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Number 2



Alaska OCS
Socioeconomic
Studies Program

Sponsor
Bureau of
Land Management

Alaska Outer
Continental Shelf
Office

Literature Survey

The United States Department of the Interior was designated by the Outer Continental Shelf (OCS) Lands Act of 1953 to carry out the majority of the Act's provisions for administering the mineral leasing and development of off-shore areas of the United States under federal jurisdiction. Within the Department, the Bureau of Land Management (BLM) has the responsibility to meet requirements of the National Environmental Policy Act of 1969 (NEPA) as well as other legislation and regulations dealing with the effects of off-shore development. In Alaska, unique cultural differences and climatic conditions create a need for developing additional socioeconomic and environmental information to improve OCS decision making at all governmental levels. In fulfillment of its federal responsibilities and with an awareness of these additional information needs, the BLM has initiated several investigative programs, one of which is the Alaska OCS Socioeconomic Studies Program.

The Alaska OCS Socioeconomic Studies Program is a multi-year research effort which attempts to predict and evaluate the effects of Alaska OCS Petroleum Development upon the physical, social, and economic environments within the state. The analysis addresses the differing effects among various geographic units: the State of Alaska as a whole, the several regions within which oil and gas development is likely to take place, and within these regions, the local communities.

The overall research method is multidisciplinary in nature and is based on the preparation of three research components. In the first research component, the internal nature, structure, and essential processes of these various geographic units and interactions among them are documented. In the second research component, alternative sets of assumptions regarding the location, nature, and timing of future OCS petroleum development events and related activities are prepared. In the third research component, future oil and gas development events are translated into quantities and forces acting on the various geographic units. The predicted consequences of these events are evaluated in relation to present goals, values, and expectations.

In general, program products are sequentially arranged in accordance with BLM's proposed OCS lease sale schedule, so that information is timely to decision making. In addition to making reports available through the National Technical Information Service, the BLM is providing an information service through the Alaska OCS Office. Inquiries for information should be directed to: Program Director, Socioeconomic Studies Program, Alaska OCS Office, P. O. Box 1159, Anchorage, Alaska 99510.

ALASKA OCS SOCIOECONOMIC STUDIES PROGRAM
LITERATURE SURVEY

PREPARED FOR
BUREAU OF LAND MANAGEMENT
ALASKA OUTER CONTINENTAL SHELF OFFICE

April 1977

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ALASKA OCS SOCIOECONOMIC STUDIES PROGRAM
LITERATURE SURVEY

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Abstract

The Literature Survey is the second of six reports comprising the first year of the Alaska OCS Socioeconomic Studies Program, and establishes the basic information context for the project's other components. The literature reviewed has a broad relevance to OCS development in Alaska and four petroleum development regions: The Aleutian Sea Region; Bering Sea Region; Southwest Region; and the Gulf of Alaska region. Sixteen chapters discuss the most relevant literature, current research and data gaps in the following categories:

Economy	- Cultural Patterns
Oil and Gas Resources	- Subsistence
Population	- Land Use and Land Status
Revenue and Taxation	- Transportation, Communications and Utilities
Government	- Housing
Education	- Archeological /Historical and
Health	Recreational /Scenic Resources
Social Services	- Natural Constraints to Development
Public Safety	

Each subject chapter includes a bibliography listing cited literature. A master bibliography of the 1200 items surveyed, and an index to that bibliography by subject, key word, and OCS region is also included.

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I. INTRODUCTION

Alaska is a vast and sparsely settled state, yet it has been the subject of numerous and diverse studies. A significant body of research has been compiled on the state by federal, State and municipal government agencies, universities, public and private planning and research organizations, companies doing business in Alaska, and individual researchers. Much of the information gathered as part of these research efforts has relevance to the assessment of socioeconomic impacts of OCS petroleum development in the state. Studies range in coverage from individual communities to regions, and to the state as a whole. Data has also been compiled on petroleum development and associated impacts in areas outside of Alaska which provide comparative information for the Alaska experience. The literature survey has been undertaken to determine the availability and applicability of this information for the Alaska OCS Socioeconomic Studies Program.

Focus and Objectives of the Literature Survey

The primary objective of the literature survey has been the development of an information base for future baseline studies, impact assessment and information management tasks of the Socioeconomic Studies Program. The survey has consisted of a review of existing published and unpublished literature in subject and geographic areas relevant to the studies program; identification of current research that could potentially add to the data base in a particular subject or geographic area; and identification of data gaps in available literature. Data gaps include those related to a lack of geographic coverage, out-of-date studies, and the non-congruent methodologies and assumptions of studies undertaken by different researchers at different times.

The literature survey has primarily focused on documents related to the state as a whole and to four petroleum development regions identified in Task 2 of the program: the Beaufort Sea Region, the Bering Sea Region, the Southwest Region, and the Gulf of Alaska Region. These regions provide a framework for data gathering and investigation of socioeconomic impacts of each potential OCS lease sale (Cf. Figures 1-5). The focus on regional information has been related to three principal reasons.

First, the development of baseline information and impact assessment requires data with geographic specificity. Second, a major objective of the literature survey has been the early identification of deficiencies in information required for the Alaska OCS program. Third, additional research on comparative study areas is being undertaken as part of the Comparative Study Analysis.

Although a comprehensive review of both published and unpublished documents was attempted, the review was constrained by difficulties in obtaining access to unpublished materials. In some cases, as for example in the case of land use planning, the most current data is maintained in unpublished form in individual communities, the Department of Community and Regional

Affairs or the State Housing Authority. Access to these materials in individual **communities** was not possible during the time frame of the survey, and access to materials in agency files was not always granted. Similarly, the study team did not have across-the-board access to **current** academic research maintained in the files of individual researchers. It is anticipated that data gathering activities associated with subsequent project tasks will augment and update the coverage of the literature survey, and will also be incorporated into the information management **system**.

Methodology of the Survey

The literature survey includes examination of literature obtained from five major sources:

- Informed Individuals

Individuals with specific expertise in relevant subject **categories** provided information on the most significant literature in particular geographic or subject areas.

- Existing Bibliographies

Bibliographies published in impact reports, regional profiles and other documents were assessed to determine the breadth of coverage of the existing literature, and to identify potentially **useful** works.

- Libraries

The study team also undertook a bibliographic search in a wide range of libraries located throughout the state in agencies, academic institutions, and in the libraries of individual firms.

- Units of Government

Reports, documents and plans were also obtained from specific municipalities, boroughs, the State of Alaska and the Federal government.

- Special Consultants

Consultants were contracted to prepare surveys of literature in certain specialized fields. **Mim H. Dixon**, anthropologist, carried out this work for Cultural Patterns and Subsistence; **David Plaske**, archaeologist, prepared a paper on Alaskan archaeology.

The literature identified through these sources was then organized into sixteen subject categories covering socioeconomic and natural environment data related to OCS development in the state and the four petroleum development regions. This subject organization allowed important literature, relevant current research and identified data gaps to be discussed as discrete topics for the state as a whole and the four petroleum development regions. Some overlap of literature described in particular subject **categories** was inevitable in such areas as land use and housing, or culture

and archaeological resources. Nonetheless, the subject categories provide a framework for organizing both the literature survey and subsequent data gathering tasks in the study.

Types of Information in the Survey

A wide range of data was reviewed in the course of the literature survey, including several types of documents and mapped information. These are summarized below.

- Evaluative data such as environmental impact studies and assessments.
- Statistical data such as census information, labor market data, revenue and taxation information, housing vacancy figures.
- Statutes and regulations such as the Alaska Native Claims Settlement Act, local governmental ordinances and budgetary plans, and land management programs.
- Inventory data, including maps and computerized inventories of archaeological and historic sites, land status **plats**, natural resource inventories and housing conditions.
- Technical documents related to natural factors, such as reports dealing with natural ecosystems and development constraints; or the technology of exploration, production and transport of oil reserves.
- Academic research, such as studies covering historical investigations, archaeological sites, health care needs, educational attainment, native acculturation or economic modeling.
- Comprehensive plans, such as land use plans, community plans, and physical improvement facilities plans for transportation, communications and utilities.
- Newspaper and other periodical articles on issues of current interest, such as crime or loss of wilderness values.
- Comparative studies, such as reports on offshore petroleum development in the North Sea area.

Organization of the Report

This report contains three main sections, as follows:

- Subject Chapters

The Subject Chapters discuss the most useful and current, published and unpublished literature for each of the sixteen subject categories in relation to the state as a whole, and to

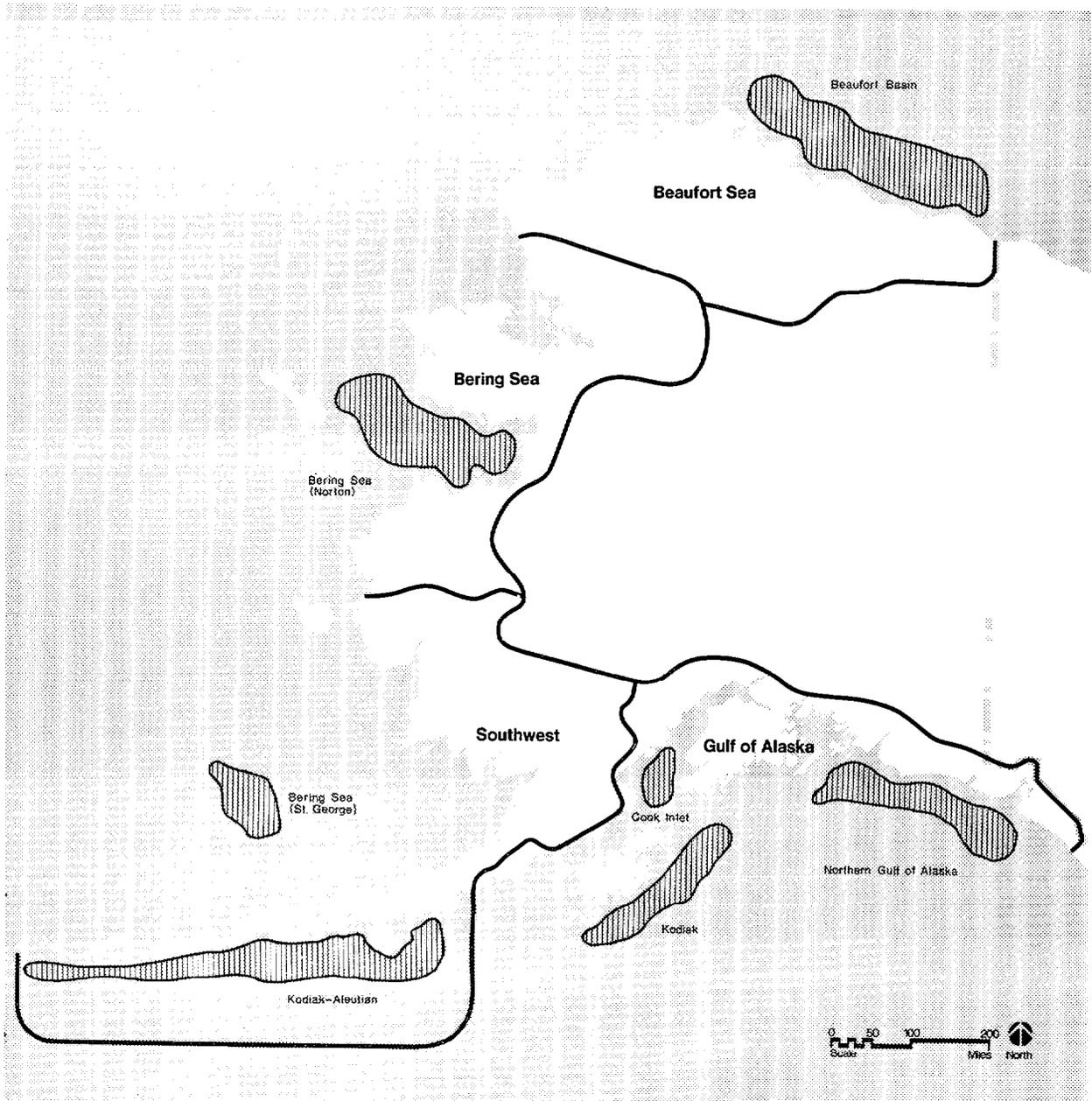
each petroleum development region, Identified current research is described, if applicable, and data gaps for OCS socioeconomic studies are discussed in each chapter. All literature cited in a chapter is included in a bibliography for that chapter,

- Master Bibliography

The Master Bibliography **lists**, in Library of Congress format, all work reviewed by the study team for the literature survey. Among the approximately 1200 documents, those cited in a specific Subject Chapter are indicated with a number keyed to the chapter number.

- o Index to the Master Bibliography

The Index to the Master Bibliography refers key words related to the sixteen Subject Chapters and important subtopics to specific listings in the master bibliography. Six geographical divisions reference literature with statewide, Beaufort Sea region, Bering Sea region, Southwest region, Gulf of Alaska region, or comparative study geographic relevance. Maps of each of the four regions and their key communities are included as guides to the use of the index.



- Regional Boundaries
- ▨ Potential Lease Sale Area

Fig. 1 Literature Regions **and** Potential Lease Sale Areas

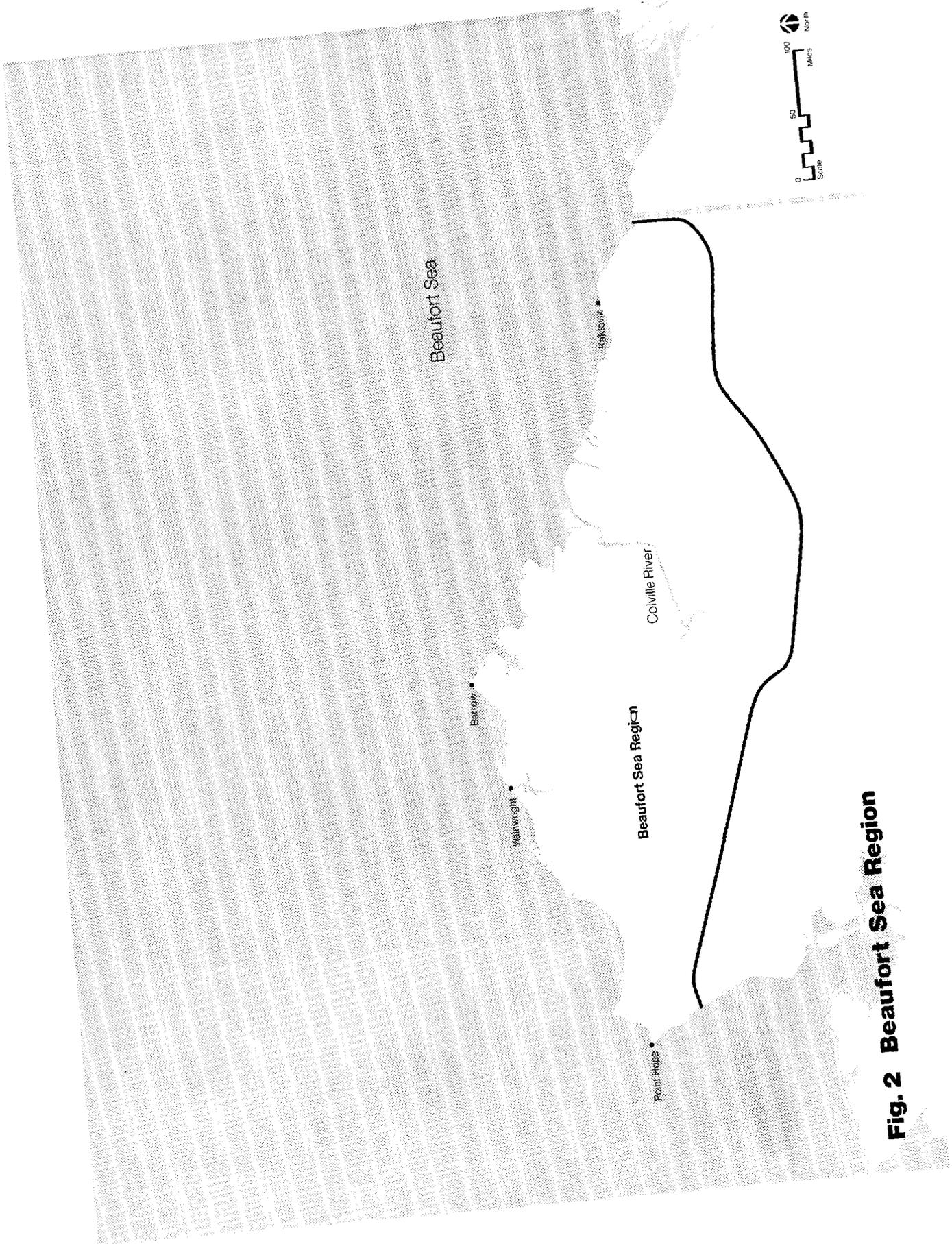


Fig. 2 Beaufort Sea Region

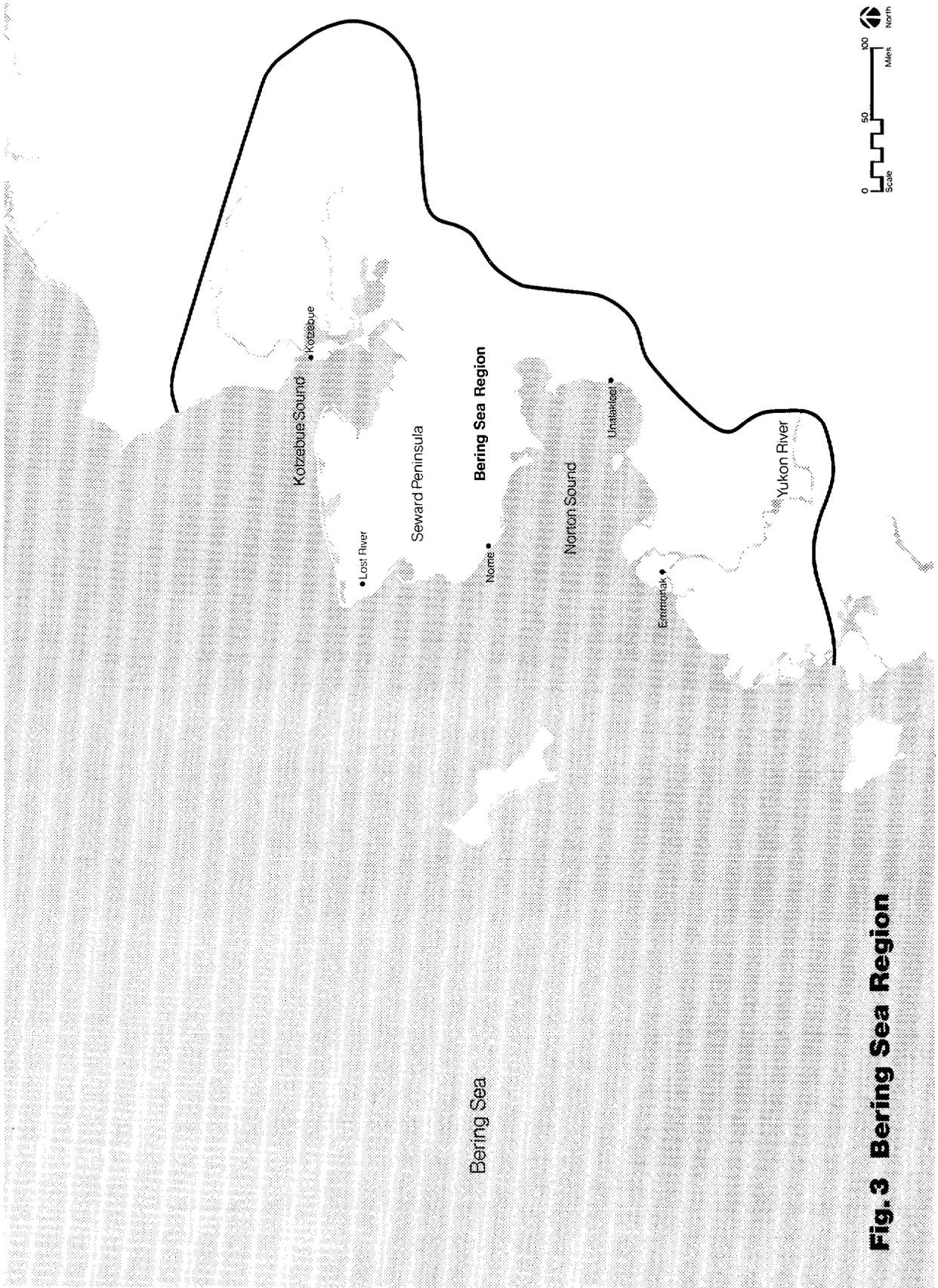


Fig. 3 Bering Sea Region

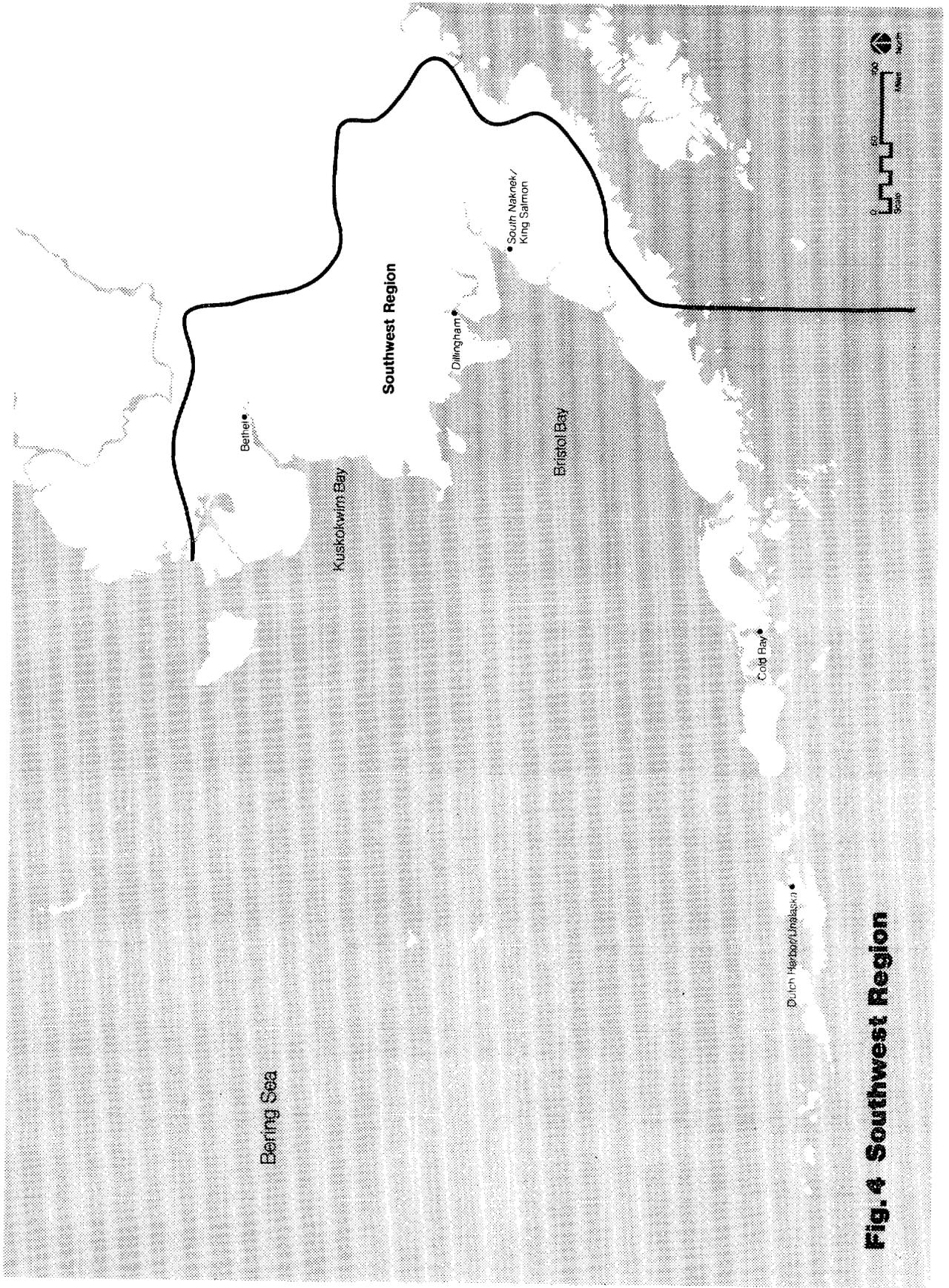


Fig. 4 Southwest Region

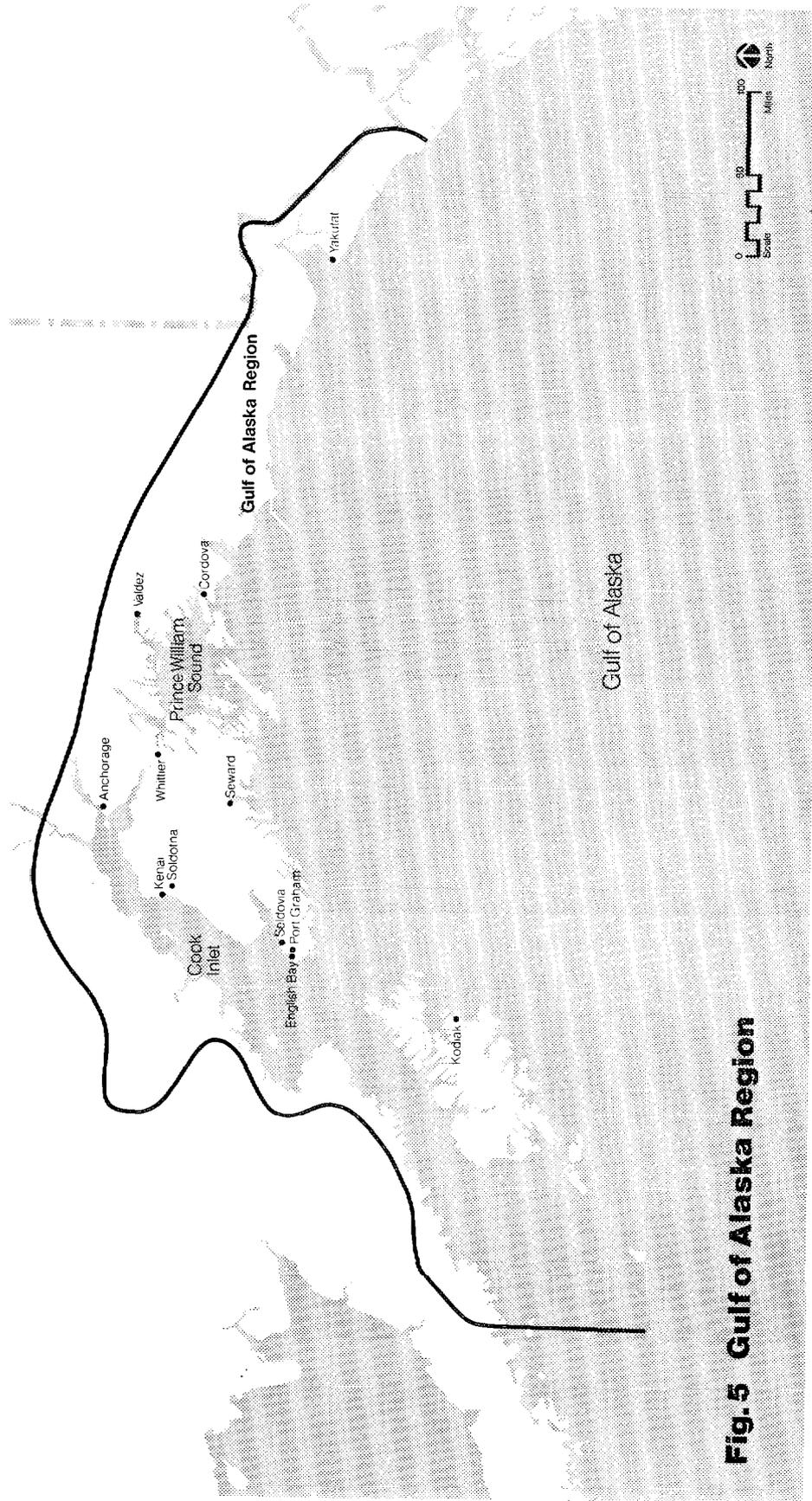


Fig. 5 Gulf of Alaska Region

II. SUBJECT CHAPTERS

This section of the literature survey provides a summary of existing information in sixteen separate subject categories, as follows:

1. Economy
2. Oil and Gas
3. Population
4. Revenue and Taxation
5. Governance
6. Education
7. Health
8. Social Services
9. Public Safety
10. Cultural Patterns
11. Subsistence
12. Land Use and Land Status
13. Transportation, Communications and Utilities
14. Housing
15. Archaeological/Historical and Recreational/Scenic Resources
16. Natural Constraints to Development

The subject categories have been selected to include basic socioeconomic, physical and technical study areas of relevance to OCS petroleum development in Alaska, and to the particular petroleum development regions of the Beaufort Sea, the Bering Sea, Southwest and the Gulf of Alaska.

Each subject chapter highlights the scope, strength and weaknesses of existing published and unpublished literature and current research. Based on a synthesis of these documents, specific gaps and deficiencies in subject literature are indicated. Additionally, a bibliography of references cited in the text of this review is provided at the end of each subject chapter. Each subject chapter is organized according to the following outline:

I. SUMMARY OF INFORMATION SOURCES

- Statewide Literature
- Community/Regional Literature
- Currency of Literature
- Form of Literature

II. LITERATURE WITH STATEWIDE RELEVANCE

III. LITERATURE WITH REGIONAL RELEVANCE

- Beaufort Sea Region
- Bering Sea Region
- Southwest Region
- Gulf of Alaska Region

IV. CURRENT RESEARCH

- Beaufort Sea Region
- Bering Sea Region
- Southwest Region
- e Gulf of Alaska Region

V. DATA GAPS FOR OCS SOCIOECONOMIC STUDIES PROGRAM

- Beaufort Sea Region
- Bering Sea Region
- Southwest Region
- Gulf of Alaska Region

VI. SUBJECT CHAPTER BIBLIOGRAPHY

1. ECONOMY

I. SUMMARY OF INFORMATION SOURCES

The literature on economy encompasses a wide range of issues including employment, economic development, economic **sectoral** analysis, and wage and occupational trends. The data available in these areas are comprehensive and consistently updated. Given the broad spectrum of issues which can be considered part of "economy," the materials available are critical sources for the analysis of socioeconomic impact. However, this information, as complete as it is, is not a sufficient base for an econometric model without extensive modification.

● Statewide Literature

The literature on the economy of Alaska primarily deals with statewide data. Although regional and community data are available, the definitions of regions and specific economic indicators vary from study to study. The most common economic indicators described or projected are employment, income, and the demand for selected private and public goods and services.

The primary literature sources on the economy of Alaska can be classified into three broad categories. First, the most current comprehensive analyses have been those that have been filed in the recently concluded Federal Power Commission (FPC) hearings held to determine which of three competing pipeline companies will be granted the certificate to build the natural gas pipeline from Prudhoe Bay to the Lower 48. The three competing companies (Arctic Gas, El Paso, and **Alcan**, 1974-76) have all made projections of the social and economic impact that their pipelines will have on the economy of Alaska. In addition, the Federal Power Commission and the United States Department of Interior have prepared both environmental impact statements and related background studies. All of these documents were prepared pursuant to the requirements of the National Environmental Policy Act (NEPA).

Second, the State of Alaska and the University of Alaska publish monthly and quarterly reports which give current statistics for certain key economic indicators. The three **primary** state reports are Alaska-Economic Trends, the Alaska Statistical Quarterly, and the Alaska Labor Force Estimates by Industry and Area. All three are published by the Research and **Analysis** Division of the Alaska Department of Labor. In addition, the University of Alaska's Institute of Social and Economic Research (**ISER**), formerly the Institute of Social, Economic, and Government Research, publishes the monthly Alaska Review of Business and Economic Conditions. The contents of the "Alaska Review" vary from month to month, but

often the publication contains useful information not only on economic and fiscal data, but also on the projections of the statewide (and regional) ISER econometric model of Alaska.

A third category of economic studies contains a variety of reports which either are not as comprehensive or not as current as those contained in the first two categories. Human Resources Planning Institute (HRPI) and Urban and Rural Systems Associates (URSA) prepared two studies (one in November, 1974; the other in June, 1976) for the U.S. Department of Labor, Region X, that projected and described the impact of oil and gas pipeline construction on Alaska and on in-migration to Alaska. In addition, there are three outdated but comprehensive reports which contain excellent background material for any current analysis of Alaska: 1) A Forecast of Industry and Occupational Employment in the State of Alaska prepared for the Man in the Arctic Program (MAP) (HRPI and Mathematical Sciences Northwest, April 1 1974); 2) A Study of the Economic and Sociological Impact of Construction and Operation of the Trans-Alaska Pipeline (Mathematical Sciences Northwest and HRPI, September 1972) prepared for the Alyeska Pipeline Service Company; and 3) Alaska Pipeline Report (Tussing, 1971) prepared for the U.S. Department of the Interior.

With the exception of the last study mentioned above (ISER's "Alaska Pipeline Report"), all the major statewide studies discuss, analyze, or project various economic indicators for specified regions or communities in Alaska. The problem is that the regions and the actual statistics projected vary from study to study. This lack of uniformity precludes a comprehensive analysis of regional economic studies in Alaska.

- Community/Regional Literature

Regional economic studies are to be found in recent (1975/1976) environmental impact statements carried out by the State of Alaska and the U.S. Department of the Interior. Focusing on the Beaufort Sea, Gulf of Alaska, and the Lower Cook Inlet, they provide valuable economic analysis and projections related to OCS development.

For the Bering Sea and Southwest Regions, economic information is available in community planning and development studies and land use plans.

- Currency of Literature

The first and third categories of literature sources on economy are somewhat dated. However, the second category contains continually ongoing publications which are issued monthly, quarterly or yearly, thus providing up-to-date economic statistics and information. Community and land use plans are the most recent and current major studies available.

● Form of Literature

The majority of the reports cited above have been printed but have not been published. They may, however, be available on request from the authors of the reports. In addition, the reports put out both by the State of Alaska and ISER have been published and can be obtained directly from the State Department of Labor or from the Institute of Social and Economic Research.

II. LITERATURE WITH STATEWIDE RELEVANCE

The documents and studies submitted to the FPC during the course of the recently concluded natural gas pipeline hearings provide the most current and the most comprehensive analyses of the Alaskan statewide economy. In general, all the documents take as their "baseline" the **economy** of the State of Alaska without including the **Alyeska** oil pipeline. The documents then project the impact of the various alternative gas pipeline routes on the social and economic environment of Alaska. Economic projections are made for the entire period of anticipated pipeline construction and, in many cases, are made for the post-construction or operations and maintenance phase.

The two government agencies involved in the FPC hearing process have been the Federal Power Commission (**FPC**) staff and the U.S. Department of the Interior (**USDI**). The primary FPC reports have been the FPC Final Environmental Impact Statement (**FEIS**, April 1976) and a detailed analysis of potential in-state demand for natural gas ("Evaluating the Use of North Slope Natural Gas in Alaska") by Resource Planning Associates that was commissioned by the FPC staff in 1975.

The FEIS relies heavily on a January 1976 computer run of the ISER econometric model of the State of Alaska. The FEIS projects the impact of both the Arctic Gas and the El Paso pipelines on the economy of Alaska for the period 1977-1990. The FEIS projects assorted economic indicators such as employment, personal income, gross state product, real wages and salaries, and State and local government revenues and expenditures. In addition, the FEIS contains a **summary** of the RPA report commissioned by the FPC, Evaluating the Use of North Slope Natural Gas in Alaska (October, 1975). The RPA report analyzes the likelihood of industrial development **occurring** in Alaska if the State chooses to take its royalty share of natural-gas in kind.

The **USDI's** economic study is contained in the "Alaska and Alternatives" volumes of its FEIS (March, 1976), and in turn these volumes of the FEIS are dependent on a study **written** by Michael Scott, Analysis of Economic and Social Impact of Alternative Routes to the Alaska Arctic Gas Pipeline (December, 1975). The FEIS primarily consists of a descriptive analysis of the **impact** on Alaska of **the major** alternative gas pipeline routes. The detailed, quantitative **analysis** is contained in Michael Scott's study, which is cited in the **FEIS**.

The Scott study relies (as did the FPC **FEIS**) on a computer run of the ISER econometric model* and projects the impact on selected economic indicators for five alternative **trans-Canada** routes and four alternative all-Alaska routes.

The three competing applicants--Arctic Gas, El Paso, and Alcan--have also all submitted studies to the FPC. In general, the studies are fairly current and comprehensive. Arctic Gas has submitted both an Environmental Report (1974) as part of its application and also a separate socioeconomic analysis entitled Analysis of the Socio-economic Impact In Alaska of the Alaskan Arctic Gas Pipeline Company Pipeline (URSA, January 1974). The Arctic Gas studies are relatively out of date. However, the analysis is useful in that it separately describes the baseline (no oil or gas pipeline) economy of Alaska, the impact of the Alyeska oil pipeline, and finally the impact of the Arctic Gas pipeline.

El Paso has also submitted two socioeconomic studies to the FPC--its original application (September, 1974) and a later Mid-1975 Socio-Economic Report (October 1975). El Paso relies on a regression model** of the Alaskan economy developed jointly in 1974 by Human Resources Planning Institute (HRPI) and Urban and Rural Systems Associates (URSA). The El Paso study mainly deals with the projected impact of its pipeline on employment, unemployment, and population. The study does not project income, although it does discuss the impact of gas pipeline construction on public service revenues and costs for selected communities.

Finally, Alcan also has prepared two separate documents for the FPC--Volume I, Exhibit Z-1, of its application (July 9, 1976); and a separate concluding volume entitled "The Alternatives: A Summary of Three Proposals to Move Prudhoe Bay Gas." The original Alcan application does not contain original work but rather relies primarily on an earlier computer run of the ISER econometric model of the Alaska economy. The Alcan Alternatives volume was prepared by a Canadian consulting firm (Lombard North Group, Ltd., August, 1976) and contains no new analysis. Rather, the volume is a summary only and contains concluding comments but not detailed descriptions.

The second group of statewide literature sources are the continuing reports published by the State of Alaska and by ISER. The most relevant State reports are Alaska Economic Trends, Alaska Statistical Quarterly, and Alaska Labor Force Estimates by Industry and Area. These reports are all compiled by the Research and Analysis Section of the Alaska Department of Labor and are the source of most of the primary data used in all the projections of Alaskan economy. The ISER publication, Alaska Review of Business and Economic Conditions, at

* Econometric Model definition: a mathematical statement of the interrelationships of a series of economic variables.

** Regression Model definition: a type of econometric model which attempts to predict future events based upon historical data.

times contains **useful** information and analysis, but in general it is not a source of essential primary economic data. The State reports give monthly or quarterly statistics on civilian labor force, employment (total and by industry), unemployment, personal income, selected banking statistics, and petroleum production. The reports also give average weekly earnings in selected industries. The data supplied in the State reports are required for any state-wide economic analysis.

The Alaska Department of Commerce and Economic Development's Division of Economic Enterprise publishes The Alaskan Economy which analyzes the impact of various changes in the Alaska economy. Each year's publications include the Mid-Year and the Year-end Performance Reports.

This same Division also published the Alaska Statistical Review 1972 with 1975 Supplement which is a summary of basic data on Alaska. Its **primary** value is that of introducing the reader to some of the basic **Alaska** economic and demographic **issues**.

The third category of reports or studies is too disparate to permit general comments that are applicable to all the studies. However, some comments can be made. Human Resources Planning Institute (HRPI) and Urban and Rural Systems Associates (URSA) prepared two reports for the U.S. Department of Labor, Region X. The first is Manpower and Employment Impact of the Trans-Alaska Pipeline (November, 1974). In essence it is a regression analysis of the impact of the **Alyeska** and Arctic Gas **pipelines** on the **state's** economy for the years 1974-1980. The study projects, by year, economic indicators such as total employment, unemployment, labor force, and in addition, employment broken down **by** industrial sector and **by** occupational classification. A second **study** is A Report of the Findings of a Series of 4 Quarterly Surveys of In-Migration to Alaska (June, 1976), and describes and analyzes the pattern of in-migration to Alaska induced by **Alyeska** construction.

Three other studies in this category are outdated but comprehensive. The earliest report is the Alaska Pipeline Report (Tussing, 1971) published in response to a **USDI** request to prepare a study (as required by §102 (c) of the National Environmental Policy Act) of the economic consequences of the **Alyeska** oil pipeline. The report is out-dated and relies upon an **Alyeska** construction timetable and employment estimates that subsequently were changed considerably. In addition, Mathematical Sciences Northwest, Inc., in conjunction with HRPI, prepared two early econometric studies of the Alaskan economy. The first, A Study of the Economic and Sociological Impact of Construction and Initial Operation of the Trans-Alaska Pipeline (September 1972) was the result of a contract let by the **Alyeska** Pipeline Service Company. **Alyeska**, in essence, wanted an economic model of Alaska which could make quantitative projections of a variety of economic indicators. This **study** was later refined and up-dated in a two-volume report entitled A Forecast of Industry and Occupational Employment in the State of Alaska (April 1974). This "Forecast"

was one portion of the "Man-in-the-Arctic Program," a multi-year National Science Foundation-supported research program undertaken by **ISER**.

Additional economic reports have been completed which are valuable sources of information on different aspects of the Alaska economy. Two concern Native issues. One is "Staff Estimates of Native Alaskan Population, Labor Force, Employment and Unemployment by Agency with Area (State) Totals for Years 1966-1977" (**Gazaway**, undated). This report is a series of tables prepared at the regional level. It is not an analytical document. Although it does provide the researcher with baseline data, the data cannot be verified against data from other sources. The second report is Trouble Ahead; Some Questions and Answers About the Future of Subsistence Hunting and Fishing for Alaska Villages (Alaska Native Foundation and David Getches, 1976). This report contains two papers related to the preservation of subsistence hunting and fishing in the face of the changes resulting from passage of the Alaska Native Claims Settlement Act.

A report which is valuable today, though outdated as a result of the recent inflation and economic structural changes brought about by **Alyeska**, is the Regional Cost Indexes, Alaska House Districts (Alaska Department of Community and Regional Affairs, Division of Community Planning, 1974). For each of the State's House districts the document analyzes state salary scales, food and housing combined index, low rent public housing, fuel costs, air freight costs from Seattle and shipping rates. Although the actual costs may no longer be relevant, relative cost comparisons are a useful analytic tool for the researcher.

III. LITERATURE WITH REGIONAL RELEVANCE

● Beaufort Sea Region

A report dealing directly with the Beaufort Sea is the Draft Environmental Assessment of the Proposed Beaufort Sea Nearshore Petroleum Leasing (Alaska Office of the Governor, April 1975). This two-volume assessment of the impact of petroleum development on the Beaufort Sea extends through 1987. The analysis proceeds through three phases: 1) characterization of the environment; 2) description of the proposed action; and 3) analysis of the impacts. With respect to the socioeconomic, this study is drawn from other sources and does not represent an original analysis. Nevertheless, it is a prime source for an initial quantitative approach to manpower and employment estimates and projections.

The Beaufort Sea Region includes Prudhoe Bay; thus any environmental impact statement addressing itself to the impact of transporting the oil or natural gas from the North Slope directly or indirectly discusses Beaufort Sea impacts. Three such recent and comprehensive studies are those presented before the Federal

Power Commission by the three pipeline companies seeking a certificate of convenience and necessity to transport natural gas from Prudhoe Bay to the markets in the Lower 48. The three are Arctic Gas, El Paso, and Alcan. In addition, the U.S. Department of the Interior and the FPC staff each submitted a Final Environmental Impact Statement (FEIS) which supposedly balances the views of the three competing submissions.

The ISER study (relied upon in the USDI FEIS projects) selected economic indicators for several regions, including the Northwest Region, the Southcentral Region, and Anchorage. These regions do not coincide with OCS regions. More importantly, there is no discussion of how the regional models differ (if at all) from the statewide econometric model. The 800-equation statewide econometric model appears not to be applicable to the sparsely populated Beaufort Sea Region, and may not be applicable to the other regions. The FPC FEIS, on the other hand, only makes projections for statewide data. With the exception of qualitative descriptions of impact on crucial cities such as Fairbanks, Anchorage, and Valdez, the FPC FEIS contains no regional projections.

Arctic Gas, in its Analysis of the Socioeconomic Impact in Alaska of the Alaskan Arctic Gas Pipeline Company Pipeline, discusses the Northern Region which consists of the seven northern-most labor markets in Alaska. Arctic Gas' Northern Region is far larger than the OCS Beaufort Sea Region. In addition, there are descriptive analyses of the North Slope Borough, the Arctic Slope Regional Corporation, and four individual North Slope communities (Barrow, Nuiqsut, Prudhoe Bay, and Kaktovik).

El Paso in its application to the FPC describes the Arctic Drainage Area, the Interior Drainage Area, and the South Coastal Drainage Area. Although the Arctic Drainage Area is roughly coterminous with the OCS Beaufort Sea Region, no statistics or economic projections are given for this area. Moreover, the South-coastal Region--although it includes Anchorage, Cordova, and Valdez--does not include Kodiak Island or Yakutat. In short, descriptions of the El Paso regions are deficient either because there are insufficient economic data, or because the regions do not correspond to OCS regions.

Finally, with respect to the Alcan application to the FPC, Alcan breaks down its statewide projections only into Anchorage, Fairbanks, and the Interior. There are no projections or analyses for any regions that even approximate the geographic boundaries of the Beaufort Sea or the Gulf of Alaska Regions.

It must be emphasized that economic discussions in Alaska tend to be on the statewide rather than on the regional level. The data is more consistent, more comprehensive and not subject to disclosure problems on a statewide basis. Local or regional information is often spotty, and as a result of the small samples

subject to rapid fluctuations and structural changes. The formal literature is thus often statistical on a statewide basis and only descriptive at the **local level**. Also given the **kinds of** research funding available, the State and university have focused most of their efforts on statewide analyses since the more region efforts would **be** very costly and subject to far greater **ranges of** error.

● Bering Sea Region

The literature on economics for this region is limited, **and** this literature survey did **not** encounter any studies directly related to the Bering Sea Region. However, a number of different documents cover economic issues as part of their purview. The Kotzebue Comprehensive Development Plan, (Alaska State Housing Authority, 1971) and the Land Use Plan (Alaska Consultants, Inc., 1976) together address some of the economic issues facing the community of **Kotzebue**. The report Elim, Alaska: Its Resources and Development Potential (U.S. Bureau of Indian Affairs, 1975) contains an inventory of the human, natural and physical resource of the Norton Bay Native Reserve.

● Southwest Region

The literature for this region focuses primarily upon Bristol Bay an area whose economy is traditionally based upon the fisheries industry. With the poor harvests of recent years, this predominantly Native area has been the subject of numerous studies in an attempt to establish a series of policies to revive the **local** economy. Documents of relevance are: The Bristol Bay Environment A Background Study of Available Knowledge (Arctic Environmental Information and Data Center and the Institute of Social, Economic and Government Research, 1974); Bristol Bay; the Fishery and the People (Bristol Bay Development Corporation and **Bristol Bay Native Corporation**, no date); Bristol Bay, Its Potential and Development (Carey and Green, 1976); Bristol Bay; an Overall Economic Development Plan (Bristol Bay Native Association, 1976); and Bristol Bay a Socioeconomic Study (Kresge, and others, 1974).

Two documents have been prepared for areas of the Aleutian chain. The first is Socio-Economic Characteristics of Natives Living in the Aleut Corporation Area (U.S. Department of the Interior, Bureau of Indian Affairs, 1974). This report is **regional**, not community by community, in scope and is dependent on 1970-Census material. It is not analytical. The second document is Unalaska Preliminary Development Plan (Brown, 1973) which emphasizes the development of a strong economic base for the community.

A Study of the Impact of Ten Rural Consumer Cooperative Stores (Olson, Gaedeke, and Peterson, 1972) analyzes the impact of ten consumer cooperatives in rural Alaska, the majority of which are in the small villages of the Southwest and Bering Sea Regions.

