDA Forest Service, INT Missoula FSL, January 18, 1973  
A Task Force Analysis.

Ecosym - Progress Report I.  
A classification and information system for management and wildland  
ecosystems: The Conceptual Framework.  
  
Prepared by Lawrence David, Dept. of Forestry and Outdoor Recreation.  
Utah State University, Logan, Utah 84322.

Bibliography of Arctic Water Resources.  
Institute of Water Resources, University of Alaska, College, Alaska  
Hartman, Charles and Caroson, Robert, (November 1970),  
Report No IWR-II.  
Availability: ADL Library.

Alaska State and Local Publications Received in 1976, (also available for 1975  
and a compiled summary of 1964-74 publications.)  
Organized by state and local agencies. Division of Museums and  
Libraries, Juneau.

The Cook Inlet Environment: A Background Study of Available Knowledge.  
Alaska District, Corps of Engineers (August 1972).  
Available: ADL library;  
Report is designed to provide a basis for environmental impact  
statements for activities relating to the exploration, development  
and production of petroleum in Cook Inlet.

List of Reports Issued by the Division of Geological and Geophysical  
Surveys.  
Information Circular II, (Revised October 15, 1976), (16 p.).

Geologic Water Supply Reports and Maps, Alaska.  
USGS (March 1976), (74 p.).

Alaskan Reports in Open Files.  
USGS (December 30, 1976), (44 p.).  
Also list of USGS Open Files, 9 page xerox.

List of Publications, Institute of Social and Economic Research,  
University of Alaska (August 1976), ( 8 p. pamphlet).  
Includes listing of all four of the Institute's publication  
series: The Alaska Review of Business and Economic Conditions,  
ISER Reports, Occasional papers, and Research Notes.

Environmental Assessment of Water Quality Management Plans.  
U.S. Environmental Protection Agency, (January 1977).

Water Pollution in Estuaries and Coastal Zones. A Bibliography with  
Abstracts.  
Volume 2, 1975, September 1976. (Search period covered: 1964-  
September 1976), NTIS, U.S. Department of Commerce/PS-76/0852.

A Review of the Geological and Related Literature of Alaska.  
Sharick, William; USDI National Park Service, Alaska Task  
Force, (August 1972), (5 p.).

Annotated Bibliography of Alaskan Geological, Hydrological,  
Pedological and Climatological Literature.  
Sharick, W.: USDI NPS, Alaska Task Force, (August 1972).  
Sections: Bedrock, Climate, Fossils, General Geology, Glacial  
Features, Hydrology, Maps (General Geologic), Minerals, Permafrost  
Soils, Tectonics, Volcanics.

Bibliography of Community Planning.  
Office of the Governor, Division of Planning and Research, (July 1973).

Current Research Profile for Alaska.  
AEIDC, 1977.  
Organized by research subjects. Project locations are given.  
1976 and 1975 profiles are organized by geographic region.  
Project description, contact person, telephone number, agency and  
duration of research project are given.

Bibliography of Alaska Coastal Management Data Products.  
Department of Natural Resources, Planning and Research Section,  
(1977), (preliminary listing).

Bureau of Mines Publications on Alaska 1911-1976.  
USDI Bureau of Mines, Alaska Field Operation Center (September 1976)  
(47 p.).  
Lists all Bureau of Mine publications by "types" of publications;  
i.e. bulletins, open files, reports of investigation, etc.; includes  
reports in preparation  
Availability: Available from the Alaska Resources Library.

Coal Bibliography for Alaska.

Lyle, William; DGGs Alaska Open File #41.

A Land Use and Land Cover Classification System for Use With Remote Sensor Data.

Anderson, J.R., Hardy, E.E., Roach, J.T. and Witmer, R.E.;  
U.S. Geological Survey Professional Paper 964, (1976); (28 p. illus.).  
A revision of the land use classification system as presented in  
U.S. Geological Survey Circular 671.

Alaska Regional Profiles.

Selkregg, Lidia L. (ed.); Arctic Environmental Information and Data  
Center (1976).

Continental Shelf Development: A Bibliography Background for Alaska.

Alaska Department of Education, Division of State Libraries and  
Museums (1977).

Volume I - Entries by topical headings.

Volume II - Subject, author and title indices.



Title: Evaluation of Feasibility of Mapping Seismically Active  
Faults in Alaska. Gedney, L.D. and VanWormes, J.P.;  
Geophysical Institute, University of Alaska,  
(January 25, 1974), (34 p. illus.).