● Gulf of Alaska Region

Two recent environmental impact statements deal with petroleum development in this area: The Proposed OCS Oil and Gas Lease Sale, Northern Gulf of Alaska, FEIS (U.S. Department of the Interior, 1976) and Proposed OCS Oil and Gas Lease Sale, Lower Cook Inlet, DEIS (U.S. Department of the Interior, 1976). Both are primarily sources for the development of **OCS-related** employment by function and facility, as well as manpower scheduling patterns and population distribution patterns. The other socioeconomic impacts covered are of limited value and reference.

The FEIS is a three-volume assessment of the impacts of **OCS** development in the Northern Gulf of Alaska. **Volume I** includes a description of the proposed action and a description of the existing environment. Volume II includes the environmental impacts of the proposed action, and Volume III includes consultation and coordination among government agencies. The report contains both **original** and secondary source material, and no attempt was made to establish conclusive and quantitative impact assessments. The emphasis of the report is on the physical and biological environments, and concludes that accidental large and chronic low-level oil spills, as well as onshore and offshore construction, may directly affect biological productivity and cause direct conflict with fishing, recreation and shipping activities in the area. The socioeconomic analysis proceeds from a hypothetical OCS development scenario which is biased toward the "worst case" or "high development" profile, with an estimated peak oil production of 200 million barrels/year in 1987, and thereafter declining through 2005.

Mathematical Sciences Northwest in conjunction with first Human Resources Planning Institute and then with Alaska Consultants prepared A Social and Economic Impact Study of Off-Shore Petroleum and Natural Gas Development in Alaska, Vols. I and II (MSNW, 1976). This document focuses upon the visible results of the petroleum development in the **Kenai/Cook Inlet** area. It utilizes both economic base and input-output models.

IV. CURRENT RESEARCH

The primary current research now underway on the Alaskan economy is an econometric study (prepared by Data Resources of Cambridge, Mass., and San Francisco, **Calif.**) which will project the impact of various external or exogenous factors on state oil and gas revenues and on the state economy in general. The final report is due in early 1977. This is the only current research the literature survey has identified in this **field**.

● Beaufort Sea Region

No current economic research has been identified by this literature survey.

- Bering Sea Region

No current economic research has been identified by this literature survey.

- Southwest Region

No current economic research has been identified by this literature survey.

- Gulf of Alaska Region

No current economic research has been identified by this literature survey.

V. DATA GAPS FOR OCS SOCIOECONOMIC STUDIES PROGRAM

- Beaufort Sea Region

The data gaps for the Beaufort Sea Region are substantial and severely limit the ability of the researcher to undertake the normal, formal economic study which **would** be desired in a more populous area. In particular, disclosure regulations actually limit the kind of data available; the change from labor force to work force has implications for the historical series of data on North Slope employment; the shift in the boundaries of the labor market areas of Barrow and Upper Yukon also has unknown implications for the data base.

The overwhelming data gap for the Beaufort Sea Region is the lack of comprehensive, regular, and consistent data on **small communities**. For example, all the data available in the Alaska Statistical Quarterly (cited earlier) for the Barrow Labor Market Area cannot be broken out for each of the communities within its boundaries. Similarly the Census data on communities of less than 2,500 people are much more limited than that available for the larger communities.

Compounding the universal problem of specific data for very small communities is the fact that the communities have a mixed economy. The subsistence component has not been described in detail, much less quantified.

There is little baseline data for the Beaufort Sea Region and for many of its communities. The need for more primary information is essential; it includes the following:

- Total employment statistics (Native and non-Native, Alaska residents and in-migrants);
- e Unemployment figures (Native and non-Native, Alaska residents and in-migrants);

- o Migration inter- and intra-regionally;

- Labor force participation rates;

- Subsistence activities (timing, numbers of people, catches, location, equipment).

- Bering Sea Region

The preceding discussion on data gaps for the Beaufort Sea applies equally for this region.

- Southwest Region

The preceding discussion on data gaps for the Beaufort Sea applies equally for this region.

- Gulf of Alaska Region

While substantial amounts of baseline data exist for this region, data are deficient in the following areas:

- Employment

Research in this area should cover the effectiveness of Native training programs and the Local Hire Act. Also, data on skilled, unskilled and "subsistence" workers drawn into the wage economy should be gathered.

- Unemployment

There is a need for data on what groups of people comprise the unemployed, and how many "subsistence" workers drawn into the wage economy are unable to find work.

- o Migration

Data also are missing on figures and trends for in-migration and out-migration from remote communities affected by OCS development.

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2. OIL AND GAS RESOURCES

I. SUMMARY OF INFORMATION SOURCES

Literature on oil and gas resources, including data that are required to formulate petroleum development scenarios, can be classified according to the following subject area categories:

- Data summarizing equipment utilization, manpower usage and cost experience in petroleum operations;
- Data on the potential resource base, including estimates of oil and gas reserves, reservoir spacing, reservoir size and depths, production and production life;
- Transportation, methods, and costs;
- Data on offshore technology, specifically in Arctic regions, and natural development constraints placed upon offshore development (ice, wind, waves, etc.)

The geographic specificity of such data varies. Baseline data on the key parameters for typical petroleum operations (exploration, production, transportation) pertain primarily to U.S. and worldwide operations from which it is necessary to separate statistics which are peculiar to Alaska.

● Statewide Literature

Literature with statewide relevance on cost and manpower experience is available through State and federal **governmental** agencies covering oil operations in Alaska such as the Alaska Division of Geological and Geophysical Surveys and the U.S. Geological Survey. Such data include regional breakdowns for existing oil and gas areas such as Cook Inlet and projected data for Prudhoe Bay and the **OCS** lease areas.

In addition to published and unpublished reports of such agencies as the U.S. Geological Survey, there are about fifteen petroleum industry journals that provide baseline information on such subjects as production technology, petroleum geology, cost and production statistics. The Oil and Gas Journal, for example is the best current source of cost trends; and other publications, such as Petroleum Engineer, provide details on equipment performance and requirements. Several of these journals (e.g., Offshore) deal exclusively with marine and offshore activities, and provide equipment inventory baselines against which the impacts of future operations can be projected,

The collected papers of the annually-held Offshore Technology Conference examine problems relating to offshore petroleum technology, marine sciences and environmental problems. In recent years these volumes have included an increasing number of papers on the Arctic in general, and on the Beaufort Sea in particular.

● Community/Regional Literature

Oil and gas literature with regional relevance generally falls into the category of resource and geological survey papers produced by federal or State agencies, or discussion of scenarios and associated impacts specific to the Beaufort Sea, the Bering Sea, Southwest and Gulf of Alaska Regions. The latter literature includes studies that address the severe environmental conditions of Arctic oil development; while the former category includes reports that have statewide descriptions of oil and gas resources, though they also contain geographically-specific data that can be related to petroleum development regions.

Published conference proceedings also are a source of data on regionally-oriented data.

● Currency and Form of Literature

Because of the rapid pace of changes in manpower and equipment costs and manpower productivity, primary reliance is placed upon petroleum industry literature that is less than three years old. Thus, the documents reviewed include recent oil and gas resource surveys, scenario and impact studies, periodical literature and conference proceedings.

II. LITERATURE WITH STATEWIDE RELEVANCE

The key literature with relevance to oil and gas resources, manpower and equipment costs and other economic data is found in current reports and studies by State and federal agencies. These agencies have responsibility for revenue, taxes, resource evaluation, employment, housing, environmental quality, business licensing, and permits, etc., and maintain current Alaskan data. Major data sources on **oil** and gas resources are the U. S. Geological Survey and Alaska Division of Geological and Geophysical Surveys.

Much of the available petroleum industry and petroleum resource data have statewide coverage broken down by a variety of regions. However, these data do not distinguish petroleum operations by **category--e.g.**, production, **construction, transport.** Cost data arising from wages, taxes and equipment inventory are reported in a form that avoids disclosure of individual corporate operations, but some disclosure of certain operations, such as the **Alyeska** pipeline, is provided by the requirements of other agencies.

Government data for Alaska are current because of the interest by State and federal agencies in economic conditions which may be affected by petroleum industry activities. Agency projections of future employment may tend to be overstated, however, because manpower productivity in the petroleum industry has historically increased, which reduces employment per unit of oil or gas production.

Oil and gas resource documents include Geological Estimates of Undiscovered Oil and Gas Resources in the United States (Miller and others, 1975), one of the most current **published** data sources on Alaskan oil and gas reserves that includes estimates for Alaskan OCS areas. This paper also provides tentative production schedules and a discussion on the methodology of generating such data.

Energy and Mineral Resources of Alaska and the Impact of Federal Land Policies on their Availability (Klein and others, 1974) is one of several studies completed by the Alaska Division of Geological and Geophysical Surveys on the state's oil and gas resources. This report provides estimates, in graphic and tabular form, on speculative petroleum resources for onshore and offshore sedimentary basins. The resource data are also broken down into land ownership categories and current land uses.

Petroleum development scenarios and impacts are discussed in Onshore Impacts of Oil and Gas Development in Alaska (Resource Planning Associates, 1974), which provides scenarios for onshore and offshore frontier areas of Alaska, and projects the socioeconomic and environmental impacts at the state, regional and community levels. The study also includes an analysis of the cumulative socioeconomic impacts of petroleum development.

Manpower and Employment Impact of the Trans-Alaska Pipeline (Human Resources Planning Institute and URSA, 1974) **predicts** the socioeconomic impacts of **in-migration**, including employment impact by industry and occupations related to construction of the **Trans-Alaska Pipeline** for the 1974-1980 period.

Outer Continental Shelf Oil and Gas Costs and Production Volume: Their Impact on the Nation's Energy Balance to 1990 (A. D. Little, Inc., 1976) is a report for the U. S. Bureau of Land Management which is one of the most important compilations of petroleum development scenarios. The report is an in-depth cost analysis of seventeen nationwide OCS lease areas including those in Alaska, and presents the costs of producing oil and gas, estimates of production under various price scenarios, and the impact of OCS production on national energy supply and demand.

Petroleum economics, specifically baseline cost and facilities, information, is covered in Oil and Gas Journal--Annual Summary of Pipeline Costs and the Oil and Gas Journal--Nelson Index which provides monthly **baseline** information on petroleum facilities costs. Offshore Magazine--Annual World Rig Inventory provides data on the types, numbers,

locations and cost of offshore drilling rigs, platforms, and ancillary equipment. Much of these data are not specific to Alaska, but are useful as basic development economic data.

Onshore petroleum development scenarios are projected for National Petroleum Reserve No. 4 in The Exploration, "Development and Production of Naval Petroleum Reserve No. 4 (Resource Planning Associates, 1976). This report discusses alternative management programs, socioeconomic impacts, and relates potential **environmental impacts** to socioeconomic and cultural impacts.

III. LITERATURE WITH REGIONAL RELEVANCE

● Beaufort Sea Region

Oil and gas resources on a regional level are discussed in Summary Report of the Sediments, Structural Framework, Petroleum Potential, Environmental Conditions, and Operational Considerations of the United States Beaufort Sea, Alaska Area (Grantz and others, 1976). This study provides the most current state-of-the-art summary on geology, petroleum potential, environmental geology (i.e., oceanography, permafrost, etc.), and development constraints of the Alaskan Beaufort Sea.

Oil and gas reserve estimates for the Beaufort Sea region are also

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Regional petroleum development scenarios and related impacts for the **Beaufort** Sea are discussed in Onshore Impacts of Oil and Gas Development in Alaska (Resource Planning Associates, 1975) which is also cited in Section II.

In the compilation of petroleum development scenarios, the technology available to explore, develop and produce petroleum in the unique environment of the Beaufort Sea has to be considered. Similarly, the constraints placed upon petroleum development by the Arctic environment and the sensitivity of that environment to such developments have to be evaluated. Literature which addresses technology and environmental constraints in the region includes Prototype Beaufort Sea Technology Scenario (Clarke, 1976), which considers probable courses of action by the petroleum industry in the Beaufort Sea petroleum development region. These technology scenarios describe, in particular, the feasibility and costs of offshore drilling and producing structures.

Facilities Development, Construction and Operation Problems and Related Environmental Conflicts and Problems of the Ice Stressed Coastal Areas of Alaska (Bretschneider and others, 1970) summarizes environmental constraints and potential impacts related to petroleum development along coasts affected by sea ice, including the Beaufort Sea.

- Bering Sea Region

The Bering Sea Region includes two potential OCS lease sale areas - the Hope Basin (Kotzebue Sound) and the Bering-Norton Basin that straddles the Seward Peninsula. Less is known about the geology and oil and gas resource potential of these areas than the Gulf of Alaska region. Consequently, much of the published literature is general in geographic scope embracing large areas of the Bering Sea, including the St. George Basin and Bristol Bay Basin OCS lease sale areas, described below in the Southwest Region.

Oil and gas reserve estimates for all the Bering Sea basins are contained in Geological Estimates of Undiscovered Recoverable Oil and Gas Resources in the United States (Miller and others, 1975), cited above. This **report gives** the most recent U.S. Geological Survey estimates available-to the public of speculative **reserves**.

The most recent U.S. Geological Survey report concerning the Bering Sea is Preliminary Report on the Regional Geology, Oil and Gas Potential and Environmental Hazards of the Bering Sea (Marlow, 1976). This report describes the geology of the sedimentary basins (11 or more) that underlies the Bering Sea shelf, and speculative oil and gas resources of these basins are appraised. In addition, the report evaluates certain environmental hazards including seismic activity, faulting, sea floor stability, volcanic activity and sea ice.

Data on speculative oil and gas resources of both State and federal offshore areas are contained in two Alaska Department of Natural Resources reports: Energy and Mineral Resources of Alaska and the Impact of Federal Land Policies on their Availability (Klein and others, 1974) and A Study of State Petroleum Leasing Methods and Possible Alternatives (Alaska Department of Natural Resources, 1977). In these reports, resource data is given for the Hope Basin Province (southern Chukchi Sea) and Bering Sea Province (includes Norton, Yukon-Koyukuk and Bethel Basins). These reports, in particular, note the lack of geologic data on the Bering Sea sedimentary basins.

A geologic evaluation of petroleum prospects in the **Bering** Sea is contained in Cenozoic and Mesozoic Petroleum Prospects, Aleutian-Bering Sea Region (Scholl and Marlow, 1974).

General geologic data on the northern **Bering** Sea is Provided by Geology of the Floor of the Bering and Chukchi Seas-American Studies (Creager and McManus, 1967) and in The Bering Land Bridge (Hopkins, 1967). The onshore geology of areas adjacent to the Bering Sea, from Norton Sound south to Bristol Bay, is provided by Preliminary Geologic Map of the Southwest Quadrant of Alaska (Beikman, 1974) which has an extensive reference list. A basic reference source and state-of-the-art literature summary of Bering Sea geology are contained in the multidisciplinary volume Oceanography-of the Bering Sea (Hood and Kelly, eds., 1974), Chapter 26, Cenozoic Sedimentary and Tectonic History of the Bering Sea (Nelson, Hopkins and Scholl,

1974). This volume also provides data on environmental conditions pertinent to offshore oil and gas development, including such subjects as ice conditions, meteorology and geologic processes.

Petroleum development scenarios for offshore areas of the Bering Sea Region including **Kotzebue** Sound and Norton Sound were formulated in the Resource Planning Associates report cited above. This report utilized U.S. Geological Survey oil and gas reserve figures contained in Circular 725 (1975).

Petroleum development scenarios for Alaskan **OCS** areas including the Bering Sea are contained in Outer Continental Shelf Oil and Gas Costs and Production Volume: Their Impact on the Nation's Energy Balance to 1990 (A.D. Little, Inc., 1976).

- Southwest Region

The Southwest petroleum development region includes the potential OCS lease sale areas of the Kodiak-Aleutian Shelf, St. George Basin and Bristol Bay Basin. Information on oil and gas resources and geology of the Southwest Region for the most part is contained in references that geographically include the Bering Sea Region which were cited above. There are limited data with geographic specificity for the Southwest Region in this subject area.

Petroleum Potential of Bristol Bay Basin, Alaska (Hatten, 1971) describes the geology of the Bristol Bay basin which is a structural and sedimentary basin that lies mainly offshore. The basin, which comprises an area of 95,000 square miles, has numerous structural and **stratigraphic** traps in a thick section of mainly Tertiary sedimentary rocks that may contain major fields.

The onshore geology of the Southwest **region** is described in Preliminary Geologic Map of the Alaska Peninsula and Aleutian Islands (Beikman, 1976), a basic reference source that includes an extensive bibliography.

- Gulf of Alaska Region

Petroleum development scenarios are available in the **EIS's** prepared for the Lower Cook Inlet and Northern Gulf of Alaska lease sales, but additional data on oil and gas resources, and petroleum industry economic data for **this** region will be required to provide comparative data (and subsequent base data) for Beaufort Sea development scenarios. In addition, oil and gas resource information is **important** baseline data for the Gulf of Alaska Region. The most current and relevant literature in this **context** is described briefly below.

An Analysis of Future Petroleum Development of the Alaskan Outer Continental Shelf, Northern Gulf of Alaska (Dobey and O'Connor, 1976) provides estimates of recoverable reserves of **oil and gas** and describes a model scenario of exploration and production in terms of offshore equipment and manpower requirements. A similar

and more detailed analysis for the Kodiak Island OCS lease area is contained in An Analysis of Future Petroleum Development on the Alaskan Outer Continental Shelf, Kodiak Area (O'Connor and Dobe, 1976) .

Interim Report on Petroleum Resource Potential and Geologic Hazards in the Outer Continental Shelf of the Gulf of Alaska Tertiary Province Tafker, Burns and Page, 9 provides a regional treatment on the geology, petroleum potential and geologic hazards of the Gulf of-Alaska.

A Summary of Petroleum Potential, Environmental Geology, and the Technology, Time Frame and Infrastructure for Exploration and Development of the Western Gulf of Alaska (Von Huene and others, 1976) describes probably development hazards of the Kodiak OCS lease area. Von Huene's report is oriented to geologic aspects of Kodiak Island OCS development, while O'Connor and Dobe's discussion of the same area is useful for statistics on equipment and manpower requirements.

IV. CURRENT RESEARCH

- Beaufort Sea Region

Oil and gas resource evaluations of the Beaufort Sea by government agencies in preparation for the proposed oil and gas lease sale No. 50 are primarily being conducted by the Alaska Division of Geological and Geophysical Surveys, the Alaska Division of Minerals and Energy Management and the U.S. Geological Survey.

State agencies have recently commenced a resource evaluation and petroleum development scenario analysis of the State's portion of the Beaufort Sea near-shore lease area (i.e., within the **three-mile** limit) . . .

The U.S. Geological Survey is conducting similar studies. In addition, the Geological Survey is conducting various environmental geology and oceanography programs (described in Chapter 16, Natural Development Constraints) that relate to natural development constraints on petroleum development.

- Bering Sea Region and Southwest Region

The principal research organizations outlined for the Beaufort Sea Region are also applicable to the Southwest and Bering sea Regions. These regions are not, however, receiving the research priorities that the Beaufort Sea and Gulf of Alaska are currently experiencing because of existing or projected petroleum development.

In the Bering Sea (including the Bering Sea and Southwest Regions) the thrust of current U.S. Geological Survey research is toward hazard geology, Current geologic evaluations include analysis of shallow and deep geophysical data. Ultimately more offshore **stratigraphic** data from boreholes such as the one recently drilled

in the St. George **Basin** area by a consortium of oil companies are required before the U.S. Geological Survey can provide more detailed resource estimates.

Ongoing offshore geologic studies and resource evaluations, their progress and interim results for Alaskan OCS areas, including the Bering Sea and Southwest **Regions**, are given in the Principal Investigators' Annual **Reports - Environmental Assessment of the Alaskan Continental Shelf, Volume 13, Geology (NOAA-BLM)** - the most recent of which **is** for the year ending March 1976. These are supplemented by quarterly reports.

e Gulf of Alaska Region

Oil and gas resource evaluations of the northern Gulf of Alaska for lease sale No. 39 in 1976 were primarily conducted by the Alaska Division of Geological and Geophysical Surveys, the Alaska Division of Minerals and Energy Management, and the U.S. Geological Survey. Exploratory drilling is now being undertaken by the petroleum industry, with two rigs currently operating in the Gulf and further activity scheduled for 1977. **In** addition,

- The U.S. Geological Survey is continuing its program of resource evaluation and environmental geology/oceanography programs in the Gulf **of** Alaska.
- The Alaska Division of Geological and **Geophysical** Surveys, the Alaska Division of Minerals and Energy **Management** and the U.S. Geological Survey continue to monitor petroleum development in the northern Gulf of Alaska.

v. DATA GAPS

● Beaufort Sea Region

The most important data gap related to this study is the estimate of oil and gas reserves of the Beaufort Sea. Construction of petroleum development scenarios requires detailed geologic information on geologic structures, reservoir size and spacing, reservoir depths and rock porosity.

Other Beaufort Sea region data gaps include:

- Manpower productivity that will be experienced by the industry in OCS operations. Historically, manpower productivity has increased, but in the case of the Prudhoe Bay development and Alyeska pipeline, it is probable that industry is accepting unusually **low** manpower productivity to open a frontier area and gain experience. Since this is a sensitive parameter for projected oil studies, data gathered from current petroleum **acti-**vities in Alaska will have to be monitored.

- o Technology required to explore and develop petroleum resources under Beaufort Sea conditions **is** only in the formative stages. Consequently, the literature primarily relates to experimental technology, and the technology model **input** into the formulation of petroleum development scenarios would be speculative. The literature relating to Canadian experience in the Beaufort Sea and Arctic **islands will** be important in assessing this data gap.
- Socioeconomic data on the projected participation, investment and concerns of the Native population in Beaufort Sea petroleum development is required. Data requirements include Native training programs, Native hire and other socioeconomic impacts related to OCS development.

- Bering Sea Region

The geologic data base for the Bering Sea Region is substantially less complete than that available for **other** regions and is insufficient to make a more detailed petroleum resource evaluation than that currently available in U.S. Geological Survey Circular 725.

In addition to more detailed data on the geology and potential oil and gas resources and hazards of the Bering Sea Region, other OCS petroleum development-related data requirements include:

- Detailed petroleum development scenarios to predict socioeconomic and environmental impacts including those **at** the local community, regional and statewide levels.

Possible scenarios for the Bering Sea Region may have to consider the construction of a pipeline from Naval Petroleum Reserve No. 4 or the western Beaufort Sea to a port along the western Alaska coast (e.g., **Nome**) where sea ice conditions are less severe.

- Southwest Region

Lack of detailed geologic data is an information gap in the Southwest Region. Among the areas of petroleum interest within the region, more data is available for the Bristol Bay and St. George Basins than the Kodiak-Aleutian shelf.

The lack of detailed petroleum scenarios is a data gap.

Geologic hazards and related problems presented to OCS development, especially the seismic activity of the Aleutian shelf area require further study.

- Gulf of Alaska Region

Although data on the oil and gas resources of the Gulf **of** Alaska are not required to directly formulate scenarios (which is not within the scope of the present study), such data is needed to compute statewide economic and impact data. In comparison to

other regions, more data are available to provide better resource evaluation for the Gulf of Alaska. However, much of these data remain proprietary as the **industry commences** exploration after the 1976 lease sale.

The current exploratory program and subsequent developments in the northern Gulf of Alaska **will** provide an important comparative data base (e.g., exploration and development costs, technology requirements, environmental and socioeconomic impacts) for the other Alaska OCS areas scheduled for lease sales.

In addition to more detailed data on potential oil and gas resources off the Gulf of Alaska, other petroleum related data requirements include:

- A detailed petroleum development scenario or scenarios **to** enable the prediction of socioeconomic and environmental impacts in the Gulf of Alaska and statewide is required. Such scenario(s) **would** include evaluation of such factors **as** exploration and development costs, manpower productivity, national and international petroleum supply and demand, speculative resources, technology requirements, environmental constraints, and local resource demands.
- A coordinated multidisciplinary program is required to monitor petroleum exploration and subsequent development phases **in** the Gulf of Alaska. Such a program would provide information on the economic, social, and environmental impacts of such development, as well as the technology and resource requirements of Alaska **OCS** petroleum development. These data would serve as baseline data to better predict, **plan** for, and minimize impacts in subsequent Alaska OCS development.

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3. POPULATION

I. SUMMARY OF INFORMATION SOURCES

Population as defined by the literature survey is limited to demographic studies. Although the raw data in this area are often available, there is a paucity of analytic material which attempts to explain and project population changes.

● Statewide and Regional/Community Literature

The information sources for population are primarily derived from the U.S. Census (Bureau of the Census, U.S. Department of Commerce). Since censuses have been taken historically every ten years, they provide baseline information on population changes in Alaska for the state as a whole, for regions **and** for localities. However, they do not enable any projections to be taken into account for specific impact due to such developments as the **Alyeska** pipeline or outer continental shelf petroleum development. In the future, the Census is to be taken every five years instead of every ten years, thus allowing more consistent monitoring of population shifts. This change is **especially** important given Alaska's small population base and its significant changes due to natural resource development and/or defense expenditures.

In addition to the Census, there are other population studies which are more specific in nature and not related to the entire state or its population. The following subjects are covered in various specialized studies:

- 1) the changing migration patterns and population patterns of Alaska Natives throughout the state;
- 2) specific studies of growth in localities such as Anchorage or Fairbanks;
- 3) the changing patterns of labor market needs and occupational demands resulting from population growth and shifts in the age composition of the population;
- 4) analysis and projection of educational needs for school districts, **community** colleges, university systems, and day care centers based on changing population patterns;
- 5) specific projections of pipeline impact organized by the various regions and by the state in anticipation of and during the impact period of the **Alyeska** oil pipeline; and

- 6) individual environmental impact statements filed by applicants for various petroleum development or transportation systems with projections of future population impact resulting from their particular project. Such environmental impact statements are submitted to the State, the federal government, and some regulatory agencies of the federal government.

Certain individuals in the state have undertaken private studies of population characteristics which are not directly demographic in nature but which have a demographic component. Many of these are researchers in the areas of mental health or social services or education. Projections of future impact, demand or present need in any of these three areas are **very dependent** on accurate estimations **of** population **shifts** and trends. Therefore, studies carried out in these areas give some indication of population change. Often these studies are not statewide or **even** regional in nature. They are often focused on particular localities or particular groups of people scattered in various parts of the state.

● Currency of Literature

In addition to the sources cited above, the Alaska Department of Labor, Research and Analysis Section publishes annual population data. As a component of their labor data, they attempt **to project** population for the various regions of the state. Beyond **the presentation** of population statistics, there is very little **analytical** work done on the **implications** of population shifts or the causation of population shifts. The literature prepared by the State tends to be almost entirely concentrated in different forms of **presentation** or organization of Census materials or projections of future population.

● Form of Literature

All of the sources listed above are published. Some are **published** in bound volumes; others, like the U.S. Census materials, are available from summary tapes.

II. LITERATURE WITH STATEWIDE RELEVANCE

Materials with statewide significance **for** population are primarily derived from the Census, the only single source consistently **gathering** statewide population data. Of historical interest is the **tenth Census of Population, Industries and Resources of Alaska (I. Petroff U.S. Census Office, 1882)** which provides a historical baseline for Alaska. Since that time, Alaska has been the subject of a Census **every** ten years. Therefore data on population can be obtained in **historical** sequence from the U.S. Department of Commerce, Bureau of **the** Census. Much of that material is not published in a readily accessible form; rather it must be gained from either census tapes or microfilm. The

Alaska Department of Labor, Research and Analysis Section does provide printed material on the 1960 Census and the 1970 Census. The Census preceding **1960 was** taken during the period of time when Alaska was a territory, not a state, and therefore the information is not as reliable.

The 1970 Census of Population has been the base of two documents and projections published by the Bureau of the Census or by the State of Alaska. The Alaska **Department of Community and Regional Affairs** published Selected 1970 Census Data for Alaska Communities (1974), providing data of direct relevance to local and regional planners attempting to establish statistical baselines on local demographic conditions. More recently the Bureau of the Census published "Current Population Reports: Population Estimates and Projections. Series P-25, No. 638" (**1976**) which presents total population estimates for July 1, 1974 and provisional estimates for July 1, 1975. The summary projections are for all census divisions and the SMSA of Anchorage.

The Alaska Department of Labor publishes Current Population Estimates by Census Divisions. This document has been published annually since 1972, and is current **through** 1975. It **provides** basic data on population-for each of the state-census divisions--the boundaries of the census divisions are those of the 1970 Census. These documents are by far the best and most current population estimates provided by the State of Alaska. They provide a more accurate index of the state than any document published by the U.S. Bureau of the Census.

Current Population Estimates by Labor Market Area (Alaska State Department of Labor, Research and Analysis Section, 1974) provides estimates which attempt to take into account the population impact resulting from the **Alyeska** oil pipeline. The population projections are estimated for the five years of direct **Alyeska** impact plus the first initial years of pipeline operation. Data is provided on a statewide basis, as well as for five regions of the state: **South-central**, including Anchorage; Southeast; Southwest; Northwest; and Interior. In addition to population projections this document also projects work force, employment and unemployment estimates for Alaska and the five regions.

Applying the population projections to labor and employment issues has been a consistent effort of the Alaska **Department** of Labor. Alaska's Manpower Outlook (Alaska Department of Labor, Research and Analysis Section, 1970) is the product of an ongoing effort, subsequently de-funded and discontinued. It is an effort to provide long term analysis of the occupational demands and labor needs of the state, given certain population shifts and economic projections. Although outdated, it is still a solid baseline study which has not been equaled in any subsequent work by the State.

Of particular significance, given the location of much of the potential OCS development (particularly in the Beaufort Sea) is Alaska

Manpower Resources (Alaska Department of Labor, Small Communities Program, November 1972). This series of volumes attempts to analyze the manpower capability or availability in the smaller communities of the state. This entire effort is focused on the eventual use of **Alaska** Native labor for the **Alyeska** pipeline construction effort. As a result, the heaviest concentration of study is on areas where Native population predominated. The separate volumes of this document cover: 1) the East Central region which includes **Valdez**, Glenallen, and Tok; 2) the Upper Yukon; 3) Barrow-Wainwright; 4) the Northwest area; 5) the **Yukon-Koyukok** area; and 6) the **Wade-Hampton** area. The quality of information provided in each of the documents is very uneven. Often there is not even consistent statistical information for each of the six areas. Nonetheless, it is the first effort by the Department of Labor to analyze the particular manpower capabilities of the rural areas of the state of Alaska.

Some specialized population studies have been developed by a variety of different sources. Each of them is specialized and is not necessarily comparable to any of the others. Some are dependent on Census information; others are research documents by the individual authors. Among these documents is The Alaska Population Growth and Movement 1960-1973 (**Seiver** and **Fison**, University of Alaska, ISEGR, April 1975) which is a demographic analysis of the population shifts in the state. This is done on a gross scale, and no attempt is made to localize or regionalize the population shifts. The study divides the state's population by race and by military or civilian occupations. The percentage changes between 1960 and 1970 are documented, and some analysis is made. Age changes are also documented over the two census periods. Special tables are presented for the following regions: 1) statewide; 2) Northwest; 3) Southwest; 4) Southeast; 5) South Central minus Anchorage; 6) Anchorage; 7) the Interior minus Fairbanks; and 8) Fairbanks.

Three recent reports focus on the demography of the Alaska Native. The first is Staff Estimates of Native-Alaskan Population Labor Force, Employment and Unemployment by Agency with Area (State) Totals for Years 1966 to 1976 (Gazaway, undated). This document provides a series of tables prepared at the regional level on total Native population, by sex and age cohorts, number employed and unemployed, income, etc. The BIA regions are Bethel, Anchorage, Southeast, Nome and Fairbanks, and do not directly correspond to OCS regions.

The second document is completed but not yet published by the Joint Federal-State Land Use Planning Commission. It is entitled "The Evolving Pattern of Rural Alaska" (**Alonso** and **Rust**). This study analyzes the patterns of migration between small villages and the larger towns in the rural, predominately Native areas of Alaska. The information in this volume is basically a reworking of census data to provide the basis for various theories of migration patterns and causes.

The third document is "The Problems of Alaska's Urban Native People" (Kish Tu, 1975). This study focuses on the problems encountered by the 25% of Alaska Natives who have migrated to Alaska's larger communities. The demographic information contained in this volume is secondary to the discussion of the major problems of employment, housing and services.

An additional report is "Population Trends of Alaskan Natives and the Need for Planning" (Joseph Bloom, American Journal of Psychiatry, February 1972). This study traces some of the factors that have affected the population distribution of Alaska Natives, particularly the recent population explosion and the percentage growth of the youth. In addition, this population analysis extends to implications for the system of medical care provided by the government to the Alaska Natives.

A document that is directly focused on the Native **population** trends of the state is Alaska Native Population Trends and Vital Statistics, 1950-1985 (George Rogers, University of Alaska, ISEGR, 1971). This study utilizes **Census** materials for 1950, 1960, and 1970 to project general population trends in Alaska, to identify significant Native population movements within the regions of the state, and to estimate total Native populations and the various vital statistics of that group.

Many of the publications on population were developed in the early 1970s partially as a result of the impending development of the **Alyeska** pipeline. One study focused on the implications of **pipeline** construction for the Native-population is A Study of the Impact of the Proposed **Trans-Alaska** Pipeline on the Alaska Native Population (Schlickheisen, **Consolvo**, and Raymond, July 1971). Not simply a copy of the Rogers document cited above, this publication is an attempt at profiling the Alaska Native communities and the living conditions that face the people who live in those communities. Particular attention is paid to the conditions of housing, sanitation, health, education, and sources of livelihood. This is not an attempt to focus solely on population, nor **is it an** analytic document in terms of population trends and shifts. The only document that does discuss Native population trends is the 1971 Rogers study cited above.

A final document which lacks the depth of either the Rogers or the **Schlickheisen** document is a statewide survey of Alaska's smaller communities and villages, Alaska Community Survey (Alaska Department of Community and Regional Affairs, 1972). This is a summary of very brief reports on 271 different villages in Alaska. The information is not at all consistent in its quality, and the variety prevents any consistent use of materials for research. Nonetheless, the survey provides an overview of the various villages throughout the state.

In addition to the reports summarized above, two recently published environmental impact statements cover large segments of the state, although not every region. The publications are: 1) Final Environmental Impact Statement (Federal Power Commission, April 1976) and 2) Alaska Natural Gas Transportation System Final -Environmental Impact Statement--Alaska Volume (U.S. Department of the Interior, March 1976). Both of these studies involve environmental analysis of the impact of natural gas pipelines from Prudhoe Bay. Each evaluates the impact of three different routes from Prudhoe Bay: first, the Arctic Gas route going due east from Prudhoe Bay to the Canadian border; second, going parallel to the Alyeska oil pipeline and terminating in Cordova in Prince William Sound rather than Valdez as does the oil pipeline; and third, a route that parallels the Alaska Highway and enters Canada near Northway Junction. Both documents are multi-volume compendiums of all data on environmental impact. Socioeconomic analysis is only one small component of these volumes and population is only one small detail. Thus they cannot be said to be in-depth studies of population nor heavily analytic.

Another study concerned with population and pipeline impact is the Alaska Pipeline Labor Impact Study--A Report of the Findings of a Series of 4 Quarterly Surveys of In-Migration to Alaska (Human Resources Planning Institute and Urban and Rural Systems Associates, June 1976). Demographic findings include the fact that about 56,000 migrated to Alaska in 1975, most from the Far West. Of this number 31% headed for Fairbanks, 21% to Anchorage, 20% to the Southeast, and 13% to the North. Various socioeconomic impacts of this population influx are analyzed in the study.

III. LITERATURE WITH REGIONAL RELEVANCE

o Beaufort Sea Region

Population information on the Beaufort Sea impact area is not very complete. Some of the documents cited previously cover the northern part of Alaska, particularly the North Slope, as one of many regions discussed. But there is no single set of documents that exclusively investigates the population shifts, changes and trends of the North Slope area. Often many of the documents include Fairbanks within the area of study or they include parts of the Northwest region which is outside and too far to the west and south for Beaufort Sea impact.

Nonetheless, five sources directly address the issue of population concerns on the North Slope. An Analysis of the Socioeconomic Impact in Alaska of the Alaskan Arctic Gas Pipeline Company Pipeline (Urban and Rural Systems Associates, 1974) is part of the **submission** of Arctic Gas' environmental report to the Federal Power Commission. As one of many areas covered, the URSA volume discusses the population impacts on the North Slope, although it does include the Fairbanks area as part of the northern region of Alaska. Particular attention is paid to the shifts in population due to in-migration and out-migration resulting from the

oil pipeline. The Barrow Regional Plan (Dupere Associates) includes a section on economic and social considerations. It utilizes the standard population information provided by the Census and the Alaska Department of Labor. It does not include trends from pipeline impact.

The other two sources relevant to the North Slope are academic in their orientation. Migration and Psychopathology of Eskimo Women (Joseph Bloom, American Journal of Psychiatry, April 1973) reports on a series of studies of the migration patterns of Eskimo women as they move from Native villages in the North Slope area to the cities and larger rural towns such as Barrow. The other source is a chapter, "Prehistoric Population Growth and Subsistence Change in Eskimo Alaska," in the book, Population Growth: Anthropological Implications (B. Spooner, ed., 1972). This chapter traces three major cultural shifts as shown by archaeological evidence. The work is particularly significant because it ties together the study of technological change and the resultant population shifts and growth among the Alaska Eskimos.

The Draft Environmental Assessment of the Proposed Beaufort Sea Nearshore Petroleum Leasing (Alaska, Office of the Governor, 1975) is a two volume work with only three pages devoted to population analysis (pp. 363-366).

Finally, the Fairbanks Pipeline Impact Information Center continues to provide monthly reports on the population changes in Fairbanks that have resulted from the construction of the **Alyeska** pipeline and the various increases and decreases in work force. Though not scientific in nature and certainly not able to provide retrospective views of population changes, these studies provide a good source of material to monitor impact as it occurs. This information is only available for Fairbanks and the North Star Borough.

- Bering Sea Region

A recent source of population information for this region is the Bering Strait Regional Census (Eilanna and others, 1975). This study includes population totals, household numbers and average household size, population profiles by age and sex, ethnic distribution, educational levels, regional working skills, and settlement patterns.

The Kotzebue Land Use Plan (Alaska Consultants, 1976) identifies the potential growth and development of population and economy as they relate to land use in that **community**.

- Southwest Region

Some population data is contained in Bristol Bay, An Overall Economic Development Plan (Bristol Bay Native Association, Inc., 1976). This work focuses on the population and labor force of

Bristol Bay in order to identify the area's specific economic development potential.

Several sources deal with **Aleut** populations. Socioeconomic Characteristics of Natives Living in the Aleut Corporation Area (U.S. Department of the Interior, 1974) is based on the 1970 Census and covers population distribution, income, poverty, employment, and education for the overall area in both statistical and descriptive terms. Patterns of Village Growth and Decline in the Aleutians (Jones, 1973) analyzes **Aleut** village population changes and inter-village migration patterns from 1890 to 1970. The author concludes that job opportunities and geographic proximity have been the basic features of pattern changes in population. Unalaska Preliminary Development Plan (Brown, 1973) discusses the future development potential of **Unalaska** in relation to regional concerns in the Aleutian Chain. This source includes data on population settlements, economy, employment and **community** development.

● Gulf of Alaska Region

Population material for the **Gulf of Alaska** is more complete than for the North Slope, mostly because Anchorage is located in this area. Anchorage is the state's largest city and the state's only SMSA. Therefore, its census information is more detailed and covers more issues of importance to social scientists. In the past the Greater Anchorage Area Borough Planning Department has published documents focused solely on population characteristics of that area. One is entitled Population Projections, 1970-1990 (May 1972). Another is entitled People in Anchorage (January 1972). In addition, there is the Summary Profile of 1970 Census for the Anchorage SMSA (U.S. Department of Commerce, Bureau of the Census, March 1973). Anchorage is the only city in Alaska which has this kind of coverage.

Besides information on population in Anchorage, individual documents have been written on the smaller communities in and around the Gulf of Alaska area. Among the documents are: Western Gulf of Alaska: Summary of Available Knowledge (University of Alaska, Arctic Environmental Information and Data Center, April 1974). This document, in its Chapter 7, studies **socioeconomics** and in an overview fashion discusses the population characteristics of this region of the state which includes Kodiak Island, the **Kenai** Peninsula, and part of Prince William Sound. Another document is entitled The "Valdez Research Project Report: First Two Years of Impact (Baring-Gould, et al., 1975). Through a series of surveys Baring-Gould analyzes the attitudes of the new and old residents of **Valdez immediately** before the impact of the construction of the **trans-Alaska** oil pipeline terminal and during the first **major year** of impact. This is not an analysis of population shifts or economic development, but rather an analysis of population attitudes of people who were living there and then who had their lives changed by the influx of new residents.

Population information and projections for this region are also discussed in several recent environmental impact statements: Draft Environmental Impact Statement--Proposed OCS Oil and Gas Lease Sale, Lower Cook Inlet (U.S. Department of the Interior, 1976), Lower Cook Inlet Final Environmental Impact Statement (U.S. Department of the Interior, 1976), and Proposed OCS Oil and Gas Lease Sale, Northern Gulf of Alaska, Final Environmental Impact Statement (U.S. Department of the Interior, 1976). In the Cook Inlet EIS the total population of the region is projected to increase by 851 persons in 1977, and to climb to a peak of 16,424 persons in 1983 before the subsequent exodus. By 1987, the OCS-related population will drop to 6,749. Overall, Anchorage will receive about one-third of the population increase and the Kenai-Cook Inlet area the other two-thirds of that increase. The specific projections for the peak year 1983 are as follows: Anchorage 5,145 persons, Kenai-Cook Inlet 10,882 persons, Matanuska 270 persons, and Seward 127 persons.

In the Northern Gulf of Alaska EIS, statewide population increases are expected to peak in 1984 at 11,832 persons and thereafter decline to 7,896 persons in 1987. However, the total population increase in the Primary Population Impact Area (PPIA), which encompasses Anchorage and most of southcentral and southeastern Alaska, includes additional persons in-migrating from other areas of Alaska. Thus, the total population impact to the PPIA will peak in 1984 at 14,124 persons. Distribution of this population among major communities and regions in 1984 is expected to be as follows: Anchorage 8,617, "Coastal High Probability Area: (Cordova, Valdez, Yakutat, etc.) 3,022, Kenai-Cook Inlet 711, Seward 187, Juneau 1,005, and Kodiak 582.

Population shifts and demographic characteristics are an integral component of A Social and Economic Impact Study of Off-Shore Petroleum and Natural Gas in Alaska (Mathematical Sciences Northwest, 1976). Population information is provided on the Kenai-Cook Inlet area in Phase I, and Phase II presents data for the Gulf of Alaska and for Bristol Bay-Bering Sea.

IV. CURRENT RESEARCH

- Beaufort Sea Region

No current population research in this region has been identified.

- Bering Sea Region

No current population research in this region has been identified.

- Southwest Region

No current population research in this region has been identified.

- Gulf of Alaska Region

No current population research in this region has been identified.

V. DATA GAPS FOR OCS SOCIOECONOMIC STUDIES PROGRAM

● Beaufort Sea Region

● Population Data

Population information on the North Slope of Alaska is very scarce. The Census, while a complete enumeration of the residents, may have missed many people. Even a **small** number of people missed is a relatively significant number of the total population of the NSB. Any sample projection of information on housing, occupational characteristics, employment characteristics is simply inadequate given the small population base there. Thus, any analysis that derives from the Census information, especially that of sampling rather than complete enumeration, is of limited research value.

e Developments Since Alyeska Pipeline Construction

A further gap in the information available on the North Slope concerns what has happened since the development of Prudhoe Bay and the construction of the **trans-Alaska** oil pipeline. There has been much talk of people shifting from the rural areas to the actual construction area around Prudhoe Bay or to the town of Barrow. Yet this has not been fully documented and shifting patterns of the population (both in terms of numerical changes and changes in terms of age groupings within the particular towns) have not been followed through and studied. In the future, the University of Alaska will attempt to investigate these changes, but as of now, no documentation is available. The last relatively complete studies of population shifts are demographics of the North Slope compiled by George Rogers in 1971. The five years that have passed since then have been periods of great change for that area, yet no analysis has been undertaken.

● Demographic Shifts in Small Communities

OCS development will follow the development of Prudhoe Bay and the **Alyeska** Pipeline. Thus OCS development will be building on a base which is yet to be determined. Future work must focus on the kinds of demographic shifts that have taken place in the past few years. Of particular importance are population shifts in the small communities of the North Slope. Towns such as **Wainwright**, Kaktovik, Point Hope, and **Anaktuvik** Pass must be analyzed to identify the kinds of shifts that have occurred, which group of people **and** age **groups** have moved, whether they have returned, whether they have moved from the construction effort back into the major towns, or whether they have gone to the cities such as Fairbanks and Anchorage. An understanding of these changes and their permanence must be an area of future discussion.

While previous studies of demographic shifts have been based on available census data, future studies will have to augment statistical information with updated data collection and visits to specific sites for relevant fieldwork.

e Patterns of Migration and Population Change

All of the population changes that have occurred in the immediate past are based upon patterns of a more distant past and raise the following questions:

- 1) What kinds of changes have occurred with the onset of the military installations on the North Slope, or even in the more distant past, with the development of the whaling industry?
- 2) Did these changes create further changes in migratory patterns?
- 3) Did these changes create more permanent communities, such as Barrow or **Wainwright**; or were these permanent communities established before the coming of the whalers, the consequent development of a barter economy, and the development of a cash economy?

● Historical Precedents for Population Shifts by Eskimos

An issue that should be investigated as part of the overall view of population is the historical precedent for shifts by the Eskimos from the smaller communities to larger ones. If this has been a consistent pattern, then further development on the North Slope will probably reinforce it. If, however, there has been a shifting back and forth between initial movement into the larger towns and then a movement back to the smaller communities then the **OCS** type of development may be more transitional than permanent. Questions of this nature must be discussed, and are obvious data gaps for future socio-economic work.

● Bering Sea Region

The data gaps identified for the Beaufort Sea and the Gulf of Alaska Regions apply equally to this region.

● Southwest Region

The data gaps identified for the Beaufort Sea and the Gulf of Alaska Regions apply equally to this region.

o Gulf of Alaska Region

● Geographic Gaps

The geographic gaps are primarily related to the lack of comparable studies from any of the major **communities** of the region. Clearly, Anchorage is the only area that has a consistent history of population studies. Other communities which are important for an understanding of socioeconomic impact in the Gulf of Alaska (e.g., **Valdez**, Cordova, Kodiak) have not been studied with any consistency. Information from the Census is not available in **great** detail at the level of the individual communities. Basic raw information on age group, sex, and racial characteristics is available for each of the **communities** in the Gulf of Alaska. But there is no detailed information in terms of housing characteristics, economics, or income patterns. Information of this nature is crucial to understanding the changes, for example, between Cordova and Valdez resulting from the **different** kinds of impacts that they each have undergone in the past few years. Similarly, the whole **Kenai-Cook** Inlet area, where there has been development of natural gas since the mid-1960's, has not been studied in terms of population shifts in any great detail.

● Subject Category Gaps

In terms of subject categories, the data gaps are very similar to those for the Beaufort Sea. Among the issues that have not been studied are the following:

- 1) shifting patterns from small towns to larger towns;
- 2) the particular shifts undertaken by the Native residents of these towns;
- 3) the historical patterns of population shifts which have occurred since the creation of the various communities located in the Gulf of Alaska; and
- 4) the individual reactions of specific communities to the various kinds of impacts that have occurred locally. For example, **Valdez** has had the **trans-Alaska** oil pipeline constructed in its harbor and the **Kenai-Cook** Inlet communities have had natural gas **facilities** developed within their boundaries. Yet each of the various Kenai communities and **Valdez** may have had totally different population shifts or demographic characteristics. These differences should be explored to determine the kinds of alternative reactions that communities have to different levels of **petroleum**-based impact.

VI. SUBJECT CHAPTER BIBLIOGRAPHY: POPULATION

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4. REVENUE AND TAXATION

I. SUMMARY OF INFORMATION SOURCES

The issues of revenue and taxation are of relatively narrow focus. The information available analyzes the stream of income by source which is due the particular governmental entity under discussion. The most consistent and reliable materials are available on a state-wide basis since so much recent discussion has centered upon the revenue and taxation impacts of oil and gas development.

● Statewide and Regional/Community Literature

There are two separate categories of information sources for revenue and taxation. First, there are the studies submitted to the Federal Power **Commission (FPC)** during the recently **concluded** administrative hearings in Washington, D.C., held to determine which of three applicants will be granted the certificate to build the natural gas pipeline from Prudhoe Bay. Second, the State of Alaska and individual communities within the state publish annual budgets and financial reports. In general these documents reflect the actual projected cash inflows and cash outflows anticipated by specific jurisdictions.

● Currency of Literature

The information is, by and large, as current as possible. The **FPC-related** studies contain the most recent projections of the impact of oil and gas production at **Prudhoe Bay** on State revenues and expenditures. In addition, some of the **FPC-related** documents discuss the impact of gas pipeline construction on public service costs and on revenues of specific **communities**. The second group of documents, the budgets and financial reports of individual taxing jurisdictions in Alaska, are continually revised every fiscal year. In addition, another highly relevant document is the recently passed U.S. Coastal Management Act, P.L. 94-370 (July 1976) which provides for financial assistance to communities affected by OCS activity.

● Form of Literature

The **FPC-related** documents are printed but unpublished. However, they are on public record and can be obtained from the authors of the reports. The various Alaska budgets and fiscal documents are both published and unpublished. Copies of these documents are available on request from the individual jurisdictions. Copies of the U.S. Coastal Management Act are available from the U.S. Government Printing Office.

II. LITERATURE WITH STATEWIDE RELEVANCE

The literature from State sources which discuss revenue and taxation issues on a statewide basis are the most complete and **up-to-date**. The State is the primary recipient of revenue generated by oil and gas; thus it is the entity which most consistently develops models to predict future revenue flows. Fundamental to the future fiscal stability of Alaska, oil and gas revenues are the primary future source of income to a state which has been heavily dependent upon federal transfers. Alaska presently has expended the bonus money it received from the Prudhoe Bay lease sales and has already instituted an ad **valorem** tax on the reserves of Prudhoe Bay. The future income from severance taxes, royalties, the sale of royalty oil and gas, and local property taxes will be greater than the sum of all other taxes combined.

e Documents Filed with the Federal Power Commission (FPC)

The first category of information sources, those filed with the FPC, discuss in varying degrees of detail the impact of gas pipeline construction and operation on the revenues and expenditures of the State. The FPC Final Environmental Impact Statement (FEIS, April 1976) relies on the University of Alaska ISER computer model and projects the differing **effect** of the Arctic Gas and El Paso pipelines on "State and local government revenues" and on "State and local government expenditures." The FPC does not disaggregate the state impact and the **local** impact from total impact. The FEIS merely delineates the total cash inflows and the cash outflows that all State and local government entities can **expect** from 1978 to 1983. The U. S. Department of the Interior Final Environmental Impact Statement (USDI, FEIS, March 1976) also briefly mentions the impact of gas pipeline construction on State and local government revenues and expenditures; but the **primary USDI discussion** is contained in a study cited in the USDI FEIS, Michael Scott's Analysis of Economic and Social Impact of Alternative Routes to the Alaskan Arctic Gas Pipeline (December 1975). The Scott study projects (as does the FPC **FEIS**) the annual impact of gas pipeline construction on State and local revenues and expenditures. Projections are made from 1978 to 1990 for **five trans-Canada** routes and for four all-Alaska routes.

The applications of the three competing applicants also deal with the subject of revenue and taxation. The "Application of Alcan Pipeline Company for Certificate of Convenience and Public Necessity (Exhibit Z-1, Volume 1, July 1976) relies, as do the FPC and **USDI FEIS**, on the ISER computer model and projects the impact of **Alcan** construction on State and local revenues and expenditures. No attempt **at disaggregation is made**. Arctic Gas, on the other hand, deals **with** the issue of revenue and taxation most **thoroughly** in An Analysis of the Socio-Economic Impact in Alaska of the Alaskan Arctic Gas Pipeline Company Pipeline (URSA, January 1974).

● Budget Documents and Financial Reports

The second category of information sources, State and local budgets and financial reports, discusses and projects revenues and expenditures. However, only the State documents contain relevant statewide data. Examples of excellent State documents are the Department of Revenue's Revenue Sources FY 1975-1977 and the Department of Administration's State of Alaska Annual Financial Report, FY 1977; State of Alaska Bonded Debt and Debt Service, FY 1977; and State of Alaska Operating and Capital Budget, FY 1977. These documents are published every fiscal year and are primary sources, essential in projecting the revenues expected from various tax sources and from various funding entities.

● Federal Legislation

Another document that fits neither category one or two is the United States Coastal Zone Management Act, P.L. 94-370 (July 26, 1976). This legislation provides federal financial assistance to State and local governments which have been affected by **energy-related** activity in the Outer Continental **Shelf**. Clearly, this Act will be crucial for Alaskan communities affected by OCS exploration and development.

III. LITERATURE WITH REGIONAL RELEVANCE

In the first category of relevant documents (those filed with the **FPC**), only the Arctic Gas (1974) and the El Paso (1974, 1975) applications describe revenue and taxation **impacts** in either the Beaufort Sea or the Gulf of Alaska Regions. The FPC and **USDI FEIS's** (1976) and the **Alcan** application (1976) all rely on various computer runs of the **ISER** econometric model of the **State of Alaska**. As stated above, this econometric model projects only the total impact on state and local revenues and expenditures; there is no **disaggregation** into impacts on specific communities or regions.

● Beaufort Sea Region

On the other hand, in An Analysis of the **Socio-Economic** Impact in Alaska of the Alaskan Arctic Gas Pipeline Company Pipeline (URSA, January 1974), there is a discussion of the revenue implications of the Arctic Gas pipeline on the Northern Region of Alaska (which consists of the 7 northern-most state labor markets), the North Slope Borough, and individual **communities** (Barrow, **Nuiqsut**, Prudhoe Bay and **Kaktovik**). Also covered are such critical issues as the maximum property taxes that the North Slope can levy on pipeline-related property, and the need for effective and expanded **intra-state** revenue sharing mechanisms.

The Draft Environmental Assessment of the Proposed Beaufort Sea Nearshore Petroleum Leasing (Alaska, Office of the Governor, 1975) contains estimates of revenues accruing to the State from six sources: lease bonuses, lease rentals, royalties, production taxes, property taxes and income taxes. The **total** economic effect upon the State over the entire lifetime of the Beaufort Sea producing fields was projected at over **\$2,600** million.

With regard to the second category of information sources, State and local budgets and financial reports, only the North Slope Borough prepares an annual fiscal report.

- Bering Sea Region

As with communities in the Gulf of Alaska region, Bering Sea localities like Kotzebue and Nome publish annual budget and **financial** reports which describe local revenue sources, expenditure and policies.

These municipal reports are available in the local government office and also are on file with the State's Department of Administration in Juneau.

- Southwest Region

Local budget and financial reports from Bethel, **Dillingham** and the Bristol Bay Borough also provide information on their revenue on an annual basis.

These municipal reports are available in the local government office and **also** are on file with the State's Department of Administration in Juneau.

- Gulf of Alaska Region

El Paso, in its original publication (1974) and its later Mid-197 Socioeconomic Report (1975), also analyzes the impact of its project on regional revenues and regional public service costs. The region **which** El Paso discusses **in** the greatest detail is the South Coastal Drainage Area, which includes Anchorage, Cordova, and **Valdez**. El Paso makes actual dollar projections of the **impact** of its project on revenues and on public service costs only for the state as a whole, although it discusses in detail the anticipated impacts on the **Cordova-McCarthy** Census Division.

In the second category of information sources, individual **communities** in Alaska publish annual budgets or fiscal reports. In the Gulf of Alaska Region the most comprehensive reports are prepared by the Municipality of Anchorage. For example, Anchorage prepare an Annual Financial Report (1974, 1975), an Annual Budget (FY 1976), and specific financial feasibility studies such as the Public Transportation Feasibility Study (1972). These documents

and comparable ones for other major communities in the Gulf of Alaska Region are crucial sources. From them one can learn what revenue and taxation impact individual jurisdictions expect to incur as a result of OCS exploration and development.

IV. CURRENT RESEARCH

● Beaufort Sea Region

The on-going analysis of the Alaska Department of Revenue is a consistent source of information on current research. Every proposed revenue legislation is analyzed by that agency in terms of State and local revenues. Often the material is not published or is only available upon request from specific individuals within the Department. In addition to State legislative proposals, the Department also analyzes the possible impact of each proposed lease-sale. Similar efforts are on-going in the Division of Oil and Gas, Department of Natural Resources.

● Bering Sea Region

The above comments apply for this **region** as well.

● Southwest Region

The above comments apply for this **region** as well.

● Gulf of Alaska Region

The above comments apply for this region as well.

v. DATA GAPS FOR OCS SOCIOECONOMIC STUDIES PROGRAM

There are many documents that project the expected statewide revenues from oil and gas production and construction activities. Currently the statistics in these documents reflect only Prudhoe Bay and **Kenai/Cook Inlet** oil and gas activities. This, of course, will change when **OCS-related** exploration and development become more significant. Given the various "OCS petroleum scenarios," it will not be difficult to project the impact on a variety of statewide taxes--royalties, severance, property, corporate and personal income, and miscellaneous business taxes and license fees. Moreover, assuming that the existing State property tax limits will apply for the duration of OCS activities, **it will** also not be difficult to project the amount of property taxes that local jurisdictions in the various regions will be able to raise.

However, the crucial data gaps relate to the **actual** increases in public service costs that will be borne by local jurisdictions, and to the specific taxing or revenue measures that will be implemented in order to pay for these increased costs.

- Statewide Data Gaps

Basic statewide data gaps exist because the State has not yet decided on the redistribution of its revenues and tax policies. The following questions define the nature of these gaps:

- o Intra-State Revenue Sharing

- 1) What **intra-state** revenue sharing mechanisms will be developed **so** as to transfer State revenues to communities affected by oil and gas activities?
- 2) Will the current State revenue sharing law be amended in the future?

- Special Impact Assistance

- 1) Over and above normal intra-state revenue sharing mechanisms, what special impact assistance will be provided to local jurisdictions?
- 2) Will the same restrictions on special impact funds that were applicable during the initial **Alyeska** construction period also be applicable during **OCS** activity?

- Lags Between Increased Population and Increased Revenue

- 1) Will there be a lag between increased population in local communities (and thus increased public service costs) and increases in local revenues (primarily property tax receipts)?
- 2) How long will this lag be?

- Boundaries of Local Taxing Jurisdictions

- 1) Will the increase in property taxes due to **OCS** activity accrue to the same jurisdictions that must bear the increased public service costs caused by this same **OCS** activity?

- Revenue Leakage from Local Communities

- 1) How much of the money earned by **OCS-related** workers will be spent in (or leaked to) other **communities**?
- 2) How much of this money earned by **OCS-related** workers will be spent in the **local** communities, thus increasing local governmental revenues?

- Beaufort Sea Region

What will be the future revenue policies of the North Slope and Fairbanks-North Star Boroughs?

- Bering Sea Region

What will be the future policies of the unorganized boroughs?

- Southwest Region

What will be the future revenue policies **of** the Bristol Bay Borough, particularly if a proposed annexation takes place?

- o Gulf of Alaska Region

What will be the future revenue policies of the Municipality of Anchorage, the **Kenai** Peninsula Borough, and the unorganized boroughs?

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5. GOVERNANCE

I. SUMMARY OF INFORMATION SOURCES

Governance is the study of how Alaska is governed on the state and local level, and which governmental entity has the responsibility for which services. Clearly, the information on governance will overlap with the material on the specific services. Similarly, the gaps in the information on service programs and delivery systems are applicable to the area of governance.

The literature on governance relevant to OCS impact evaluation can be organized into a number of important categories at both the state and regional levels. First, Alaska has a number of unique governmental divisions (boroughs, class cities) hence literature is available which discusses the evolution of local governance in Alaska. Second, the State government assumes more responsibility for the local delivery of human services (police, health, education) than do other states; and literature is available on the evolution of the state's role in governance. Third, there is a significant federal government presence in Alaska (BIA, BLM/OCS, Fish and Wildlife, Defense) and information is available from sources on that presence.

● Statewide Literature

There are a number of sources which are devoted to discussions of State and local government in Alaska. Among these sources are analytical studies of Alaskan Government and up-to-date **summaries** of State government organizations. These sources provide the reader with an overview and general understanding of the organization and distribution of governmental responsibilities in Alaska. Because of the unique nature of the Alaskan system, they should be considered important.

A second major source of statewide governance data is available from a series of policy reports prepared to address specific development issues. The Division of Policy Development and Planning of the Governor's Office is the primary author of reports. The information included in these documents is keyed to specific **issues--laws**, regulations, institutional structures--which are critical to the State agency directly involved with overall policy and development planning relating to oil and gas impact.

The third major source of statewide data is available from environmental impact reports prepared for projects with potential **statewide** impact. Governance data presented in this literature is 'somewhat outdated; but discussions on issues of need and specific government responses are valuable in the governance area. Often such reports present descriptions of government organization and operation that are useful for baseline data development.

A fourth major source of data is contained in the financial reports and budget documents which describe the allocation of State resources to the several governmental agencies, and the legislative process involved in that allocation. Specific pipeline impact budgets have been prepared for State agencies; and the State's governmental response to oil and gas development during previous efforts (e.g., Alyeska construction) can be used to provide a perspective on responses to future development.

A fifth source of data is provided by the Alaska Regional Profile and certain publications of the Department of Economic Development and Community and Regional Affairs which discuss local government issues in a consistent format, and at times attempt to address statewide concerns and policies from the local perspective. Other agencies such as the Department of Natural Resources provide reports which discuss broad policy areas (e.g., land management, water resources) which have relevance to State planning. Several divisions of **the U.S.** Department of the Interior (e.g., BIA, BLM/OCS, Fish and Wildlife) produce reports which have direct relevance to the policies, programs, and plans of the State of Alaska in its regions and communities. Any discussion of governance should address the issues presented by the overwhelming federal presence with which Alaskan governance is faced.

A final source of information on governance at the statewide level is available in the numerous books and articles that have been produced on Alaska which discuss certain elements of Alaskan political and governance (e.g., the State Capital move, pipeline "fever," etc.). These sources are often useful to provide a general perspective on issues that are not **dealt** with in a more scholarly fashion.

● Community/Regional Literature

The primary source of data in the governance area includes those ordinances, budget documents, and organizational documents drawn up to: 1) define the governmental powers assumed by the various legal entities that constitute municipal government or local government; and 2) outline the ways in which resources are generated and allocated to perform the governmental functions.

A second source of information available from the literature is resource summaries, regional profiles, and general analyses prepared by public and private agencies and organizations. Such sources are valuable because they present information on a wide range of **communities** in a consistent format, thus allowing for inter- and **intra-regional** comparisons.

A third source of information is planning, development, or impact studies developed to present the future responses of individual communities or regions to future growth and development. The foci of such studies differ from specific project impact analyses geared to address the projected impact of a given proposed development (e.g., pipeline construction); and from long-range capital and services development plans geared to address projected population and community cultural changes over time; and from specialized studies analyzing the changing character or nature of a given community or region. Because of the site and time specific nature of such studies and the varied methodologies used to produce them, the relevance of the data for comparisons and regional aggregations is limited.

o Currency of Literature

A great deal of information on governance is quite up-to-date. Most of the government reports, budgets, and other publications are issued annually and provide on-going coverage of the subject. New books and articles and recent policy analyses provide the most current information. While slightly dated, environmental impact statements and community comprehensive plans are quite useful. Ordinances, regardless of date, are important.

● Form of Literature

All books and reports are published. Some governmental documents may not be formally published but they are available from the issuing agency.

II. LITERATURE WITH STATEWIDE RELEVANCE

● Analytical Studies

Literature with statewide coverage of governance is limited. The most exhaustive study of governance analysis is included in Borough Government in Alaska: A Study of State-Local Relations (Morehouse and Fischer, 1971). Basically it is a discussion of the borough concept of local government in Alaska and the inter-relationships between borough and State government. The study includes a discussion of the history of local government in Alaska, of the organization and the relationships between and among the cities, the boroughs, and the State.

Another study is Morehouse and Fischer's The State and the Local Government System (1970). It describes the origins of Alaska's local government and the State's role in **regional** and community **development**. Its focus **is** on **areawide borough** government and the deficiencies in government goals due to unclear definitions and environmental constraints.

A **more** up-to-date, but less analytical source of information on State and local governance is provided by the Alaska Blue Book (Mitchell, cd., bi-annually). This source is an overview **of State** government organization, current State officeholders--both elective and appointed--and current State governmental functions. The source lists services and community resources, and provides reviews of land status issues, economic development **indicies**, voting patterns, **and** includes a directory of the State government. The source is valuable as a **summary** of State governance.

● Policy Reports

Policy-oriented studies which are relevant to OCS development impact include the recent reports produced by the Division of Policy Development and Planning of the Governor's Office, Coastal Management Program Development (quarterly and annual progress reports). These sources **identify** the relevant laws, **regulations**, institutional 'structures and-an improved updating of the natural and socioeconomic information base. The annual report provides a review of office performances in policy development, legal analysis of borough and municipal governments, and site-specific data on planning, management, public participation, and project administration. The Office regularly provides a narrative description of the statewide and regional work being done in the field of Coastal Management, and as such will be important to the **OCS** effort throughout the project.

The State's Coastal Zone Management Program also publishes a monthly newsletter Alaska Current-ly, which summarizes activities workshops, meetings and national developments related to coastal development in Alaska,

Other State agencies, such as the Department of Community and Regional Affairs (Community Profiles), the Department of Natural Resources (Annual Reports), the Department of **Commerce** and Economic Development (Alaska Economy Performance Report), produce annual or regular reports and surveys which address specific developmental issues which may be **of** critical relevance to the study.

The Alaska Growth **Policy** Council has recently **prepared** a draft of Alaska's Growth and **Future Choices--Statewide** Policy Issues for the Alaska Public Forum Program (1976, draft). This document describes Alaska's growth since statehood in general background terms with projections of future population and economic growth.

It also discusses a series of statewide policy issues, their parameters and alternative policy directions. The issues include: petroleum leasing, development, revenues; land use planning and management, land selection, and human resources development. The report also projects the possible costs and benefits of alternative policy directions. It does touch upon the impact on communities of adjacent oil and gas development with both on-shore and off-shore perspectives.

Policy development and planning issues are also considered in the primary budgetary sources of the State government which are prepared every fiscal year by the Department of Administration (Annual Financial Reports, Budget Documents, Executive Budget), the State Legislature (Free Conference Committee Report-Operating and Capital Budget), and the individual operating departments. Specific impact funding budgets were produced during Alyeska construction. These may provide some perspective on the way in which the state assumes responsibilities for specific petroleum development impact.

● Environmental Impact Studies

Relevant impact assessment studies that address governance issues include both statewide-oriented projects and specific OCS projects. An Analysis of the Socioeconomic Impact in Alaska of the Alaskan Arctic Gas Pipeline Company Pipeline (URSA, 1974) has an extended discussion on governance including an analysis of certain oil and gas development-related legislation passed by the Alaska Legislature during the 1972 and 1973 sessions. Other impact reports--Application of Alcan Pipeline Company for Certificate of Public Convenience and Necessity (Alcan, 1976) and A Study of the Economic and Sociological Impact of Construction and Initial Operation of the Trans-Alaska Pipeline, (Mathematical Sciences Northwest, Inc., 1972)--also provide a perspective on special impact of pipeline development on governance and government employment. All three of these reports are somewhat outdated and focus on impacts due to specific non-OCS related projects.

In a similar vein, a series of reports were developed to address the specific government manpower needs in Alaska due to pipeline and related development. The most relevant (but dated) source is Manpower Needs in Alaska State and Local Government (Kleinfeld, 1970) which identifies the problem in Alaska of a lack of qualified people to assume professional positions in government, the problems faced by Alaskan Natives in securing professional positions; and projects the needs of Alaska during the seventies in government employment. The study is informative but is somewhat outdated. Two more recent manpower studies conducted by

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specific employment problem of **State** and local government caused **by the Alyeska** Pipeline. Again these **three** reports are of **marginal** utility **to** the current study because they either have a broader focus than government per se or they address issues which have since become dated.

● Federal Government

The role of the federal government in **Alaska** is extensive and has significant implications for the **field** of governance. The Department of the Interior's **role is** among the most significant because of the interests and responsibilities assumed by the 61A, **OCS/BLM**, Fish and **Wildlife**, etc. One study detailing the impact of the federal presence **on** Alaska, Federal Programs and Alaska Natives (Robert Nathan, 1975) surveys special issues around the federal role in the direct delivery of services to Alaskan Natives. There are other reports **available** from federal agencies, both completed and in development, which indicate the extent of federal presence in the state. Such information is important to gain a clearer perspective on the shared responsibilities of the State and the federal governments in the overall governance **of** Alaska.

Another major federal influence on Alaska stems from the Alaska Native **Claims** Settlement Act (**ANCSA**). The book Alaska Native Land Claims (Arnold, 1976) deals with the changes and **impacts experienced by Alaska** Natives as a result of that legislation. Aspects discussed include American Indians and their land, Alaska Natives and the land claims struggle, description of ANCSA provisions, settlement organizations, money and land settlements, goals of the corporations, and detailed information on each Native corporation. This is a major source for understanding the **Act's** impact on each Native corporation. It is also a **major** source for understanding the implications of federal action on a state and its **people** and the institutional framework under which the Act is administered.

For **OCS** issues, an important source of data will be information about the implementation of the Coastal Zone Management Act (U.S. Laws, Statutes, 1976) which provides federal financial assistance to meet state and local needs resulting from new or expanded energy activity in or affecting the coastal zone. The Department of Community and Regional Affairs has produced an analysis of this legislation for **local** communities (1976).

e Articles

The **final** source of governance data can **be** gleaned from recently published articles on current Alaska governance issues.

Primary among these is **the** recent two-part series **of** articles appearing in the New Yorker Magazine entitled "A Reporter at Large: What They Were Hunting For", by John **McPhee**, (September and October, 1976). The articles discuss the issues presented by the proposed capital move to Willow, Alaska and the constraints and problems that this move presents. The capital move is expected to have an influence upon the OCS and related petroleum development in Alaska, and is sure to have an influence on the role of the State government in Alaska. The article provides an interesting perspective on this critical issue.

III. LITERATURE WITH REGIONAL RELEVANCE

● Beaufort Sea Region

Of primary importance in the area of governance are the North Slope Borough Code of Ordinances, (1972, 1973), and the various unpublished **documents** prepared pursuant to the establishment and organization of the Borough. Moreover, the municipal codes developed by the individual cities in the Borough (e.g., Barrow) and the organizational framework they describe are critical for an understanding of the governance issues. Lastly, the process of transferring powers from the cities to the boroughs--accomplished through mutually passed ordinances--is available.

Some secondary sources, which trace the history of the Borough and its disputes with the oil and gas companies at Prudhoe Bay over property taxation and other issues, are available (e.g., The Problem of Settling the Alaska Native Land Claims as Viewed by the Eskimos of the North Slope, Paul, 1972). At the same time, the Alaska Native Management Report (Alaska Native Foundation, 1973-1976), a periodical **outlining** the activities of the regional **corporations** organized under **the Native Claims Settlement Act**, is an interesting source of information on the Arctic Slope Regional Corporation, the issues it faces and **its relationship** with and to the North Slope Borough (**NSB**).

Other governance related information relevant to the present **inquiry** includes the Barrow Region Master Plan (John Graham, 1973), **the North Slope Borough Planning Department's** various plans for capital **improvement** activities **in** municipalities, and the current NSB budget and fiscal report.

Specific oil and gas development impact assessment data is available in the above mentioned 1974 URSA study. It includes discussion of the Borough, and its organization, and projects the impact **of the Arctic Gas pipeline** on the NSB. This **work is somewhat** dated and does not address specific issues posed by other off-shore development.

Few general studies address the governance of the region specifically; however there is one data publication **available**--"The Changing World of Government among the North Alaskan Eskimos" (Chance, 1964). This source predates the organization of the Borough, but does provide some interesting information on the conflicts between Eskimo culture and **formal** municipal governance.

Other secondary sources include the Alaska Regional Profiles: Arctic Region (Selkregg, 1975) and Resources of Alaska, A Regional Summary (JFSLUPC, 1974). Each of these provides general information on the communities in the region and discusses governance issues marginally.

● Bering Sea Region

Community development plans include useful information on governance issues. The Comprehensive Development Plan for Kotzebue (Alaska State Housing Authority, 1971) stresses strengthening the economic base of the community and upgrading human resources through increased local-state-federal coordination and greater local self-determination. Similarly, Comprehensive Planning in Rural Alaska: An Evaluation of 701 Planning in Nome, Bethel and Kotzebue (Alaska State Housing Authority, 1972) assesses planning programs in housing, employment and utilities and describes the ways in which **all** these programs are financed by federal and State local assistance programs.

Elim, Alaska: Its Resources and Development Potential (U. S. Department of the Interior, 1975) contains an inventory of human, natural and physical resources of the Norton Bay Native Reserve. It is especially useful in its analysis of development possibilities and resource utilization in relation to the Alaska Native Claims Settlement Act.

o Southwest Region

Bristol Bay, Its Potential and Development (Carey and Green, 1976) explores the short and long term economic factors and federal and State programs and policies affecting the Bristol Bay region.

Planning documents with village profiles and models for the planning of social, economic and community development often contain descriptive and evaluative information on government programs and administration. Two such documents are A Community Planning Seminar for Village Planning Representatives of the Aleut Region (Aleut League and Nathan Associates, no date) and Mountain Village Comprehensive Development Plan (Alaska State Housing Authority, 1971).

o Gulf of Alaska Region

As with other regions, the primary documents relevant to governance in the region include the Borough and city ordinances which control local government. These documents will provide baseline data on how local government is organized and how it operates within the region.

Other sources of **community-oriented** documents which will provide a perspective on local governance are those **pre-** and post-pipeline development planning studies prepared by Gulf of Alaska **communities**. They include: Kenai Peninsula Borough Comprehensive Plan Abstract: Goals and Objectives (Kenai Peninsula Borough Planning Department, 1973); Seward Concept Plan (Kramer, Chin & Mayo, 1975); Kodiak Island Borough Comprehensive Plan: Part I - General plan (Tryck, Nyman and Hayes, 1968); Cordova Comprehensive Development Plan (Alaska Consultants, Inc., 1976); and Cordova Area Water and Sewer Study (Tryck, Nyman and Hayes, 1972). Other specialized reports prepared for local government entities which are concerned with specific local responsibilities (e.g., airports, utilities, transportation, human services, criminal justice, etc.) are useful to provide a clearer perspective on the operations and organization of special authorities or components of local general purpose government in the region.

Apart from the impact studies cited in the statewide section, there are **reports** available which have more local **regional** relevance. **These include:** Management Planning for the Prince William Sound Region-Phase I: Perspective, Findings and Recommendations (Grumman Ecosystem Corporation, October, 1971), a study **examining impact due to** traffic in and-around Valdez pipeline terminal; preliminary Trans-Alaska Pipeline Impact Statement (City of Anchorage, 1973), a report detailing 1973 level city impact planning; 1975 Pipeline Impact-Anchorage (Greater Anchorage Area Borough Planning Department, 1975); **similar** reports prepared by other **communities** (e.g., Fairbanks); and How the State is Preparing to Respond to the On-Shore Impacts Brought About by Oil and Gas Development in the Gulf of Alaska [Alaska Department of Community and Regional Affairs, 1976).

A further source of information useful to trace recent local government response to oil and gas development is provided by recent city and borough budget and financial reports. **It** is important that these documents be gathered for a series of years to identify trends in **local** taxation, government employment and government service delivery.

Basic information on individual **communities** is contained in those regional community organization and resource profiles prepared on a statewide basis by a number of sources cited above. Such information is only marginally useful, but is relevant to provide some level of comparison between **communities**.

Apart from strictly governance-oriented studies, a number of reports on native groups or **communities** in the region which emphasize native culture over patterns of government are **available**. These include: A Descriptive Study of the Process of Social Change Among Alaskan Natives at Bethel, Alaska (Youdan, 1970--Master's Thesis) and Does One Way of Life Have to Die so Another Can Live? (Yupiktak-Bista, 1974). Another source of information on native cultural and governmental activities in the region is the Alaskan Native Management Report (AFN, 1973-1976). This monthly Duplication identifies the issues of concern to each of the **Native** Corporations and the areas in which they are **responsib**

IV. CURRENT RESEARCH

● Beaufort Sea Region

No current governance research has been identified by this literature survey.

● Bering Sea Region

No current governance research has been identified by this literature survey.

● Southwest Region

No current governance research has been identified by this literature survey.

o Gulf of Alaska Region

Current research in the Gulf of Alaska Region includes OCS Planni Grant Studies (Kenai Borough). This study in progress will attempt to: 1) assemble baseline information on **communities** potentially impacted by OCS; 2) identify problem areas and involve communities in OCS issues; and 3) support further studies. Areas (towns) are being identified in an informal way and a 5% sample of the **popula** tion will be surveyed about OCS impacts.

Housing occupancy figures are being assembled for population projections and **community** response mechanisms; and impact on fire, police and other services are being studied. This will provide a good baseline information source by community and useful information on community attitudes. Specific other studies underway include Kenai airport planning, Seward and Homer concept plans.

v. DATA GAPS FOR OCS SOCIOECONOMIC STUDIES PROGRAM

o Beaufort Sea Region

Overall regional government planning is carried on by the North Slope Borough, but certain critical areas remain unresolved (e.g. land selection, federal land withdrawals).

Other gaps include:

- differential in planning activities in areas other than capital improvement;
- unavailability of background material comparable to other regions in the state;
- updating of previously developed impact studies to assess actual socioeconomic impact on North Slope;
- region-wide studies on subject areas critical to governance (e.g. Public Safety); and
- long term communications or transportation plans.

- Bering Sea Region

The data identified for the Beaufort Sea and the Gulf of Alaska Regions apply equally to this region.

- Southwest Region

The data identified for the Beaufort Sea and the Gulf of Alaska Regions apply equally to this region.

- Gulf of Alaska Region

There is no OCS petroleum development regional perspective available nor any regional plans available. Each community prepares its own response which isolates it from the overall region. More comprehensive regional governance efforts are needed.

Other data gaps include:

- a great differential between the information available on **communities**;
- a need to update reports;
- reports which rely on different analytical methods;
- long range planning unavailable or inadequate because OCS contingencies are rarely considered; and
- native communities unrepresented in the governance literature.

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6. EDUCATION

I. SUMMARY OF INFORMATION SOURCES

The literature on education covers a wide range of issues but without much depth. Among these subjects are: school enrollments, educational programs, construction plans and specialized studies on satellite transmission, and vocational education. Overall, the literature is very limited in scope and geographic coverage.

● Statewide and Regional /Community Literature

Literature on education in **the** State of Alaska is quite scarce. There have been no statewide educational plans published since 1968. The State's paucity of published material on their schools, school curriculum or school facilities reflects the fact that numerous providers have responsibility for providing educational services in the State of Alaska.

Alaska's education system is organized on several levels. On one level is the State, which runs the statewide program of education in the unorganized boroughs. This system was formerly called the State Operated Schools (SOS School System). Now with the passage of Alaska Senate Bill 35, the state is organizing Regional Education Attendance Areas (REAA), which are to administer local schools in the unorganized boroughs. **In** addition, the State administers the university and junior college systems. On another level, there is the U.S. Bureau of Indian Affairs (**BIA**), which has traditionally provided the education to Indian and Eskimo children in many parts of rural Alaska. On yet another level are the local unified school districts, which tend to be found in the large **communities**. All three levels of education operate separately from one another, and do not have common reporting documents nor do they jointly sponsor research.

Research studies in the state, covering a wide range of topics including program evaluation, education **technology** and cognitive abilities, come from two sources, both located at the University of Alaska. One is the Center for Northern Educational Research (**CNER**); the other is the Institute for Social and Economic Research (**ISER**), formerly called the Institute for Social, Economic, and Government Research. ISER is located in both Fairbanks and Anchorage, while CNER is in Fairbanks. Both agencies provide a repository of scholars who, under contract or on their own, undertake either local or statewide analyses of educational issues.

● Currency of Literature

Another information source is the annual formal report which each public school district must file with the Department of Education in Juneau. Such reports are not analytical in content or approach. Three kinds of data are presented.

One is a demographic report on the enrollment characteristics of the pupil within the school system, and the teachers within the school system. Second is a financial statement, a consistent financial picture of each school district. Both of these are required by federal programs which are passed through from the federal government to the localities by the State. Third is a report on local school construction plans. Given the importance of the State as a funding source for both program as well as physical construction, any school district which wishes to float local bonds must submit a construction plan to the Alaska Department of Education for approval. These construction plans must be updated or totally revised whenever a district is considering floating a bond issue.

The three kinds of documents (the demographic report, the financial report, and the construction plan) are available in the libraries of the State Department of Education. These reports provide specific information about the local school systems. Comparisons between districts or within regions must be done by the researcher, since data are not compiled on that level by the **Department** of Education.

● Form of Literature

All the government and academic documents cited have been published and are available at their respective organizations.

II. LITERATURE WITH STATEWIDE RELEVANCE

The only document which is **truly** statewide in its coverage is the Annual Report of the Alaska Department of Education (1971-72, 1974-75, 1975-76). **Reports** are divided into two sections: first is a **narrative summary** describing the department's functions, its administration and management, the laws that apply, and its financial arrangements. In addition, it provides a brief **summary** of the **Department's** program activities. The second section is statistical, primarily based upon enrollments of the various school districts.

In addition to the Annual Report, the State publishes smaller annual reports on specific **program** areas under its jurisdiction. In **particular**, the report of the Adult Education program, the Vocation Education program, and the Special Education program are all produced as a result of a full year's planning effort, **community** support, and compilation of statistical data. All three must develop as part of their annual statements a plan for the next year's programmatic **activities**; they all are statewide in scope and thus give a picture of activity for many different school districts throughout the state.

A recent report, School Finance in Alaska, Report No. 1 (Coon and others, 1976), analyzes, for the first time, how money is spent in the delivery of educational services to the Alaskan student. Revenue sources and professional personnel are identified for each school district or region. The three distinctly different systems of educational organization are described with their roles in financing education. Appendices containing relevant state statutes help make this document an informative and highly useful resource. It should be noted that this report has not been endorsed by the Alaska State Board of Education.

Statewide higher education is described in Preliminary Survey of Postsecondary Education Programs in Alaska (Behlke, 1975). Data on programs, enrollments, faculty and fiscal information is included along with the training efforts of Native regional corporations.

Given the particular organization of school districts in the State of Alaska, the State's primary role over the years has been the support of the schools in the rural areas of Alaska--the unorganized boroughs of Alaska. As a result of that continuing responsibility, the most consistent reports which have come out of the State Department of Education are those concentrated on rural education in the unorganized boroughs. Specifically, the document entitled An Over-all Education Plan for Rural Alaska (Governor's Committee on Education, October 1968) is the only existing master plan for education for a great segment of the state's population. It has not been updated.

Another document of similar focus is one entitled A Needs Assessment of Education in the Unorganized Boroughs (Alaska Department of Education, February 1976). This document addresses the **particular**, changing local policies of developing local high schools in many of the smaller towns of the state instead of the establishment of a few, larger, regional high schools. The establishment of regional high schools is discussed most fully in the 1968 plan. The needs assessment referred to above is a further development coming from a consistent pattern of change in the schools of the state. A document entitled Pre-Higher Education in the Unorganized Boroughs: Analysis and Recommendations (University of Alaska, Center for Northern Education Research, 1974) is a precursor to the most recent document and part of that evolutionary step in the development of local high schools and elementary school districts at the community level. Another precursor is Delivery of Educational Services to the Unorganized Boroughs (Alaska State Operated School System, 1973), which looks at the need for local control of educational organization.

Given the particular problems of rural education in Alaska, much interest has been shown in the applicability of satellite **communi-**cations to educational programs. Two documents have been developed within the last year evaluating tele-communications for Alaska's schools. One is entitled Evaluation of the ATS-6 Satellite Project (Practical Concepts Institute, March 1976). The second

document entitled Educational Tele-Communications Alternatives for Alaska (Office of Planning and Research, Governor of the State of Alaska, January 1976). An earlier document on **tele-communications** is Tele-Communication User Alternatives Study (Gardiner, 1974) which describes planned and proposed facilities and their applications to education.

The Bureau of Indian Affairs (BIA), of the U.S. Department of the Interior, has traditionally provided education to many of the most rural areas of the state. More recently, their role has diminished; and they are now being phased out. Nonetheless, a statewide discussion of their services was written in March 1972, entitled Education in Alaska (Thompson, March 1972). This document is simply a brief status report on BIA's education program, describing the day schools, the boarding schools, school nutrition programs, construction programs, and their means of higher education. It has not been updated. The BIA has sponsored a recent study, The Problems of Alaska's Urban Native People (Kish Tu, Inc., 1975) which describes **potential** solutions to **urban Native problems** in education and other **social** service areas.

Several other studies focus on education vis a vis Natives. A Long Way from Home (Kleinfeld, 1973) studies Alaska's boarding home **program** and its impact on Native students who left home to attend high school. In discussing the social and economic costs of the program, **Kleinfeld** recommends terminating the boarding programs in some towns

Alaska Natives and Alaska Higher Education 1960-1972 (Jacquot, 1974) surveys the general education of Natives in higher education institutions, needs assessment, and the future of Alaska Native higher education with a generally favorable outlook.

Higher and Adult Education Needs in Rural Alaska (Alaska Native Human Resource Development Program, 1974) explores the fields of study important to Natives today and how such programs might be organized to be of maximum use. It has value as an attempt at higher education needs assessment on a statewide basis.

Since 1974, Alaska has been heavily impacted by the construction of the Alyeska pipeline. A Study of the Impact of the Proposed Trans-Alaska Pipeline on the Alaska Native Population (Schlickeisen, Consolvo, and Raymond, 1971) reviews the existing conditions in the small communities of Alaska, particularly those where the majority of Alaskan Natives reside. There is an analysis of the housing and sanitation conditions, the health conditions, sources of livelihood, and the educational systems of the smaller communities of the state. This document is outdated now, given the size and magnitude of the Alyeska pipeline and the fact that the pipeline has recently been completed (although the total work force has not yet been dissolved) No update of this document has been prepared.

III. LITERATURE WITH REGIONAL RELEVANCE

● Beaufort Sea Region

One of the ongoing research projects in the northern part of the state has focused on the educational skills of the Eskimo residents of Alaska. The chief researcher in this area is Judith **Kleinfeld** of the University of Alaska's Institute of **Social** and Economic Research (formerly the Institute of Social, Economic, and Government Research). She has published two documents--one entitled Cognitive Strengths of Eskimos and Implications for Education (**ISEGR**, November 1970), and the second document entitled Intellectual Strengths in Culturally Different Groups: An Eskimo Illustration (update). The research for both documents is **slightly** dated. However, a future **survey** to be taken in the spring of **1977** under the auspices of Dr. **Kleinfeld** and others at **ISER**, will attempt to see how much recent activities on the North Slope (particularly petroleum development and the construction of the **Alyeska** pipeline) have affected the educational attainments and plans of the Eskimo residents.

Another document by another member of the **ISER** staff is comparable to the **Kleinfeld** efforts in that it tries to combine educational issues with an anthropological approach. This document, Barrow and Kotzebue: An Exploratory Comparison of Acculturation and Education in Two Large Northwestern Alaskan Villages (Arthur Hippier, University of Minnesota, 1969), is presently available only from the author or from **ISER** on loan. Although it does not emphasize the particular aspects of formal educational systems, it addresses the educational process of the people of these communities as more modern society develops on the Northern Slope of Alaska.

As has been indicated in the **Summary** of Information Sources, there are regular reporting documents submitted to the State by **local** educational units, **which** describe demographic and financial characteristics of the local schools. In addition, all local districts have been required to supply local construction plans whenever undertaking the passage of a local bond issue. Then there are particular documents which cover the education resources of the northern part of Alaska. Fairbanks, by far the largest city, also has the largest school district and the most complete staff. A Study of Student Enrollment and Implications for School Construction 1972-1977 (City of Fairbanks, 1973) is the first attempt by the Fairbanks district to predict the pipeline construction impact on the student enrollment trends and the potential needs for additional construction in the locality. The actual projections of enrollment are significantly off due to the unforeseen small numbers of families who actually moved to Fairbanks. Most of the workers who came for the **Alyeska** pipeline were single individuals who did not move their dependents to the Fairbanks area.

The development of small local school districts is especially significant on the North Slope, the area directly adjacent to the Beaufort Sea Outer Continental Shelf lease-sale area. Barrow and the communities such as Kaktovik are all developing their local schools run by **local** boards. Each is developing its own high school plan. Barrow already has its high school. Kaktovik is planning one in the future. As the schools develop and are staffed, they will have to submit plans to the State Department of Education.

The trend toward smaller school districts is illustrated by these statistics: in June of 1976, there were 30 school districts in the State of Alaska; in July, after the passage of legislation by the State Senate, there were 52. All 52 will be reporting to the State beginning this school year.

The **school** situation in Fairbanks during the past two years has been monitored by the Fairbanks Pipeline Impact **Information** Center which, in its occasional publications (every six weeks), reviews changes in school enrollment and school **policy**, as one of its ongoing monitoring activities (Fairbanks Pipeline Impact Information Reports, 1974 to 1977). Its main focus is not education although education is included in its purview. These documents will continue to be published by the Center until June of 1977. Thus, it will complete approximately three years of monitoring activity during the height of the Alyeska impact. Such monitoring is only available for Fairbanks.

Part of the FPC application process for Alaskan Arctic Gas **Pipeline** Company included An Analysis of the Socio-Economic Impact in Alaska of the Alaskan Arctic Gas Pipeline Company Pipeline (URSA, January 1974). This study analyzes the educational systems on the North Slope and in Fairbanks and projects the impact resulting from the Alyeska Pipeline and the proposed Arctic Gas Pipeline. Like the Fairbanks school system, this study overestimated the number of dependents who would come to Fairbanks.

- Bering Sea Region

Sources on education specific to this region have not been **identified**.

- Southwest Region

Bristol Bay, Its Potential and Development (Carey and Green, 1976) is a comprehensive look at this Particular area in the Southwest region. " In relation to education, it focuses on inadequacies in the local education system and places education within the context of services important to the growth and planning of a community facing potential OCS impact, The study is especially important in understanding the outlook and interests of the Bristol Bay Native Corporation.

Descriptive data on education in the Southwest is found in Socioeconomic Characteristics of Natives Living in the Aleut Corporation Area (U.S. Department of the Interior, 1974). Based on the 1970 Census, this report covers education and population distribution, income and employment for the overall area.

Mountain Village Reconnaissance Report (Alaska State Housing Authority, 1970) contains information on education and other community services in that locality. It is primarily a housing study, but does provide useful information on educational activities and programs in the area.

- Gulf of Alaska Region

Educational material for this region of the state is available only in two forms: 1) the regular reporting mechanisms from the local school districts to the State Department of Education; and 2)

Socioeconomic Impact In Alaska of Alaska
1974; El Paso Mid 1975 Socioeconomic Re

educational impact of proposed pipelines (such as El Paso Pipeline) or Outer Continental Shelf activity (such as Gulf of Alaska Outer Continental Shelf or Lower Cook Inlet Lease-Sale Area).

There are no analytic documents which focus specifically on the educational programs or issues in this part of the state of Alaska. There are no ethnographic studies focusing on particular peoples of the area, nor are there specific overall concerns of this part of Alaska which are unique enough to foster individual research efforts.

IV. CURRENT RESEARCH

- Beaufort Sea Region

In 1977, Judith Kleinfeld and Jack Kruse of the University of Alaska, ISER, plan to survey recent educational activities of Eskimos on the North Slope. (See Section 111.)

The Fairbanks Pipeline Impact Information Center Reports will continue to be published by the Center until 1977. These reports are the most constant monitoring of local impacts and undoubtedly will contain some references to education. (See Section 111.)

- Bering Sea Region

No other current educational research has been identified for this region.

- Southwest Region

No other current educational research has been identified for this region.

- Gulf of Alaska Region

No other current educational research has been identified for this region.

V. DATA GAPS FOR OCS SOCIOECONOMIC STUDIES PROGRAM

- Beaufort Sea Region

- Educational Plans of Eskimo People

The single most important data gap on the North Slope is one that is being partially addressed by the future survey of the University of Alaska's Institute for Social and Economic Research--namely, what has happened to the educational plans and attainments of the Eskimo people with the recent impact of the Alyeska Pipeline, the development of Prudhoe Bay, the future development of such areas as the Outer Continental Shelf area and National Petroleum Reserve 4. The changes that this kind of development will bring to the local educational attitudes must be explored before any projections of future impact can be made.

- Planning Concepts of Local People

The second gap concerns an understanding of the overall planning concept of the local people as they formulate or take over their local schools.

- 1) What programmatic changes are they planning on undertaking?
- 2) What teacher-training programs?
- 3) What special programs are being developed?
- 4) What particular construction needs are necessary?
- 5) Has there been a shift in population which means different kinds of facilities in different areas of the region?

None of these questions are addressed in existing literature, and they must be the basis for some future research.

- Changing Role of BIA

A third gap exists in analyzing the role of the BIA and the transfer of power from the Bureau of Indian Affairs to the localities. Transfer to **community control** is, in and of itself, a topic that should be investigated as a means to determine the future efficacy of similar efforts.

- Bering Sea Region

Generally, the data gaps cited for the Beaufort Sea Region and the Gulf of Alaska **Region** can be applied to this **region**, in particular the **gaps centered** on the educational **needs** and plans of Native **Alaskans**.

- Southwest Region

The data gaps identified for the **Bering Sea Region** apply equally to the Southwest Region.

- Gulf of Alaska Region

- Education Plans and Changes in Specific Areas

The need for future research is as great in the Gulf of Alaska area as for that of the Beaufort **Sea** area. However, in the Gulf of Alaska the need is to focus more on the problems of smaller communities with predominately Eskimo populations. Among the topics that should be addressed are the particular impacts on a town like **Valdez**. Research should also look into what has happened to the major metropolitan area of Anchorage and its school system in the past few years with the impact of the Alyeska Pipeline. The key point to investigate is the means by which communities such as Anchorage or **Valdez** adapt to significant changes in their local population, and possibly in their local attitudes toward education.

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7. HEALTH

I. SUMMARY OF INFORMATION SOURCES

The information included in this subject chapter encompasses mental health, public health, the private health delivery system, environmental health and such specialized areas as health care for Alaska Natives, and child and maternal health. Overall, the available literature (both published and unpublished) lacks consistency and depth of coverage. Some individual papers may provide the researcher with an incisive picture of one component of health care, but that depth of coverage is not available for other health issues. The research has been spotty and has not been maintained over time.

The literature on health related to OCS impact evaluation is primarily available through planning and information documents prepared by official agencies such as the Alaska Department of Health and Social Services or available through the three regional Health Systems Agencies. There appear to be few current non-agency reviews, surveys, or analyses of statewide health.

However, a number of internal and external evaluations of specific programs have been produced, focusing on particular services such as tuberculosis programs and target populations such as rural Alaskans, Interior Athabaskans, and so on. Only in the area of the causes of mental illness, however, are there significant attempts to include cultural and economic factors into the etiology of disease. Literature on mental illness tends to relate petroleum development activities directly to the type, incidence, and location of mental illness, whereas work in other areas tends to record and project impact in terms of overall numerical increases in health care demand and agency response to demand.

● Statewide Literature

The preponderance of available sources of health information on a statewide basis is currently provided through documents published by Alaska State departments, specifically the Departments of Administration and Health and Social Services. These documents are readily available, although a series of departmental reorganizations has made comparisons over a period of time a complex task.