Area: Statewide.

Interest: Interest Level I.

Description: Through the use of ERTS-1 imagery, the report concludes that most earthquakes in Alaska can be associated with lineaments (suspected faults) which are visible on the imagery. The potential significance of this in terms of construction planning zoning, and seismic risk evaluation is obvious.

Previously uncharted lineaments are compared with seismic activity. Several of these are in the Susitna Basin.

This project applies to present efforts of tectonic mapping and seismic risk evaluation - both important in future planning as the state develops.

**Title:** Matanuska-Borough 1976 Census. Matanuska-Susitna  
Borough Planning Department, (December 1976).

**Area:** Mat-Su Borough.

**Interest:** Interest Level 2.

**Maps:** 1) Matanuska-Susitna Borough Precinct Map (9"=25 miles).  
2) Fire Service Area Map (no scale) shows Butte, Palmer, Sutton, and Wasilla area populations.

**Tables:** 3) Mat-Su Borough population and households by precinct, fire service area and city.  
4) Summary of population; location of employment and members of household; 1970, 1973, and 1976.  
5) Population increase by general age group, 1970-76.  
6) Precinct Population by age.  
7) Number of employed residents within the Mat-Su Borough and location of employment by precinct and city.  
8) (Graph) Number of employed location of employment (1970, '73 and '76).  
9) Households: Time in Borough and time at address by precinct.  
10) Borough: Population history and population projections through 1986 (graph).  
11) Population and related indices by year.  
Past published population figures and sources.  
12) Assembly district population.  
13) Mat-Su Borough Census form.

**Description:** Preceding the maps, tables and graphs is an explanation of the methodology used, past census, geographical census divisions, and summary of results.

Title: Clean Energy From Alaskan Coals. Stanford Research Institute, prepared for the U.S. Energy Research and Development Administration -- Fossil Energy, under contract No. E (49-18) 1516. (January 1976), (214 p. illus.)

Area: State priority areas 4a and 4b Beluga and Chuitna Coal areas.

Interest: Interest Level 2.

Maps:

- 1) Beluga Coal Reserves of Southcentral Alaska; location map (1"=15 mile).
- 2) Topographic Map of the Chuitna Area (1 1/2"=5,000 feet).
- 3) Chuitna Area: structural contours on top of the Capps Seam (1 1/2"=5,000 feet).
- 4) Chuitna Area: structural contours on top of the Waterfall Seam (1 1/2"=5,000 feet).
- 5) Chuitna Area: Interval between Capps and Waterfall Seam.
- 6) Chuitna Area: Isopacs on total strippable coal (1 1/2"=5,000 feet).

The same five maps as listed above, are given for the Capps area. Numerous other illustrations, including port and transportation alternatives, regional map of Cook Inlet and other coal producing areas are included. (42 maps total).

Tables: A total of 66 tables are included. Most are of technical nature with regard to costs, energy consumption, capital investment and processing of the solvent refined coal.

Description: The report presents the results of a project to determine the economic feasibility of operating an Alaskan coal conversion facility that would utilize the Beluga coal reserves.

Central to study was the possibility of obtaining additional energy from Alaskan coal, and need for examination of major technical problems facing development of coal properties and synthetic fuel industries

For the mining, coal conversion, and transportation analyses, the equipment needed for the operation is outlined and cost estimates prepared. The coal mine investment is not included with the coal conversion plant investment because ownership of the resource varies.

Description:  
(cont)

The second phase of the report relates to the feasibility of open-pit mining of about 20 million tons of subbituminous coal per year using the Beluga fields. Included in this section are the following descriptions: 1) location, access and transportation; 2) physical features, climate and vegetation; 3) glacial debris, volcanic capping, the Kenai Formation and structure; 4) coal zones, coal quality, and coal reserves; 5) the mining plan analysis includes construction, operation, reclamation, mining equipment, mine staffing, mine equipment depreciation and mining cost variations.

The third section describes the solvent refined coal (SRC) process. This process is designed to produce a clean solid or liquid fuel that has significantly lower sulfur and ash content and higher heating value than the feed coal.

Objectives of the economic evaluations concerning the transportation and distribution include: 1) examination of alternative port sites; 2) examination of alternative SRC plant sites; 3) various methods of transporting coal to the plant; 4) examination of ship types and sizes; 5) capital and annual operating costs; and 6) ocean shipping costs to Japan and California.

The feasibility of marketing Beluga coal or SRC in California and Japan is presented in separate chapters.