● Community/Regional Literature

A variety of studies and reports are available on Alaskan communities and regions. Some local information is available through Directories of Services published by State departments.

Other sources are **community** studies and budgets published by government and semi-public agencies in the four impact regions, but particularly for the large urban areas of Fairbanks and Anchorage.

There are studies conducted in regions and communities by subject area. In addition, there are documents in support of grant applications for increases and facilities in specific locales. These documents will become increasingly accessible through improved bibliographic information and retrieval systems of major health institutions. Similarly, as the regional Health Systems Agencies develop and index their libraries, more working documents should surface for public use.

● Currency of Literature

Research, evaluation, and planning are constant tasks of Divisions within the State Department of Health and Social Services; results appear in their quarterly journal, other publications, and public reports and budgets.

Currently, the Alaska Federation of Natives is preparing its own report on Alaskan health, but no preliminary findings are yet available.

● Form of Literature

Many of the documents (from the Alaska Department of Health and Social Services and the three Regional Health Systems Agencies) of potential significance in the evaluation of **OCS** impacts appear not intended for wide public distribution or use. They are essentially "in-house" working papers for agency personnel in the preparation of planning proposals or grant applications. Other cited documents are published and available through the usual channels.

II. LITERATURE WITH STATEWIDE RELEVANCE

In 1954, the so-called Parran Report (Parran and others, University of Pittsburgh, Alaska's Health: A Survey Report to the U.S. Department of the Interior) comprehensively described and analyzed **Alaska's** health and health delivery system. It details the human and physical environment, the etiology of various diseases, the health service agencies, their facilities, personnel, and service units. Since the Parran Report, no similarly comprehensive study of statewide health issues has been published. A number of papers and manuscripts have been produced, however, by a variety of sources on specific topics and on the nature of Alaska's health delivery system.

● Health Delivery Systems and Services

A number of these reports have been gathered into Circumpolar Health (Shephard, 1976). In particular, a paper by Price ("**Comparison** of Health Care in Alaska and Scandinavia") describes the fragmented nature of Alaska's public/private health delivery system and its shortage of health personnel. Papers on similar topics often appear in the journal, Alaska Medicine. One such paper is "Future Health Care in Alaska" by Thomas (Vol. 17, No. 2, 1975) which examines the modernization of health care through the use of technology in bringing care to the Alaskan bush.

In terms of the organization of medical services in Alaska, State offices periodically publish agency, department, and program reports. For example, the Department of Health and Social Services published the Alaska Health Plan 1963-1965, which reports on the operations of numerous services (such as Public Health, Mental Health, Environmental Health, Child and Maternal Health) including information on budget and specific programs. Since that time, successive reports have also been prepared on regional health planning activities.

Similar but more limited works abound in health, such as A Year of Caring (Medicaid report, 1975) which covers groups **served**, types of health care most frequently needed, and the costs of provided care. This document is supported by other agency publications, such as the State Plan for Medical Assistance under Title XIX of the Social Security Act (1974) which describes the comprehensive plan for the state, the organization and functions of the State agency, **participant coverage** and eligibility, and the amount, duration, and scope of medical assistance available.

The State has recently incorporated into three Health Systems Agencies: South Central, Southeast and Northern Alaska. These are described in "Health Services Areas" (Alaska Department of Health and Social Services Quarterly, August 1975). More complete descriptions can be obtained directly from each HSA. Each is expecting to develop its own library on needs and services.

In addition, the Alaska **Department** of Health and **Social** Services has published a Directory of Public Health Services (no date) which summarizes the health services and programs available within the 3 geographic health regions of Alaska.

● Planning for Facilities and Services

Literature bearing on statewide health planning for facilities and services is readily available. The Alaska Department of Health and Social Services Quarterly published "The Last Four Years" (1974), a summary of the major accomplishments of its various divisions. The Department's Office of Comprehensive Planning has produced an undistributed in-house paper on resources, limitations,

and implementation scheduling for emergency medical services. The Office of Facilities Development has produced (1972) surveys of existing health facilities and construction plans for the new hospitals and medical facilities; it has also cataloged (1970, 1971) the available mental health resources (public and private practitioners and facilities) in seven catchment (service) areas: Ketchikan, Juneau, Anchorage, Kodiak, Bethel, Fairbanks, and Nome.

Statewide detailed information on health expenditures and program performance is readily available through the Annual Reports of the State Department of Administration (1969-1976), as well as Free Conference Committee Report (1974-1976).

A regular source of information on health agencies' accomplishments, problems, programs, and costs is the Annual Financial Report (Alaska Department of Administration, 1976). The Report contains extensive narrative reporting, for example, on a new health center in Bethel, intensive field courses in vital record handling in rural areas, increased admissions to the Alaska Psychiatric Institute, and the establishment of new community mental health programs in Cordova, Kenai, and the Aleutian chain.

The needs and services resulting from disease types are recorded in reports, The Weekly Communicable Disease Bulletin (Alaska Department of Health and Social Services). Annual reports on such diseases as tuberculosis are also published, with statistics detailed by region, village, race, sex, and age. Research on such topics as the relationship between petroleum development-related migration of workers and disease appeared in occasional papers such as "Cancer Mortality Among Alaskan Natives" Journal of the National Cancer Institute (Blot, September 1975).

o Mental Health Care

Mental health care systems in Alaska are thoroughly described in a manuscript entitled Mental Health in Alaska 1972 (Erskine). There appears to be no other comprehensive description of mental health services. Most papers on mental health focus on the etiology and manifestation of various disorders (including alcoholism, violence, and suicide) of interest primarily to anthropologists and mental health practitioners. Statistical data are of dubious quality due to lack of diagnostic uniformity and definition. Many studies are more than twenty years old and may lack current relevance.

Program development and evaluation of programs in alcoholism are available from the Alaska Office of Alcoholism. A report from this office, entitled Alcoholism in Alaska and the Alcoholism Grant-in-Aid Program (1971) describes multi-agency participation, activities training, education, research, and evaluation in alcoholism treatment.

Current titles in mental health, mental disorders, alcoholism, race relations, and social problems are **made** available through the Alaska Health Sciences Information Center in Anchorage through computer bibliographic services.

o Health Care and Population

In a related area, the needs and services of Alaska's **aged population** on a regional basis, are examined in the Alaska Comprehensive Study on Aging: Final Report (Alaska Department of Health and Social Services, 1972). This **study** addresses itself to the determination of the status and needs **of Alaska's** elderly, including an assessment of existing resources, and the suggestion of alternative solutions for meeting those needs.

The role played by government's system of medical care in affecting the population distribution of Alaska Natives (particularly the recent population explosion and the resultant proportionate increase in youth) is examined in a recent paper in American Journal of Psychiatry: "Migration and Psychopathology of Eskimo Women" (Bloom, 1972).

● Health of Alaska Natives

A series of statewide studies entitled Health of Alaska Natives appeared in 1972-1973. This volume is an assemblage of papers solicited for an **unheld** workshop in 1972, sponsored by the Arctic Health Research Center. The authors include the seminar health researchers in Alaska and deal with the organization of public and private health care delivery systems, health costs, and health manpower development.

Among the key papers is "Federal Health Care Delivery System", by Dr. **M.R. Wilson**, which outlines the scope, organization, and progress of Federal efforts to solve Native health problems since the Parran Report. It describes the systems, programs, and facilities of the Alaska Area Native Health Service and its affiliated agencies.

Another significant paper is "The Costs of Availability of Human and Material Resources for Alaska Native Health Care", by **J. R. Weinrich**. It "identifies the number and location of health facilities and resources available to Alaska Natives and delineates the costs involved in delivering health care to them".

A third paper, "Effects of Cultural Change on Health", by **F. A. Milan** is particularly apropos to the OCS Socioeconomic Studies Program. It discusses the physical and mental health concomitants of cultural change and urbanization of Native Alaskans, including alcohol abuse, social isolation and estrangement, unemployment, and **affectional** deprivation of children.

A fourth paper, "Future Health Goals of the Alaska Native Health," authored by the **Alaska** Federation of Natives, lists 15 specifications leading to an improved health care delivery system.

Additional information on AFN health concerns may be obtained in the Annual Reports of the AFN. The Health **Affairs** Division of the AFN summarizes the evaluations and **recommendations** of the Second Phase Statewide Conference on Rural Health Care for the Alaska Native in "Rural **Health** Conference; Second Phase 1974-1975." This document presents an overview evaluation of the **12** regional health entities as well as policies for future implementation.

In the introduction to "Human Services" (1976) The Health Affairs Division presents brief demographic data identifying the need for mental health and social services resources, delineated by Native Health Regions. Two short papers authored by Lester **Gorsline** Associates for the AFN (1974) discuss the role of Native leadership in providing comprehensive health services to Alaska Native people and the organization of such services at the state, regional, and village levels.

s Other Health Services

Published materials in health services such as dentistry, optometry, and so on do not appear in great numbers. However, a paper entitled, "Dentistry in Alaska: Striving to Surmount the Obstacle: (Journal of the American **Dental** Association, July 1975) graphically portrays a severe practitioner shortage combined with vast distances from clinics, which makes dental care for much of Alaska population difficult. More recent trends, particularly in health delivery systems and pipeline-related demands, do not yet appear prominently in **current publications**.

Current information on statewide health issues, problems, concerns programs, services and activities appears regularly in the Health and Social Services Quarterly (Alaska Department of Health and **Social Services**) and Alaska Medicine.

III. LITERATURE WITH REGIONAL RELEVANCE

● Beaufort Sea Region

Alaska has passed through stages of health care system development which are similar to other states--from government agency district: to Comprehensive Health Planning districts to Health Systems Agency (**HSA**) regions. As a consequence, the source and type of regional and community information vary considerably over time, particularly in recent years.

● Health Care Services Delivery

Two significant documents which include the Beaufort Sea Region are **readily** available in the North Alaska HSA offices. The first is the Alaska Health Service Area Plan, 1975. This document provides a statewide overview of the relationship between health services delivery and demography, urban and rural health planning needs, and transportation and community; a description of the boundaries of sub-state planning and development districts; a description of each health service area; and a large number of useful figures, maps, and tables.

The second document is a loose-leaf report, Selected Information on Health Care Services in the Northern Alaska Health Resources Association Area (1976). This is an excellent description of the organization, deficiencies, and successes of the multi-agency health-institution and its many services in Northern Alaska, together with current issues. It attempts to understand the positive and negative impacts of the growth of the oil industry along with the human support services and industry.

● Mental Health

Of related interest is the paper, "Inception of a 'Grass Roots' Mental Health Delivery System" by **Feigin** (Circumpolar Health, 1976) which describes mental health in widely scattered Arctic villages.

● Health Care for Natives

The **Feigin** paper cited above suggests alternative methods of health care delivery more in keeping with Native needs and values than traditional hospital-oriented medicine. This suggestion is supported by **Schrader** (1975) in his article "Community Mental Health Services: An Alternative Concept." He shows the need for the **re-evaluation** of previously existing mental health care systems based on the preliminary results of an ongoing evaluation. **Schrader** includes a list of CMH Programs in Anchorage, Juneau and Fairbanks. Richards, in "Mental Health Program Development in Rural Alaska: Changing Roles of Public and Private Psychiatrists" (Alaska Medicine, May 1976), also argues for the adaptation of mental health approaches to the rural Alaskan society and environment.

The health of Alaska Natives is and has been a continuing source of investigation and **comment**. A **major guide** to researchers is Robert **Fortune's** The Health of the Eskimos: A Bibliography 1957-1967. This bibliography provides citations in environment, housing, **sanitation**, health programs and surveys, and specific disease studies and programs.

The mental health of Eskimos has been the subject of a number of research efforts. These works describe the impact of petroleum development on culture, economy, and labor. For example, Bloom's "Migration and Psychopathology of Eskimo Women" (American Journal of Psychiatry, April 1973) ties together the migration of Eskimo women (from Native villages into cities to marry into a higher social status), their unsatisfactory integration into the new culture, and their higher rate of psychopathology than Eskimo men.

Another Bloom paper, "Psychiatric Problems and Cultural Transitions in Alaska" (Arctic, 1973), emphasizes conflicting lifestyles of Native, unhealthy social environments, **sociocultural** disintegration, and the crisis of transition. This work is an extension of the significant literature survey accomplished by Boag in "Mental Health in the Arctic" (1966), which covers and updates publications in psychiatry, medicine, public health, and anthropology. Materials are grouped as follows:

- 1) Mental illness and health in Native peoples of the Arctic in the context of their traditional culture
- 2) Specific exotic syndromes
- 3) Shamanism as a **cultural** ly defined role for emotionally disturbed individuals and as a psycho-therapeutic resource
- 4) Mental health of the Native peoples in a process of acculturation
- 5) Small groups of whites in isolated stations
- 6) Current patterns of large scale settlement

Chance's study of Kaktovik, "Modernization, Value Identification, and Mental Health" (Anthropologica, 1966), emphasizes the emotional disturbance among Eskimos caused by a discontinuity between contact with Western values and culture and sharing of Western values and culture.

Several studies have focused on the relationship among intercultural transitions, gaps in mitigating services (particularly among the young), and self-destructive behavior such as suicide, accidents, **homocide**, and alcoholism. Prominent among these studies are those of **Schall** (1971) and Kraus and **Buttler** (1976).

In addition, the State Office of Alcoholism has published a major report, Allocation of Adult Alcoholics in Alaska by Geographic, Sex and Racial Indices (1973), which tabulates the incidence and intensity of alcoholism in each district.

e Rural Health Services

Northern and rural health services are well described in working documents of health agencies. For example, the Alaska Area Native Health Service's Tanana Service Unit Operating Plan FY 1977 provides a detailed description of the purposes, personnel, **facilities**, resources, and limitations of the **Tanana Service Unit** in affecting the health status of Interior **Athabascans**. It displays the impact on health services in Fairbanks and smaller communities resulting from increased or changing demand, detailed by Agency limitations and target populations. These documents, along with HURA (Health in Underserved Rural Areas) grant applications, provide detailed descriptions of met and **unmet** needs, such as health aides, accident prevention, eyecare, tribal employee training, emergency medical services, and so on. Problems of funding, staffing, transportation, demand and facilities are presented and provide a basis for calculating potential **OCS** impacts.

The Alaska **Department of Health** and Social Services Quarterly contains occasional papers on urban, rural and remote programs and services.

● Directories

Finally, a number of directories of health services and planning and support resources are available from the Alaska Division of Public Health (circa 1975), the Easter Seal Society (1972), and **the State** of Alaska Legislative Council (1976).

Information on funding of regions¹ and community health services is available on Kaktovik from the North Slope Borough (1973-1974) and the City of Fairbanks (1972-1975).

● Health and Petroleum Development

Few studies have been reported on the relationship between petroleum development and northern health. Reinhard, in Circumpolar Health (**Shepard**, 1976), discusses the impact of natural resource exploitation, the disruption of traditional patterns, and the introduction of disease among the Arctic population.

Generally, the studies of the **Trans-Alaska** Pipeline and environmental reports on competitive gas pipelines have devoted **little** space to consideration of impacts on Northern **community** health status and health services other than to present an expected increase in demand on hospital bed capacity, physicians in urban areas, emergency medical services, and public health care

programs, particularly in communicable diseases, maternal and child health care, and family planning (An Analysis of the Socio-Economic Impact in Alaska of the Alaskan Arctic Gas Pipeline Company Pipeline, URSA, January 1974).

● Bering Sea Region

As noted earlier, the Lester **Gorsline** Associates paper (1974) for the AFN discusses the role of regional health corporations serving areas such as Norton Sound. In addition, Norton Sound and Kotzebue are the subject of 1974 Consumer Profile: Kotzebue Area Health Corporation which attempts to determine the effectiveness of **Kotzebue's** health care delivery system, including local issues, problems and perceptions.

In terms of mental health in the Bering Sea Region, of particular interest is **Schall**'s "Self Destructive Behavior Patterns in a Northwest Alaskan Eskimo Community" (1971). Of related interest is "Inception of a 'Grass Roots' Mental Health Delivery System" by **Feigin** (in Shepherd, 1976) which describes mental health in widely scattered **Arctic** villages.

The towns of Nome and Kotzebue have been the subject of interesting, potentially useful studies, including:

- 1) Alaska Comprehensive Health Care Proposal (U.S. Office of Economic Opportunity, 1968) an analysis of problems regarding Health Services Administration in Rural Alaska.
- 2) Patterns of Delivery of Mental Health Services in Alaska Natives (Bloom & Richards, 1972) which traces the developing relationship between Native Regional Corporations and Rural Mental Health Services, the development of bilingual therapists, the creation of **consumer** boards, the movement of services to villages, the incorporation of renewed shamanism and folk medicine into services, and the development of regional and community capabilities.
- 3) "Evaluation of the Alaska Native Health Service" (Alaska Medicine, May 1974), a **socio-medical** investigation of BIA, OED, HUD, and the Indian Health Service.

● Southwest Region

See discussions under Beaufort Sea and Bering Sea Regions.

- Gulf of Alaska Region

OCS development in this region is projected to place burdens on the capacity of Anchorage service delivery systems. Information on current Anchorage programs is available through published reports of the Greater Anchorage Area Borough (1972-1973).

Many of the information sources listed for the Beaufort Sea Region also describe the Gulf of Alaska Region. In particular, good reference use can be made of these already cited documents:

- 1) Alaska Health Service Area Plan
- 2) Alaska State Department of Health and Social Services Quarterly
- 3) Alaska Comprehensive Health Care Proposal

IV. CURRENT RESEARCH

- Beaufort Sea Region

A series of papers on health issues has been presented at the Third Annual Behavioral Sciences in the North Conference (October 1976). These papers report current developments and positions and are being sought from their authors. Other current research for this area has not been pinpointed in this literature survey.

- o Bering Sea Region

No other current research for this region has been identified.

- o Southwest Region

No other current research for this region has been identified.

- Gulf of Alaska Region

Monthly professional journals have articles on health issues in Alaska for this and the above-mentioned regions. Examples of such publications are Alaska Medicine, American Journal of Psychiatry, and Anthropologic (See Section II).

The North Pacific Rim Native Corporation, the non-profit arm of the **Chugach** Native Corporation, is starting fieldwork for a health study in native communities.

V. DATA GAPS FOR OCS SOCIOECONOMIC STUDIES PROGRAM

● Beaufort Sea Region

● Identification and Accessibility of Data

One major data gap is the **problem of** identification of and accessibility to available data. It is estimated by reliable sources that eighty percent of the studies, reports, and data which bear on statewide and regional OCS impact potential reside in "in-house" working documents of service agencies. There does not appear to **be** a statewide index for such data and no immediate expectations for the creation of such an index. The three new Health System Agencies, for example, have not yet coordinated or systematized the method of gathering, indexing, or releasing the studies they currently possess. **Identification** of and access to studies is commonly through essentially informal routes; that is, by personal contact with persons who have knowledge of such studies, possess them, or know how they might be informally obtained.

Much the same situation exists in the identification of and access to **H.U.R.A.** grant applications; documentation of **local** service area needs, facilities, and personnel; and evaluation studies. However, the efforts of the Alaska Health Sciences Library, various bibliographers in health, and Alaska journals provide helpful services and information.

● Bering Sea Region

See discussion of data gaps of the Beaufort Sea Region.

e Southwest Region

See discussion of data gaps for the Beaufort Sea Region.

o Gulf of Alaska Region

● Anticipated Burdens on Anchorage

Many of the information sources listed above for the Beaufort Sea Region also describe the Gulf of Alaska Region. However, OCS development anywhere in the state is predicted to place burdens on the capacity of Anchorage service delivery systems. Such information is available through published reports of the Greater Anchorage Area Borough (1972-1973).

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8. SOCIAL SERVICES

I. SUMMARY OF INFORMATION SOURCES

Social services cover a very wide area of programs and services. Among the issues which can be described as "social services" are information and referral, child protective services, family planning, day care, corrections, alcohol rehabilitation and **public** assistance. As with other service subject chapters (health, education, public safety), the information sources are few in number, incomplete in coverage and not updated.

Because most governmental agencies combine health and social services into one organizational entity, social services information is available from the same sources as health information. The literature related to OCS impact evaluation is mostly available from the Alaska Department of Health and Social Services. Program and budgetary information can be drawn from the Alaska Department of Administration and selected localities' budgets and financial reports. Some information is available from the federal government, primarily through the Department of Health, Education and Welfare. Apart from some academic researchers, there are very few other sources on social services in Alaska.

● Statewide Literature

The documents published by the Alaska Department of Health and Social Services are the best sources available, though a series of reorganizations has made historical comparison a very complex task. There appear to be few current non-agency reviews or analyses of statewide social services.

● Community/Regional Literature

As in the area of health, there are studies on Alaskan communities, **local** directories of services, and community budgets, especially for the large urban areas of Anchorage and Fairbanks. Studies have been conducted in regions by subject areas, such as child welfare.

● Currency of Literature

The journals, reports, and budgets of the Department of Health and Social Services are always updated in weekly, quarterly, or annual installments.

• Form of Literature

Almost all of the literature cited has been published and is available from the appropriate government agency sources, educational and research sources, or individual authors.

II. LITERATURE WITH STATEWIDE RELEVANCE

● Statewide Social Services

A description of statewide social services may be obtained by review of seven official State documents. The first three (Proposed Comprehensive Annual Social Services Plan 1972, 1975, 1977) detail the planned services financed by Title XX funds of the Federal Social Security Act. Important emphases are needs assessments, planning, and evaluation and reporting as they relate to improved delivery systems. Areas covered include information and referral, child protective services, family planning, day care, alcohol rehabilitation, and counseling.

Fourth, at another level, there is the outline of the presentation by Commissioner Francis Williamson (Alaska Department of Health and Social Services, before the House Finance Committee, 1976). This presentation focused on the overall departmental goals and 1977 objectives in social services, alcoholism, drug abuse and **public** assistance programs as they contribute to the accomplishment of overall departmental goals:

- 1) Common data base and systems development;
- 2) Decentralization;
- 3) De-institutionalization;
- 4) Prevention and early intervention;
- 5) Increased coordination of programs to improve cost effectiveness;
- 6) Maximization of federal funding;
- 7) Increased services for the aging;
- 8) Improved responsiveness to the public; and
- 9) Development of the team concept among **departmental** staff.

Fifth, a summary statement of the major accomplishments of the various divisions of the Department of Health and Social Services appears in its Quarterly (October-November 1974), including such topics as in-state care of the mentally retarded, transportation

service for the elderly, and subsystems development for the Alaska Criminal Justice Information System.

Sixth, the booklet, Alaska's Assistance Programs (Alaska Department of Health and Social Services, 1975), defines program purposes, eligibility criteria, levels of assistance, services, and coverage for a number of programs, including Aid to Families with Dependent Children, Food Stamps, Medicaid, and General Relief.

Seventh, as noted above, a useful source of annual information about operations and costs of social services. **public** assistance and corrections is the Annual Financial Report (Alaska Department of Administration, 1976).

Other than these official publications, no overall summary, history, or critique of Alaska's statewide social services has been identified. The recent costs of social services are available through Budget Documents, 1969-1977 (Alaska Department of **Administration**). In addition, the Division of Family and Children's Services authored a Pipeline Impact Budget (FY 1975) which breaks down its budget by BRU (budget request unit) with the **full** explanation of needs analysis in each category. Similar useful documents may be located within other Social Services Divisions. For example, the Division of Family and Children's Services provides a booklet (1974) identifying its available programs and eligibility criteria.

● Children's Services

A very significant report on Alaska's children, Digest 1974: Studies of Alaska's Children (League of Women Voters of Anchorage, 1974) focuses on **the needs** of the 119,859 children under the age of 18 and their families. This "digest" is a review of studies of children's services in Alaska known to the Office of Child Advocacy. These studies were undertaken between 1972 and 1974 in an effort to coordinate existing information and make it more accessible to State and local agencies and the general public. The summaries of studies and their recommendations are intended to be a base for comprehensive planning mechanisms established in FY 1975. Five subject areas are covered: child advocacy legislation, programs for young children, programs for youth, child welfare services, criminal justice planning for youth. Most significant are the evaluative aspects of the recommendations and the projected needs for children's services in the State of Alaska.

o Drug Abuse Services

The Alaska Office of Drug Abuse, as another example of the significance of essentially "in-house" working documents, authored the Alaska State Plan for Drug Abuse Prevention (FY 1974/75) which:

- 1) Describes the processes by which Alaska will develop a statewide strategy for drug abuse prevention;
- 2) Emphasizes needs, priorities and plans;
- 3) Shows anticipated impact of the pipeline on the existing drug scene in the state;
- 4) Lists and summarizes available resources;
- 5) Identifies needs and gaps in services;
- 6) Analyzes present problems;
- 7) Recommends needs assessment and action planning;
- 8) Includes a summary of needs for principal urban and village communities in the state.

A systematic search for such working documents, budgets, and grant proposals from Social Services Divisions should uncover many which have relevance for the OCS impact study. The Health and Social Services Quarterly cited above continues to provide updated information and directions for current work.

● Petroleum Development Impacts

There is limited information on petroleum development impacts on overall statewide social services contained in most pipeline impact studies. However, An Analysis of the Socio-Economic Impact on Alaska of the Alaskan Arctic Gas Pipeline Company Pipeline (URSA, 1974) indicates a likely increase in the caseload of aid to families with dependent children, the number of persons **eligib** for unemployment insurance, the cases **of workman's** compensation, the number of family breakups, and the need for public assistance resulting from the **Alyeska** as well as the Arctic Gas pipeline.

III. LITERATURE WITH REGIONAL RELEVANCE

● Beaufort Sea Region

There appear to be few documents on social services which focus on the Beaufort Sea Region. Most government studies provide local and regional information as part of statewide surveys. For example, information on Beaufort Sea Region social services is contained in Organization and Delivery of Human Services in Rural Alaska: An Evaluation of the Rural Areas Social Services Project (Feldman, 1972). This paper reports an evaluation of the training of Native village residents as "unprofessional" to deliver needed human services in isolated communities. It also **catalogues** the social agencies, churches, and other resources in remote villages

The Health Affairs Division of the Alaska Federation of Natives, in Human Services (introduction, 1976) presents brief demographic data identifying the needs for resources in social services, **de-**
lineated by Native Corporation Regions.

Similarly, the Task Force Report on Standards and Goals for Criminal Justice (Governor's Commission on the Administration of Justice, 1976) touches upon regional and community concerns. The product of intensive research **and public** surveys, - this document prioritizes the problems of the criminal justice system in Alaska. The emphasis is on the community crime prevention in urban and rural Alaska. It contains standards and goals in juvenile justice --community crime prevention developed from community input via citizen-agency task groups in Ketchikan, Bethel, Barrow, Juneau, Fairbanks, and Anchorage. Representatives from the various **commu-**
nities identified 31 different problem areas and made suggestions to alleviate problems through public hearings, individual and group interviews with agency people and written **comments**. The major recommendation evolving from the Task Force's studies and surveys is that the juvenile justice system should be separated from the community crime prevention section.

Monthly allocations are available **by** welfare districts. For example, the Division of Family and Children's Services provides a report on the assistance, aid to the blind, aid to the disabled, and aid to dependent children programs by welfare district and by community within each district (1975). It also includes tabulation of Native and non-Native recipients.

The City of Fairbanks also provides information on expenditures for social services in its Annual Budget Report (1972-1975).

Social services agencies and facilities are cataloged in the Directory of Human Service Organizations published by the State (1976). Discussions of the adequacies and **inadequacies** of this system to mitigate disturbances 'caused by rapid **culture** change appear in **Schall** (1971). In a corollary paper, Manpower Needs in Alaska State and Local Government (1970), **Kleinfeld** and Morehouse point to the increasing need for and lack of special efforts to train Natives into professional health and social service careers.

Beaufort Sea Region communities are also included in individual service studies; for instance, the Report of the Survey of the Child Welfare Services of the State of Alaska (Child Welfare League of America, Inc., 1976). The **findings** of this **report** are based on the results of-intensive field **research** conducted in Anchorage, Barrow, Bethel and two villages in that area, and Fairbanks. These communities were chosen as representative of the delivery of services for children in Alaska. The unique conditions and problems in Alaska are incorporated in the report's findings and recommendations. The report addresses the need for a social services plan; areas for increased services; recommended changes (administrative as well as policy) in the Division of

Social Services; personnel needs and qualifications, coordination of programs within the Department of Health and Social Services, the structure and function of advisory boards, and staff development programs; and finally, areas for legislative action.

This survey is well supplemented by an analytic paper, Child Welfare Problems in Alaska Native Villages (Jones, 1969) which examines the cultural gap between **social** work agencies and the minority clients served.

Petroleum development environmental impact statements do not examine in depth the impacts on social needs and services created by drilling, production, and transportation activities. However, **Schlickeisen**, and others, in A Study of the Impact of the Proposed Trans-Alaska Pipeline on the Alaska Native Population (1971) have commented in some detail on the (then) proposed **trans-Alaska pipeline** impact on the cultural change process in Alaska Native communities.

The impact of petroleum development on the Fairbanks area social needs and services has been the subject of a number of studies. The **Social** Concerns Committee of the Fairbanks Council of **Churches** (1975) conducted a one-day community forum on growth covering such topics as hiring, youth, congestion, public services, trim, and families. Human Resources Planning Institute and URSA completed a pipeline-related, in-migrant study (A Report on the Findings of a Series of Four Quarterly Surveys of In-Migrations to Alaska, 1976) with extended commentary on social services in Fairbanks and Northern Regions. A number of special successive **reports on pipeline-related impacts** were produced under the title Fairbanks Pipeline Impact Information Center Reports (1974-1976). They deal with crime, **childcare**, child welfare, rents, divorce, cost of living, recreation, voters, public services, and senior citizens as rapid, large-scale economic development occurs.

The Fairbanks Town and Village Association for Development recent completed a survey, Rural Impact Information Program (1976), which deals, in part, with community integrative factors affected by development.

● Bering Sea Region

Materials on this region will require extensive review of unpublished agency and corporation documents. Individual reports specific to the various towns and areas within this region may be available from local officials and/or from the Alaska Department of Health and Social Services. The agency materials may be in regional offices or in Juneau. All these sources are unpublished and available only by making personal contacts with the appropriate officials. Other materials relevant to this region are discussed under Beaufort Sea Region literature.

- Southwest Region

See Beaufort Sea and Bering Sea Regions discussions.

- Gulf of Alaska Region

With few exceptions, the works cited above provide similar information on Gulf communities and districts. In addition, a **number** of impact studies specific to the Gulf of Alaska Region have been recently completed as part of petroleum development. For example, the Greater Anchorage Borough Planning Department authored an analysis (1975) of pipeline impacts, indicating a heavier demand on social services due to an increased urban population. An attitudinal study was conducted in **Valdez** (Baring-Gould and others, 1975) indicating changes in community values and relationships resulting from association with pipeline development and bearing on potential levels of social services. Impact studies have also been conducted which focus on **Gulf** communities--Juneau, **Yakutat**, Cordova, Whittier, Seward, Kodiak, and **Valdez** (Alaska Sea Grant Proposal, 1976, and Mathematical Sciences Northwest, Inc., 1975). These studies do not examine in depth the nature or extent of petroleum-related impacts on social needs or services.

An insightful, highly critical study of the social services system (in Anchorage) met by urban Native migrants is entitled The Urban Native Encounters the Social Service System (Jones, 1974). The first section of the book discusses characteristics of the urban Natives and their life situations. The second section describes one social service system and the destructive consequences it has on the in-migrating Native ("fragmentation of services. . .lack of knowledge base. . .ineptness of social service planning"). The third section proposes a redistribution of social service resources to better help Natives. It is a case study analysis of the plight urban Natives face from discrimination, isolation, underemployment and the problems that well-meaning Social Service Agencies encounter due to lack of funding, gaps in service and lack of knowledge/training among predominantly white public servants.

IV. CURRENT RESEARCH

- Beaufort Sea Region

A series of papers on social service issues has recently been presented at the Third Annual Behavioral Sciences in the North Conference (October 1976). However, these papers are not yet available. This is the only current academic research this literature survey can cite at this time.

- Bering Sea Region

No other current social services research has been identified.

- Southwest Region

No other current social services research has been identified.

- Gulf of Alaska Region

No other current social services research has been identified.

v. DATA GAPS FOR OCS SOCIOECONOMIC STUDIES PROGRAM

Social services data gaps tend to parallel those cited for health (see Chapter 7) as a result of the frequent combining of the two subject areas by governmental entities (e.g., Department of Health and Social Services) and other researchers (e.g., Alaska Comprehensive Study on Aging, 1972). Health and social services data gaps or information sources are best assessed when viewed together. See Chapter 7--Health.

- Beaufort Sea Region

- Specific Pipeline Impact Information

While petroleum-related impact studies exist, there appears a dearth of specific information on potential and actual impacts of the **Alyeska** Pipeline activities. Similar gaps exist for the potential impacts of OCS development. One major exception is the regular reports from the City of Fairbanks and its impact information center.

As a consequence of these gaps, it is difficult to assess the following important factors:

- 1) The current adequacy of remote **community** facilities and personnel;
- 2) The pattern of Native and non-Native usage of specific services;
- 3) The increased demand on and for **local**, trained **community** service personnel;
- 4) A community-by-community assessment of needs, services, and attitudes;
- 5) The need and service areas particularly sensitive to **OCS-related** impacts; and
- 6) The community linkages which are conducive to or predictive **of** a healthy social environment.

- Problems in Focus of Literature

In addition, there is a problem with the nature and focus of the literature itself. **With** very few exceptions, there exist no evaluations or analyses of the data collected or **programs** described at statewide, regional, or community **levels**. (There is also no uniformity of method or community of focus either on locale or subject matter among studies.) Most studies appear to have been accomplished without knowledge or interest in the others. Potential composite views of services or communities emerge instead as disparate mosaics of information. It is possible that the examination of **still** unidentified additional "in-house" studies may **fill** in gaps which currently appear.

- Bering Sea Region

See discussion for Beaufort Sea Region.

- Southwest Region

See discussion for Beaufort Sea Region.

- Gulf of Alaska Region

See discussion for Beaufort Sea Region.

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9. PUBLIC SAFETY

I. SUMMARY OF INFORMATION SOURCES

Public safety is a term used to describe a wide range of public issues and activities including: 1) the criminal justice system and its crime reporting, law enforcement, adjudication, and corrections components; and 2) other public safety concerns, such as fish and wildlife regulation and enforcement, fire control and prevention, occupational safety and disaster relief. Each of these concerns is the subject of reports, plans, and evaluations which are geographically specific on statewide, regional, and individual community levels. Overall, the information on public safety is often contained in documents whose perspective is only tangential to public safety issues. As a result, the information available to the planner and researcher is neither comprehensive nor analytic.

● Statewide Literature

Information on public safety systems is included in the Alaska Regional Profiles (Selkregg, 1974-77), which inventory services on a statewide basis and by community. Generalized information is presented on the existence of public safety components, including police and/or fire departments, in these geographic areas. Both the generalized nature of the data and its questionable currency, however, preclude its use as a sole information source in the public service area.

A second major source of statewide data is included in the yearly criminal justice plan and the yearly reports of State agencies with statewide responsibility in the public safety field. Information about the organization and administration of these agencies is included in the annual budget and financial reports prepared by the Department of Administration, the State Legislature, and the Governor's Office. These describe the fiscal commitments to public safety made by the State of Alaska on a yearly basis.

A third major source of statewide data is included in a range of special reports prepared by a variety of public entities, commissions, and private contractors which deal with specific public safety issues on a statewide basis. In most cases, data contained in these sources is limited to the issues under consideration.

The fourth major source of statewide data is included in environmental impact statements for projects with potential statewide

impact, such as petroleum development activities. The public safety related information included in these reports often deals with examinations of the **public** safety systems of the State of Alaska and of its various regions and communities. As such it is useful as baseline data on the public safety system.

A fifth major source of statewide data in the public safety area is provided by **local** publications such as newspapers and magazines. Because of the nature of the issues under discussion in the public safety field, such as crime rate, crime control, law enforcement, and corrections, current events and trends in the fields encompassed by public **safety are of** critical importance to the people and the State of Alaska. Because of this fact, newspapers and periodicals often provide a primary source of information in the **public** safety area.

● Community/Regional Literature

Literature with community or regional relevance in the public safety field takes three forms. First, community general plans and specific studies often discuss issues of public safety and **public** safety planning. Second, local governmental budgets and fiscal plans often detail specific allocations and commitments of public safety departments. Moreover, those departments often prepare reports of yearly activities and yearly commitments of manpower and resources. Third, environmental impact statements on projects with potential impact to individual communities often provide discussions and additional data on the impacts upon criminal justice systems **in** those communities.

The quality and consistency of data available on the public safety systems of local communities varies according to the nature and size of the community and its public safety system.

● Currency of Literature

Statewide and community budgets and comprehensive plans are published annually and offer continually updated information. Newspapers and periodicals provide the most current information although they are not official or research-oriented sources. Environmental impact assessments and special State reports tend to be one-time efforts; they become quickly dated although they do have useful baseline data. Public safety data from local communities vary in their currency--some are available yearly while others are only one-time efforts.

● Form of Literature

The majority of the literature cited in this chapter is available as published documents. The literature ranges from government agency reports and statistics to consultant's environmental impact assessments to newspaper articles.

II. LITERATURE WITH STATEWIDE RELEVANCE

● Crime Statistics

Data on the yearly crime rate is available from a number of sources. The Department of Public Safety publishes reports on the criminal offenses reported to the State Trooper detachments around the state (1964 to 1975). Such data does not include municipalities served by an independent police department. The Alaska Criminal Justice Planning Agency aggregates information from the Department of Public Safety and the municipal police departments in its annual Criminal Justice Plan (1975-76). A third source of statewide data on crime statistics is available from the Uniform Crime Reports statistics prepared annually by the Federal Bureau of Investigation on a state-by-state basis.

The reliability of crime rate statistics in Alaska is considered quite low by many State contacts. Reporting techniques and processes vary as do community responses to crime and criminal activity. However, crime rate changes can be an important source of baseline data to test the relative impact of significant population or employment shifts at the statewide, regional or community levels.

0 Law Enforcement, Adjudications, and Corrections

Literature on the criminal justice system in Alaska with a statewide focus is available from a number of sources. The yearly Criminal Justice Plan provides useful information on system activities, describes action programs to be funded to address priority problem areas, and discusses current criminal justice trends in the state.

The Plan represents the primary source of data in Alaska on the criminal justice system. Unfortunately, the Criminal Justice Planning Agency is considered to be understaffed, and the quality of the document is inferior to the plans developed by other states.

The Department of Public Safety, the Alaska Judicial Council, the State Attorney General, and the Division of Corrections (Department of Health and Social Services) prepare reports describing their statewide activities on an annual basis. The quality of information contained in these documents varies, and it cannot always be disaggregated on a regional or community basis. In addition, the data gathering and reporting techniques of these statewide criminal justice system agencies vary considerably. It is, therefore, not possible to obtain consistent data in uniform data categories.

The yearly agency reports do provide important information on the internal administration, operation, and planning activities conducted during the year. As such they are useful sources of baseline

data. When the reports are considered in addition to the budget and fiscal reports prepared by the State, a sense can be gained of the staffing, expenditures and yearly priorities of the state-wide criminal justice issues on a one-time basis. Standards and Goals for Criminal Justice outlines the specific priorities for the enforcement and administration of justice on a statewide basis, (State of Alaska, Governor's Commission on Administration of Justice, 1976). The paper identifies ten specific problem areas in Alaska and the goals to be reached in remedying those problems.

A report of special significance for Alaska is An Impact Analysis of Construction of the Trans-Alaska Pipeline on the Administration of Criminal Justice in Alaska (1976). This document discusses the **impact of** the pipeline on the criminal justice system through 1975 and projects the future impact through 1980. Its analysis and projections are based upon population and work force indicators; thus the other critical aspects of changes in criminal activity such as value or cultural conflict are slighted.

Various environmental impact statements address public safety issues. Among these are the El Paso (Application of El Paso Alaska Company for a Certificate of Public Convenience and Necessity, Vol. IV & V, September 1974), Alyeska A Study of the Economic and Sociological Impact of Construction and Initial Operation of the Trans-Alaska Pipeline, Mathematical Sciences Northwest, 1972), and Arctic Gas (An Analysis of the Socioeconomic Impact on Alaska of the Alaskan Arctic Gas Pipeline Company Pipeline, URSA, 1974) reports. These documents provide a general introduction to the criminal justice system in Alaska. However, they have all become dated and therefore may not accurately reflect the current administration, organization and operation of the system and its various components.

Public safety issues are of primary concern to the Alaskan public, and as such receive a great deal of emphasis in the media. Thus, the press represents an important source of public safety data.

In some ways, the most current sources of data on criminal justice system issues and problems are newspapers and periodicals. Apart from reporting crimes and the results of enforcement activities, such publications often attempt to analyze current crime trends (e. g., growth in illegal gambling and prostitution) in Alaska. Moreover, they also provide the most consistent source of information on the impact of crime-specific legislation (e.g., the **decriminalization** of drunkenness) or proposed legislation (e.g., the decriminalization of prostitution).

III. LITERATURE WITH REGIONAL RELEVANCE

● Beaufort Sea Region

● Crime Statistics

The Department of Public Safety publishes yearly crime statistics on the communities served by its State Trooper Detachments, (1964-1975). The Barrow detachment serves the entire North Slope (**Beaufort** Sea Region) and thus, regular reports on the incidence of crime and criminal activity in the region are available from the Department.

There are other potential sources of data on crime or **crime**-related social problems such as alcoholism. The Office of Alcoholism of the Alaska Department of Health and Social Services developed information in 1968 pursuant to a request for special federal funding which includes discussion of alcohol-related crime problems in several regions (including the Beaufort Sea). In addition, the Criminal Justice Planning Agency addresses priority problem areas related to funding action programs (e.g. a drug treatment program in Anchorage to address problems of drug abuse). Such programs may be scheduled for the Beaufort Sea Region and if so, applications, justification or needs assessment statements, will serve as up-to-date sources of information about the crime and crime-related problems in the region.

Since crime rate increases and decreases are often a reflection of broader economic and population changes, up-to-date information on economic and population trends can be useful in projecting criminal activity. This is **also** true in the case of legislative or judicial decisions (e.g. recent Alaska Supreme Court decision legalizing possession of small amounts of marijuana). Thus, by tracking certain exogenous sources of data, inferences can be drawn on the potential impact which will be experienced within the region.

● Law Enforcement, Adjudications, and Corrections

The Alaska Criminal Justice Plan is a source of information on public safety and criminal justice system activities in the region, (Alaska Criminal Justice Planning Agency, 1975). Information is available on local police departments, the availability of short-term holding facilities, the location and availability of magistrate courts, and the status or changes in service proposed by the plan. Since both the adjudications and corrections systems are administered centrally by statewide agencies, statewide reports and budget summaries will often provide information on regional changes in the local or regional **public** safety system. Another source of information on the status of the criminal justice system in individual communities is available from the Arctic Regional Profile

(Selkregg, 1975). This source tracks the **number** of police officers by **community**, the size of fire departments and their status as paid or volunteer operations.

Neither the Arctic Regional Profile nor the State agency reports provide information of sufficient detail and focus to-be used as primary data sources for public safety on a **community** or regional basis. Rather, they will provide a consistent basic level of information to serve as baseline data.

A more relevant source of data on potential changes in the public safety system in the Beaufort Sea Region is the document Standards and Goals for Criminal Justice (State of Alaska, Commission on Administration of Justice, 1976). This report identifies as a high criminal justice priority the development of culturally relevant justice services in village Alaska. The goals to meet that priority include: the establishment of local decision-making authority, the provision of training and technical assistance at the local level, and the development of local community-based programs to address criminal justice needs. Implementation of these goals may bring about significant changes in the criminal justice systems of the communities in the Beaufort Sea Region.

A second source of information which is more descriptive of the local community environment is available from the various planning and capital development documents prepared by and for the North Slope Borough and the Arctic Slope Regional Corporation. Two such **documents** are the Barrow Regional Master Plan (John Graham & Co., 1973) and the North Slope Borough Capital Improvements Plan (North Slope Borough Planning Department, 1973-74). Both of these documents include some discussion on resource needs and potential capital and service oriented projects to address them. While public safety issues are not stressed, the information included in the documents is valuable in that it focuses directly upon the North Slope and its communities and expands **upon** the rather limited information **contained** in the Arctic Regional Profile.

In more specific detail, the Evaluation of the Bush Justice Modular Facilities (Alaska Court System, August 1976), an evaluation of the justice systems in 13 **communities**, includes specific information on Point Hope. The evaluation itself is tied to the creation of court facilities and the introduction of a part-time magistrate in the community. Similar unpublished literature, evaluating specific criminal justice oriented action efforts may be available in the future. The information contained in this and other such reports is useful because it expands the baseline information on a given subject (e.g., corrections, adjudications) **within** a given community (e.g., Point Hope). The methodologies used in such efforts vary considerably and thus the relevance of the conclusions reached in any such evaluation is somewhat limited.

The volume "Northern Eskimo Law Ways and Their Relationships to Contemporary Problems of Bush Justice; Some Preliminary Observations on Structure and Function" is a controversial study of Eskimo attitudes toward conflict resolution and social order. Nonetheless, it is the only document which formally attempts to analyze the interaction between the traditional views of dealing with deviant behavior and the more structured methods of the contemporary criminal justice system.

Several somewhat out-of-date studies relating to North Slope oil and gas development contain assessments and discussions of pipeline impact upon the Beaufort Sea Region's criminal justice system. Of these the Analysis of the Socioeconomic Impact in Alaska of the Alaskan Arctic Gas Pipeline Company Pipeline (URSA, 1974) provides the most extensive discussion of the potential impact upon the region. Public safety impact is viewed as a result of **intra-regional** migration and population growth. The State's Pipeline Impact--A Report on State Findings, Assumptions, and Projections Regarding Construction of the Trans-Alaska Pipeline (Office of the Governor, 1974), and an earlier (1973) report prepared by the Attorney General's Office, both describe potential impact upon the Beaufort Region and the potential State response to such impacts. In the public safety area, the projected responses include modular justice facilities to house short-term detainees and magistrate courts, and increased State Trooper activity if it should be called for.

None of these source documents has been updated to address recent changes in the Beaufort Sea Region. It is unlikely that they will be unless a specific need for such updating is identified and financed.

● Bering Sea Region

There are no specific works which focus on the topic of criminal justice in this geographic area. The Alaska Criminal Justice Plan (1976), the study by Hippiar and Corm "Northern Eskimo Law Ways and Their Relationships to Contemporary Problems of Bush Justice; Some Preliminary Observations on Structure and Function," (1973), and the State of Alaska Final Task Force Report; Standards and Goals for Criminal Justice (1976) all cited above are also applicable to this region.

● Southwest Region

The same analysis and sources which apply to the Bering Sea Region also apply equally to this region.

● Gulf of Alaska Region

o Crime Statistics

(See Beaufort Sea Region discussion.]

● Law Enforcement, Adjudications, and Corrections

The Alaska Regional Profiles (Selkregg, 1974) provide a **limited range** of information on the public safety operations in each community discussed. A number of communities (e.g., Kenai, Seward, Cordova, Kodiak) have produced planning documents, usually through HUD §701 grants, to address the comprehensive planning and development responses to be undertaken in response to oil and gas development impact. The impact statements prepared for the OCS gas leasing activities in the Gulf of Alaska Region are also relevant sources of baseline information. These various reports address the criminal justice systems of the individual communities and **assess** the impact of development.

A second type of impact statement, prepared by individual communities, but less comprehensive in scope than those reference above, is available. Examples include: 1975 Pipeline Impact: Anchorage (Greater Area Anchorage Borough Planning Department, 1975), which represents a relatively superficial analysis of the Potential responses (e.g., increased police service); and Preliminary Trans-Alaska Pipeline Impact Statement (Anchorage City Manager, 1973), which represents impacts upon City responsibilities, including projected police and fire department requirements to handle population impact. Both of these documents are useful to identify how specific pipeline impacts are translated into projected community responses. They do not represent rigorous analysis and as such are suspect as actual examples of oil and gas development impact planning documents.

In a similar vein, early oil and gas environmental impact statements (see Section II) addressing specific proposed projects--Arctic Gas (1974), Alyeska (1972), El Paso (1974, 1975)--do provide some information on the organization and administration of the criminal justice systems of relevant communities (i.e., Anchorage, Fairbanks, Valdez, etc.). However, these reports predate actual Alyeska pipeline construction and as such are not particularly relevant description of local public safety services as they operate today.

Perhaps the most relevant **baseline** information for the current status of criminal justice systems and public safety programs is available from government budgets and financial reports. On a statewide level such information can be found in these yearly documents: 1) Revenue Sources (Alaska Department of Revenue); 2) Free Conference Committee Report--Operating and

Capital Budget (Alaska Legislature); 3) State of Alaska Annual Financial Reports; 4) Budget Documents; and 5) Executive Budgets (3, 4, and 5 from Alaska Department of Administration). These sources have separate listings for Administration of Justice, Public Safety, and Division of Corrections, Department of Health and Social Services which indicate such things as specific funding allocations and programs, location and strength of State Trooper detachments, locations of courts, and staffing of state institutions. These documents are not evaluative or comparative; they simply state what is planned and funded in public safety for a given fiscal year.

On a local level, the boroughs' and cities' financial documents provide similar information. Anchorage, Fairbanks, and other communities issue their own yearly Annual Financial Reports and Annual Budgets. Such information is available from the respective government entities and is in the public domain.

For more specific information about the general operations of individual public safety agencies, departments, and programs in the region, inquiries must be made of the State Criminal Justice Planning Agency and the other agencies both statewide and local which are responsible for public safety. Examples of such reports are: South Central Regional Correctional Institution, Anchorage, Alaska (CCC/HOK, 1971) which represents the program and architectural planning for the Eagle River, Alaska facility. The operations of the facility have also been evaluated by the same firm. Again, like so much of the data in the area of public safety in Alaska, such reports present a one-time picture of an isolated process or phenomenon, are rarely if ever updated over time, make use of different analytical methods and processes, and represent only a part of the public safety system in an individual community.

IV. CURRENT RESEARCH

- Beaufort Sea Region

Relevant current public safety research has not been identified.

- Bering Sea Region

Relevant current public safety research has not been identified.

- Southwest Region

Relevant current public safety research has not been identified.

- Gulf of Alaska Region

Relevant current public safety research has not been identified.

v. DATA GAPS FOR OCS SOCIOECONOMIC STUDIES PROGRAM

e Statewide

There are serious gaps in the statewide literature on public safety **in** Alaska. First, since public safety is a responsibility shared by the State and **local** communities, the State Department of Public Safety does not collect or analyze municipal crime data. Local communities have neither the staff nor the administrative capability to adequately address planning issues.

Second, responsibility for various statewide criminal justice functions is dispersed to numerous agencies. The State Criminal Justice Planning Agency is not always able to unravel the statistical problems created by this. The information that is **available** is often related to specific issues or problems and is not the result of true scientific investigation. Evaluation reports appear to be of a low quality and are rarely useful. Impact reports which address issues of public safety are out of date since the best of them predate Alyeska construction.

● Beaufort Sea Region

● Specific Public Safety Issues

There does not appear to be any literature available that focuses upon the specific public safety issues that will be created by OCS development, including:

- 1) Recent changes **in** lifestyle and cultural patterns since pipeline development;
- 2) Population impact due to further development;
- 3) Crime rate increases related **to** specific **social** problems (**e.g.**, alcoholism) due to lifestyle or cultural changes;
- 4) Long-range criminal justice system improvement plans for the region as a whole.

● Bering Sea Region

The data gaps indicated above for **the** Beaufort Sea Region also **apply** to this region.

● Southwest Region

The data gaps indicated above for the Beaufort Sea Region also apply to this region.

e Gulf of Alaska Region

● Lack of Regional Perspectives

The region includes numerous **municipal** entities, each of which assumes its own public safety responsibilities. Hence, there appears to be no regional perspective available in the literature on public safety concerns and issues.

● Planning Deficiencies

Public safety impact will flow from population increases. Hence impact will be focused in those communities which will experience the greatest development. Information on planning for **public safety** is not **usually** available **apart** from other impacts. **Specific** information **is** needed in the area.

- 1) Anchorage and Fairbanks, because of their size and administrative capabilities, are better able to address some issues. However, since public safety is a traditional city rather than borough concern there are territorial planning problems that the literature does not address.
- 2) State Department of Public Safety reports are not sufficiently site-specific to identify problems and needs of each community served by it in the region.
- 3) State Criminal Justice Planning Agency reports are not available as programs in a wide range of communities in the region.

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10. CULTURAL PATTERNS

I. SUMMARY OF INFORMATION SOURCES

Culture is a fairly complex concept in that it encompasses nearly every aspect of behavior and cognition. Therefore, any literature about Alaska will include information relevant to cultural patterns. In general, the concept of culture is used to identify shared traits of groups which are different from Western, or Euro-American groups. Because there is a strong relationship between culture and language, groups are usually identified on the basis of **language**. Using this approach, there are five major cultural groups in Alaska: **Aleut, Athabascan, Eskimo, Euro-American, and Tlingit-Haida**. In addition, there are some **smaller** cultural groups, **such** as the Old Believers on the Kenai Peninsula and the Tshimpian on **Metlakatla**. Groups such as Afro-Americans in Fairbanks and Anchorage and persons of Filipino descent in cannery towns during the summer, which comprise segments of the Alaskan population, may either be considered as ethnic sub-groups of the Euro-American culture or as cultural groups. Most often, the cultures of Alaska are identified as those groups who occupied Alaska prior to contact by Russians, Europeans, and Americans, and these groups are usually called "Alaskan Natives" or "Natives." The distribution of Native peoples and languages of Alaska is depicted on a map prepared by Alaska Native Language Center (Krauss, 1974).

The Alaskan OCS Socioeconomic Studies regions includes areas occupied by a variety of cultural groups: **Tlingit-Haidas** in the **Yakutat** area; **Athabascans** in the Cook Inlet area; **Aleuts** in the Aleutian Islands; Eskimos in most of the other coastal areas; and Euro-American and Afro-American persons in the major cities. Most of the literature on the culture of Native groups prior to contact consists of historic sources, such as the journals of Russian, German, and British explorers, traders, and missionaries. Anthropologists have also contributed to the reconstruction of traditional culture, both through archaeological studies and ethnographic reconstructions. Studies of culture in the post-contact period have focused on issues of culture change and may be found in anthropological and sociological literature.

Contemporary studies of culture are most closely related to issues of the Native Land Claims Settlement Act and its effects. Many of these studies are self-studies conducted by Native groups, or reports by State and federal agencies.

● Statewide Literature

Alaska is a geographical/political division, not a cultural one. Indeed, Native cultures of Alaska have a stronger cultural relationship to some circumpolar groups outside of Alaska than they

do with their fellow Alaskans. Because the state boundaries are not a natural division for the consideration of culture, the statewide literature on the cultures of Alaska tends to be government reports, travelogues, or textbooks. This literature usually consists of vague, secondary sources which are not very useful. Most of the anthropological research focuses on a single culture or a single group within a culture.

● Community/Regional Literature

Most of the research on culture in Alaska consists of community studies. Cultural research is usually conducted by anthropologists who live in a community over a period of time. Occasionally, they will study a region to make comparisons with the findings which evolve from their studies of a particular community. Research conducted in a particular community is often regarded as representing a region. However, the regional focus is based on distribution of cultures and does not necessarily coincide with the regions selected for the Alaskan OCS Socioeconomic Studies Program.

In general, there is more literature about Alaskan Eskimos than other Alaskan Native groups. This emphasis on Eskimo culture may be attributed to the romantic view of the Eskimos maintained by Euro-Americans and their interest in human adaptation to such a unique environment. In addition, the coastal peoples have been more accessible to early traders, explorers, and missionaries.

● Currency of Literature

Alaskan Native peoples have been adapting to changing social environments since the time of Euro-American contact. However, the events of recent years have created significant changes for Alaskan Natives. Particularly, the Alaskan Native Claims Settlement Act of 1971 and the formation of regional and village corporations have created entirely new social, economic, and political structures. While there is some literature on the history and legal aspects of the ANCSA, there has been very little research on how it has affected the culture of Native peoples.

Other recent development, including substantial changes in transportation and communications and increased employment opportunities, have also altered Native culture. These changes have outdated much of the ethnographic literature.

The most current research on culture in Alaska will probably appear in scholarly journals with Arctic emphasis, such as Arctic Anthropology, Anthropological Papers of the University of Alaska (APUA), Arctic, Arctic, Arctic, and Canadian journals.

● Form of Literature

While much literature about the cultures of Alaska has been published, many valuable sources are out of print. Rare books and documents may be found in the collections and archives at the University of Alaska in Fairbanks and the National Archives in Washington, D.C. Other libraries with extensive Alaskan collections include the Steffanson Collection at Dartmouth College, and the Bancroft Library at the University of California. Most unpublished Ph.D. dissertations may be obtained through University Microfilms, in Ann Arbor, Michigan. Many periodicals have also been preserved on microfilm, some of which are available at the library of the University of Alaska in Fairbanks. One important source of information is unpublished papers which are delivered at professional meetings. These are usually only available from the author. Such articles and their authors are most often identified in bibliographies. Another approach to obtaining literature about a given area is to contact the researcher who has specialized in that area. Often these researchers have extensive libraries and private collections, and they have often written articles which are not readily available.

II. LITERATURE WITH STATEWIDE RELEVANCE

The most useful literature with statewide relevance is bibliographies. A number of bibliographies have been prepared about Alaska. Since culture evolves with continuity, early literature is particularly helpful for understanding **culture**. Thus, even the older bibliographies can be quite useful for identifying sources. The most extensive bibliographic work has been done by the U.S. Department of Defense, which has published a 12-volume **circumpolar** bibliography which covers sources from all **disciplines prior** to 1965 (M. Tremaine, cd., Arctic Bibliography, 1965). Although the Arctic Bibliography is quite comprehensive, it is also quite cumbersome. Therefore, many researchers prefer to use more selective **bibliographies**. One of the earliest bibliographies for Alaska is Judge Wickersham's A Bibliography of Alaska Literature, 1725-1924, which is an excellent guide to historic sources. G.H. Fuller attempted to update Wickersham in 1943, when he published Alaska: A Selected List of Recent References. This source may be particularly helpful in compiling references in education, missions, and economics. More recently, M.B. Ricks (1960) compiled A Basic Bibliography of Alaska Literature, a four-volume annotated list of what he considers to be "basic" works about Alaska. Researchers seeking government documents of a historic nature will find Subject Index to the History of the Pacific Northwest and of Alaska as Found in the U.S. Government Documents, 1789-1881 (Judson, 1913) to be useful for **tracking down** reports by **explorers** and federal employees in Alaska. Another **bibliography** which may be useful for identifying more recent sources is Economic Development of American Indians and Eskimos, 1930 through 1967: A Bibliography for Human Geographical Studies of the Native Populations in Central Alaska (1964) which includes sources relating to demography, geography, history, and economy of several regions in Alaska from the Copper River Delta to Bristol Bay.

Scholarly works which have attempted to treat culture on a statewide basis are rare. Margaret Lantis has been one of the few anthropologists who has attempted to synthesize data on traditional Native cultures of Alaska ("The Alaska Whale Cult and Its Affinities," 1938). More recently researchers have attempted to synthesize experiences with culture change including Charles Hughes' "Observations on Community Changes in the North, An Attempt at a Summary" (1963), J.D. Bloom's "Psychiatric Problems and Cultural Transitions in Alaska" (1973), and Mim Dixon and JoAnn Gal's "Analyzing the Impact of Rapid Change on Culture in Rural Native Alaska" (1976).

Most anthropologists who synthesize data, do so by cultural groups, rather than on a statewide basis. For example, there are several works about Eskimos in Alaska which cross regional lines. Perhaps the most popular is Wendell Oswalt's Alaskan Eskimos (1967). Lantis has produced several works synthesizing data on Eskimos in Alaska, including "Alaskan Eskimo Ceremonialism" (1947); "What is Happening to the Eskimo" (1950); and "Alaskan Eskimo Cultural Values" (1959). Diamond Jenness has synthesized more recent Eskimo history in terms of economic and institutional changes in Eskimo Administration: Alaska (1962). And Bloom has considered psychological effects of culture change in "Migration and Psychopathology of Eskimo Women" (1973). A bibliography of Eskimo acculturation studies in Alaska has been compiled by Arthur Hippiar (Eskimo Acculturation: A Selected, Annotated Bibliography of Alaskan and Other Eskimo Acculturation Studies, 1970). In addition, research conducted among Eskimos in other circumpolar areas may have broad significance for Alaskan Eskimos.

Other scholarly sources which are not specifically about culture may have relevance to this subject on a statewide basis. Some examples are George Roger's Alaska Native Population Trends and Vital Statistics, 1950-1985 (1971); Gordon Harrison and Thomas Morehouse's "Rural Alaska's Development Problem" (1970); and Harrison's "Alaska Public Policy--Current Problems and Issues" (1973).

Specific issues of statewide significance tend to produce literature which is statewide in scope. One of the most significant issues which relates to contemporary cultures of Alaska is the Alaska Native Claims Settlement Act (ANCSA). A variety of literature has been produced on this subject, including the act itself, Alaska Native Claims Settlement Act of 1971, Report Together With Additional and Supplemental Views (U.S. Senate, 1971) and a textbook about the Act (Arnold and others, 1976). Other works on the subject include Mary Berry's The Alaska Pipeline--The Politics of Oil and Native Land Claims (1975), and a report by Robert D. Nathan Associates, Complementing the Alaska Native Claims Settlement Act (1972). In addition, the Alaska Native Foundation produces twice-monthly reports on issues related to ANCSA (Alaska Native Management Report).

Another issue which has created a body of literature which may relate to culture on a statewide basis is resource development. Specifically, the **trans-Alaska** oil pipeline and the proposed natural gas pipelines have produced numerous documents which have considered the effects of those projects on Native cultures. These include environmental impact statements, applications to the Federal Power Commission, records of testimony at hearings, and special reports (cf. **R.A. Schlickeisen, C.W. Consolvo, Jr., and R.C. Raymond, A Study of the Impact of the Proposed Trans-Alaska Pipeline on the Alaska Native Population**, 1971).

State and federal reports also provide a source of statewide literature which may relate to culture. Although it is superficial in scope and outdated, one of the most often cited sources is Alaska Natives and the Land (U.S. Federal Field Committee on Development and **Planning** in Alaska, 1968). Another source which **provides** information **about** each community in Alaska is the Alaska Community Survey (State of Alaska Department of Community and Regional Affairs) which **is** updated periodically. A partnership-between-the Alaska Governor's Office and the Joint Federal-State Land Use Planning Commission has produced a series of regional profiles which includes information about culture. A source which may be helpful in understanding the social environment in which Alaskan Native culture is **evolving** is Federal Programs and Alaska Natives (Robert Nathan Associates, Inc., 1975). An important historic source for the reconstruction of traditional Native cultures in Ivan **Petroff's Report on the Population, Industries and Resources of Alaska**, part of **the 10th** U.S. Census in 1884.

Journalism provides yet another category of literature with cultural information which is statewide. An important source of contemporary information is The Tundra Times newspaper. Alaska Magazine often provides sketches of communities in Alaska. Some of those community descriptions are compiled in Lael Morgan's And The Land Provides (1974). One outstanding source **is** THEATA, a magazine written and produced by Native students at the University of Alaska.

III. LITERATURE WITH REGIONAL RELEVANCE

● Beaufort Sea Region

This region is the traditional home of the North Alaskan Eskimo, a group whose culture has been well documented through time. Five communities in this area have been subjected to intensive study by anthropologists: Anaktuvuk Pass, Barrow, Kaktovik, Point Hope, and **Wainwright**.

Located in the Brooks Range, Anaktuvuk Pass is one of the few interior communities of Alaskan Eskimos. For that reason it has drawn a lot of attention from anthropologists, particularly in recent years. The people of Anaktuvuk Pass are usually referred to as **Nunamiut** Eskimos. Ernest S. **Burch, Jr.**, has attempted to refine the **Nunamiut** concept in his article, "The

'Nunamiut' Concept and the Standardization of Error" (1976). Two fairly complete **ethnographies** have been written about the people of Anaktuvuk Pass, Helge Ingstad's Nunamiut (1954) and Nicholas Gubser's The Nunamiut Eskimos: Hunters of Caribou (1965). In addition, many articles on specific aspects of **Nunamiut** culture have been **published, including** the recent volume **edited** by Edwin S. Hall, Jr., Contribution to Anthropology: The Interior Peoples of Northern Alaska (1976).

Because of Barrow's prominent location and the excellent marine resources which attracted commercial whalers, the traditional culture of Barrow's inhabitants was well-documented by explorers, traders, and social scientists. **In 1888**, the 9th Annual Report of the Bureau of American Ethnology contained the Ethnological Results of the Point Barrow Expedition (Murdoch, 1892). In the 1950's, military activities in that area stimulated additional research on the culture of the Barrow Eskimos. One result was the classic ethnography by Robert F. Spencer, The North Alaskan Eskimo, A Study in Ecology and Society (1959). Proceedings of the second and third Alaskan Science Conferences, held in 1951 and 1954, respectively, reflect the wealth of information about Eskimo culture being collected in Barrow at that time. Some of the papers presented included: "The Child in the Contemporary Culture of the Barrow Eskimo" (M. Spencer, 1954); "Employment of Eskimos by the Navy at Point Barrow, Alaska" (Roberts, 1954); "Forms of Cooperation in the Culture of the Barrow Eskimo" (R. Spencer, 1954); and "An Anthropological Survey of the Point Barrow, Alaska Region" (Shade and Caine, 1951).

Most of the cultural research in Kaktovik has been conducted by a single anthropologist, Norman A. Chance, who conducted most of his fieldwork in the 1950's. His most complete ethnographic study of Kaktovik, The Eskimo of North Alaska, was published in 1966. He has also produced a series of articles relating to culture change and mental health: "Investigation of the Adjustment of the Eskimos at Barter Island, Alaska, to Rapid Cultural Changes" (1960); "Culture Change and Integration: An Eskimo Example" (1960); "Symptom Formation and Patterns of Psychopathology in a Rapidly Changing Alaskan Eskimo Society" (Chance and Foster, 1962); "The Changing World of Government Among the North Alaskan Eskimo" (1964); "Acculturation, Self-identification, and Personality: Adjustment" (1965); and "Modernization, Value Identification, and Mental Health" (Chance and Chu, 1966). **More** recent studies of Kaktovik have been conducted by Urban and Rural Systems Associates in conjunction with their impact assessment work for Alaskan Arctic Gas Pipeline Company.

One of the most spectacular archaeological collections from Alaska was excavated at Point Hope. The elaborately carved ivory objects stimulated interest in the culture history of that area. Helge Larsen and Froelich Rainey, who excavated the site, produced an extensive monograph about the early cultures of Point Hope, Ipiutak and the Arctic Whale Hunting Culture

(1948), as well as a series of abbreviated articles on the subject (**Rainey**, 1941). Although archaeologists have attempted to reconstruct cultural history for Point Hope, relatively little early ethnographic data is available for that community. However, military presence on the North Slope stimulated extensive ethnographic work in Point Hope in the 1950's, most of which was carried out by James W. VanStone. VanStone produced several government reports, as well as a popular ethnography, Point Hope, an Eskimo Village in Transition (1962). In addition, he published a series of articles based on his field work at Point Hope: "Report on Air Force--Eskimo Contacts" (1956); "An Autobiography of an Alaskan Eskimo" (1957); and "An Eskimo Community and the Outside World" (1958).

Wainwright was also the subject of studies stimulated by the military presence in the 1950's. Frederick Milan conducted extensive work in physical anthropology and demography in **Wainwright** at the time. He also published a paper entitled "The Acculturation of the Contemporary Eskimos of **Wainwright**, Alaska" (1964). More recently, **Wainwright** was the place in which Richard Nelson conducted his fieldwork for Hunters of the Northern Ice, 1969, an outstanding contribution to understanding of subsistence aspects of Eskimo culture.

● Bering Sea Region

The Kotzebue Sound Area, including the **Kobuk** and Noatak River drainages, has been the locus of extensive archaeological research into Eskimo prehistory. This area is also well-documented historically, as a result of several early explorers (Stoney, 1900; **Healy**, 1887; **Healy**, 1889). Archaeologist **J.L. Giddings** interviewed older informants who resided in the **Kobuk** River drainage to produce several ethnographic reconstructions, including Forest Eskimos (1956) and Kobuk River People (1961). **Edwin Hall**, another archaeologist working in the Noatak drainage, has collected myths from that area (The Eskimo Storyteller: Folktales from Noatak, Alaska, 1975). **Ernest S. Burch, Jr.**, has been the major investigator of social structure in this area. His most significant contribution has been Eskimo Kinsmen: Changing Family Relationships in Northwest Alaska (1975). He has also written about belief systems "The Nonempirical Environment of the Arctic Alaskan Eskimos," (1971). Other anthropologists have made contributions to understanding various of Eskimo culture in this area, including traditional medical practices (**Lucier**, VanStone, Keats, 1971) and acculturation (Parker, 1964). In addition, Valerie Smith has produced a contemporary ethnography of **Kotzebue** (Kotzebue: A Modern Alaskan Eskimo Community, 1966).

In the 1960's, the proposed U.S. Atomic Energy Commission activities called "Project Chariot" led to extensive ecological studies in the Cape Thompson area. A variety of cultural information resulted from this research, including Don Foote's Human Geographical Studies in Northwestern Arctic Alaska--The Upper Kobuk River (1965) which discusses the economic history of the

region. Other sources of cultural information on this region include artist Claire **Fejes** observations in her book People of the Noatak (1966), and a comprehensive development plan prepared for Kotzebue (Alaska State Housing Authority, 1971).

The area encompassing the Seward Peninsula, Norton Sound, the Yukon-Kuskokwim River Delta, and **Nunivak** and St. Lawrence Islands was originally inhabited by Eskimos of three linguistic and cultural sub-groups. **Unalakleet**, at the center of Norton Sound, is the dividing point between the Northern Eskimos, or **Inupiag-speaking** Eskimos, and the Central Eskimo, or **Yupik-speaking** Eskimos. The Eskimos of **Nunivak** Island are also **Yupik** speakers; but the Eskimos of St. Lawrence **Island** are more closely related linguistically and culturally to Siberian Eskimos. This area also includes the relatively large non-Native settlement of Nome and the distinctively non-traditional service center of Bethel.

One of the earliest and most comprehensive reconstructions of traditional Alaskan Eskimo culture is based upon anthropological fieldwork in St. Michael from 1877 to 1881. The result of this work is Edward W. Nelson's classic ethnography The Eskimo About Bering Strait (1899). During this same **time** period, explorers and traders also wrote about the Seward Peninsula and Norton Sound (see Dan, 1898; Ray, **1966**). Combining many sources of information, Dorothy Jean Ray has written an economic history of this region, The Eskimos of Bering Strait, 1650-1898 (1975).

Ray has produced several articles about Eskimo culture in this region, including "Land Tenure and **Polity** of the Bering Strait Eskimos" (1967) which discusses traditional leadership, political organization, law, territoriality and alliances. She has also written a paper on the "Present Status and Role of Eskimo Women in Nome, Alaska." Other contributors to the literature on Eskimo culture in the Seward Peninsula and Norton Sound area include E.W. Hanks (The "Inviting-in" Feast of the Alaskan Eskimo, 1913) and Dean F. **Olson** (Alaska Reindeer Herdsmen: A Study of Native Management in Transition, 1969).

Comparatively little ethnographic work has been done in the Yukon-Kuskokwim Delta, perhaps because this area was difficult to traverse and the early explorers and traders preferred to enter the Yukon River by portaging from **Unalakleet**. One of the few ethnographies, and the most noteworthy, was written by Wendell **Oswalt**: Napaskiak, An Alaskan Eskimo Community (1963). Another source which may be useful for understanding the culture of this area is Raymond Youdan's A Descriptive Study of Process of Social Change Among Alaska Natives at Bethel, Alaska (1970).

Significantly more cultural information is available for **Nunivak** Island, which is across the **Etolin** Strait from the Yukon-Kuskokwim Delta. For many years, Margaret **Lantis** has conducted ethnographic studies on **Nunivak** Island. Some of the Products of her research include Social Culture of the Nunivak Eskimo (1946), Eskimo Childhood and **Interpersonal Relationships: Nunivak** Biographies and

Genealogies (1960), and "Alaskan Eskimo Cultural Values" (1959).

While St. Lawrence Island is not officially in this region, its proximity to the oil lease-sale area is noteworthy. Therefore, it might be mentioned that ethnographic studies have been conducted on St. Lawrence Island. Some relevant publications are R.D. Moore's "Social Life of the Eskimo of St. Lawrence Island" (1923) and Charles Hughes' An Eskimo Village in the Modern World (1960).

- Southwest Region

The Kuskokwim Delta area of this region is discussed above as part of Yukon-Kuskokwim Delta.

Sources on the culture of the Aleuts of the Aleutian Islands are relatively scarce. The **Aleuts** were the subject of study by some of the earliest anthropologists in Alaska. **W. Jochelson** published "People of the Foggy Seas--the Aleut and Their Islands" in 1928, and later published the History, Ethnology and Anthropology of the Aleut (1933). Henry B. Collins' The Aleutian Islands, Their People and Natural History (1945) is more natural history than ethnology, but it does give some cultural information. And, George **Quimby** wrote about the Aleutian Islanders at the same time (Aleutian Islanders: Eskimos of the North Pacific, 1944).

Contemporary studies of the **Aleuts** are less frequent in number. Gerald Berreman has presented a classic psychodynamic culture change study based on fieldwork in the Aleutians, "Alienation, Mobility and Acculturation: the **Aleut** Reference Group" (1964). And, in recent years, Jones has studied the social service delivery system and population dynamics in the Aleutian Islands (see Patterns of Village Growth and Decline in the Aleutians, 1973).

The major river draining into Bristol Bay is the **Nushagak** River, an area which has been intensively studied by anthropologist James VanStone. VanStone has compiled the most complete bibliography on this region, Annotated Ethnohistorical Bibliography of the Nushagak River Region, Alaska (1968). Using both historic sources and the results of his own fieldwork, VanStone has documented culture and culture change in this area from 1778 to 1962 in Eskimos of the Nushagak River; An Ethnographic History (1967). A more recent source which has some information relevant to contemporary culture is Bristol Bay: A Socioeconomic Study (Kresge and others, 1974).

- Gulf of Alaska Region

Before contact with white men, three cultural groups occupied the Northern Gulf of Alaska: **Tlingits**, **Eyaks**, and **Chugach** Eskimos. Understanding of the traditional cultures of these groups comes from a few historic and ethnographic sources.

The only Tlingit community in this region is Yakutat which happens to have one of the most well-documented histories and traditional cultures of any community in Alaska. Frederica de Laguna, whose fieldwork in the 1940s and 1950s resulted in a massive three-volume **ethnography**, Under Mt. St. Elias: The History and Culture of the Yakutat Tlingit (1972), has provided a rich and detailed account of **nearly every aspect of life in Yakutat** prior to 1960. While **this source** hardly needs augmentation, there are some other classic sources about the Tlingit. In The Tlingit Indians: Results of a Trip to the Northwest Coast of America and the Bering Straits, Erna Gunther (1956) has translated the work of Aurel and Arthur Krause in 1878-79. Other sources about the Tlingit culture include Phillip Drucker's book, Indians of the Northwest Coast (1965), and Tom McFeat's Indians of the North Pacific Coast (1966). While the traditional Tlingit culture is well-documented, little has been written about contemporary Tlingits. One of the few sources is an unpublished article by Marvin Weber and Cynthia Wentworth, "American Indians in Rural Areas: Social Changes to the Alaska Tlingit Indians' Subsistence Lifestyle as a Result of Outer Continental Shelf Leasing in the Northern Gulf of Alaska."

Located to the west of Yakutat is the original habitat of the Chugach Eskimos, a group whose traditional culture has been documented primarily through a single source. Written in 1953, Kai Birket-Smith's The Chugach Eskimo is a standard **ethnography** characterized by the prevailing Western cultural biases of that time. More recent work in this area has focused on the non-Native culture, particularly the town of Valdez, which has **recently** experienced both **re-location** and extensive development. A brief description of Old Valdez is contained in the Valdez Industrial Report (Sundborg, 1955). Several reports have been prepared about the impact of the **trans-Alaska** oil pipeline terminal on Valdez. The one which is most often cited is Valdez Research Project Report: First Two Years of Impact (Baring-Gould, Bennett, Heasley, 1976).

Eyak language is no longer spoken, and there are few accounts of traditional Eyak culture. The classic source on traditional Eyak culture is The Eyak Indians of the Copper River Delta, Alaska, an **ethnography** by Kai Birket-Smith and Frederica de Laguna (1938).

The traditional inhabitants of Cook Inlet were the Tanaina, an Athabascan-speaking group. The classic **ethnography** of the Tanaina is Cornelius Osgood's monograph, The Ethnography of the Tanaina (1937). While this source is based on limited fieldwork in 1931, it does cover a variety of topics, including culture change. Osgood (1933) also abstracted his findings into article form. An earlier historic account of the Tanaina is included in Joan B. Townsend's "Journals of 19th Century Russian Priests to Tanaina: Cook Inlet, Alaska" (1974).

Although Anchorage is located in the Cook Inlet area, it is a metropolitan city which has attracted Natives from all over Alaska. To some, the "urban Native" represents yet another cultural group in contemporary society. Some studies have been conducted among urban Natives, including the works cited by Bloom. Dorothy M. Jones has prepared a report, The Urban Native Encounters the Social Service System (1974) which considers urban Native problems.

Kodiak Island, home of the Koniag Eskimos, is documented by Don Clark's Koniag-Pacific Eskimo Bibliography, 1975, which lists 500 entries. However, sources on the culture of the Koniag Eskimos are relatively scarce.

Most of the sources about the people of Kodiak Island are highly specialized in subject. There is no definitive ethnography for this group. Relatively early ethnographic data about the Koniag was recorded by Ales Hrdlicka (The Anthropology of Kodiak Island, 1944), who emphasizes material culture and physical characteristics. In 1938, Lantis published "The Mythology of Kodiak Island, Alaska," in which she synthesizes research on Koniag myths and compares them with the myths of neighboring cultures. More recent work has included Harumi Befu's "An Ethnographic Sketch of Old Harbor, Kodiak: An Eskimo Village" (1964), and Nancy Davis' "The Effects of the 1964 Alaska Earthquake, Tsunami and Resettlement on Two Koniag Eskimo Villages" (1971).

IV. CURRENT RESEARCH

● Statewide

A number of anthropologists are currently researching aspects of Native culture in Alaska. There are at least two major research programs with statewide significance. In conjunction with Section 14-H of the Alaska Native Claims Settlement Act, the National Park Service has employed one researcher for seven Native regional corporations to identify archaeological and historic sites, collect ethnohistorical information, and compile references on culture history. The director of this project is Zorro Bradley, National Parks Service Archaeologist, University of Alaska, Fairbanks.

Another significant research program with statewide scope is the Man in the Arctic Program funded by the National Science Foundation and conducted by the Institute for Social and Economic Research, University of Alaska, Fairbanks. While the major thrust of this project is economic modeling, John A. Kruse is conducting attitudinal surveys which may reveal important cultural information.

Since there is no clearinghouse for anthropological research in Alaska, it is difficult to ascertain who is researching what aspects and areas of culture until research results are published.

It may be assumed that anthropologists who have specialized in a single area are continuing to work in those areas. However, that assumption may be verified only by contacting those researchers. Some outstanding Alaskan researchers, including J.L. Giddings and Don Foote, are deceased. Others, such as Norman Chance, have turned their attentions to other areas of the world. Still other outstanding researchers, such as Douglas Anderson and Wanni Anderson who have been doing extensive ethnographic work in Selawik, have not been mentioned in this literature review because their ethnographic research has not yet been published.

- Beaufort Sea Region

No other current cultural patterns research has been identified.

- o Bering Sea Region

No other current cultural patterns research has been identified.

- Southwest Region

No other current cultural patterns research has been identified.

- Gulf of Alaska Region

No other current cultural patterns research has been identified.

- v DATA GAPS FOR OCS SOCIOECONOMIC STUDIES PROGRAM

The objectives of including culture as a topic for study in the Alaskan OCS Socioeconomic Studies Program are: to understand the cultural diversity in Alaska, how culture integrates with other study topics, the cultural dynamics which affect the ways in which various groups cope with OCS development, the types and magnitudes of culture change which may be anticipated from OCS development, and how that culture change affects individuals in society. The basic kinds of information which are needed for this type of assessment are a culture history which has continuity from traditional (**pre-contact**) times through the present; an understanding of cultural values and social structure, particularly with regard to leadership and decision-making; an indicator of the strength and content of cultural identity and its implication for mental health; the structure of the interface between Native culture and the dominant non-Native social environment. These informational requirements will be used as the basis for determining information gaps. In addition, it is necessary to understand economic aspects of culture, but this subject has been reserved for the section on subsistence. Since this literature is necessarily brief, there is also a need to determine whether regional bibliographies exist to identify and evaluate additional sources.

- Beaufort Sea Region

- No bibliography has been identified for this region.
- Information on culture history and culture change is quite adequate except for the post-AN6SA period.
- More information is needed on values, leadership, and decision-making.

- Bering Sea Region

Information and current research in the Kotzebue Sound area appears to be adequate for the objectives of the Alaskan OCS Socioeconomic Studies Program.

In the Seward Peninsula and Yukon Delta areas, the following data gaps exist:

- No regional bibliographies have been identified.
- For an understanding of culture and culture history, more ethnographic reconstruction needs to be done for **Yukon-Kuskokwim** Delta and contemporary ethnographic work is needed for all areas.
- Strength and content of cultural identity is unknown for most areas.
- The interface between Native and non-Native is largely unknown for Yukon-Kuskokwim Delta.
- Contemporary cultural values and leadership need to be examined.

- Southwest Region

- While the culture history of this region is well-documented prior to 1968, it requires a post-ANCSA up-date.
- Information is needed on strength of cultural identity and mental health implications.
- More information is needed on cultural values and leadership.
- No synthesis of cultural history is available for the Aleutians.
- For an understanding of culture and culture history, more ethnographic reconstruction needs to be done for the **Yukon-Kuskokwim** Delta and contemporary ethnographic work is needed.

- Gulf of Alaska Region

- North Gulf of Alaska

- Bibliography is not available.

- Culture history requires a look at contemporary (post-ANCSA) **cul ture**.
 - Assessment of strength of cultural identity needed, particularly for Eyak and **Chugach** Eskimos since there are apparently no Native language speakers.
 - There are no contemporary studies of values and leadership,
 - Native/non-Native interface has not been examined.
- Lower Cook Inlet
 - Culture history requires research into contemporary culture, particularly for Tyonek, which has experienced oil development.
 - Since this area is gradually becoming part of the Anchorage metropolitan area, there is a need to assess cultural identity.
 - There are no contemporary studies of values and leadership among the Tanaina.
 - The Native/non-Native interface in Anchorage has been studied to some extent in regard to social service delivery systems. However, greater attention needs to be directed toward subjects of economics, political structure, and social structure. Also, more information is needed about migration patterns.
 - Some cultures such as the Old Believers (**Russian-speaking** population on Kenai Peninsula) and **Blacks in Anchorage** are not well understood.
 - Kodi ak
 - Literature on Kodiak Island is uneven and incomplete-- there is no synthesis of culture and culture history.
 - Assessment of strength and content of cultural identity is needed, particularly since many people in this region trace their ancestry to Russian origins.
 - Native/non-Native interface has not been examined for Kodiak Island.
 - More research is needed to understand cultural values, social structure, and leadership.

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11. SUBSISTENCE

I. SUMMARY OF INFORMATION SOURCES

Some aspect of subsistence influences nearly every component of Alaskan lifestyles, and therefore relates to nearly every component of the Alaskan OCS Socioeconomic Studies Program. Subsistence activities bridge the gap between man and his environment, the social and the biological, traditional Native cultures and modern lifestyles, the economy of economists and the economy of Alaska, the rural communities and the urban areas. Particularly in the rural areas of Alaska, subsistence influences and/or is influenced by nearly every aspect of life including government, education, employment, housing, and social services. Because subsistence is so pervasive, it has found its way into the literature of a variety of disciplines.

Until recently, most of the literature about subsistence activities in Alaska was contained within **ethnographies** by anthropologists who considered subsistence to be an integral part, and sometimes an organizing feature, of culture. Recent interest in cultural ecology as a theoretical approach to analyzing culture and culture change has led to more specialized studies of subsistence. These studies draw upon a variety of sources for information about the natural environment in which subsistence activities take place. Hence, various disciplines relating to biology and botany have provided valuable information about subsistence. Scholarly works about subsistence may be found in the literature of a variety of disciplines, including anthropology, economics, biology, botany and wildlife management.

Changing economy, land ownership, and land use patterns in Alaska have created political issues relating to subsistence. Subsistence has become the subject of State and federal reports, hearings, and political position papers. The intensity of the political issues has created a greater need for documentation of subsistence activities, which in turn has made more funds available for this type of research.

Information about subsistence is still very much in the formative process. The types of questions which are being asked by researchers include: How do we define subsistence? What is the historic context of subsistence? To what extent are subsistence activities being practiced today? What resources are being used for what purposes? Who is using the resources? How are resources used? What types of specialized knowledge are needed to engage in subsistence activities? How are subsistence activities integrated into other aspects of culture? How are changes in technology, cash income, and public policy affecting subsistence activities? While

many researchers are attempting to answer these questions, the literature which they are producing is quite fragmented. Perhaps the best source for information on subsistence in Alaska is a **library** with an extensive Alaskan collection, such as the University of Alaska at Fairbanks.

- Statewide Literature

Statewide literature tends to be limited to planning documents which consider the distribution of resources, and the effects of public **policy** on subsistence. There are some scholarly sources which have relevance for more than one region.

- Community/Regional Literature

The best information on subsistence is regional in scope because both the distribution **of** resources and the geographic range of subsistence activities are regional in nature. However, reports of explorers and anthropological works **which** are based on a community study often give excellent information about subsistence activities. Some **early** teachers and missionaries regularly recorded data about subsistence activities in the communities in which they resided.

Currency of Literature

Much of the **academic** work on subsistence is currently being conducted by archaeologists who are using a cultural ecology approach to analyzing settlement patterns, technological change, and culture history. **While** this work offers an historic context for present day subsistence activities, it does not necessarily **clarify** contemporary subsistence problems. Because archaeologists use ethnographic analogies, some archaeologists in Alaska are also doing ethnographic research in relation to subsistence and cultural ecology. These researchers are providing some of the most detailed documentation of subsistence activities. However, archaeologists who are focusing on reconstructions of traditional subsistence patterns may **fail** to record in detail the current technological and social aspects of subsistence activities. In general, published literature on contemporary subsistence patterns is very scarce.

- Form of Literature

Contemporary research on subsistence is primarily unpublished. Historic sources are available in book form and in articles. Much information is also recorded on maps. And some information is recorded on film. Some archival sources provide reports on numbers of animals taken in a community each year, as recorded by teachers and missionaries.

II. LITERATURE WITH STATEWIDE RELEVANCE

There are no statewide sources documenting subsistence per se, but several sources are applicable to more than one region. **Richard Nelson's Hunters of the Northern Ice** (1969), for **example**, is an **excellent** source on Eskimo subsistence activities and **the** knowledge which is necessary to engage in subsistence hunting. A dietary survey conducted in 11 villages in Alaska from 1956 to 1961 gives information about subsistence foods in the diet (Scott and Heller, 1968). Art Patterson has statistically documented subsistence activities in five regions in Alaska (Subsistence Harvests in Five Native Regions, 1974). And the Federal-State Land Use Planning Commission has produced a series of maps for Alaska which indicate both the distribution of resources and areas of subsistence use. Another series of useful maps is Alaska's Wildlife and Habitat (Alaska Department of Fish and Game, 1974).

Literature on resources in Alaska has great applicability for subsistence activities for the regions in which those resources are found. For example, Ernest S. **Burch, Jr.**, has written "The Caribou/Wild Reindeer as a Human Source" (1972), in which he reconsiders assumptions about the subsistence use of caribou based upon recent biological and ecological information about the animals. This article would apply to all areas of Alaska in which caribou is used as a resource. Slightly removed from direct investigation of subsistence is information about animal behavior and the effects of various factors on **faunal population** size and distribution. Documentation of resource distributions, such as Alaska Regional Profiles and Resources of Alaska, A Regional Summary (Joint Federal-State Land Use Planning Commission, 1974) are also useful statewide.

Another type of literature which has statewide applicability is that which synthesizes aspects of culture related to economy, ecology, or specific subsistence activities. One of the very few articles of this nature is Margaret **Lantis'** "The Alaska Whale Cult and Its Affinities" (1938). Wendell **Oswalt's** Alaskan Eskimos (1967) provides information about Eskimo subsistence activities in several regions.

Attempts to develop State and federal policy in relation to land ownership, land use, and economics have led to public documents which include a consideration of subsistence on a statewide basis. Some examples are "Summary of the Conference on Taking Fish and Game Resources to Meet Subsistence Needs" (Joint Federal-State Land Use Planning Commission, 1974), "Alaska's Growth and Future Choices--Statewide Policy Issues for the Alaska Public Forum Program" (Alaska Growth Policy Council, 1976), and "Analyzing the Impact of Rapid Change on Culture in Rural Native Alaska" (Dixon and Gal, 1976), all of which consider the possible implications of public **policy** on subsistence.

Because Alaska Native groups are trying to influence public policy which may affect subsistence activities, they have also been producing literature on the subject. The Yukon-Kuskokwim Native association **Yupiktak-Bista** has produced Does One Way of Life Have to Die so Another Can Live? which illustrates the importance of subsistence to Native people. And the Alaska Native Foundation has produced Trouble Ahead: Some Questions and Answers About the Future of Subsistence Hunting and Fishing for Alaska Villages (1976).

There is also a growing body of literature about the effects of snowmachines on subsistence activities. Although many of the studies were conducted outside of Alaska (**Pelto, 1973; Smith, 1970**), they have broad applicability to the Alaskan situation, as do those studies conducted in Alaska (Hall, 1971; Francis, 1969).

III. LITERATURE WITH REGIONAL RELEVANCE

● Beaufort Sea Region

Archaeological and ethnographic work in this area has tended to focus on subsistence activities. Thus, all of the major ethnographies for this region contain relatively extensive discussions of subsistence activities, including J. **Murdock's Ethnological Results of the Point Barrow Expedition** (?892), Robert Spencer's The North Alaskan Eskimo, A Study in Ecology and Society (1959), **Helge Ingstad's Nunamiut** (1954), James W. VanStone's Point Hope, An Eskimo Village in Transition (1962), Nicholas **Gubser's The Nunamiut Eskimos: Hunters of Caribou** (1965), and Norman **Chance's The Eskimo of North Alaska** (1967). Most of these ethnographic sources treat aspects of subsistence such as annual cycles, technology, social structure related to subsistence activities, beliefs and ceremonies related to subsistence, and brief descriptions of subsistence behavior. This material is augmented by the archaeological record, which is particularly rich for Point Hope (Larsen and Rainey, 1948), and Anaktuvuk Pass (**Campbell, 1968; Hall, 1976**).

In addition to these ethnographic and archaeological sources, several specialized studies of subsistence have been conducted in this area. The most outstanding study is Nelson's Hunters of the Northern Ice (1969) which gives extremely detailed descriptions of subsistence activities and the knowledge associated with them. **Nelson also** discusses recent changes in hunting activities. J. Sonnenfeld has produced another specialized study which analyzes the influence of firearms on subsistence activities among the Eskimos at Barrow ("Changes in Eskimo Hunting Technology: An Introduction to Implement Geography," 1960). More recently, Lewis Binford has written "Forty-Seven Trips--A Case Study in the Character of Some Formation Processes of the Archaeological Record" (1976), in which he reports on a contemporary study of subsistence activities among the people of **Anaktuvuk** Pass with particular emphasis on technology and material culture. He includes a discussion of snowmobiles and other modern technology, and his analysis

provides a basis for integrating archaeological work with ethnographic work on subsistence.

The Arctic Slope is one of the areas in which records of hunting and fishing activities were compiled by Art Patterson in Subsistence Harvests in Five Native Regions (1974), and it is **also the** subject of one of the Alaska **Regional Profiles** (Arctic Regional Profile, Selkregg, 1975).

o Bering Sea Region

The region around Kotzebue Sound is the site of extensive archaeological and ethnographic research related to subsistence. Comments on subsistence activities are included in the reports by some of the earliest explorers and **ethnographers** (Healy, 1887; Gordon, 1906). Archaeologist J. L. **Giddings** investigated ecological and economic problems both through the archaeological record and **through his ethnographic** work. Thus, there are extensive discussions of **subsistence in** his works The Arctic Woodland Culture of the Kobuk River (1952); Forest Eskimos (1956); and Kobuk River People (1961).

In the 1960s, the U.S. Atomic Energy Commission's proposed "Project Chariot" led to extensive ecological investigations in the Cape Thompson Region. These studies offer a wealth of information about the environment (**Wilimovsky** and Wolfe, 1966), human ecology (**Saario** and **Kessel**, 1966), and economic history (Foote and Williamson, 1966) of this area. Foote amassed data on expenditures, wages, population, and presence of Western technology which offer excellent baselines for Present subsistence studies (Human Geographical Studies in Northwestern Arctic Alaska--The Upper Kobuk River Project, 1965; 1965).

In addition to these detailed studies of the relationship between man and his natural environment, there is also information from this region on the supernatural, or non-empirical, environment (**Burch**, 1971). Among other works relating to subsistence in this region, Hall has written about "The 'Iron Dog' in Northern Alaska" (1971). And this was one of the regions surveyed by Art Patterson in Subsistence Harvests in Five Native Regions (1974).

The most comprehensive study of subsistence in this area has recently been completed by a team of researchers under the guidance of Doug Anderson as part of a National Park Service study program. This research has attempted to describe contemporary subsistence activities and to reconstruct traditional subsistence patterns. Nearly every aspect of subsistence is considered and documented in the as yet unpublished report, Kuvungmiut: A Study of Traditional Subsistence Life Style of the Kobuk River Eskimo.

Dorothy Jean Ray has been responsible for major work in the Norton Sound area. In "Nineteenth Century Settlement and **Subsistence** Patterns in Bering Strait" (1964), she discusses the

relationship between subsistence activities and the location of communities in this area. She offers a typology of subsistence patterns based upon resources utilization, seasonal mobility, flexibility, and alternative resources. She also gives descriptions of food resources and population for individual communities. The social and political aspects of subsistence are treated in "Land Tenure and Polity of the Bering Strait Eskimos" (1967), in which Ray discusses territoriality, law, land use, alliances, and other relevant aspects of culture.

E.W. Hawkes (The "Inviting-in" Feast of the Alaskan Eskimo, 1913) demonstrates how Eskimo ceremonialism is related to subsistence needs.

Michael Nowak's article, "Subsistence Trends in Modern Eskimo Community" (1974) is unique in that it discusses the interaction between cash economy and subsistence activities. He argues that a cash income is needed to obtain and maintain equipment necessary for subsistence in contemporary Nunivak society. By comparison, Does One Way of Life Have to Die so Another Can Live? by Yupiktak-Bista (1974) stresses the need for subsistence activities in contemporary-society to maintain culture, identity and mental health.

Parts of this area were included in Subsistence Harvests in Five Native Regions (Patterson, 1974) and the Southwest Regional Profile (Selkregg, 1976).

- Southwest Region

This region includes part of the Yukon-Kuskokwim Delta, which has been reviewed in the Bering Sea Region discussion.

The Bristol Bay area includes several sources on subsistence. Although James W. VanStone focuses on cultural change in his book Eskimos of the Nushagak River; an Ethnographic History (1967), he presents an economic history in which subsistence activities are integral. Bristol Bay: a Socioeconomic Study (Kresge, Fison, Gasbano, 1974) presents a more contemporary economic analysis which also encompasses the subject of subsistence. A village by village record of subsistence activities is given in Bristol Bay: the Fishery and the People (Bristol Bay Area Development Corp. and the Bristol Bay Native Association, 1975), and this area is included in the Southwest Regional Profile (Selkregg, 1976).