Appendices to the report include recommendations and socio-economic considerations.

Availability: Original returned to Stanford Research Institute.

#### IV. ONGOING PROJECTS: MISCELLANEOUS REFERENCES

Title: Aerial Photography available from North Pacific Aerial Surveys.

Area: Matanuska and Susitna Valleys.

Maps: 1) The Matanuska Valley and the Susitna Valley (a strip 6 to 8 miles wide along the Parks Highway north to Talkeetna: 1"=1,000 feet flown in 1973, 1974 and 1975).

2) The Matanuska and Susitna Valleys: 1"=1 mile 1975 high altitude photos.

3) Matanuska Valley: 1"=2,000 feet - 1975.

4) Matanuska Valley and lower Susitna Valley (Townships 16, 17 and 18N;) 1"=3,000 feet, 1977.

Availability: All above mentioned aerals are available from:

North Pacific Aerial Surveys (Tony Follett)  
800 Cordova  
Anchorage, Alaska

Photos are approximately \$4.00 per contact sheet, with a \$25.00 minimum order.

Project: LANDSAT Imagery and Applications in Alaska.

Contact: N.R.D. Albert, USGS; Branch of Alaskan Geology;  
345 Middlefield Road; Menlo Park, California 94025,  
(415) 323-8111 extension 2025.

Area: Statewide.

Description: Recent work using LANDSAT imagery of the McCarthy, Tanacross and Talkeetna quadrangles, as part of the Alaska Mineral Resource Program (AMRAP), has provided unique geologic structural and surficial reflectivity information relevant to mineral resource assessment. Interpretive techniques include visual analysis of a black and white, singleband LANDSAT mosaic, and various computer-generated color and black and white products. Most of these are now available from the EROS Data Center in Sioux Falls, South Dakota.

The principal objectives of this project are: 1) to furnish the AMRAP personnel with LANDSAT materials for reconnaissance purposes; 2) to provide a unique geologic, structural and tectonic information for each quadrangle; 3) to construct a controlled 1:1,000,000 scale LANDSAT mosaic for each mineral resource assessment area; and 4) to provide additional geologic, structural and tectonic information for each Regional Alaska Mineral Resource Program that may not be available by other methods.

Primary work on the Talkeetna quadrangle presents the following geologic features:

- 1) northeast-trending lineaments that may have controlled the development of Yenlo Hills and Little Peters Hills.
- 2) lineaments that correspond to the Yenta mineral belt;
- 3) concentric circular features in the Dustin Peak area.

Project: Matanuska Electric Association 115 KV Transmission Line.

Contact: Vince McClelland: Lands Project Officer: Southcentral District: 279-7691.

Area: State Priority Area 1.

Description: Matanuska Electric Association has received tentative easements from the State, and anticipates the start of right-of-way clearing in October for a 115 KV transmission line. The powerline would run from Teeland Substation near Wasilla to Willow, crossing the Parks Highway north of Houston.

The project is part of a long-range program by MEA to increase power to the Susitna Valley. Another phase of the program calls for a line to continue to Talkeetna by the fall of 1981.

Projected demand for power in the Susitna Valley and load forecasts -- not including the future capital site -- have been prepared by MEA.

Maps indicating the transmission line right-of-way, the location of an existing 138 KV line, and substation sites are available. The Southcentral District Office has additional detailed information on the MEA proposal.

Status: Matanuska - Sustina Borough approval of the easement is pending.

Duration: Construction is scheduled for November 15, to be completed by April 15, 1978.



Project: Cartography on the Northern Approaches to Mt. McKinley.

Contact: Dr. Bradford Washburn; Museum of Science; Science Park,  
Boston, MA 02114; (617) 723-2500

Area: Mt. McKinley Park.

Description: With the use of laser equipment and prisms, Dr. Washburn is charting the dimensions of Muldrow Glacier. Muldrow Glacier lies on the Denali fault and periodically goes into a two-year surge. The glacier surged from 1910 to 1912 and from 1956 to 1957. The objective of the work is to provide a map of the Glacier at a scale of 1:10,000 of the area most affected by the surges, and provide a topographic base for measurement of future surges.

Other work involves a high quality strip map two miles wide and 17 miles long at scale of 1:20,000, between Wonder Lake and McGonagall Pass.

The work also involves remeasuring the height of Mt. McKinley by utilizing laser and prisms.

Status: Boston Museum of Science Research fund. (No further information available.) Present status unknown.

Duration: Summer 1977.