While specialized articles on aspects of subsistence in the Aleutians area have been published, such as R.F. Heizer's Aconite Poison Whaling in Asia and-America; an Aleutial Transfer to the New World (1942), no comprehensive synthesis of subsistence and cultural ecology for this area has been

identified, although ecological information about this area is included in the Southwest Regional Profile (Selkregg, 1976).

● Gulf of Alaska Region

The major ethnographic sources for the North Gulf of Alaska area contain information about traditional subsistence activities, including Frederica de Laguna's Under Mt. Saint. Elias: The History and Culture of the Yakutat Tlingit (1972), Erna Gunther's trans-tation of the Tlingit Indians: Results of a Trip to the Northwest Coast of America and the Bering Straits (1956), Kai Birket-Smith's The Chugach Eskimo (1953), and The Eyak Indians of the Copper River Delta, Alaska by de Laguna and Birket-Smith (1938). No sources on contemporary subsistence activities in this area have been identified. However, this area is included in the South-central Regional Profile (Selkregg, 1974).

No published sources specifically about the subsistence activities of the Tanaina Athabascans of the Cook Inlet have been identified. However, two sources which have broad applicability to Alaskan Athabascans discuss subsistence activities in detail. These are Richard Nelson's Hunters of the Northern Forest (1973) and James W. VanStone's Athabaskan Adaptations (1974). Also, this area is the subject of the Southcentral Regional Profile.

Don Clark's Koniag-Pacific Eskimo Bibliography (1975) identifies 500 sources for the Kodiak area, some of which consider aspects of subsistence. The earliest anthropologists in this area recorded information about subsistence activities (Hrdlicka, 1944; Collins, 1945). More recently archaeologist W.S. Laughlin has been conducting a comprehensive ecological study program in this area. A collection of research reports from that project have been published under the title, Kodiak Studies: Aleut-Konyag Prehistory and Ecology Project (1966).

IV. CURRENT RESEARCH

Three major research programs which are currently being conducted in Alaska are expected to make significant contributions to understanding subsistence. Two of these programs are being conducted under the auspices of the National Park Service. One program is designed specifically to study subsistence activities. Research has already been conducted in the Kobuk River area and publication of the findings is pending. Research is currently being conducted in the Koyukuk River area, in the Interior Region. It is not known what other areas, if any, will be selected for this type of intensive study.

The second National Park Service study program in Alaska is designed to help implement Section 14-H of the Alaska Native Claims Settlement Act. Researchers have been hired by NPS for seven Native

regional corporation areas to record and document archaeological and historic **sites** within the region. The work includes bibliographic search and **ethnohistories**. It **is** presumed that location of archaeological sites will convey much information about land use, which in turn **will** convey information about subsistence.

● Beaufort Sea Region

Current research activities by the Institute for Social and Economic Research at the University of Alaska, Fairbanks, include household surveys **in** which questions about subsistence and related topics are being asked. Fairbanks North Star Borough, the North Slope Borough, and the Porcupine River Drainage Area have been selected for these attitudinal surveys. It is not **known** what additional areas, if any, will be included in the project.

● Bering Sea, Southwest, and Gulf of Alaska Regions

No specific items **of** current research have been identified for these regions. However, several comprehensive works nearing completion **will** have relevant information. Regional profiles for the remaining regions of the state have been completed, and other products from the Joint Federal-State Land Use Planning Commission are expected to yield information on environment, ecology, and subsistence.

Since there is no clearinghouse for studies related to subsistence, it is difficult to ascertain what research is currently underway **until** researchers begin **to** publish their data. One approach for determining this is to survey researchers, state and federal agencies, and Native corporations and associations.

V. DATA GAPS FOR OCS SOCIOECONOMIC STUDIES PROGRAM

Two types of information are needed in order to assess **how OCS** development **will** affect subsistence and, in turn, affect culture.

First, there needs to **be** an understanding of the relationship between subsistence activities and cultural identity in contemporary society. To what extent are subsistence activities carried out for physical survival and to what extent are they maintained for cultural survival? In other words, do people hunt and fish because they would starve if they did not, or because their cultural identity and the very fabric of their culture would disintegrate if they did not? For the purposes of preserving culture, what is considered to be a desirable level of subsistence activity? Are age, sex, and formal education variables which correlate with desire to maintain subsistence activities? How do subsistence activities integrate into daily life, annual cycles, and ceremonial activities? How does proficiency in subsistence skills relate to leadership at the local and regional levels? In contemporary Native society, how are subsistence **skills** and knowledge learned and transmitted? In contemporary

society, how is a cash economy integrated with subsistence? What patterns can be identified which characterize the relationship between cash employment and subsistence activities?

Second, for the purposes of land use planning and the projection of OCS impacts on subsistence, it is necessary to identify the geographical and biological dimensions of subsistence activities. For each community, there needs to be an assessment of areas in which specific types of subsistence activities take **place**. This must be done with an understanding of the flexibility of the system in which game migrates and hunters follow the game. With the possible exception of traditional sites for fish camps, before one can map areas used for subsistence activities, one must understand the behavior of animals which are used for subsistence and the dynamics of plant colonization. There also needs to be an understanding of the amounts of fish, game, and other **biota** needed to sustain desired levels of subsistence for current and projected population levels.

Limitations on this review of the literature have made it impossible to examine the available environmental data. However, it is assumed that the Joint Federal-State Land Use Planning Commission (**JFSLUPC**) activities, the regional profiles prepared by the Alaska Environmental Information and Data Center (**AEIDC**) will produce a comprehensive review of the available data on this subject.

Therefore, the following identification of data gaps is based upon three criteria: 1) the presence of literature offering a historical context for subsistence; 2) literature offering an understanding of the relationship between subsistence activities and cultural identity in contemporary society; and 3) an assessment of the current dependency upon subsistence activities. In addition to these needs at the regional level, there is a need for better understanding of the dynamics of changes in subsistence activities. In other words, there is a need to develop theoretical models about the relationship between subsistence and factors which affect the **levels** and types of subsistence activities.

● Beaufort Sea Region

A contemporary assessment of the relationship between subsistence and cultural identity is needed to update existing literature.

e Bering Sea Region

While information about **riverine** subsistence activities in this region appears to be relatively complete for the purposes of the Alaskan **OCS** Socioeconomic Studies Program, there is virtually no information on coastal subsistence activities.

● **While** the historic context of subsistence in the Bering Straits area is relatively complete, there is a dearth of information on the subject **for** the Yukon-Kuskokwim area.

- The **Yupiktak-Bista** report offers insights into the relationship between subsistence and cultural identity, but this subject also needs to be addressed with a research approach.
- An assessment of subsistence harvests in this region is uneven and needs to be augmented with research for additional communities.
- Southwest Region

Research is needed on the relationship between subsistence activities and cultural identity.
- Gulf of Alaska Region
 - There needs to be a better understanding of the relationship between subsistence activities and cultural identity.
 - No sources assessing the current dependency upon subsistence activities in this area have been identified, particularly in relation to commercial fishing.
 - Historic context of subsistence in this area is minimal.

VI. SUBJECT CHAPTER BIBLIOGRAPHY: SUBSISTENCE

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12. LAND USE AND LAND STATUS

1. SUMMARY OF INFORMATION SOURCES

Land use and land status in Alaska are closely related. Land use broadly refers to human use of the land, particularly to designated or regulated uses associated with settlement and urbanization. Land status in Alaska refers not only to ownership (federal, State, Native corporation, borough or private land), but also to classifications (tentatively selected, selected, tentatively patented, patented) associated with the land patenting process mandated by the Alaska Native Claims Settlement Act of 1971, (U.S. Laws, Statutes, 1971). Land classifications confer broad land management and usage rights. For example, Native regional and village corporations will eventually own and control the usage of perhaps 80 percent of the entire Alaska coastline. Similarly, the National Petroleum Reserve No. 4 in the Arctic, the Chugach National Forest and the Tongass National Forest, both in the Gulf of Alaska, represent large federal land holdings for which specific studies of land use have been prepared.

The 28 proposals for land withdrawals for the four National Systems, usually referred to as (d-2) proposals, are also documented in planning studies and environmental impact statements.

● Statewide Literature

Land use and land status information is available from public and private agencies responsible for preparing either inventories of resources, or land use plans regulating the use of those resources. In the case of statewide literature, the key inventory is the State's documentation of all lands in the land patenting process according to individual plat maps of the entire State. The Joint Federal-State Land Use Planning Commission (JFSLUPC) provides planning assistance to various agencies for purposes of establishing federal, State and Native corporation withdrawals.

In this capacity, the Commission maintains extensive map inventories of land use throughout the State. Other inventories of land use and land status are compiled in the Alaska Regional Profiles produced by the University of Alaska Arctic Environmental Information and Data Center (AEIDC).

Map inventories of land status and land use along the entire Alaska Coast are being prepared by the State Coastal Management Program and the Division of Lands of the Department of Natural Resources. Although these inventories are statewide in focus, they will provide the most accurate, legal picture of land status for the specific potential OCS impact regions.

● Community/Regional Literature

Land status and land use inventories on a specific regional level are best provided in the above mentioned state inventories of the JFSLUPC and the **AEIDC**. In addition, other agencies which regulate land use on a regional or community level also publish literature relevant to OCS impact regions. Each of the organized boroughs is responsible for land use planning for settlements within it and, hence, each is a repository for community-level land use as **well** as local and boroughwide comprehensive plans. Larger **communities** have prepared such plans, and, in the past, the Alaska State Housing Authority (ASHA) has prepared comprehensive plans with HUD Section 701 funding for other communities. Each of the separate Native regional and village corporations has prepared various land use studies relevant to their land claim interests. These studies, however, are often difficult to obtain. Another source of land status and land use information is included in environmental impact statements related to specific projects such as land use plans for national forests and parks, or for petroleum development activities. Because of the localized focus of these studies, their applicability to other land areas may be restricted to methodological comparisons.

e Currency and Form of Literature

Because of the need to closely monitor the land selection process, the State Division of Lands maintains current, mapped records of land status. More generalized inventories at both a regional and community level may be of continuing use even if the conclusions (as in comprehensive plans) contained in these reports are dated. Because of the map format common to most information on land use and land status, information can be relatively easily aggregated or **disaggregated** to fit the designated impact regions and their subregional or community components. The comprehensiveness of existing map coverage, particularly for very specific areas such as onshore staging sites, can **only** be determined when such localized areas have been defined through the petroleum development scenarios.

II. LITERATURE WITH STATEWIDE RELEVANCE

Land use documents include both those which describe or inventory existing land use and those which describe or analyze land use **policies**, laws or regulations. Existing land use data is presented in Alaska Regional Profiles - Arctic Region (Selkregg, 1975), Southcentral Region (Selkregg, 1974), Southeastern Region (Selkregg, 1976), Southwestern Region (Selkregg, 1976), Northwestern Region (Selkregg, 1976), and Yukon Region (Selkregg, 1977), which contain maps by region and **sub-region of urbanized areas**, small community areas, rural development areas, State and federal, reserves and **recreation** areas, and **agricultural and mineral** resources areas, all at a scale of 1:1,000,000.

Statewide land use profiles and regulations are summarized in Alaska's Land 1975 (Joint Federal-State Land Use Planning Commission, 1976), the

annual report of the JFSLUPC. This report, and those of previous years, describe the Commission's responsibility to plan land use in Alaska for federal reserves and State and Native land selections. Most Commission activities are strictly advisory; however, certain recommendations by the Commission on the use of State lands, which are endorsed by the Governor or his designee, can constitute a classification of those lands. This annual report also summarizes the activities and decisions of the Commission and provides a guide to land use data and classification information available through the agency.

An Inventory of Existing Land Management Tools in Alaska (Center for Natural Areas, 1975) discusses constitutional powers, statutes, home rule and eminent domain factors as management tools for coastal zones in Alaska. A second volume of matrices identifies the applicability of these tools to jurisdictions, coastal areas, and funding mechanisms. This study is useful as long as the legal tools remain in their present form.

Other statewide land use regulation activities are outlined in Annual Reports of the Division of Lands (Department of Natural Resources, 1975) and the Division of Policy Development and Planning (Office of the Governor, 1975). The 1975 reports include reviews of land management programs, oil and gas leases, water and forest resources, and planning activities, and provide a background on State involvement in land use and planning.

Land status literature in Alaska also consists of documents that describe current federal, State or Native corporation ownership, and those which discuss legal, historical or administrative aspects of land status changes in Alaska. These include Resources of Alaska - A Regional Summary (Joint Federal-State Land Use Planning Commission, 1974), which contains maps by hydrologic subregion of federal, State and Native withdrawal status as of January 1974, -at a 1:2,500,000 scale. This report provides statewide data in a convenient form, but is less detailed than the Regional Profiles.

The Alaska Regional Profiles contain 1:1,000,000 scale maps of land status information current as of publication, and tables of acreages under federal, State or Native corporation control, broken down by various federal agencies and national systems (parks and wildlife ranges, etc.), State classifications and individual Native regional and village corporations. A brief history of land ownership and status including statehood, native claims, and federal withdrawals on a statewide and regional basis is included in each Regional Profile.

Statewide land status as of March 1974 is also mapped on a statewide scale of 1:2,500,000 by the U.S. Bureau of Land Management. This map includes withdrawals prior to ANCSA (December 18, 1971), State selections; federal withdrawals for the four National Systems (d-2); withdrawals for classifications and public interest (d-1); Native, regional and village corporation withdrawals; dual withdrawals (Native/federal); and utility corridors (pipeline). Since a revision has not been published, this is a useful one-sheet summary of land status data as of 1974.

Detailed discussion of the (d-2) withdrawals is found in the final environmental impact statements for each of the proposed additions to the four National Systems: National Parks, National Forests, National Wildlife Refuges, and National Wild and Scenic Rivers. These were published in 1974 and 1975 by the U.S. Department of the Interior, Alaska Planning Group. While the natural and socioeconomic data in these reports is useful, these land status proposals themselves will not become final until 1978.

In connection with the coastal management planning process, an ongoing project of the State Division of Lands is the compilation of land status plats at a 1:200,000 scale for the entire Alaskan coastline. These plats are currently available for the Yakutat to Kodiak Island area in the Gulf of Alaska. The large scale of the maps and the currency of the data make this pertinent coastal land status data in the development regions.

A basic reference for the Native claims aspects of Alaska land status is Alaska Native Land Claims (Arnold, 1976), which is a detailed study of the events leading to Alaska Native Claims Settlement Act of 1971, together with the text of the Act. The volume also projects the future results of implementation of the Act.

Socioeconomic impact studies related to oil and gas development discuss land use or land status changes related to particular projects which cover broad areas of Alaska.

On-Shore Impact of Oil and Gas Development in Alaska (Resource Planning Associates, 1975) projects impacts on population, employment and land requirements of oil and gas development scenarios in nine OCS lease sale areas. This report produces an overview of OCS development that would be valuable as a basis for petroleum development scenarios and impact evaluation in the current study.

Several environmental impact statements and permit applications for oil and gas development forecast statewide socioeconomic impacts, but cursorily treat land use and land status impacts. The Application of El Paso Alaska for a Certificate of Public Convenience and Necessity (El Paso Alaska, 1974) describes anticipated land use and planning changes necessitated by the El Paso project on Fairbanks, Anchorage, Cordova and the small communities of Delta Junction, Gulkana, Copper Center and Glenallen. It also briefly describes the organizations and jurisdictions responsible for land use planning in the Interior Drainage Basin. This information has limited usefulness because of its focus on land use of the interior.

A Social and Economic Impact Study of Off-Shore Petroleum and Natural Gas Development in Alaska (Mathematical Sciences Northwest, and Human Resources Planning Institute, 1976) is primarily an economic model of development impacts, but the-report does contain information on potential land use changes in Kenai Peninsula communities. An earlier report, A Study of the Economic and Sociological Impact of Construction and Initial Operation of the Trans-Alaska Pipeline (Mathematical Sciences

Northwest, 1972) discusses community land use impacts in the pipeline corridor, but has relatively little current usefulness.

Marine Service Bases for Offshore Oil Development (Alaska Consultants, 1976) discusses marine base requirements for OCS **development** that create the least environmental disruption. The document is primarily transportation facility-oriented and does not study external effects of bases and surrounding uses. Although the study uses Cordova and Yakutat as case examples, it generally applies to OCS land use impact anywhere on the Alaska coast.

III. LITERATURE WITH REGIONAL RELEVANCE

● Beaufort Sea Region

General land use and land status information for the Beaufort Sea-Arctic region is found in the Regional Profile cited above (Selkregg, 1975). Periodic updating is planned for this material.

Regionally-oriented documents include environmental assessments, community inventories and comprehensive plans. The former concentrate on economic, **social** and natural environmental impacts, and most give only minimal consideration to land use, land status data and impacts. Those which do have some usefulness within these areas include Environmental Report (Alaska Arctic Gas Pipeline Co., 1974), a comprehensive environmental assessment prepared as part of an application to the Federal Power Commission for gas pipeline permits. Land requirements of the project are described as part of the socioeconomic impacts. Another gas pipeline-related impact report, An Analysis of the Socio-Economic Impact in Alaska of the Alaskan Arctic Gas Pipeline (URSA, 1974), is a detailed baseline analysis, as well as impact projection, for the northern **region** and the state as a whole, of both the Alyeska oil pipeline and the proposed gas pipeline. As defined in this report, the Northern regions include the Arctic, Northwest and Interior regions of Alaska. Brief histories of regional and village corporations and claims settlements are given and land use maps are provided for Barrow, Prudhoe Bay and Kaktovik. Unmapped data is provided for the village of Nuiqsut. The comprehensive data relating to Beaufort Sea communities is current and useful in preparing a land use information base.

A very general account of projected impacts is contained in the Draft Environmental Impact Statement, Offshore Oil and Gas Development - The Alaskan Arctic Coast (U.S. Army Corps of Engineers, 1975). The usefulness of this document is limited **because** it is not based on economic models or other quantified impact evaluations.

Alaska Coastal Zone Management Program (Alaska Department of Fish and Game, 1976), is a **progress report** on the definition of Alaska coastal zones and their **environmental** sensitivity. The report also describes an application of these coastal data on a map of

environmental stipulations for oil and gas leasing in the **Beaufort Sea OCS** region from the **Colville** River to the Canning River. These stipulations are based on risk factors resulting from demands placed on the environment for gravel, water supply and waste **disposal** by oil development activities. This document is a current, geographically-specific description of potential land use impact related to OCS development. Community or regional inventory and planning studies with relevance to land status or land use in the Beaufort Sea region include A Discussion of Sites Recommended as Potential Natural Landmarks in the Arctic Lowland Natural Region, Northern Alaska (**Koranda** and Evans, 1975). Although this study discusses the natural environment of the Arctic lowland, the text proposes eighteen sites for nomination as Natural Landmark reserves, and thus is a significant source of data on the relationship between the Arctic natural environment and potential land use and land status. The report is useful in assessing impacts of Beaufort Sea OCS development on potential **land** use.

North Slope Borough: Issues Overview (Alaska Consultants, 1976) describes briefly the decision time-frame, relevant political entities and current status of seven issues affecting the North **Slope** Borough. These include the gas pipeline route, North Slope haul road, Naval Petroleum Reserve-4, OCS, Caribou resources, land tenure and d-2 proposals, and coastal zone management. **All** these issues have land use and land status aspects related to OCS development.

As part of these issues studies, a report on North Slope Borough Coastal Zone Management Program Considerations (Alaska Consultants, 1976) proposes studies to determine "preferred development zones" and "**preferred** conservation zones" for OCS and other coastal development. These two reports provide current data on land use problems in the borough, but must be regarded as consultant viewpoints rather than official borough positions.

Few planning documents are currently available that discuss local community facilities and land use in the Beaufort Sea **petroleum development** region. North Slope Borough Reconnaissance Study - An Inventory of the Borough and its Communities (**Dupere** and Associates, 1973) outlines baseline socioeconomic and community facility data for the borough and its communities, including existing land use in Barrow, Anaktuvuk Pass, **Kaktovik**, Prudhoe Bay, Point Hope and **Wainwright**. Since this study predates much North **Slope** oil development activities, some of the land use data are outdated. Basic community data for Barrow, the region's largest settlement, are discussed in Barrow Regional Master Plan (John Graham and Company, 1973) and alternative and recommended land use plans are presented. As with the publication cited above, the baseline data require updating to maintain usefulness.

● Bering Sea Region

Two Alaska Regional Profiles contain regional land use and land status data. The Northwest Region (Seikregg, 1976) and Yukon Region (Seikregg, 1977). Periodic updating of these profiles is planned.

Other land use and land status data for this region are in the form of community land use or comprehensive plans, various studies for the Lost River mining development, and information gathered by Native corporations.

The latter category includes A Selected Bibliography of Published Material Pertaining to the Calista Region (Wallick, 1975). Most of the listings, including documents with statewide relevance, are generally available and overlap with socioeconomic literature discussed in this survey. This bibliography does provide a relatively complete listing of published land use plans for communities in the Yukon delta potentially impacted by OCS development. Land Selection in the Calista Region: A Summary of Activities During 1973-1974 (Burns and others, 1975) describes the methodology for a land resource data base to aid village land selection in the Calista region. This report is a useful guide to potential level status changes in the Yukon delta.

The Lost River project, a proposed mining development, deep-water harbor and new community in the western Seward Peninsula is documented in a number of reports containing land and other socioeconomic information. Lost River Socio-economic Survey (Alaska Consultants, CCC/HOK and Rowan Group, 1972) surveys and evaluates responses of the existing rural populations to issues of housing, sense of community, work, community facilities and services and the proposed Lost River new community. A related document, City of Lost River Pre-application Proposal (Alaska Consultants and CCC/HOK, 1972) focuses on physical environmental, social and economic planning and costs for the new community. While this project is not currently active, these reports provide land use planning background for resource development and marine transport-related activities in a potential OCS impact region.

Land use plans for the larger communities in the Bering Sea Region are generally brief analyses that focus on local land use, transportation and community facilities needs. Many date to the 1960s and therefore do not address OCS issues. Nome Comprehensive Development Plan (Alaska Consultants, 1968) and Teller Comprehensive Development Plan (Alaska Consultants, 1968) are examples of these. The Teller plan is useful since it describes a small village, near the potential deep-water harbor of Port Clarence, that is connected by a 60-mile road to Nome.

Land Use Plan - Kotzebue (Alaska Consultants, 1976) is an update of the 1971 comprehensive plan land use element. The plan mentions potential impact of OCS development on local port facilities and the apparent lack of desire of many residents for an intra-state highway connection.

The Alaska State Housing Authority evaluated the planning program in three western Alaskan towns in Comprehensive Planning in Rural Alaska: An Evaluation of 701 Planning in Nome, Bethel, and Kotzebue (1972). The report characterizes **planning** in Nome as a consultant study-with no follow-up for **implementation**; in Kotzebue as **longer-term** planning with an implementation program; and Bethel as a **low-budget, "crash" project** to justify HUD funding. This document, while not current, is an aid in evaluating the usefulness of documents in communities potentially impacted by OCS development.

- Southwest Region

The Southwest Regional Profile (Selkregg, 1976) provides land use and land status data, organized by **Kuskokwim Bay**, Bristol Bay and Aleutian sub-regions. Periodic updating of the profile is planned.

Bristol Bay: A Socio-Economic Study (Kresge, **Fison** and **Gasbano**, 1974) also provides a basic description of land use and land status in this sub-region.

Community plans for coastal towns include Dillingham Comprehensive Plan (Alaska State Housing Authority, 1971) which **emphasizes** economic **growth** goals, and mentions potential conflict of the fishing industry and petroleum development. The important potential OCS staging area of Dutch Harbor and **Unalaska** is documented in Unalaska Preliminary Development Plan (Brown, 1973), City of Unalaska Comprehensive Plan **Fritsch**, 1970) and Dutch Harbor Unalaska Preliminary Development Plan (Alaska State Housing Authority, 1967). All these **documents** have limited usefulness because of brevity and date of publication.

Other **plan** documents with similar limitations are City of Sand Point Comprehensive Plan (Alaska Consultants, 1970), an Aleutian **fishing community, and Bethel Comprehensive Plan** (Alaska State Housing Authority, 1969). The latter must be regarded in light of **the ASHA** report cited earlier, 'which evaluates comprehensive planning in Nome, Kotzebue and Bethel, and points out the "crash project" shortcomings of Bethel planning.

- Gulf of Alaska Petroleum Development Region

General land use and land status information for the Gulf of Alaska region is found in the Southcentral Profile (**Selkregg, 1974**) and Southeastern Profile (**Selkregg, 1976**). The latter is cited for its **coverage** of the Yakutat area.

Two other regional inventories are available, The Western Gulf of Alaska: A Summary of Available Knowledge (University of Alaska, Arctic Environmental Information and Data Center, 1974) summarizes natural and **socio-economic** data for the region, including Kodiak Island, and also describes three main data gaps: ethnography; future **land** status; and tourism potential. The study provides valuable baseline data, but is not specifically oriented to land use questions

Kadyak: A Background for Living (Buck, 1975) is a geographic and environmental document focused on Kodiak Island and surrounding waters. Land use is discussed in terms of resource utilization and environmental quality. The report provides current baseline data for a critical area of the Gulf of Alaska OCS region.

Current baseline data and generalized socioeconomic impacts on port communities (that are potential staging areas for OCS development) are covered in the Final Environmental Impact Statement - Proposed Oil and Gas Leasing in Northern Gulf of Alaska (Alaska Sea Grant Program, 1976-). Valdez, Cordova, Seward and Yakutat are discussed, but land use impacts in these areas are not specifically considered.

Land use planning for "multiple use" resource areas in the Gulf of Alaska region is the subject of the Final Environmental Impact Statement - Chugach National Forest Land Use Plan (U.S. Forest Service, 1975). Resource management and land use data for the Kenai Peninsula/Prince William Sound/Copper River Delta area are documented within this major federal jurisdiction. The plan and data are current, but existing or contemplated resource extraction activities in areas of OCS on-shore activities are mentioned, but not defined. A similar document is Draft Environmental Impact Statement: Tongass National Forest Land Use Plan (U.S. Forest Service, 1975).

Alaska Coastal Zone Management Program (Department of Fish and Game, 1976), cited earlier, relates environmental sensitivity of Gulf of Alaska coastal areas to potential on-shore OCS service areas. Twenty-eight sites from Kodiak Island to Yakutat are rated by environmental sensitivity and fish harvest value of adjacent coastal zones. The Seward area has the lowest sensitivity rating compared to Kodiak, Cook Inlet, Prince William Sound and Icy Bay-Yakutat areas. These data are current, site-specific estimates of land use impacts in the Gulf of Alaska OCS impact region.

Detailed land status data for Native villages in the Yakutat area is provided in Land Resources of Southeast-Alaska Native Villages (Wilsey & Ham and McGaughan & Johnson, 1973), prepared for the Sealaska Corporation. Maps of mineral resources and man-made resources are included.

Local community comprehensive plans provide existing land use and land status information current as of publication. The usefulness of the data would require evaluation for specific OCS studies. These documents include, among others: the Kenai Peninsula Comprehensive Planning Program Recommendations (Alaska State Housing Authority, 1970); Kenai Peninsula Borough Comprehensive Plan Abstract - Goals and Objectives (Kenai Peninsula Borough Planning Department, 1973); Kodiak Island Borough Comprehensive Plan - Part 1: General Plan (Tryck, Nyman and Hayes, 1968); Matanuska-Susitna Borough Comprehensive Development Plan - Phase II: Recommendations (Alaska State Housing Authority, 1970); Cordova Comprehensive Development Plan (Alaska Consultants, 1976); Land Use Study-Homer Spit (Unwin-Scheba-Kozynta, 1975); Seward Concept Plan

(Kramer, Chin & Mayo, 1975) Tyonek Comprehensive Development Plan (Kenai Peninsula Borough Planning Department, 1972); English Bay Comprehensive Development Plan (Kenai Peninsula Borough Planning Department, 1971); Seldovia Comprehensive Development Plan (Alaska State Housing Authority, 1969); and Yakutat Comprehensive Development Plan (ASHA, 1971).

The more recent local plans often refer to oil and gas development impacts in general non-quantified terms, and represent the **post-pipeline planning** response in Gulf of Alaska **communities**. Other local plans in addition to those cited above have been prepared and published, but were not available at the time of this survey.

IV. CURRENT RESEARCH

- Statewide Research

Maps at 1" = 1 Mile Scale of Native Selection Around Gulf of Alaska and Arctic Tote Villages, Joint Federal-State Land Use Planning Commission. Available at Commission offices, in progress 1976. **These** maps delineate easements and village and regional withdrawals of selected Native corporations as part of JFSLUPC easement review process. These large scale maps provide current land use and land status data around selected native villages.

Maps of "Indian Allotments", Joint Federal-State Land Use Planning Commission, in progress, 1976. Although the Alaska Native Claims Settlement Act supersedes "Indian Allotments", the Bureau of Land Management is honoring and processing claims under the 1920's legislation for allotments up to 160 acres. Maps show approximately 90,000 applications, and provide land status data at a detailed level

National Interest Lands Study, Joint Federal-State Land Use Planning Commission, in progress 1977. Recommendations to the Department of the Interior for National Interest (d-2) lands, with maps by specific area. These updated system reports provide detailed land status data.

Natural Systems Analysis, Joint Federal-State Land Use Planning Commission, in progress. Description of major **land** and water systems in **Alaska**; **assessment** of existing resource inventories alternative data storage and retrieval systems; constraints and opportunities determined by physical and biological characteristics; and analysis of cumulative impacts of man in each major **land** and water system. This **study will** provide regional land use information.

Study of Potential Port Sites, Paul **Engelman**, Joint Federal-State Land Use Planning Commission, Anchorage, with Virgil Keith, engineering consultant, Washington, D.C. Completion **July** 1977. As **part of a** review of (d-2) lands, this study is identifying (d-2) withdrawals that could block road access to twenty-four potential port sites in Alaska. This study is relevant to long-term land use requirements.

Coastal Land Status Survey, Alaska Division of Lands. In progress. A compilation of 1:2,000 scale land status plats for tidelands and adjacent coastal areas for the Alaska coast". The Gulf of Alaska plats, from Yakutat to Kodiak Island, have been completed and are available at the Division of Lands, and the final product will include the entire coastline. This project will provide the definitive land status mapping of the Alaskan Coast.

Coastal Zone Identification, Office of the Governor, Coastal Management Program, in progress, 1977. A series of maps at a scale of 1:250,000 which combine key natural systems and subsistence information in the designation of the Alaska coastal zone.

Marine Facilities Coastal Inventory, Tryck, Nyman & Hayes, for Alaska Department of Environmental Conservation, and Coastal Zone Management Program, in progress 1977. A detailed listing of man-made facilities along Alaska's shoreline, compiled from existing data -- Corps of Engineers files, navigation charts, etc. -- rather than field inventories. This study will be a source of specific information on coastal facilities and land use impact communities.

● Beaufort Sea Region

National Petroleum Reserve No. 4 (formerly Naval Petroleum Reserve No. 4) Land Use Plan, U.S. Bureau of Land Management, Bureau of Indian Affairs, Bureau of Mines. Geological Survey. Alaska Department of Community and Regional Affairs, and Department of Fish and Wildlife. Completion, 1979.

Federal and state task force will complete a land use study for the Reserve lands as required by Congress. Drawing upon the community baseline studies by the Department of Community and Regional Affairs and the literature search by AEIDC, the study team will prepare a plan which includes the following key components: community public facilities and services; historical information; recreation/esthetic resources; Native life styles and subsistence; and oil and gas reserves as they pertain to industry and economy.

o Bering Sea Region

Village Planning Folio for NANA Region, University of Alaska Arctic Environmental Information and Data Center for the Alaska Department of Community and Regional Affairs. Completion, March 1977. Land use data base for each NANA region Native village.

Delta Land Management Planning Study, John Dunker, Alaska Division of Lands, Fairbanks. Completion, March 1977. Development of management guidelines for state lands in the Yukon Delta, which will provide useful planning data for this coastal area.

e Southwest Region

Comprehensive Planning Assistance Program, Aleut League, Anchorage in progress. Program to increase planning capabilities of Aleutian communities through seminars, planning manuals and preparation of profiles for seven communities of the region.

Land Use and Site Planning Study for Quinhagak and Sheldon Point, AVCP Regional Housing Authority, Bethel, in progress. An inventor of physical conditions to determine areas that can support residential structures in the two coastal villages.

● Gulf of Alaska Region

Coastal Recreation Resources: West Kenai Peninsula, Alaska, Alan Meiners, Division of Parks. Completion spring 1977. A detailed natural and socioeconomic study, with recommendations for new state parks at selected West Kenai locations. Similar studies are due for Cordova and Prince William Sound in spring 1977, and Kodiak and Yakutat in fall 1977. These studies would be excellent sources of environmental sensitivity data for Gulf of Alaska coastal areas.

OCS Development: A Blessing or Headache? The Choice is (Seward's, Seldivia's, Soldotna's, Homer's). Kenai Peninsula Borough Planning Department. Completion, 1977. These four reports outline community planning required for OCS development and baseline data for each of the four communities.

OCS Gulf of Alaska Regional Planning Book, Alaska Department of Community and Regional Affairs, Juneau. Completion November 1977. A planning guide for Gulf of Alaska communities dealing with OCS impact. Contents will include profiles of typical onshore facilities and, for four or five levels of development, will describe potential population, employment and indirect impacts of OCS activities. A consultant report on legal and planning tools available to local communities to deal with OCS impacts will also be included.

Kodiak Island Borough Outer Continental Shelf Impact Study - Phase I Simpson Usher Jones, Inc., in progress, 1977. This study provides socioeconomic baseline data for Kodiak Island, will estimate OCS impact and make recommendations for planning for and mitigating the adverse impacts. Phase I is primarily baseline data.

Coastal Zone Definition Applications, M.P. Wennekens, University of Alaska Arctic Environmental Information and Data Center, in progress, 1977. An application of detailed environmental data for the Lower Cook Inlet area to aid local communities in decision-making for location of onshore, oil-related facilities. Significant

variables include elimination of many coastal areas because of environmental sensitivity, limited availability of water, power, sand and gravel at many sites, limitations related to land status and ownership patterns, the likelihood that existing onshore developments will be sites for further development, and oil and gas well location in relation to well-to-shore transport systems. The study is funded by local boroughs and the State Coastal Management Program.

Land Use Planning - Copper River Delta, Charles **Harnish**, U.S. Forest Service, Anchorage. Completion, October, 1978. Planning for National Forest lands in the Copper River Delta, to allocate uses based on **geomorphology**, soils, water, timber, wildlife, recreation, transportation, and other socioeconomic factors. This study addresses a sensitive coastal area potentially impacted by OCS development.

Upper Prince William Sound Planning Unit Plan - Chugach National Forest, John Johnson, U.S. Forest Service, Anchorage, in progress 1977. This study covers the Whittier to **Valdez** area in Prince William Sound that will incorporate resources, as well as social and economic needs of the area into a coordinated document. The geographic coverage of this study includes potential OCS impact areas.

v. DATA GAPS

Complete inventories of land use information can be compiled from subject literature. However, because much of the report material is dated and less comprehensive in its coverage than other material with which it could be aggregated, inevitably poor or incomplete overall coverage will result. Particularly missing from this literature survey is information on the planning activities of Native corporations, presumably a valuable source of inventory information. Another state-wide data gap is complete location information on subsistence activities. Particular data gaps are identified by region below.

● Beaufort Sea Region

- e The future land use impact of the pipeline service road as public access to the Beaufort Sea region.
- Post-completion evaluation of oil development around Prudhoe Bay in relation to projections in earlier studies, as a means of modeling land use impact of other petroleum development in the region.
- Monitoring of State of Alaska near-shore leasing program impacts.
- Updating of local comprehensive plan, land use, and planning data.

- Bering Sea Region
 - Studies of **potential** impacts of mineral development, particularly on the Seward Peninsula and Kotzebue.
 - Updating of community land use and comprehensive planning data.
- Southwest Region
 - Updating of local **community** land use and comprehensive planning data, **particularly** in the Aleutian Islands, where developable land is extremely limited.
- Gulf of Alaska Region
 - More detailed and quantified land use impact information on **Alyeska** pipeline development is lacking for this region. As outlined in Section III above, local community plans recognize these impacts in a qualitative rather than quantitative manner.
 - Updating of local **community** land use and comprehensive planning data in light of OCS leasing and exploration activities in Cook Inlet and Gulf of Alaska.

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13. TRANSPORTATION, COMMUNICATIONS AND UTILITIES

I. SUMMARY OF INFORMATION SOURCES

Literature on transportation, **communications** and **utilities** systems in Alaska is normally published by public and **private** agencies and organizations responsible for the development and maintenance of facilities. In the case of transportation, that responsibility **rests** largely with the State and its various Departments such as Highways, Public Works, Marine Transportation and Water and Harbors. In the case of **communications**, it is a combination of private communications firms, educational institutions and the military. Utility information is generally published by the Alaska Departments of Commerce (Public Utilities Commission and the Alaska Pipeline Commission), and Environmental Conservation; as well as by individual **communities**. The mandated responsibilities of these organizations also determines the depth and specificity of coverage given to transportation, communications and utility systems as a whole or to their geographic and functional components.

There is currently no agency responsible for the overall coordination of transportation planning in the state. In consequence, the development of integrated transportation systems is **still** in an embryonic stage with facilities often growing in an ad-hoc fashion to meet demand. There are also inevitable gaps and inconsistencies in transportation plans and in the literature describing highway, rail, air, and marine transportation systems. Many studies have inventories of facilities, but little information on the functional attributes of the systems themselves.

Data necessary for developing OCS impact information, such as transportation origin-destination studies, or data on the use, capacity and performance of existing systems may be gleaned in part from existing studies. Such studies include environmental impact statements for specific projects only peripherally related to OCS development or others based on very specific assumptions, which if altered, would also **alter** study conclusions. Perhaps the most useful data on transportation, communications and utilities are related to inventories **of existing** systems and facilities rather than impact reports for specific projects. There are some exceptions in the most recently published literature and in current research, as discussed below.

● Statewide Literature

Literature with statewide relevance is covered in the Alaska Regional Profiles, prepared by the Arctic Environmental Information and Data Center of the University of Alaska, which inventory services on a statewide basis, by hydrologic region, and by **community**. Generalized information is presented for transportation, communications and utilities in these geographic units, allowing aggregation or **disaggregation** for

specific geographic areas. The generalized **nature** of the data, however, precludes their use as a sole information source in any data category.

A second major source of statewide data is environmental impact statements for projects with potential statewide impact, such as petroleum development activities. The transportation, communications and utilities information included in this literature is difficult to disaggregate because of **its** specificity to one project.

The third major source of statewide data are the range of state **transportation**, power and water surveys and projections prepared **by** government agencies. In most cases, data contained in these sources can **be** disaggregate by region and community. Periodic updating of the Regional Profiles and statewide surveys is anticipated. **This** differs from the **EIS** literature, which is generally project specific.

- **Community/Regional Literature**

There are three major information sources for community/regional literature on transportation, communications and utilities: project related discussions in environmental impact statements; regional components of statewide inventories and **plans**; and borough and **community** comprehensive **plans**. These general plans usually have study components describing existing transportation, communications and utilities systems and plans to upgrade them. **In** the past, many of the studies for smaller towns and villages were authored by the Alaska State Housing Authority (ASHA). More recently, these studies have been prepared by boroughs **and** private consultants.

- **Form and Currency of Literature**

Community level comprehensive plans and utilities studies are inherently site and time specific. Data categories and data manipulation techniques used by the numerous agencies and consultants responsible for these plans, as well as the differing time frames covered by these studies, **limit** the ability to aggregate the data. Thus, these documents can be considered most useful as baseline data, rather than ongoing, updated literature. The majority of the literature cited in this chapter is available as published documents. The current research reviewed tends to have specific geographic or functional focus and usefulness, such as a study of OCS generated highway impact in the Cook **Inlet** Region, or a statewide inventory of coastal facilities. The actual value of these studies must be determined as the reports become available.

I. LITERATURE WITH STATEWIDE RELEVANCE

● Transportation

Literature with statewide coverage of transportation information related to OCS impact evaluation is limited. The most comprehensive source of statewide transportation data is the Alaska Regional Profiles for the Arctic Region (Selkregg, 1975), the Southwest Region (1976), Northwest Region (1976), the Yukon Region (1977), the Southcentral Region (1974), and the Southeast Region (1976), which discuss regions' air, land and water transportation networks as related to the state as a whole. Maps and brief discussion of statewide air service, air routes, air fields, the highway networks and the Alaska Railroad are included in the Regional Profiles, in addition to information on the availability of maritime freight and passenger service.

The scope of this data is basically an inventory of existing services and facilities, with no attempt to project future needs or programs. The material is current up to publication date; and the regional profile program plans to produce up-dated material as necessary.

The recently published Six Year Transportation Construction Program (Alaska Department of Highways, 1977) is the first **six-year plan**, and the first program for all transportation improvements: highways, marine highways, and aviation. Previous highway construction programs were published on a five-year basis, and the six-year period coordinates with the two-year legislative funding cycle. The document contains detailed funding information and describes the criteria for project planning:

1. Projected federal and State resources;
2. Maximizing use of existing facilities;
3. Environmental protection considerations;
4. Completing projects underway before starting new ones.

The projects are listed by year and location for each of the five highway districts. These districts are not **coterminous** with OCS impact regions or other regions used by other agencies, such as hydrologic regions or census divisions.

This program will be updated each year.

An earlier statewide discussion of transportation conditions includes the Department of Highways Five Year Highway Program (Alaska Department of Highways, 1976). This document describes capital projects oriented to maintenance and improvement of the existing highway network in the five **State** highway districts. Deterioration of roads resulting from pipeline construction, truck traffic, and potential improvements around Cordova and **Yakutat** related to potential OCS development are mentioned.

The major land status changes resulting from Alaskan statehood and **Native** claims settlement engendered a **series** of proposals to reserve transportation corridors throughout the state. Multimodal Transportation and Utility Corridor Systems in Alaska (U.S. Department of the Interior, Bureau of Land Management, 1974) is **primarily** concerned with potential corridors for movement of **energy** resources; however, the routes are related to **physiographic** suitability, rather than environmental **or** legal considerations. Summary of Public Comments: Multimodal Corridor Proposal (U.S. Department of the Interior, Bureau of Land Management, 9/5) is a product of the **public** hearings, and many negative comments focused on conflicts between the corridor proposals and the Native Land uses.

A Statewide Multimodal Transportation Study (Garrett & Goeglin, unpublished) postulates corridors on the basis of linking existing or potential nodes--economic, governmental **or** resources centers. This Joint Federal--State Land Use Planning Commission study is not yet complete.

Statewide aviation needs are discussed in the Alaskan Region Ten-Year Plan (U.S. Federal Aviation Administration, 1975). Three criteria--safety improvements because of adverse geographic and climatic conditions; service; and cost-effectiveness in adding to or replacing obsolete ground equipment--are used to justify the 1977-1986 **programs** of improvements to airfields in Alaska. The relationship **of transportation** needs to economic growth in Alaska **is** also discussed. Improvement programs for specific airports are listed. These programs are periodically updated.

An unpublished **paper**, Alaska Transportation Issues: 1976 (Pernela, 1976), develops **three themes** on statewide surface transportation needs: federal aid limits are insufficient to maintain or reconstruct, let alone expand, Alaska's road systems; easements reserved by the federal government through State lands for resource extraction will probably be developed by private capital; and coordinated statewide transportation planning is necessary. The costs of highway expansion versus alternative uses of these funds are also analyzed. This short paper appears to be a discussion document rather than an on-going study.

Marine transportation facilities related to OCS development are discussed in Marine Service Bases for Offshore Oil Development (Alaska Consultants, 1976). This report describes **types** of marine service bases that create least environmental disruption by combining all necessary on-shore activities in one facility. By studying the North Sea experience, the specific onshore physical requirements for marine bases in Alaska are projected.

- Communications

Other than the Regional Profiles cited above, there is **little** literature which broadly discusses **communication** on a statewide basis. Availability of television and radio broadcasts and telephone service in specific communities is outlined in the "Services" Chapter of these Profiles.

The availability of telephone, telegraph, radio and television service is also documented **by** community and census division in an Inventory of Alaska's 'Communication Systems (Parker, 1974).

- Utilities

Utilities availability (water, sewer, power) is indicated by a community checklist in the Alaska Regional Profiles, the best comprehensive source of this information, which were cited above.

Energy utilities as a statewide concern are discussed in an Alaska Power Survey (U.S. Department of the Interior, Alaska Power Administration, 1974). This study of recent growth and projection of electric power demand foresees a growth of from three **to** ten times existing capacity, based on alternative assumptions. The study compares costs of oil, gas and hydroelectricity and suggests goals of increased planning, increased efficiency in the electric power system, better data on future needs and alternative energy systems, and lower energy costs for remote areas of the state. No time frame for further work is given.

A more recent electric power study, An Overview of Electric Power in Alaska (Alaska Department of Community and Regional Affairs, 1975), **describes** some of the **overall** 1 problems of providing electric power in the state: rates, consumption, and costs of expansion in rural areas. The report proposes increased **regionalization** of power systems and describes opportunities for involvement by State and federal agencies in this problem.

Alaska Water Assessment Problem Identification (Alaska Department of Environmental Conservation, 1975) analyzes and summarizes water use, needs and resources by hydrologic **region** and community throughout Alaska. Different potential development and economic growth assumptions are utilized to generate water needs in a 1975-1985 time frame and a 1985-2000 period.

A follow-up report, State of Alaska State-Regional Futures: Alaska Water Assessment (Capito and Parker, 1976), discusses legal bases for controlling water uses in the six hydrologic regions of Alaska. The uses are domestic reservation of water, stream **flow** maintenance, energy development, subsistence resources, and renewable and non-renewable resource extraction.

III. LITERATURE WITH REGIONAL RELEVANCE

● Beaufort Sea Region

The basic transportation, communications and utilities sources available in the Beaufort Sea-Arctic Region are summarized in Alaska Regional Profiles cited above (Selkregg, 1975). Material is presented graphically or in checklist format, and is planned to be periodically updated.

Several earlier studies relating to North Slope oil and gas development contain assessments of transportation and utilities issues": The State's Pipeline Impact - A Report on State Findings, Assumptions and Projections Regarding Construction of the Trans-Alaska Pipeline (Office of the Governor, 1974) is a non-quantified estimate of population increase and capital projects--roads, aviation and marine facilities--that the State would be required to provide as a result of the pipeline project. This study is outdated, but use could be made of it as a comparative standard for reports on conditions that have actually ensued.

The Analysis of the Socioeconomic Impact in Alaska of the Alaskan Arctic Gas Pipeline Company Pipeline (URSA A, 1974) and the Environmental Report (Alaskan Arctic Gas Pipeline Company, 1974) are two early, unpublished studies that cover a complete range of natural, environmental and socioeconomic impacts of gas pipeline construction. The transportation and utilities impacts are covered primarily from a financial, rather than a physical perspective, and the pipeline itself is considered as a transportation/utility corridor with associated impacts. Again, follow-up on these early projections is required.

The State has also prepared a Draft Environmental Assessment--Proposed Beaufort Sea Near-Shore Petroleum Leasing (Office of the Governor, 1975). This lengthy study assesses direct transportation, communications and utilities requirements rather than secondary environmental effects of near shore oil development in the Prudhoe Bay. It concludes that data gaps in Arctic offshore development prevent complete assessment, that improved technology would accelerate the possibility of increased leasing, and that environmental risks increase with distance from shore. Overall State policy for leasing is tied to State fiscal conditions. As with previous impact studies, the continuing usefulness of data is related to comparing projections with actual events.

Documents that discuss the specialized problem of transportation to serve mineral resource needs include " Optimum Transportation Systems to Serve the Mineral Industry North of the Yukon Basin (Wolff and others, 1972) and Technical Memorandum: Transportation in the Arctic (Paddison and Stone, 1972) analyze the costs and benefits of surface effect vehicles (SEV) as potential year-round mineral transport systems in the Arctic. Wolff concludes that SEV could be feasible for transport of high value copper,

while a **slurry** pipeline is more appropriate for coal movement. This indicates the close relationship between the value of goods and the costs of transportation systems.

Paddison and Stone also consider more general transportation needs of the regions and the limitations on road and sea routes, and conclude that **SEV** could be appropriate vehicles for resource extraction. These studies have an economic and technical orientation, and require additional research on environmental considerations to determine the feasibility and suitability of SEV use.

Economic trade-offs between transport options and resource locations is also discussed in Present Marine Transportation Options in the Arctic (Parker, 1975). Environmental control in movement of oil and other resources are related to rigorous early engineering considerations.

The status of the **Alyeska** Pipeline haul road as a potential public highway is summarized in North Slope Borough: Issues Overview (Alaska Consultants, 1976). **While** long-range policy is under study by the State, interim policy provides for continued use of the road by industrial and mining interests, and indicates that users of the road will be expected to pay for that use. Final policy is not expected to be formulated until 1978, after study by the Joint Federal-State Land Use Planning Commission.

A short paper, "The Impact of New Highways Upon Wilderness Areas," (**Jackman**, 1973) analyzes the impact of the Alaska pipeline service road. The author concludes that with strict controls, roads can be constructed in tundra-permafrost areas with minimal environmental degradation. This study appears to have continuing value.

Facilities in local communities are minimally discussed in the literature, owing to the sparsity of population and the isolation of village utility development. Most useful is North Slope Reconnaissance Study - An Inventory of the Borough and its Communities (**Dupere** and Associates, 1973). -an inventory of **socio-economic and community** facilities data for the **North Slope Borough** and its communities. 'Local air, sea and road networks are **mapped** or described, and inventories of waste disposal and other utility systems are presented for Barrow, **Anaktuvuk Pass**, **Kaktovik**, **Prudhoe Bay-Deadhorse**, Point Hope and **Wainwright**, among the more significant communities. The study provides baseline conditions and outlines specific community problems. Since the work predates pipeline construction and other recent developments, its usefulness is limited.

One **local** plan, the Barrow Regional "Master Plan" (John Graham & Company, 1973), studies baseline conditions **and** discusses land use alternatives and recommended land use plans for this largest North Slope **community**. Again, this work predates **later** oil related development. Utilities planning for Barrow is described in

Water and Sewer Master Plan Preliminary Engineering Report (Linck-Thompson, 1972). **Alternative** water and sewer service **plans** are presented for a design population of 5,000. The proposals are useful as background for feasibility of providing urban services in an Arctic region.

e Bering Sea Region

Alaska Regional Profiles - NorthWest Region (**Selkregg, 1976**) and **Yukon Region (Selkregg, 1977)**, summarize transportation, **communications and utilities** services in **the Kotzebue** Sound, Seward Peninsula and Yukon Delta areas.

The Lost River area on the Seward Peninsula has been the subject of studies pertaining to mineral extraction and related transportation proposals. The Final Environmental Statement - Lost River Project, Lost River, Alaska (U.S. Department of the Army, Corps of Engineers, 1976) relates general, qualitative socioeconomic impact of the proposed marine terminal. Regional Marine Terminal - Lost River, Alaska - for the Council of the City of Lost River - Final Feasibility Report (Carr & Donald, 1973) is an engineering-oriented study for the deep water, general cargo and mineral transport facility at Lost River and describes the environmental conditions impinging on such developments (soils, shore erosion, ice and seismic conditions).

Land use plans and other development plans available for the major communities in the region address transportation and utilities in terms of local needs. Needs or proposals for regional transportation are discussed in more general terms. Land Use Plan - Kotzebue (Alaska Consultants, 1976) is an update of the land use element of a 1971 comprehensive plan. The plan briefly discusses potential impact of **OCS** development on Kotzebue and expresses **the** apparent lack of desire of the community for an **intra-state** highway connection. The Nome Comprehensive Development Plan (Alaska Consultants, 1968) and Overall Economic Development Program for Nome (Alaska Planning and Management Consulting Associates, 1972), provide basic socioeconomic data for that community, relating development problems to the lack of deep-water access, which is a factor in many Bering Sea communities.

General **transportation** needs in the Yukon Delta **region** are described in Preliminary Location Study - Lower Yukon River Delta Airport (Transwestern Engineering Company, 1973). This study for a gravel embankment runway near Emmonak relates natural environmental factors to transportation development in this coastal area.

● Southwest Region

Alaska Regional Profiles - Southwest Region (**Selkregg, 1976**) describes briefly transportation, communications and utilities facilities for Southwest Alaska. The data is organized by the

Kuskokwim Bay, Bristol Bay and Aleutian sub-regions. Bristol Bay: A Socioeconomic Study (Kresge and others, 1974) also provides basic data on transportation in the Bristol Bay sub-region, including airport types and construction.

The Bristol Bay Native Association, Inc. has prepared Bristol Bay - An Overall Economic Development Plan (1976), a report which relates land use and physical infrastructure, including transportation, to economic needs in Bristol Bay native villages. The Native corporation appears to be pursuing a policy of encouraging oil exploration.

A proposed highway from Iniskin Bay to King Salmon is discussed in Alaska Peninsula Crossing - Socioeconomic Study (Alaska Department of Highways, 1969). The route could promote tourism and mining, and could lengthen the Bristol Bay fishing season, but at a high capital cost. This document **could** be useful in evaluating transportation impacts of OCS development in the Bristol Bay area.

Local community plans in the region include Dillingham Comprehensive Plan (Alaska State Housing Authority, 1971), which discusses economic growth goals, a fishing industry in potential conflict with OCS development, and the limitations of a shallow-draft harbor only open four or five months a year.

The Dutch **Harbor-Unalaska** complex is a transportation hub of the Aleutian Islands with significant deep water harbor facilities remaining from **World War II**. The Dutch Harbor-Unalaska Preliminary Development Plan (Alaska State Housing Authority, 1967) and the Unalaska Preliminary Development Plan (Brown, 1973) discuss the existing facilities and potential improvements required for air and marine transport.

The City of Sand Point Comprehensive Plan (Alaska Consultants, 1970) discusses similar issues in this small island fishing community.

Recent studies specifically addressing utilities in the Southwest Region include Unalaska Area Water and Sewer Study (Tryck, Nyman & Hayes, Inc., 1973). This report describes the constraints affecting water and sewer system development in the Aleutian environment. A Regional Electric Power System for the Lower Kuskokwim Vicinity (Robert W. Rutherford Associates, 1975) is an engineering study for an interconnected electric power system for villages in a 40 mile radius of Bethel.

- Gulf of Alaska Region

Alaska Regional Profiles - Southcentral Region (Selkregg, 1974) summarizes transportation, communication and utilities services by three **subregions**: Kodiak-Shelikof, Cook Inlet and Gulf of Alaska-Copper River. The Southeastern Regional Profile (Selkregg, 1976) describes these facilities in the Yakutat area.

Impact studies related to oil development include An Economic and Social Impact Study of Oil-Related Activities in the Gulf of Alaska (Mathematical Sciences Northwest, Inc., 1975), which generates alternative levels of OCS activity and concomitant socioeconomic impacts on the port communities of Juneau, Yakutat, Cordova, Whittier, Seward and Kodiak. High and low ranges for impact on labor, housing, schools and utilities are calculated, but only general conclusions for transportation and communications impacts are given. This is an unpublished report prepared for the Gulf of Alaska Operators Committee, which generates a low range of impacts used in a subsequent state study cited below. The Final Environmental Impact Statement"- Proposed Oil and Gas Leasing in Northern Gulf of Alaska (Alaska Sea Grant Program, 1976), an extensive three volume document, covers much of the same area as the previously described study for the potential staging areas of Valdez, Cordova, Seward, and Yakutat. It generally projects a higher amount of marine and onshore transport activities in OCS-impacted ports than the Operators Committee study.

Increased service requirements and associated facilities costs for ports, airports, railroads and roads resulting from OCS development are discussed in Transportation Impacts of Outer Continental Shelf Oil and Gas Development in the Northern Gulf of Alaska and Western Gulf (Kodiak) Areas (Alaska Department of Highways, 1976). The document also summarizes facilities requirements and recommendations by community. The report provides up-to-date data on the communities of Kodiak, Seward, Cordova, and Yakutat.

The Operators Committee and the federal impact statements provide low and high projections of marine operation at Cordova and Yakutat which are synthesized in Supply Boat and Port Facility Scenario - OCS Sale No. 39 - Northern Gulf of Alaska (Alaska Division of Community Planning, 1975), and project peak visits and peak demand for 200-foot quay facilities in the 1976-1985 time period. This short paper is based on very specific assumptions, and would be obsolete under altered conditions.

On-shore marine transportation impacts are also the subject of Methodology for Facility Siting (Alaska Division of Community Planning, 1976), which identifies 28 potential bases in the Gulf of Alaska for OCS related supply, service, pipe coating and platform prefabrication sites. Because the methodology is described, and because a large number of sites are evaluated, this paper would appear to have long term value.

Marine commerce related to oil development is considered in Management for the Prince William Sound Region, Alaska - Phase 1: Perspective, Findings and Recommendations (Grumman Ecosystems, 1971). The study inventories the physical and natural environment of Prince William Sound, and discusses navigation and safety concerns for projected tanker traffic at the Valdez pipeline terminal.

This study has been followed up by the U.S. Coast Guard regulations in Vessel-Traffic System - Proposed Prince William Sound Vessel Traffic Service (U.S. Department of Transportation, 1977). These regulations were formulated for ship safety and environmental protection related to anticipated tanker movements in the **Valdez** Arm servicing the **Alyeska** pipeline terminal.

"The Alaska Marine Highway System," (Institute of Social, Economic and Government Research, 1970) and A Report on Scheduling, Routing, Feasibility and Tariffs - Alaska Marine Highway System (**Tibbets, Abbett, McCarthy, Stratten, 1972**) are two useful sources of data on the history, - policy and future of the Alaska Marine Highway System. Providing a form of public transportation to the many roadless areas of the state, the system is secondarily related to **OCS** development; but this literature is current on the topics of transportation, economic growth and public subsidy for transportation.

Transportation and economic growth are analyzed in Alaska Transportation and Economic Development: The Alaska Railroad, A Case Study (**Pernela and Porter, 1976**). The document states that the Alaska Railroad has traditionally functioned as a railroad in a developing area, but this has been affected by completion of the Anchorage-Fairbanks Highway, the railroad's pricing structure and its narrow market area. The study concludes that the capacity and pricing structure could respond more efficiently to economic growth.

The literature outlined below is oriented to specific community or regional plans or projects. Many of the documents include pipeline or **OCS** impact as a justification for new or expanded public facilities and services, but generally this justification is not quantified.

The Draft Environmental Impact Statement - Valdez Airport Improvements (Federal Aviation Administration, 1973) is an example of this case, in which airport expansion is related to pipeline terminal development at **Valdez**. Similarly, Financing Studies, Turnagain Arm Crossing (Porter, Armstrong and Ripa, 1968) relates the transportation and economic needs of the Cook **Inlet-Kenai** Peninsula area to local petroleum development.

A more precise attempt at oil development impact assessment is found in 1975" Pipeline Impact - Anchorage (Greater" Anchorage Borough Planning Department, 1975). Population influx and resulting housing shortages and cost increases, social service demands, and cost increases for urban services (including roads and utilities) are estimated for the 1974-1978 period. Although costs are determined by extrapolation rather than detailed modeling, the figures tend to support a conclusion of significant service impacts as a result of accelerated petroleum development.

Water for Anchorage: An Atlas of the Water Resources of the Anchorage Area, Alaska (Barnwell and others, 1972) is a survey of water resources available by impoundment of surface water, with 35 to 295 million gallons per day available. These resources are concluded to be adequate to meet-projected population growth.

The following community-oriented documents are all useful baseline data on transportation, communications and utilities in potential impact areas, but, as mentioned above, the literature refers to oil development impact in general, non-quantified terms. These reports generally represent the post-pipeline planning response in Gulf of Alaska communities. They include: Kenai Peninsula Borough Comprehensive Plan Abstract -- Goals and Objectives (Kenai Peninsula Borough Planning Department, 1973); Tyonek Comprehensive Development Plan (Kenai Peninsula Planning Department, 1972); Seldovia Comprehensive Development Plan (Alaska State Housing Authority, 1969); Seward Concept Plan (Kramer, Chin and Mayo, 1975); Kodiak Island Borough Comprehensive Plan--Part 1 General Plan (Tryck, Nyman and Hayes, 1968); Cordova Comprehensive Development Plan (Alaska Consultants, 1976); and Cordova Area Water and Sewer Study (Tryck, Nyman and Hayes, 1972).

IV. CURRENT RESEARCH

- Statewide

Analysis of Social Overhead Costs of Rapid Community Expansion and Contraction, John Beebe, Joint Federal-State Land Use Planning Commission, Anchorage, in progress 1977. Identification of both supply and demand for social overhead capital elements, including educational facilities, health care facilities, power, communication, and sewage disposal.

Alaska Transportation System Development Study, Victor Fischer, Institute of Social and Economic Research, University of Alaska, Fairbanks, in progress. A census of transport movements, traffic, technologies and cost for inter- and **intra-state** Alaskan transport.

Study of Potential Port Sites, Paul Engelman, Joint Federal-State Land Use Planning Commission, Anchorage, with Virgil Keith, Engineering Consultant, Washington, D.C. Completion July 1977. As part of review of Federal d-2 lands, this study is identifying d-2 withdrawals that could block access to twenty-four potential port sites. This study is relevant to long-term land and marine transportation planning.

Marine Facilities Coastal Inventory, ~~Tryck, Nyman & Hayes~~, for Alaska Department of Environmental Conservation, Coastal Zone Management Program, in progress 1976. This is a listing of man-made facilities along Alaska's shoreline, compiled from existing data in Corps of Engineers files, navigation charts, etc., rather than field inventories. This study would be a source of specific information on coastal facilities in impact communities.

Energy Systems in Arctic and Sub-Arctic Construction, William McConkey, Alaska Division of Energy and Power Development. Completion May 1977. Identification and analysis of current energy conservation technology which can be incorporated in providing energy to a new Alaskan community.

State Solid Waste Management Plan, Richard Stoker, Alaska Department of Environmental Conservation, Juneau, in progress. Study of all phases of state-wide solid waste management, resource recovery and conservation.

Statewide Waste Treatment Management Planning, Ronald Hansen, Alaska Department of Environmental Conservation, Juneau, in progress. Control of non-point sources of water pollution, primarily sediment from timber harvesting, construction, mining and urban runoff.

Emergency Water Supply Plan, James Dorn, Department of Environmental Conservation, Juneau, in progress. Development of a current inventory of all public water systems, and of a plan to help these systems establish temporary emergency service in a natural or civil defense disaster.

Alaska Water Assessment, Amos Alter, Alaska Department of Environmental Conservation, Juneau, in progress. Articulation of views of Alaskans concerning water and related land resource problems.

River Basin Water Quality Management Planning, Ronald Hansen, Alaska Department of Environmental Conservation, Juneau, in progress. Management planning for eleven major river basins, including identification of sources of pollution, treatment plans, and condition of receiving waters.

Alaska Wastewater Treatment Technology, Ronald Johnson, Institute of Water Resources, University of Alaska. Completion September 1977. A literature review and evaluation of technology available for Alaskan waste water treatment systems, particularly for villages and other remote installations.

Community Water System Management, Bertold Puchtler, U.S. Environmental Protection Agency, Fairbanks. Completion 1978. Pilot project to provide safe drinking water, and treatment facilities in remote Alaskan villages. Initial studies are in Emmonak and Wainwright.

- Beaufort Sea Region

Comparative Study of Transportation in Alaska, J. Rosenbuch, Alaska Field Operations Center, U.S. Bureau of Mines, in progress. This is a study of the economics of different transportation systems for development and operation of remotely-located mines in Alaska. Information on mining-related transportation would be useful for areas in which petroleum development is anticipated to occur.

Environmental Engineering Investigation of the Yukon River - Prudhoe Bay Haul Road, Jerry Brown, U.S. Army Cold Regions Research and Engineering Laboratory, Hanover, **N.H. Completion, 1978.** Studies of thaw penetration, subsistence, disturbance and restoration of plant communities, and **air** and ground temperature **regime** relative to haul road design.

North Slope Water Resources Study, Gordon Wilson, U.S. Geological Survey, Fairbanks, in progress. Summary of data on water **use** and water development in the North South Cape and evaluating the availability and quality **of** water.

Freshwater Enhancement by Snow Accumulation, Warren Denner, U.S. Naval Post Graduate School, Monterey, Ca. Completion September 1977. Study of using snow fence networks in the Arctic to accumulate snow to reduce ice growth in lakes and **increase** fresh water supplies.

Winter Water Availability and Use Conflicts in North Slope of Alaska, William Wilson, University of Alaska, Arctic Environmental Information and Data Center, Anchorage. Completion April 1977. Compilation of available information related to fish overwintering, industrial and community water demands, and winter water conditions in the North Slope. Regulations and agencies' responsibility governing winter water use will be summarized.

Water and Waste Water Feasibility Study for Nuiqsut, Alaska, Loven Leman, CH2M Hill, in progress. Study of methods and costs for water supply, distribution, treatment and disposal in terms of state and EPA requirements.

Point Hope Water Supply Evaluation, Terry McFadden, U.S. Army Cold Regions Research and Engineering Laboratory, Hanover, **N.H.** Completion June 1977. Location and evaluation of potential water supply sources for the village of Point Hope.

North Slope Borough Water "Planning" Study, Linda Dreyer, University of Alaska Arctic Environmental Information and Data Center. Completion June 1977. Pilot water use planning study for present and future requirements of eight North Slope villages.

Vacuum Sewer System for Arctic Native Villages, William Ryan, U.S. Public Health Service, in progress. No description available. This study would appear to relate **to** long-term planning for utilities services in the Arctic region.

- Bering Sea Region

Utilization of Geothermal Energy Resources in Rural Alaskan Communities, Robert Forbes, University of Alaska, Geophysical Institute, in progress. Reconnaissance studies of several Alaskan geothermal spring areas as potential power and heating sources in Northwest and Yukon communities.

Wind Energy Systems Demonstration Program, William McConkey, Alaska Division of Energy and Power Development, Anchorage, in progress. Project to provide three villages with wind-generated electricity: Nelson Lagoon, Cold Bay, and Kotzebue.

Vortac Dam Study, Charles Collins, U.S. Army Cold Regions Research and Engineering Laboratory, Hanover, N.H., in progress. Evaluation of damage by permafrost degradation of Kotzebue water supply dam and recommended remedial action.

● Southwest Region

No current research in transportation, communication and utilities specific to the Southwest Region has been identified at this time.

e Gulf of Alaska Region

Highway Impact Induced by Lower Cook Inlet OCS Development, OCS Office, U.S. Bureau of Land Management, Anchorage, in progress 1976. This is a study of the traffic volume which exceeds design capacity of roads in Cook Inlet - Kenai Peninsula Region. This study has high potential usefulness in assessing transportation impacts of OCS development.

Upper Prince William Sound Planning Unit Plan - Chugach National Forest, John Johnson, U.S. Forest Service, Anchorage, in progress 1976. This study covers the Whittier to Valdez area in Prince William Sound that will incorporate resources, as well as social and economic needs of the area into a coordinated document. The geographic coverage of this area includes potential OCS marine bases.

Multi-Modal Transportation Systems Plan and a Continuing Planning Process for Southeastern Alaska, John Umlauf, Department of Highways, Juneau. Completion September 1977. The goal of this study is to develop a multi-modal transportation plan, an implementation strategy and implementation of a continuing planning process for Southeastern Alaska transportation. The request for proposal notes that state-wide transportation planning does not currently exist, but a process is being developed.

v. DATA GAPS FOR OCS SOCIOECONOMIC STUDIES PROGRAM

Transportation, communications and utilities organizations in the state generally represent the extremes of either statewide or community level concern. As a result, gaps appear to exist in the literature relating to regional system components. Although facility inventories are found on a regional level, little information exists on the functional attributes of these systems on such a level, with the exception of the specific environmental impact statements.

● Beaufort Sea Region

Overall statewide transportation planning, as cited in several surveyed documents, is a serious data gap. While the need for such a study extends beyond the requirements of the OCS Socio-economic Studies Program, it is a gap that must be recognized,

Other transportation, communications and utilities data gaps include:

- The future impact of the pipeline service road as public access to the **Beaufort** Sea region.
- Post-completion of **oil** development around **Prudhoe** Bay in relation to projections in earlier studies as a means of determining transportation, communication and utilities impacts of petroleum development in the **Arctic-Beaufort** Sea region.
- Monitoring of Alaska near-shore leasing program impacts.
- Long-term **communications** improvements plans in the **Beaufort** Sea region.

● Bering Sea Region

- Follow-up of deep-water harbor proposals at Port **Clarence**, Lost River, Kotzebue and other coastal communities.
- e Studies of potential intrastate highway or rail connections for this region.

● Southwest Region

- Studies of possible **intrastate** highway or other land transport connections for this region.

● Gulf of Alaska Region

Data gaps in this region **include** more detailed and quantified transportation and utility impacts of present **pipeline** development and potential OCS development. As outlined in Section III above, local community plans recognize these impacts in a qualitative rather than quantitative fashion.

Other data gaps include:

- Long-range planning for the highway and rail networks in the **Southcentral** Region and Gulf of Alaska petroleum development region.
- Long-range water resources and sewage services needs in potentially impacted port communities.

- Potential needs and costs for communication services generated by OCS development.
- Particular follow-up studies of **Valdez** as a pipeline terminus, and monitoring of marine base developments at other Gulf of Alaska ports.
- A knowledge of airport facilities, such as fueling capabilities and **equipment** repair and maintenance services available at airports in petroleum development regions. Although published information is available on such criteria as runway length and the existence of navigational aids, individual airports need to be contacted to establish the type of air traffic and the full range of services which exist at each.

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14. HOUSING

I. SUMMARY OF INFORMATION SOURCES

The subject of housing covers all aspects of housing demand (type of units, number, cost, location), housing supply (construction linkages, transportation, raw materials, skills, costs, marketing, financing) and housing conditions. Information on any of these topics would be considered part of the network of sources on housing.

● Statewide Literature

There is no continuing work done in Alaska on a statewide analysis of housing costs, demand, adequacy or supply. This is due in part to the fact that the University of Alaska has no planning school and there is no institution which focuses on **housing** and housing issues. The only consistent statewide analysis of housing **is** carried out by the U.S. Department of Housing and Urban Development (HUD). Even here this information is primarily compilations of data on selected **communities**, not on the state as a whole. The Alaska State Housing Authority has prepared **some** statewide reports but most are dated.

● Community/Regional Literature

The literature on **housing** in Alaska **is primarily** focused on local communities. Annually data is compiled on housing construction, vacancies, housing permits and housing costs by community.

Material on a local level is compiled from a number of different sources:

- 1) comprehensive plans prepared by the communities or by the local borough planning offices;
- 2) individual environmental impact statements prepared for major projects which **would** impact those communities; and
- 3) reports from various State agencies, especially the Department of Community and Regional Affairs which focuses on **local** community needs.

● Currency of Literature

The reports on housing, both summaries and projections, are constantly being updated but not under any consistent framework. Many times individual housing plans are the result of federal housing programs, particularly 701 grants and more recent

Community Development grants. With the flow of this money, individual **towns** then are able to make projections of their **local** housing needs. Without the flow of funds these projections are not made. Thus information for some communities is current while for others it is outdated or entirely lacking.

● Form of Literature

All material that is available is in published form.

II. LITERATURE WITH STATEWIDE RELEVANCE

There are relatively few sources of information on Alaska housing **in** a statewide context. The most comprehensive information is found in the 1970 Census. Data hereon housing characteristics of the entire state has been the basis of a number of reports published by the Alaska State Housing Authority. The Statewide Housing Study (Alaska State Housing Authority, December 1971) is presently the only comprehensive study of Alaska's housing conditions and needs available in the state. **Volume I** of the study gives an overview of the housing conditions and **needs** of the entire state for each of its census divisions. Volume 11 analyzes the state's housing resources by census division and presents a plan for meeting the future housing needs of the state. It is not **an** attempt to determine the housing needs given the particulars of an oil pipeline or a gas pipeline; it is simply an analysis of need based upon expected population growth and the existing conditions found in 1970. For that reason, it is out of date. Still, it is the best single source of information on the state's housing conditions.

A second report of statewide relevance is a study entitled Housing the Alaska Native (Charles Abrams, 1967). This report analyzes the housing conditions in selected Native villages and towns and is only focused on the particular needs of the Native population in the rural areas of the state. **It** does not cover all census divisions and it only focuses on selected villages and the implications of the housing conditions in those villages.

Another statewide document is entitled Comparative Housing Cost Analysis (University of Alaska, Institute for Social, Economic and Government Research, November 1969). This document provides an analysis of the components of housing cost in Alaska and compares those costs to the Seattle and the national averages. This document is clearly dated but it provides an overview of the housing industry that is not available from any other resource; and it certainly has not been updated by recent documents published by HUD or private sources within the state.

Another statewide document is the Annual Economic Report (U.S. Dept. of Housing and Urban Development, 1975). It summarizes the economic conditions of the state in terms of employment, economy, population and translates that into issues of housing. Included in it are statements of housing activity, vacancies, home **financing** and the consumer price index. A major component of the consumer price index

is housing. Included in this document are the total housing units authorized by building permits and public contracts in ten selected communities around the state. These sites are Anchorage, Fairbanks, Juneau, Ketchikan, Kodiak, Sitka, Kenai, Soldotna, Petersburg, and Seward. These are the more urban areas of the state. There is no coverage of the small communities on the North Slope nor of some of the small communities in the Gulf of Alaska such as Valdez or Cordova.

The most comprehensive recent study of Alaska's housing is the Study of Housing Requirements for Alaskan Native People, Report #6 Phase One Final Report (Naramore, Bain, Brady, and Johanson, 1974). This document analyzes the characteristics of Native households, basic demographic data and the Native attitudes toward housing. It is important primarily because of its focus on the Alaska Native, the people and places most likely to be impacted by OCS activities.

A document of similar scope, 2C Report: Federal Programs and Alaska Natives Benefit (Robert Nathan, 1975), covers housing as well as the full range of other federal services. This report is statewide in coverage and presents housing information by Native corporation region. It is not as analytic as the Naramore, Bain, Brady, and Johanson study.

"The Problems of Alaska's Urban Native People" (Kish Tu, 1975) also discusses housing issues, but only the urban aspects. Housing problems are discussed in terms of their causes, visible attributes, and potential remedial actions.

III. LITERATURE WITH REGIONAL RELEVANCE

● Beaufort Sea Region

Housing literature for the Beaufort Sea Region is very sparse. Very few sources provide relevant information. The Barrow Regional Master Plan (John Graham and Company, May 1973) is a typical comprehensive plan in which housing is one of many different components. It includes a discussion of natural conditions, man-made facilities, economic and social characteristics, transportation and utilities. A number of alternative land use plans are presented. It is somewhat dated, given the more recent impacts in that area of the state. Also, the document is not very complete in its coverage of housing issues.

Another document which covers housing on the North Slope is An Analysis of the Socio-Economic Impact in Alaska of Alaska Arctic Gas Pipeline Company Pipeline (URSA, January 1974). The housing conditions on the North Slope and in Fairbanks are analyzed and projections are made based upon an assessment of population immigration to the northern areas of Alaska due to pipeline construction and operation (both Alyeska and Arctic Gas). Projections of housing impact are tabulated specifically for Fairbanks and for northern Alaska (which includes the Beaufort Sea OCS

impact area). The information is dated since it is based on the schedules and manpower estimates available in 1973.

Fairbanks has more **complete coverage** of its **housing** needs than Anchorage. This is primarily due to the Fairbanks-Pipeline Impact Information Center Reports, a series of **documents** which comes out approximately every six weeks and covers a number of different issues, including housing. Special attention in the past year has been placed upon housing costs and housing vacancy. The Impact Information Center Reports are not analytical; rather they attempt to report the changing vacancy rates and costs and in some ways attribute those changes to the local pressures from population shifts and employment changes brought about by the **Alyeska pipeline**. The reports from the Impact Information Center go back approximately two years to July, **1974** and will continue through to June, 1977.

In addition, there are two slightly dated documents that cover housing conditions in Fairbanks. Housing in the Fairbanks North Star Borough (Alaska State Housing Authority, May **1971**) is an **analysis of** the **1970** Census and it focuses primarily on **housing** and the qualitative analysis of housing problems. It makes recommendations about future housing needs but because of its earlier publication date, it does not include the impacts from the **Alyeska** pipeline. A more recent report is the City Center Plan--Fairbanks, Alaska (John Graham and Company, September 1972), which is a land use plan with some discussion of housing. It is primarily based upon the comprehensive **planning** necessary for future commercial and industrial growth in the Fairbanks area.

Two reports are available which are community-specific in their discussions of housing. The presentation of housing in both cases is secondary to other issues. These two documents are "Social and Economic Implications of the Alaska Village Demonstration Project: Working Paper #20" (**Puchtler, 1973**) which focuses on **Emmonak** and **Wainwright** and Point Hope: An Eskimo Village in Transition (Van Stone, 1962).

● Bering Sea Region

Sources on housing issues specific to this region are limited. The Kotzebue Comprehensive Development Plan (Alaska State Housing Authority, **1971**) is the only such document reviewed for this report. The housing conditions in the other localities are **discussed** in the various statewide housing documents cited above, particularly those emphasizing Native housing issues.

● Southwest Region

Two documents are specific to the housing issues of this region of Alaska. One of these is Three Demonstration Housing Projects for Natives in Alaska (Alaska State Housing Authority, **1968**).

This report describes the plan to locate, design and construct an experimental house in the Bethel area. The second **report** is the Bristol Bay Native Association Housing Survey 1975 (Alaska Department of **Community** and Regional Affairs, 1975). It describes in detail the housing conditions in each village in the Bristol Bay Native Association.

e Gulf of Alaska Region

Housing information for this region is much more complete than for the Beaufort Sea Region. Numerous communities have prepared comprehensive studies of housing plans; the State has prepared local reports; the planning departments of the various boroughs in the Gulf of Alaska area have prepared their own housing analysis studies. While the list of studies is quite comprehensive, detailed analysis of each of the documents shows that many are outdated and do not include the impact results of the **Alyeska** pipeline. The most complete information is prepared for the city and borough of Anchorage. Anchorage has prepared two separate discussions of the housing impact resulting from the **Alyeska** pipeline, the first entitled The Anticipated Impact, Trans-Alaska Pipeline on Public Services and Housing in the Greater Anchorage Area (Greater Anchorage Area Borough, 1973). These projections, based on preliminary estimates of **Alyeska** manpower, assume there would be from 2,600 to 4,000 units needed in 1974 and 2,600 additional units in 1975. This report has been updated with a second document, 1975 Pipeline Impact--Anchorage. It does not actually make projections, but is more of a review of the impact upon the housing costs and construction shortages resulting from the **Alyeska** pipeline.

In addition to those documents, a major plan for downtown Anchorage entitled Central Business District Plan, Anchorage, Alaska, was prepared for the Greater **Anchorage Area Borough Planning Department** (John Graham and Company, **May** 1973). This is not so much a housing plan as an analysis of the downtown area of Anchorage in terms of commercial development and the housing needs that could be satisfied by downtown construction. Again, it does not include specific impact resulting from the **trans-Alaska** or **Alyeska** pipeline. Nor does it include any assumptions of petroleum development subsequent to the oil pipeline completion.

Anchorage is the only Standard Metropolitan Statistical Area (**SMSA**) in the State of Alaska and as such is the only area for which a summary profile of housing and population has been developed from the 1970 Census. A Summary Profile of 1970 Census for Anchorage SMSA (U.S. Department of Commerce, Bureau of the Census, **March 1973**) is more of a statistical profile of the area's basic housing along with demographic and economic information; it is not an analysis of housing needs.

The Anchorage Municipal Housing Study (**Hitchins** and others, **1976**) is a summary of the recent housing survey undertaken by the Anchorage Urban Observatory of the University of Alaska as well

as a compendium of housing plans for the Anchorage area. It includes a housing plan component of a general plan, and a housing assistance plan as required by the recent federal Community Development legislation.

Individual plans have been prepared for several communities in the Gulf of Alaska area. Cordova Comprehensive Plan (Alaska Consultants, February 1976) provides community baseline information for **Cordova**. One of the community issues covered is housing. There is a similar plan for Yakutat: Yakutat, Alaska--Comprehensive Development Plan (Alaska State Housing Authority, September 1971). Likewise, The Matanuska-Susitna Borough Housing Plan (Alaska State Housing Authority, October 1973) is a very short document, only 20 pages in length, but it gives an overview of the housing issues in that area which is now one of the suburban areas of **Anchorage**. The Yakutat Socio-Economic Study (Alaska Consultants, 1975) is a quantitative analysis of a local survey. Housing is one of the issues covered.

As a result of much of the proposed petroleum development onshore in the Outer Continental Shelf in the Gulf of Alaska, environmental impact statements have been prepared which include housing as one of the subject areas covered. Documents for the El Paso natural gas pipeline have been prepared which focus on Cordova. Two documents cover that issue: the Application of the El Paso Alaska Company for Certificate of Public Convenience and Necessity (El Paso Alaska Company, September 1974) and Further Prepared Direct Testimony and Proposed Hearing Exhibits (October 1975). Both these documents have been submitted to the Federal Power Commission and address housing needs of the Cordova and the nearby Gravina Point areas, the terminus of the El Paso pipeline from Prudhoe Bay. As part of its review, the U.S. Federal Power Commission has submitted its own Final Environmental Impact Statement (April 1976) which analyzes the housing needs for the Cordova area as a result of the El Paso pipeline. These environmental impact reports also have information about the housing needs in the Anchorage area.

Environmental impact statements have been prepared for Outer Continental Shelf activities in the Gulf of Alaska. All have some discussion of housing, but are not that complete. One is An Economic and Social Impact Study of Oil-Related Activities in the Gulf of Alaska (Mathematical Sciences Northwest, Inc., May 1975). Another is the Final Environmental Impact Statement for the Proposed Oil and Gas Leasing in Northern Gulf of Alaska (U.S. Department of the Interior, Bureau of Land Management, 1976). A third is the Final Environmental Impact Statement Outer Continental Shelf Oil and Gas Lease Sites, Lower Cook Inlet (U.S. Department of the Interior, Bureau of Land Management, 1976).

IV. CURRENT RESEARCH

- Beaufort Sea Region

No current research in this area has been identified at this time.

- Bering Sea Region

No current research in this area has been identified at this time.

- Southwest Region

No current research in this area has been identified at this time.

- Gulf of Alaska Region

The Kenai Peninsula Borough is presently preparing a study of local housing needs resulting from Outer Continental Shelf development. This planning is supported by a grant from the Department of Community and Regional Affairs. Housing is one component among many that will be covered under this **plan**. No document has yet been completed as part of this study.

v. DATA GAPS FOR OCS SOCIOECONOMIC STUDIES PROGRAM

- Beaufort Sea Region

- Analysis of Housing Conditions

Of particular relevance to any further discussion of housing on the North Slope or the Beaufort Sea Region is an analysis of present housing conditions in this area.

- Population Shifts

Although marked population shifts have occurred as a result of pipeline and other economic activities on the North Slope, no analysis has been made of those population shifts and of the housing needs engendered by those shifts.

- Housing Construction Activity

Similarly, no analysis has been made of the housing construction activity since the 1970 Census. Individual efforts have been made by the Arctic Slope Regional Corporation to construct housing for various communities in the Beaufort Sea area, but no study has been undertaken to really determine whether this has had much impact or closed the **gap** between housing needs and housing construction.

- North Slope Problems

No study has been undertaken to determine the particular problems of housing construction, in terms of cost, technical problems of construction and the supplies of housing materials on the North Slope. The type of housing carried out at Prudhoe Bay by the pipeline company has been modular housing trucked in or transported by barge. The convertibility of this method of construction to the needs of the local inhabitants has not been investigated.

- Bering Sea Region

The data gaps for this region are very similar to those encountered in the Beaufort Sea Region. Even more than for that region, there exists no baseline study or plan similar to the Barrow Regional Master Plan.

- Southwest Region

The data gaps for this region focus on two major areas:

- Population Shifts

The migration to the medium size and larger villages continues to put a strain on the already inadequate housing supply system. How the receiving communities are coping has yet to be analyzed.

- Community Housing Plans

This area is more urbanized and populated than either the Beaufort Sea or Bering Sea Regions. Community plans must be developed coherently in anticipation of future developments and continuing trends. As of this date, coordinated planning is not yet viable, though the Bristol Bay Native Association Housing Survey is a beginning step.

- o Gulf of Alaska Region

The literature on this region of the state is more complete than that of other regions. Nonetheless, there are significant gaps which should be reviewed and analyzed with relevance to future OCS developments.

- Community Housing Plans

Individual towns, such as Cordova, Yakutat and Anchorage, clearly have some housing plans developed, yet many are not up-to-date; and bringing them up-to-date is a function of funding patterns available primarily from federal sources. The Alaska State Housing Authority (ASHA) formerly did local planning, but this agency is presently focusing on its role

as a secondary mortgage market. It is not in a position to report on the current housing conditions of the particular communities of Alaska.

o Different Levels of **Alyeska** Pipeline Impact

More work needs to be done in terms of studying the housing needs of a community like **Yakutat** which is relatively isolated from **the development of the Alyeska** pipeline, as well as the housing needs of towns like Seward, Whittier and **Valdez** which have had direct impact from the Alyeska pipeline.

Further analysis must be done on the **Alyeska** pipeline's impact on the local housing market. All aspects must be considered:

- 1) importation of skilled labor;
- 2) increased demand for housing;
- 3) inflation of housing costs due to inflated wages of the workers; and
- 4) the problem of the availability of local money to support housing construction, and the ability or cost of transportation to bring in needed supplies from the Lower 48 to Alaska.

o Dynamics of Housing Market

As with the North Slope, the particular dynamics of the housing market for this region have not been investigated. Richard Fisher's Comparative Housing Cost Analysis (University of Alaska, **ISEGR**, 1969) is the most recent study, and it clearly has to be updated. A comparison has to be made between the more urban areas in the **Southcentral** and Gulf of Alaska areas with the more isolated areas of the North Slope. Many of the characteristics in 1969 which created significant price variables between Anchorage and Seattle may no longer apply. That must be investigated fully before any analysis can be made of future housing trends for the state as a whole or the various regions.

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15. ARCHAEOLOGICAL/HISTORICAL AND RECREATIONAL/SCENIC RESOURCES

I. SUMMARY OF INFORMATION SOURCES

The archaeological literature for Alaska encompasses both historic and prehistoric cultural materials and spans a period of at least 15,000 years. This literature deals primarily with the delineation of specific archaeological cultures and their development and change through time. Problems such as the origin of specific cultures, interactions between cultures, environmental adaptations and historical development are also addressed. This literature is primarily oriented toward data presentation and is descriptive and comparative. A great portion of the literature consists of revised interpretations of earlier work based on current research. Much of the archaeological literature is in the **form of** unpublished preliminary reports. These manuscripts often provide the most current information concerning archaeological problems and also update the existing literature.

The preservation of historic and cultural resources also extends to scenic and recreational areas. Land withdrawals for federal **and** national interest lands and State parks recognize areas of historic value, outdoor recreation potential and such qualities as scenic and natural uniqueness and diversity. Some of the agencies responsible for the documentation and preservation of archaeological and historic resources are also involved in planning for parks, and providing assistance in federal, State and Native Land selection.

● Statewide Literature

The literature on Alaskan archaeology deals primarily with local and regional problems, although a few sources treat the literature in a statewide perspective. It is more common to find sources which deal with one particular cultural group such as Eskimo, **Aleut** or Athabascan Indians than it is to encounter sources which deal with the statewide focus of all or several of these cultural groupings.

The primary literature sources on Alaskan archaeology are located within the state although several important information sources outside the state should be considered also. Within the state of Alaska there are three general sources for the archaeological literature. These include the private files and libraries of various professional archaeologists working within the state, several facilities within the University of Alaska, and various government agencies.

The first general information source is the private files and libraries of various professional archaeologists working within the state. These private collections are particularly important since they often include unpublished manuscripts and documents which are obscure or virtually unobtainable elsewhere. Much of this material receives such limited distribution that it **is** difficult to obtain except from the individual authors. All of the unpublished material reported in this chapter can be obtained from the various authors; copies may also be obtained through the many private files and libraries in the state.

Information sources within the University of Alaska system include the Rasmussen Library in Fairbanks, the University Museum, the Cooperative Park Studies Unit of the National Park Service located on the Fairbanks campus, and the Institute of **Social** and Economic Research.

The Rasmussen Library is a good source for archaeological literature in journals such as the Anthropological Papers of the University of Alaska, Arctic Anthropology, Arctic, Polar Record, Fieldiana: Anthropology, American Antiquity, American Journal of Archaeology, and others. Many books and scientific and academic reports which have an Alaskan and Arctic emphasis are located in the Skinner collection of the library. Arctic Bibliography is an excellent reference, and is available at the library. The Government Documents section of the library contains a fairly **v complete selection** of documents with specific reference to **Alaska** including the Smithsonian Institution Annual Reports and Reports of the Bureau of American Ethnology. The Library has a **large** microfilm section that includes documents such as Ph.D. **dissertations** which are related to Alaskan archaeology. The archives of the University **of Alaska** contain many rare documents which pertain to Alaskan archaeology **includi** unpublished manuscripts, and a photo collection.

The University of Alaska Museum contains extensive archaeological collections and supporting documentation for these collections. In addition, the files and catalog records of the museum contain much unpublished information concerning Alaskan archaeology.

The Cooperative Park Studies Unit of the National Park Service is located on the Fairbanks campus of the University of Alaska and is involved in several projects that deal directly with Alaskan archaeology. These projects include the documentation of archaeological sites affected by the Alaska Native Claims Settlement Act, archaeological survey and documentation of sites in areas of proposed national parks, extensions, or wilderness areas, and location and documentation of archaeological sites affected by oil development in National Petroleum

Reserve No. 4 on the North Slope of Alaska. The Cooperative Park Studies Unit has collected and compiled a great deal of information concerning archaeological materials and sites for much of Alaska. The majority of this information is in unpublished form.

The Institute of Social and Economic Research of the University of Alaska is located in both Fairbanks and Anchorage. The Institute has recently published bibliographies which include archaeological information. These include The Arctic and Subarctic Athapaskans: A Selected Annotated Bibliography (Hippier and Wood, 1974), and An Aleutian Bibliography (Jones and Wood, 1975). Another primary source of information within the University of Alaska system is the Arctic Environmental Information and Data Center which is located in Anchorage. The Center contains reference files and a library, and has published Alaska Regional Profiles in six volumes, which cover the entire state and discuss in a general way the history and prehistory of each region. An annual publication of the center, Current Research Profiles for Alaska, abstracts much of the current archaeological research being undertaken in the state.

Several federal and State agencies also prepare both published and unpublished reports dealing with Alaskan archaeology. The primary State agency which concerns itself with Alaskan archaeology is the Office of History and Archaeology of the Alaska Department of Natural Resources, Division of Parks. The Office of History and Archaeology maintains the Alaska Heritage Resource Survey Index which lists all reported archaeological sites in the state. A data file with more complete information concerning sites on the index is also maintained. The Division of Parks has also published Alaskan Archaeology: A Bibliography (K. Workman, 1974).

Archaeological documents and materials are located in several places outside the state of Alaska. These include the National Register of Historic Places in Washington, D.C. which records many important archaeological sites in Alaska with supporting documentation. Several U.S. and foreign museums have major Alaskan archaeological collections along with published and unpublished documents related to these collections. These museums include the Smithsonian Institution in Washington, D.C., the American Museum of Natural History in New York City, the Peabody Museum of Harvard University, the Haffenreffer Museum of Brown University, the National Museum of Man in Ottawa, Canada, and the Danish National Museum in Copenhagen, Denmark. The Arctic Institute of North America in Calgary, Canada is an additional source of information concerning Alaskan archaeology.

Among the agencies responsible for documentation of information on historic and recreational/scenic resources, the State Division of Parks has prepared the most comprehensive surveys and studies. The Agency's statewide inventories of historic and archaeological sites and statewide recreation plans are supplemented by historic and ethnographic studies of the Alaska Historical Commission, the Joint Federal-State Land Use Planning Commission, the National Park Service, and the National Forest Service. Studies of scenic resources are generally limited to maps prepared by the **JFSLUPC**.

- Community/Regional Literature

The majority of Alaskan archaeological literature has a local and regional focus. This is primarily related to the fact that archaeological data are initially documented in a local context. A greater perspective is gained only after analysis and interpretation of materials from various local contexts and time periods.

Archaeological literature with a local and regional focus can be found in the University of Alaska libraries, at various government agencies and in private libraries. This literature is often difficult to locate because much of it is in the form of unpublished manuscripts in personal libraries.

Recreation, scenic and historic resources literature includes regional studies by **JFSLUPC** and Native corporations; **project-specific** environmental impact statements; and state park and national park, forest or monument master plans.

- Currency of Literature

The currency of the archaeological literature is dependent upon the recency of research or fieldwork for a particular area or problem. Often the most current literature for an area may be several years old. For other areas the most current literature may be in the form of an unpublished manuscript based on field investigations of recent seasons. To evaluate properly the currency of the archaeological literature for any area it is essential that the most recent work by professionals working in that area be considered. It is not uncommon for archaeological literature to be several years out of date at the time of publication.

Land selections by the federal and State governments and the Native corporations spurred investigations of archaeological, historic and recreational resources in critical selection areas. Requirements of the National Environmental Policy Act of **1971** has resulted in special studies, such as the

archaeological investigations along the Alyeska pipeline route, and environmental impact statements for oil and gas related activities.

Much current research continues to be related to oil development, particularly to OCS activities in the Gulf of Alaska. The federal Office of Coastal Zone Management has, through the Department of Community and Regional Affairs, funded studies of coastal archaeological, natural and recreational resources. Such studies are being carried out by the National Forest Service and the Alaska Division of Parks.

● Form of Literature

Much of the source material discussed above is in unpublished manuscript form, but is available upon request from the authors or agencies discussed. Many of the published materials can be obtained from the publisher or libraries.

Scenic, recreation, and historic site literature includes published plans and environmental impact reports, less accessible map and computer inventories of historic sites, and Native corporation studies.

II. LITERATURE WITH STATEWIDE RELEVANCE

The State of Alaska encompasses a variety of historic and prehistoric cultural groups which are discussed in the archaeological literature. These groups include inland and coastal Eskimos, Aleuts, Athabascan Indians, and Northwest Coast Indians. All of these cultural groupings have separate histories and changing spatial distributions in Alaska through time. The kinds of archaeological materials each group leaves behind changes over time. The diversity and complexity of these groupings makes it difficult to write an overall history and prehistory for all cultural groupings within a statewide framework. Most of the archaeological literature that can be considered statewide deals with only a single cultural grouping except when attempting to delineate boundaries or interactions between groupings.

Literature with statewide relevance is limited to general bibliographies, distribution maps, chapters within books on North American prehistory which deal with Alaskan archaeology in a general way, books and articles which deal with the statewide distribution of a single cultural grouping, and journal articles which briefly summarize the major archaeological work up to a certain date.

Bibliographies with statewide relevance to archaeology include Alaskan Archaeology: A Bibliography (K. Workman, 1974), and

Arctic Archaeology: An Annotated Bibliography and History (Dekin, 1975). A map: Native Peoples and Languages of Alaska (Alaska Native Language Center, 1975), shows the distribution of Native peoples in Alaska.

Several books concerning the **prehistory** of North America contain chapters which treat the **prehistory** and archaeology of Alaska in a general way. These include The Arctic and Subarctic (Collins, 1964), The Arctic (Dekin, 1973), and sections of Circumpolar Peoples: An Anthropological Perspective (Graburn, Nelson, and Strong, 1973). The six volumes of Alaska Regional Profiles (Seikregg, 1974-77) also cover the **history** and **prehistory** of Alaska **within** a statewide framework.

Several books have been written which can be considered an overview of Eskimo **prehistory** and archaeology. These include Ancient Men of the Arctic (Giddings, 1967), and Eskimo Prehistory (Bandi, 1969).

Alaskan Eskimos (Oswalt, 1967) provides an overview of Eskimo culture and archaeology.

Literature which has attempted to summarize the Alaskan archaeological work to date includes Archaeological Investigations in Alaska Since 1939 (Larsen, 1953), Archaeological Research in the North American Arctic (Collins, 1954), Archaeology in the Arctic, 1953-1960 (Larsen, 1961), and The Quarternary Geology and Archaeology of Alaska (Pewe, Hopkins and Giddings, 1965). All of this literature is now somewhat dated.

A major portion of the statewide literature deals with the problems of the origin and development of Eskimo culture in Alaska and Arctic North America. A few of the **major** references include the following: Outline of Eskimo Prehistory (Collins, 1940), Recent Achievements in Eskimo Research (Birket-Smith, 1947), The Origin and Antiquity of the Eskimo (Collins, 1951), Cultural Continuities of Eskimos (Giddings, 1961), Eskimos and Aleuts: Their Origins and Evolution (Laughlin, 1963), The Eskimo Culture and its Relation to Northern Eurasia (Larsen, 1968), Toward a Prehistory of the Na-Dene with a General Comment on Population Movement Among Nomadic Hunters (Dumond, 1969), The Arctic Small Tool Tradition (Irving, 1970), Prehistoric Population Growth and Subsistence Change in Eskimo Alaska (Dumond, 1972), The Origins of Thule Culture (Stanford, 1973), Archaeology of the Northwest Arctic (Anderson, 1973), The Pacific Origin of Eskimos (Clark, 1976). Research concerning the problems of Eskimo origins and development has led to a great-deal of information concerning Eskimo **prehistory** in Alaska and the North American Arctic and well documented periods of development.

Other archaeological literature with statewide relevance concerns the peopling of the New World via the Bering Land Bridge and the identification of **the** earliest human occupations in Alaska. At the present time, the earliest dated site that may indicate an **early** occupation of Alaska is **Trail** Creek Caves on the Seward Peninsula, **which** dates to approximately 14,500 years ago (Larsen, 1968). Artifacts recovered near Old Crow Village in the neighboring Yukon Territory of Canada have been dated **at** 27,000 years old (Irving and **Harrington**, 1973). This early date may have direct inferences for Alaskan **prehistory**. Additional Alaskan sites which indicate **an** early period of occupation in Alaska include **Anangula** in the Aleutians (McCartney and Laughlin, 1964), the **Healy** Lake site in Central **Alaska** (Cook, 1969), the Onion Portage site in Northwest Alaska (Anderson, 1968, 1970), the Gallagher Flint Station on the North Slope of the Brooks Range (Dixon, 1972, 1975), the Dry Creek site in Central Alaska (Powers and Hamilton, 1975), and the Ground Hog Bay site in Southeastern Alaska (Ackerman, 1974). Although most of the early sites in Alaska date within the 15,000 to 10,000 year range, a major research problem has been to pinpoint the earliest occupation sites in Alaska, thought to occur in the 30,000 to 15,000 year range.

Research has been carried out on this problem on both sides of the Bering Strait. On the Siberian side, the literature relevant to the early peopling of **Alaska** includes Ancient Cultures of Siberia and the Problem of First Relations of the Old World with the New (Okladnikov, 1958), Ancient Population of Siberia and its Cultures (Okladnikov, 1959), Archaeology of the Soviet Arctic (Tadnikov, 1960), The Discovery of the Palaeolithic in Kamchatka and the Problem of the Initial Occupation of America (D'akov, 1968), and The Pleistocene and Early Holocene Archaeology of Mainland and Northeast Asia (Powers, 1973). On the American side of **Bering Strait**, the literature concerning the early occupation of the Bering Land Bridge and Alaska has increased in recent years. Major sources concerning early human occupation of Bering Land Bridge and Alaska include: Notes on Cultural Relations Between Asia and America (Nelson, 1937), The Alaska Gateway Viewed from the Aleutian Islands (Laughlin, 1951), The Old World Roots: Review and Speculations (Chard, 1963), Early Man in the New World: Problems of Migration (Wendorf, 1966), Migrations of Hunters on the Bering Land Bridge in the Upper Pleistocene (Muller-Beck, 1967), The Bering Land Bridge (Hopkins, 1967), The American Paleo-Arctic Tradition: New Evidence for Early Man in Alaska (Anderson, 1968), Early Man in America and Late Pleistocene chronology of Western Canada and Alaska (Bryan, 1969), Recent Early Man Research in the North (Irving, 1971), Late Palaeolithic Cultures of Alaska (West, 1973), A Synthesis of Circum-Beringian Prehistory and Delineation of Regions of High Archaeological Potential (Dixon, 1976), The Pleistocene Prehistory of Arctic North America (Dixon, 1976), and Early Man on the Bering Land Bridge (Dixon, 1977).

The problem of the **early** occupations of Alaska **via** the **Bering Land Bridge** remains a current research interest to many archaeological scholars. In view of the archaeological research **concerning** the early peopling of Alaska **via the Bering Land Bridge**, the **outer continental shelf** itself is **an** area of high potential **yield** for archaeological materials which are presently underwater on Alaska's outer continental shelf. The **Bering Land Bridge Cultural Resource Study** (Dixon, 1976), and **Marine Archaeological Survey** (Dixon, 1976) report research oriented toward the delineation of areas of high archaeological potential on Alaska's outer continental shelf.

A number of federal and State laws pertain to historic and pre-historic cultural resources. Some of the major legislation which should be considered in relation to OCS activities includes: the **Federal Antiquities Act of 1906** requires the protection and preservation of American antiquities, **including** historic and **prehistoric** sites on federally-owned **lands**. The **Historic Preservation Act of 1966** authorizes the Secretary of Interior to maintain a National Register of Historic Places and section 106 of the act implies that federal funds and authority may not be utilized to adversely affect sites on the National Register. The **National Environmental Policy Act of 1969** charges the federal government with the preservation of historic, cultural and natural aspects of the national heritage. **Executive Order 11593** requires federal agencies to inventory their cultural resources and submit nominations to the National Register for all qualified sites. The **Alaska Historic Preservation Act** provides for the protection and **preservation** of historic and prehistoric archaeological resources in Alaska.

Statewide literature in the field **of archaeology and history** includes **Alaska's Heritage Resources**, v. 1-3 (Alaska Division of Parks, 1973). The first volume provides an historical summary of Alaska's past, the legislative background for preservation in Alaska, and the state's policy on heritage and resources. The second volume is essentially an inventory of historic and archaeological locations. It provides a key to over 4,000 known archaeological sites in the state, and gives their exact location and ownership within U.S. Geological Survey quadrangles. This inventory data is also computerized, allowing continuous updating as new archaeological and historic sites are discovered.

The inventory is, however, an incomplete listing of known sites (perhaps by a factor of more than 50 percent) and individual entries exhibit a high probability of inaccuracy. The third volume lists nominations to the National Register of Historic Places for fiscal year 1977--a status which **would** confer some protection from development.

Recreation and Heritage Resources of Alaska's Coastline (Alaska Division of Parks, 1975) is a series of eighty maps at **1:250,000** scale locating **all** of the known archaeological sites in the

coastal regions of Alaska as of June 1975. Because other data, such as land status and natural inventories of the Coastal Management Program, are also arrayed on the same map base, this form of resource inventory is particularly useful. However, these maps are only available in the Governor's Office of Planning and Research in Juneau and the Division of Parks in Anchorage.

Alaska Outdoor Recreation Plan 1976-1980 (Alaska Division of Parks, 1976) outlines current conditions of increasing demand for outdoor recreation facilities, with planning and funding for local and regional recreation areas lagging behind. The report concludes that the land status transition now occurring in Alaska provides opportunities for better park planning and management. Inventories of existing and proposed recreation areas are provided. This recently-published report on outdoor recreation resources and planning in the state will be updated on the basis of regional studies and state land selections.

The Joint Federal-State Land Use Planning Commission's Map of Alaska - Scenic, Natural and Primitive Values, 1:2,500,000 scale, is the only information source at the statewide level on scenic resources. It relates the JFSLUPC scenic and natural values interpretations in map form. Scenic quality is interpreted in terms of such factors as the uniqueness of natural features, color, form and diversity of features, topographic relief, water features and areas of primitive wilderness value. Its usefulness is limited by (1) being based only on map interpretation; and (2) the scale of the investigation. It is cited here for its uniqueness as a document on statewide scenic resources.

Recreation and Scenic Resources in Alaska; an Annotated Bibliography (Muth and Fitchet, is compilation by the U.S. Forest Service of a broad range of literature on this topic, including wildlife resources, tourism related to camping and other outdoor activities, federal and State plans and policies related to conservation of scenic and recreation resources, and briefer historic and ethnographic literature listing. This document is a general guide to the literature in this field.

III. LITERATURE WITH REGIONAL RELEVANCE

● Beaufort Sea Region

The archaeological literature for the Beaufort Sea Region reflects the intensity of research in certain areas and the complete absence or slight archaeological investigations in others. Two coastal areas have received major archaeological attention, Point Hope and Point Barrow. In the interior of the Beaufort Sea Region, two broad areas have been the focus of archaeological investigations: An area of northwest

Alaska, which includes National Petroleum Reserve No. 4 and the **Utikok, Kukpowruk, and Kokolik** Rivers area, and a **large** area of the central Brooks Range and the Arctic Slope area to the north.

The Beaufort Sea Region is archaeologically important and contains materials which span at **least** 10,500 years of **pre-**history. Known archaeological materials from this area include very early evidence of prehistoric occupation in Alaska relevant to current theories concerning the **early** movements of people into North America. The Beaufort Sea area is rich in Eskimo **prehistory**, and has provided important evidence of cultural development, including evidence of interior occupations by prehistoric Eskimo and Indian groups. Prehistoric and historic material from the area have provided insights into the movements and interactions between prehistoric Eskimo groups, as **well** as between Eskimo and interior Indian groups.

Of the coastal areas, Point Hope is one of the best known archaeologically. Several thousand years of Eskimo **prehistory** have been identified from several archaeological sites in the Point Hope area. Evidence found at Point Hope has led to the identification of the important **Ipiutak** Eskimo culture which existed on the Alaskan Arctic coast from about 200 to 300 A.D. The **important** literature for the **archaeology** of Point Hope includes A New Form of Culture on the Arctic Coast (Rainey, 1941), The Ipiutak Culture at Point Hope, Alaska (Rainey, 1941), The Whale Hunters of Tigara (Rainey, 1947), Ipiutak and the Arctic Whale Hunting Culture (Larsen and Rainey, 1948), The Ipiutak Culture: Its Origins and Relationships (Larsen, 1952), The Positions of Ipiutak in Eskimo Culture - A Reply (Collins, 1954), The Skeletal Remains of the Ipiutak Cemetery (Debetz, 1959), Near Ipiutak and Uwelen-Okvik (Larsen, 1968), and The Ipiutak Culture: Excavations at Point Hope, Alaska (Rainey, 1971).

The Point Barrow area has been the focus of archaeological investigations since the early 1900s. Archaeological materials recovered from excavations at several sites in the area have revealed occupations by prehistoric Eskimo groups which extend back in time at least a thousand years. Earlier material has been recovered from the Barrow area, but is not **fully** reported in the archaeological literature at the present time. **Important** literature for the Point Barrow area includes Excavations of Eskimo Thule Culture at Point Barrow, Alaska (Mason, 1930), Archaeological Investigations at Point Barrow, Alaska (Collins, 1933), Archaeological Survey of Eskimo, or Earlier, Material in the Vicinity of Point Barrow, Alaska (Carter, 1953), Eskimo Prehistory in the Vicinity of Point Barrow, Alaska (Ford, 1959), Archaeological Survey of Eskimo,

or Earlier, Material in the Vicinity of Point Barrow, Alaska (Carter, 1966), Recent Excavations near Point Barrow, Alaska, and their Significance in Eskimo Prehistory (Stanford, 1969), Evidence of Paleo-Eskimos on the North Coast of Alaska (Stanford, 1971), The Origins of Thule Culture (Stanford, 1973), and The Walakpa Site, Alaska (Stanford, 1976).

The coastal area of the **Beaufort Sea** to the east of Point Barrow has received very slight archaeological attention. Two primary references which discuss this area are The Tenuous Beaufort Sea Archaeology (Giddings, 1957), and An Archaeological Reconnaissance of the Lower Colville River and Delta Regions (Irving, 1953).

A large interior area of the **Beaufort Sea** Region which has been the focus of archaeological investigations is the northwest Alaska area which includes Naval Petroleum Reserve No. 4 (now National Petroleum Reserve No. 4) and areas of the **Utukok, Kukpowruk and Kokolik Rivers**. Archaeological literature which is important for the National Petroleum Reserve No. 4 area, some of which discusses coastal areas, includes New Data on the Inland Eskimo of Northern Alaska (Solecki, 1950), An Archaeological Reconnaissance of Selected Localities in NPR-4, Arctic Alaska (Hall, 1976), ...and the very recent Assessment of the Known Cultural Resources in the National Petroleum Reserve in Alaska (Schneider and Bowers, 1977) and Annotated Bibliography (Arndt, 1977). The archaeological significance of the Utukok River area of northwest Alaska is reported in Notes on the Archaeology of the Utukok River, Northwestern Alaska (Thompson, 1968), The Prehistory of the Utukok River Region Arctic Alaska: Early Fluted Point Tradition with Old World Relationships (Humphrey, 1966), and The Prehistory of the Arctic Slope of Alaska: Pleistocene Cultural Relationships between Eurasia and North America (Humphrey, 1970). The archaeology of the **Kukpowruk and Kokolik Rivers** is reported in A Preliminary Report of an Archaeological Reconnaissance of the Kukpowruk and Kokolik Rivers in Northwest Alaska (Solecki, 1960), and Archaeology and Ecology on the Arctic Slope of Alaska" (Solecki, 1951). Two additional references for this interior area of northwest Alaska include Notes on Two Archaeological Discoveries in Alaska, 1950 (Solecki, 1951), and Excavations at Tukuto Lake: The Late Prehistoric-Early Historic Eskimos of Interior Northwest Alaska (Hall, 1970).

The central Brooks Range and the Arctic Slope to the north is an area that has received continued archaeological research since the 1950s. This area has proved to be extremely important in yielding archaeological materials which may answer pertinent questions concerning the prehistory of Alaska for the last 10,500 years and questions concerning interior Eskimo adaptations. The information concerning the relationship

of coastal resources to interior resources and their utilization by prehistoric groups may be one of the major contributions of the archaeology of this area. The important archaeological literature for the central Brooks Range and Arctic Slope area, some of which includes coastal areas, includes Archaeology in the Brooks Range (Irving, 1951), An Archaeological Reconnaissance in the Brooks Range (Irving, 1952), Evidence of Early Tundra Cultures in Northern Alaska (Irving, 1953), Cultural Succession at Anaktuvuk Pass, Arctic Alaska (Campbell, 1962), Anaktuvuk Prehistory: A Study in Environmental Adaptation (Campbell 1962), Punyik Point and the Arctic Small Tool Tradition (Irving, 1964), Antiquity of Man at Anaktuvuk Pass, Alaska (Porter, 1964), Prehistory of the Central Brooks Range, an Archaeological Analysis (Alexander, 1969), Final Report of the Archaeological Survey and Excavations Along the Alyeska Pipeline Service Company Route to Fulfill Requirements of Task Order 9 (Cook, 1971), An Archaeological Survey of Interior Northwest Alaska (Hall, 1975), The Gallagher Flint Station, An Early Man Site on the North Slope, Arctic Alaska, and Its Role in Relation to the Bering Land Bridge (Dixon, 1975), Archaeological Survey in the Region of Itkillik Lake, Alaska (Kunz, 1976), and Final Report: Alyeska Archaeological Project (Cook, 1977).

Literature which is relevant to the prehistory of the Beaufort Sea Region and Canadian arctic archaeology also includes: The Engigstciak Site in the Yukon Arctic Coast (MacNeish, 1965), Speculations on Climatic Change and Thule Culture Development (McGee, 1969-'70), The Later Prehistory of the Middle Porcupine Drainage, Northern Yukon Territory (Morlan, 1973), and Contributions to Anthropology: The Interior Peoples of North Alaska

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Scenic and recreation resource literature specific to this region is limited. Resources Inventory, Arctic Region: Recreation and Preservation Opportunities tenmark and Schoder, evaluates the recreational resources in the Arctic region. Natural, cultural, recreational and development areas are mapped. This is the only document that addresses current recreation resources in the Arctic region, and is one of a series of regional inventories by the JFSLUPC.

Scenic resources of the Beaufort Sea Region are documented in A Discussion of Sites Recommended as Potential Natural Landmarks in the Arctic Lowland Natural Region, Northern Alaska (Koranda and Evans, 1975). Eighteen sites are described in detail for nomination for Natural Landmark Status, based on their environmental and visual values. The study is unique in documenting scenic qualities in the Arctic.

Other documents applicable to this region include reports of the Alaska Division of Parks, and the scenic and recreation resource bibliography (Muth and Fitchet, 1976) cited under statewide literature.

e Bering Sea Region

The Bering Sea Region **has received** continued and Intensive **archaeological research** since the discovery of prehistoric Eskimo **cultural materials in the** area in **the mid-1920s**. Research **in** this area has **led** to the discovery of many of the prehistoric Eskimo cultures now known to have existed in **Alaska for the last 4,500 years**. Several **early** archaeological **sites are known in** this area with the oldest dating around **14,500 years** old. Much research **in** this area has been directed toward the problem of **the early peopling of** the New World via the Bering Land Bridge,

The archaeological literature concerning the Bering Sea region can **be** conveniently divided **into** two broad **areas**, the Bering Strait **area**, and the **Kotzebue Sound area**. The **Bering Strait** area includes the islands in the Bering **Sea**, the Norton Sound area, and the southern half **of** the Seward **Peninsula**. The **Kotzebue Sound** area includes the northern **half of** the Seward peninsula, the coastal areas **of** Kotzebue **Sound** north to Cape Thompson, and the interior drainages of the Kobuk, **Noatak** and **Selawik Rivers**.

The archaeologically significant islands **in** the Bering Sea include St. Matthew, the **Diomed** Islands, and St. Lawrence Island. The archaeological literature for St. Matthew Island includes Terrestrial **Archaeological** Survey of St. Matthew Island (Dixon, 1976) which reports recent work on this Island. The **Diomed** Islands have played a long and important role in the understanding of Eskimo **prehistory** in Alaska. The Old Bering Sea phase of prehistoric Eskimo culture was defined on the basis of artifacts recovered from the **Diomed** Islands in 1926 by Diamond Jenness and is reported in **Archaeological Investigations in Bering Strait (Jenness, 1928) and in Little Diomed Island, Bering Strait (Jenness, 1929)**. St. Lawrence Island has received extensive archaeological attention because **of** prehistoric Eskimo cultures discovered which, during various **periods**, show similarities with Siberian Eskimo cultures. The archaeological literature concerning St. Lawrence Island describes 2,500 years of prehistory; major references include Archaeology of the Bering Sea Region (Collins, 1933),

Archaeological Excavations at Kukulik, St. Lawrence Island, Alaska (Geist and Rainey, 1936), Archaeology of St. Lawrence Island, Alaska (Collins, 1937), Eskimo Prehistory: The Okvik Site on the Penuk Islands (Rainey, 1941), Archaeological Investigations into the Prehistory of St. Lawrence Island (Ackerman, 1961), St. Lawrence Island Archaeological Field Project, University of Berne, Switzerland and the University of Alaska, 1972-1974, Project Report (Bandi, 1973) and St. Lawrence Island Archaeological Survey, Cape Kialegak, 1974 (Bradley and others, 1974).

The Norton Sound area **has** had concentrated archaeological work in a few places and very little in many others. The southern portion of Norton Sound falls into the latter category. Portions of the Clarence Rhode National Wildlife Refuge have been surveyed and tested and are reported in the Kuskokwim section of the Southwest Region of this literature survey. Two additional references for the southern part of Norton Sound include The Archaeology of Hooper Bay Village, Alaska (Oswalt, 1952), and Variations in Check-Stamped Pottery from an Archaeological Site Near Unalakleet, Alaska Lutz,
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In the northern portion of Norton Sound archaeological research has been concentrated primarily at Cape **Denbigh** and Cape **Nome**. The important sites of **Nukleet** and **Iyatayet** are located at Cape **Denbigh** and are reported in The Archaeology of Cape Denbigh (Giddings, 1964). The Denbigh Flint Complex Giddings, 1951 reports the important early Eskimo culture discovered in the Archaeological remains from Cape **Denbigh**. At Cape Nome, 2,000 years of prehistoric Eskimo culture has been recorded, and described in A Prehistoric Population Change in the Bering Strait Region (Bockstoce, 1973), and Aspects of the Archaeology of Cape Nome, Alaska: 2000 Years of Cultural Change at Bering Strait (Bockstoce, 1974).

The Seward Peninsula and Norton Sound are treated in significant literature by Dorothy Jean Ray: Nineteenth Century Settlement and Subsistence Patterns in Bering Strait (1964) discusses 19th century settlements **on** the Seward Peninsula and Norton Sound. Land Tenure and Polity of the Bering Strait Eskimos (1967) describes tribal regions of the 19th century Eskimo groups **living** on the Seward Peninsula and Norton Sound. The Eskimos of Bering Strait 1650-1898 (1975) is a history of Eskimo **groups** in the Bering Strait region and on the Seward Peninsula and Norton Sound.

Important literature on the archaeology of the Bering Strait region includes The Eskimo About Bering Strait (Nelson, 1899), an important early work which documents aboriginal material culture of Bering Strait Eskimos. Archaeology of the Bering Sea Region (Collins, 1935) discusses the early discoveries

on St. Lawrence Island and reviews the **archaeology** in the Bering Sea Region up to that time. Culture Migrations and Contacts in the Bering Sea Region (Collins, 1937) poses some **important** and innovative **hypotheses** for the more recent Eskimo cultural changes in the **Bering** Sea Region. Outline of Eskimo Prehistory (Collins, 1940) reviews Eskimo-tory up to that date. Ancient Bering Strait and Population Spread (Giddings, 1952) suggests a general sequence for explaining the **Eskimo** cultures-of the Bering Strait and Alaska coast. The Archaeology of Bering Strait (Giddings, 1960) is an **important** work which **attempts** to **group** the Eskimo cultures of" Bering Strait into several **groupings**. Culture Contact in the Bering Sea: Birnirk-Punuk Period (Ackerman, 1962) reviews the concept that separate Eskimo cultures identified archaeologically in-Bering Strait were strictly discrete cultural groupings. Alaska Aboriginal Culture (Giddings, 1962) reviews documented archaeological sites in the Bering Strait area. Two important books that discuss the archaeology and **prehistory** of the Bering Strait area as well as other coastal areas of Alaska are Ancient Men of the Arctic (Giddings, 1967), and Eskimo Prehistory (Bandi, 1969).

The archaeology and **prehistory** of the Bering Sea area must be examined in the context of contact occurring at various times among peoples of mainland Alaska, the islands of the Bering Sea, and mainland Siberia. The following references are important in gaining an understanding of these Eskimo cultural contacts: The Ancient Culture of the Bering Sea and the Eskimo Problem (Rudenko, 1947), Eskimo Archaeology in Siberia (Chard, 1955), First Iron Artifact from the Old Bering Sea Culture (Chard, 1960), Recent Archaeological Work in the Chukchi Peninsula (Chard, 1960), The Ancient Culture of the Bering Sea and the Eskimo Problem (Rudenko, 1961), An Early Eskimo Cemetery at Uelen: A Preliminary Report' on the Excavations of 1958 (Levin, 1964), New Finds in the Old Bering Sea Cemetery at Uelen (Arutiunov and Sergeev, 1964), Ancient Cemeteries of the Chukchi Peninsula (Arutiunov, Levin, and Sergeev, 1964), The Soviet Far East in Antiquity: An Archaeological and Historical Study of the Maritime Regions of the U. S. S. R. (Okladnikov, 1965), The Eskimo Culture and its Relation to Northern Eurasia (Larsen, 1968), Two Millennia of Cultural Evolution of Bering Sea Hunters (Arutiunov and Sergeev, 1968), and Stability and Adaptation in the Evolution of Ancient Eskimo Hunting Tools (Arutiunov and Sergeev, 1973).

The Kotzebue Sound area has had fairly continuous archaeological investigations since the 1930s. In addition to work reported in the literature, there have been several important **excavations** that have not been fully reported. These important sites not fully reported include the 2000 year-old **Ipiutak** material excavated at Deering on the north side of the Seward Peninsula, excavation of the important **Choris** type site on the **Choris**

Peninsula in **Kotzebue** Sound, full reporting of the major Cape **Krusenstern** site in the northwestern **Kotzebue** Sound, and many archaeological surveys and test excavations of numerous pre-historic sites known to exist in the **Kotzebue** Sound area.

The northern portion of the Seward Peninsula contains a site with the earliest date presently recorded for an Alaskan archaeological site. The Trail Creek Caves have yielded a radiocarbon date of 14,500 years old, although the association of this early date with human cultural material is debatable. This site is reported in Trail Creek: **Final Report on the Excavation of Two Caves on the Seward Peninsula, Alaska** (Larsen, 1968). Recent archaeological investigations have been conducted on the northern part of the Seward Peninsula and are reported in 1974 **Chukchi-Imuruk Archaeological Survey, Final Report** (Powers, 1975).

The Kotzebue Sound archaeological literature deals with reports on several important sites and cultural sequences. Round Houses of the Western Arctic (Giddings, 1957) is an important article which describes excavations of the 2,600 year old **Choris** Site in **Eschscholtz** Bay. The **Choris** phase of prehistoric Eskimo culture is based on this material. Coastal Manifestation of the Arctic Woodland Culture (**VanStone, 1951**) discusses archaeological material from Kotzebue Sound which can be correlated with **Giddings's** Arctic Woodland culture. Archaeological Excavations at **Kotzebue, Alaska** (VanStone, 1955) is a report of excavations at several sites in **Kotzebue** Sound and discusses the **Kotzebue** Sound regional sequence. Archaeological Studies of **Kotzebue** Sound, Alaska (**Giddings, 1959**) discusses archaeological research in **Kotzebue** Sound. First Traces of Man in the Arctic (**Giddings, 1960**) discusses the chronology of archaeological materials from Kotzebue Sound and northwestern Alaska. Notes on Nineteenth Century Trade in the **Kotzebue** Sound Area, Alaska (**VanStone, 1962**) discusses late prehistoric and early historic materials from Kotzebue Sound. At Cape **Krusenstern** in northwestern **Kotzebue** Sound numerous beach ridges extend horizontally away from the present ocean shore. These fossil ridges from former shore lines contain archaeological materials in a chronological order which move from recent to more ancient as one moves farther away from the present shoreline to older ridges. The beach ridge chronology at Cape **Krusenstern** spans thousands of years of **prehistory** and makes this one of the most unique sites in North America. Major literature which discusses the archaeology of Cape **Krusenstern** includes Archaeology at Cape **Krusenstern** (**Giddings, 1962**), Side-Notched Points near Bering Strait (**Giddings, 1962**), Eskimos and Old Shorelines (**Giddings, 1962**), Cape **Krusenstern** Ipiutak Economic and Settlement Patterns (**Anderson, 1964**), and Cross-Dating the Archaeology of Northwestern Alaska (**Giddings, 1966**).

The Kobuk River drainage inland from Kotzebue Sound has received fairly continuous archaeological research since the 1940s. Archaeological literature which deals with investigations along the Kobuk River include Dated Sites on the Kobuk River, Alaska (Giddings, 1942), Dated Eskimo Ruins of an Inland Zone (Giddings, 1944), The Arctic Woodland Culture of the Kobuk River (Giddings, 1952), Archaeological Collections from Norutak Lake on the Kobuk-Alatna River Portage, Northwestern Alaska (Clark, 1974), and Archaeological Investigations in Northwestern Alaska: Summer 1974 (Hall, 1974). The Onion Portage site on the Kobuk River has many stratified layerings of cultural materials from occupations by various prehistoric groups over a 10,000 year time period. The time depth and variety of cultural groupings represented by this site makes it one of the major archaeological sites for interpreting the prehistory of northwest Alaska. The major archaeological literature on the Onion Portage archaeological sequence includes the following: Onion Portage and Other Flint Sites of the Kobuk River (Giddings, 1962), Archaeological Progress at Onion Portage, Alaska (Giddings, 1965), Preliminary Report on the Onion Portage Site, Alaska (Anderson, 1966), Dating the Archaeology of the Onion Portage Site, Alaska: Continuing Excavations (Anderson, 1967), A Stone Age Campsite at the Gateway to America (Anderson, 1968), Akmak: An Early Archaeological Assemblage from Onion Portage, Northwest Alaska (Anderson, 1970), Athapaskans in the Kobuk Arctic Woodlands, Alaska (Anderson, 1970), and The Norton/Ipiutak Assemblage, Lower Band 2, Onion Portage: Coastal-Interior Relationships (Brown, 1976).

The Noatak River area of northwest Alaska has been the focus of archaeological research for the last decade. The recent literature in this area includes the following: An Archaeological Survey of the Noatak Drainage, Alaska (Anderson, 1971), Known Archaeological Resources of the Noatak River Basin, Northern Alaska, as of January 1973 (Hall, 1973), and Archaeological Investigations in the Noatak River Valley, Summer 1973 (Hall, 1974).

Archaeological literature which is important to other interior areas in the Kotzebue Sound area includes An Anthropological Survey of the Selawik River Drainage (Anderson and Anderson, 1972), Trade Networks Among the Selawik Eskimos, Northwestern Alaska, During the Late 19th and Early 20th Centuries (Anderson, 1975), Archaeology of the Batza Tena Obsidian Source, West-Central Alaska (Clark, 1972), and Filaments of the Prehistory on the Koyukuk River, Northwestern Interior, Alaska (Clark, 1974).

Major archaeological literature which attempts to draw some conclusions from the materials and sites of northwest Alaska includes: Some Arctic Spear Points and Their Counterparts (Giddings, 1963), Cross-Dating the Archaeology of Northwestern

Alaska (Giddings, 1966) Microblade Traditions in Northwestern Alaska (Anderson, 1970), Cultural Developments and Climatic Change in Prehistoric Northwestern Alaska (Anderson, 1971), and Archaeology of the Northwestern Arctic (Anderson, 1973).

Literature on **scenic** recreation and historic resources of the Bering Sea Region are minimal, and most data are found in the statewide literature cited above. **The JFSLUPC study, Resources Inventory, Northwest Region: Recreation and " Preservation Opportunities (Stenmark and Schoder, 1974)** is one regionally-oriented document on this **topic**, and evaluates and **maps** these resources. A similar study is available for the Yukon Region (**Stenmark and Schoder, 1974**).

- Southwest Region

The archaeological literature on the southwest region is conveniently subdivided into three areas, the Aleutians, Bristol Bay, and **Kuskokwim** Bay. The Alaska Peninsula was an area of interface between differing cultural groups with boundaries and interaction shifting through time with regard to literature coverage. The southern tip **of the Alaska** Peninsula can generally be considered with literature on the Aleutians; literature on the southeast side of the peninsula can be considered with the **Gulf** of Alaska literature; and literature on the northwest side and most **of** the interior of the peninsula can be considered with the Bristol Bay literature. **Nunivak** Island can be considered with the **Kuskokwim** Bay area.

The Aleutians have been one **of** the longest and most intensely archaeologically-investigated areas of Alaska. Aleutian archaeology has centered around three major problems: the early occupation of the Aleutians; the aboriginal adaptations and development of prehistoric **Aleut** culture; and the effects of modern contact on **Aleut** culture. The emphasis on the early peopling of the Aleutian Islands is the direct outgrowth of the discovery of the **Anangula** Site in the late 1930s. This site dates to around 8,500 years ago, is the oldest known site in the Aleutians, and is one of the oldest sites in southwest Alaska. The age of this site and its position along the margin of the Bering Land Bridge makes its interpretation important in early man research in Alaska.

Research into **Aleut** origins, adaptations, and development has been the earliest and longest research interest in the Aleutians. This research is stimulated by good preservation in large refuse remains, or **middens**, of previous occupations by the marine-oriented **Aleuts**. Prehistoric Aleuts were sea **mammal** hunters and fishermen, and exploited a rich and varied marine life of the Aleutian tidal zones. The **Aleuts** developed an elaborate **social** and material culture which centered around the adaptation to and exploitation of the rich marine-resources of the Aleutians.

Another archaeological research interest has been the changes in **Aleut** settlement and subsistence patterns which resulted from historic contact.

The archaeological literature on the **Anangula** Site is extensive because of its date and key position for understanding the early Aleutian prehistory. The following articles are major references which deal with this important site. The Lamellar Flake Manufacturing Site on Anangula Island in the Aleutians (Laughlin, 1954) is an early report on the site. The classification of the artifacts from **Anangula** was reported in Preliminary Analysis of the Anangula Unifacial Core and Blade Industry (Laughlin and Aigner, 1966). In Stratigraphy of the Anangula Unifacial Core and Blade Site (McCartney and Turner, 1966) the **stratigraphic** relationships and radiocarbon dates from the site are reported. A comprehensive analysis of the geology and archaeology of the site was made with special reference to the stone tools in Anangula: Investigations of a Bering Land Bridge Coast Archaeological Site (Aigner, Laughlin, and Black, 1970). Additional analysis of the stone tools was made in The Unifacial Core and Blade Site on Anangula Island, Aleutians (Aigner, 1970). The most recent analysis of the artifacts, radiocarbon dates, **stratigraphic** information and sea-level-history is presented in Anangula Blade Site Excavations, 1972 and 1973 (Laughlin, Laughlin, and McDowell, 1975).

The early occupation of the Aleutians and its relation to the early occupation of Alaska has been a major topic in Aleutian archaeological literature: The Alaska Gateway Viewed from the Aleutian Islands (Laughlin, 1951) discusses the racial affinities among Aleuts, Asian peoples, Indians, and Eskimos and concludes that **Aleuts** and Eskimos show the closest relationship. A New View of the History of the Aleutians (Laughlin and Marsh, 1951) discusses the ethnographic, linguistic, anthropological, and archaeological evidence and attempts to **demonstrate** the similarities between Eskimos and **Aleuts** and pinpoint their divergence from a parent population. The Earliest Aleuts (Laughlin, 1963) discusses the Aleutian environment, artifacts, house types, and skeletal characteristics and suggests a local development of **Aleut** populations. In Eskimos and Aleuts: Their Origins and Evolution (Laughlin, 1963) evidence is presented which suggests that an original Mongoloid population stretching from Umnak Island in the Aleutians to **Hokkaido**, Japan existed during the Bering Land Bridge times. Linguistic, ethnographic, skeletal, and archaeological data are reviewed and a model is presented for the derivation of **Aleut** and Eskimo populations from earlier Bering Sea Mongoloid stock. In Aleuts: Ecosystems, Holocene History, and Siberian Origins (Laughlin, 1975) a brief summary is given of **Aleut** culture from the early occupation of the Aleutians to more recent **Aleut** sites. Early

Holocene Evidence for the Aleut Maritime Adaptation (Aigner, 1976) is a recent report presenting evidence for a true maritime adaptation at least 8,500-years ago, with an indication of even earlier occupation in the Aleutians.

The major early archaeological work on the Aleutians is On Succession of Shell-Heaps of the Aleutian Islands (Dall, 1875) which describes excavations of several midden sites in the Aleutian Islands. Another major early work is Archaeological Investigations in the Aleutian Islands (Jochelson, 1925) which reports archaeological work on several Aleutian Islands, as well as summarizing the history of the earlier archaeological work of Dall. The Aleutian and Commander Islands and Their Inhabitants (Hrdlicka, 1941) provides ethnographic and archaeological information concerning fieldwork in the Aleutians between 1936 and 1938.

More recent work in Aleutian archaeology has been directed toward Aleut origins, adaptations, and development. A gap in Aleutian prehistory has existed for the time period between the early Anangula site which dates to approximately 8,500 years ago and the next youngest site of Chaluka which dates to approximately 4,000 years ago. Archaeological research has been directed toward Aleut sites younger than Chaluka in an attempt to understand the prehistory of more recent Aleuts. The following literature includes more recent major Aleutian literature. 'Archaeological Investigations on Agattu, Aleutian Islands (Spaulding, 1962) describes the excavations of a 2,500 year-old site. Chaluka: The Economic Base (Lippold, 1966) discusses the maritime adaptation of the Chaluka site based on recovered animal bones. Aleutian Studies: Introduction (Laughlin, 1966) briefly discusses research activities at the Anangula and Chaluka sites. Culture Change in Chaluka, Umnak Island: Stone Artifacts and Features (Denniston, 1966) presents an analysis of the stratigraphy, artifacts and features of the Chaluka Site. Bone Tools and Decorative Motifs from Chaluka, Umnak Island (Aigner, 1966) gives a summary of the bone tools from Chaluka. Prehistoric Aleut Influences at Port Moller, Alaska (McCartney, 1969) reviews archaeological data from the eastern Aleutians in an attempt to determine the extent of Aleut influences in this area. A Proposed Western Aleutian Phase in the Near Islands, Alaska (McCartney, 1971) is an attempt to determine the relationships of this unique material with other Aleutian materials. Archaeological Report, Site 49 RAT 32, Amchitka Island, Alaska (Cook, Dixon, and Holmes, 1972) is one of the few archaeological reports which contains an analysis of materials from the central Aleutians. Progress Report on Evolutionary Anthropological Study of Akun Strait District, Eastern Aleutians Alaska, 1970-'71 (Turner and Turner 1974) reports excavations in the Aleutians and discusses Aleut cultural change over time. Aleut Adaptation and Evolution (Laughlin and Aigner, 1973) outlines Aleut environment, subsistence, archaeology,

population structure and evolutionary trends. Chaluka Stratigraphy, Umnak Island, Alaska (Turner, Aigner, and Richards, 1974) correlates the stratigraphic information from the Chaluka site from 1938 to 1972, and outlines the major periods of cultural development. Studies in the Early Prehistory of Nikolski Bay: 1937-1971 (Aigner, 1974) presents a history of archaeological research primarily at Anagula and Chaluka. Preliminary Reports on Remains from-Sandy Beach Bay, A 4300-5600 B.P. Aleut Village (Aigner, Fullem, Veltre, and Veltre, 1976) reports important data which fills part of the time gap between the occupations of Anagula and Chaluka.

Several sources are available which report archaeological site surveys in the Aleutian Islands. These include Archaeological Report, Amchitka Island, Alaska, 1969-'70 (Desautels, McCurdy, Flynn, and Ellis, 1971), An Archaeological Site Survey and Inventory for the Aleutian Islands National Wildlife Refuge, Alaska, 1972 (McCartney, 1972), and Aleutian Site Survey, 1975, Preliminary Report (Frohlich and Kopjanski, 1975). A bibliography is also available which lists archaeological references on the Aleutian Islands, An Aleut Bibliography (Jones and Wood, 1975).

The Bristol Bay/Alaska Peninsula area of Southwest Alaska has had concentrated archaeological investigations in only a few areas. The coastal area from Unalakleet in Norton Sound to the Port Moller area on the Alaska Peninsula has been occupied historically by Yupik Eskimo. Archaeological investigations in the Bristol Bay and Alaska Peninsula areas indicate significant time depth for prehistoric occupations, and several periods of occupation by prehistoric Eskimo groups have been identified in the area. Some of these periods can be linked with other prehistoric Eskimo cultures around Bering Strait.

The early archaeological research and literature in the Bristol Bay area of southwest Alaska centered around the Alaska Peninsula. The earliest work in this area is Archaeological and Ethnological Studies in Southwest Alaska (Krieger, 1927). Sporadic archaeological work was conducted on the Peninsula in 1931 by Ales Hrdlicka near the mouth of the Naknek River, and 1950 by Helge Larsen in the same area and reported in Archaeological Investigations in Southwest Alaska (Larsen, 1950). Archaeological research on the Alaska Peninsula was stimulated in the early 1950s by the National Park Service's Katmai Project. As a result of this project archaeological work was undertaken and is still progressing in the Katmai National Monument. Archaeological Investigations of Inland and Coastal Sites of the Katmai National Monument, Alaska, (Davis, 1954) was a report of early investigations in the monument. The real thrust of current research on the Alaska Peninsula began in the early 1960s with Human

Prehistory in the Naknek Drainage, Alaska (Dumond, 1962) which developed eight phases of prehistoric human occupation in the Naknek Drainage. Further research on the Peninsula and the correlation of human periods of occupation with environmental information such as Postglacial Palynology and Archaeology in the Naknek River Drainage Area (Heusser, 1963) has led to a greater understanding of human occupation and adaptations in southwest Alaska. An informative **summary** of the **prehistory** and history of the area of the **Katmai National Monument** is presented in Embattled Katmai: A History of Katmai National Monument (Hussey, 1971). Summary of Archaeology in the Katmai Region, Southwestern Alaska (Dumond, 1971), a **major** archaeological **monograph**, is the result of research during the 1960's in the Alaska Peninsula. This report describes archaeological sequences on the northwest and southeast sides of the Peninsula with occupations which span 4500 years on the northwest side and 6000 years on the southeast side. Continuing archaeological research in the Naknek River area, as well as more recent work in the Naknek River area, has been reported in Archaeological Research on the Alaska Peninsula (Dumond, 1974 and 1975). The recent work in the Naknek River area has yielded the oldest recorded occupation on the Alaska Peninsula; and has been dated between **7600 and 9000** years ago.

A major research topic which concerns the archaeology of the Alaska Peninsula has been the delineation of boundaries of interaction between Eskimo groups on the northwest side of the peninsula, Eskimo groups on the southeast side of the peninsula, and Aleut groups on the southern end of the peninsula. Important archaeological literature which deals with this aspect of Alaska Peninsula archaeology includes On Eskaleutian Linguistics, Archaeology, and Prehistory (Dumond, 1965), Prehistory at Port Moller, Alaska Peninsula, In Light of Fieldwork in 1960 (Workman, 1966), Prehistoric Cultural Contacts in Southwestern Alaska (Dumond, 1969), Eskimos and Aleuts (Dumond, 1970), Prehistoric Cultural Integration Along The Alaska Peninsula (McCartney, 1974), Prehistoric Ethnic Boundaries on the Alaska Peninsula (Dumond, 1974), Eskimos and Aleuts on the Alaska Peninsula: A Reappraisal of the Port Moller Affinities (Dumond, Conton, and Shields, 1975).

The coastal area of Bristol Bay has had most of the archaeological work centered in two areas, the Nushagak River area, and at **Togiak**. Archaeological research in the Nushagak River area has been undertaken primarily by James VanStone. The **major** literature concerning this area includes four articles. Ethnohistorical Research in Southwestern Alaska: A Methodological Perspective (VanStone, 1970) describes the archaeological, ethnographic, and historical materials in the Nushagak

River area. A Nineteenth Century Village on the Nushagak River, Alaska (VanStone, 1970) reports archaeological **excavations** at this **village** site and discusses its placement in the history of the **area**. Historic Settlement Patterns in the Nushagak River Region, Alaska (VanStone, 1971) reports archaeological sites located **during** survey in the area and discusses the changing settlement **pattern of** the area. An Historic Trading Center in Southwestern Alaska (VanStone, 1972) discusses the archaeological material collected at the village of Nushagak and its relationship to the history **of** the area.

Literature concerning the archaeology of the **Togiak** area is limited to two references. Old Togiak in Prehistory (Kowta, 1963) describes the prehistoric cultures **of Togiak** and explains the changes in relation to environmental changes. A Report on an Archaeological Survey of Togiak, Alaska for the Public Health Service (Shields, 1975) reports new archaeological materials from the **Togiak** area. Two additional references in the literature are important contributions to the archaeology of the Bristol Bay area. Report on the Historic Use of Amanka and Ualik Lakes (Shields, 1977) reports seven new archaeological sites located around an important portage on the Nushagak Peninsula. Tikchik Village: A Nineteenth Century Riverine Community in Southwestern Alaska (VanStone, 1968) describes excavations of an interior village and its relationship to the history of this area. A bibliography of the Nushagak River area, An Annotated Ethnohistoric Bibliography of the Nushagak River Region, Alaska (VanStone, 1968), lists a few archaeological references which pertain to this area.

Little archaeological work has been undertaken in the **Kuskokwim** Bay area of southwest Alaska. Three areas of **Kuskokwim** Bay have received archaeological attention: Cape Newenham, parts of the Clarence Rhode National Wildlife Range, and Nuniwak Island. In the Cape Newenham area, Security Cove, Chagvan Bay, Nanvak Bay, and Goodnews Bay are the areas in which archaeological research has been concentrated. The primary literature related to the Cape Newenham area includes Prehistory in the Kuskokwim-Bristol Bay Region, Southwest Alaska (Ackerman, 1964), which discusses the prehistoric cultural sequences at **Chagvan** Bay, Nanvak Bay, and Security Cove. The Security Cove Assemblage and its Relation to Northern Prehistory (Ackerman, 1967) discusses the **occurrence** and distribution of certain artifacts found at Security Cove. Archaeoethnology, Ethnoarchaeology and the Problems of Past Cultural Patterning (Ackerman, 1970) attempts to correlate ethnographic information with **archaeological data from Goodnews Bay**. . . The Choris-Norton Interphase:

Some Technological Considerations (Ackerman, 1970) discusses the distribution and cultural continuity of archaeological materials from Chagvan Bay, **Goodnews** Bay, Security Cove, and Osviak. The Cultural Sequence at Chagvan Bay, Alaska: A Matrix Analysis (Ross, 1971) describes three cultural sequences at Chagvan Bay which span from 2600 to 900 years ago. The Kuskokwim River Drainage, Alaska: An Annotated Bibliography (Oswalt, 1965) includes some literature of archaeological importance.

Archaeological research in the Clarence Rhode National Wildlife Range has been limited to survey, testing, and limited excavation. The major work includes Archaeological Survey: Clarence Rhode National Wildlife Range and Recommendations for Further Archaeological Investigations (Ackerman, 1972), Reports of Archaeological Tests: Site 14 Clarence Rhode National Wildlife Refuge, Southwest Alaska (Ackerman and Shaw, 1975), Preliminary Report of Archaeological Excavation and Survey During 1976 in Southwestern Alaska (Shaw and Hoff, 1976), and Archaeological Survey of a Proposed Biological Research Station on the Kuyungsik River, L. Clarence Rhode National Wildlife Range, Southwest Alaska (Shaw and Hoff, 1976).

The archaeological literature concerning **Nunivak** Island is very limited. Major archaeological research on this island was conducted by **VanStone** in the 1950's, and Michael Nowak in the 1960's and 1970's. The major literature includes Pottery from Nunivak Island, Alaska (VanStone, 1954), An Archaeological Reconnaissance of Nunivak Island, Alaska (Van Stone, 1957), A Preliminary Report on the Archaeology of Nunivak Island, Alaska (Nowak, 1970), and The Archaeology of Nunivak Island, Alaska (Nowak, 1974).

Recreational and scenic resource literature related to this region includes Resources Inventory, Southwest Region Recreation and Preservation Opportunities (Stenmark and Schoder, 1974), an evaluation of these resources is in a **JFSLUPC** study. Other statewide literature on this topic is applicable to this region.

● Gulf of Alaska Region

The Gulf of Alaska has been occupied by several distinct cultural groups: the **Koniag** and **Chugach** Pacific Eskimo, the **Tanaina Athabascans** and the Eyak and **Tlingit** Indians. Because of this diversity, the archaeological literature is best assessed according to broad geographical boundaries. For the purposes of this literature survey, the **Gulf of Alaska will be divided into four sections: the western** Gulf of Alaska including the Kodiak Islands and the adjacent shore of the northern Alaska Peninsula, Lower Cook Inlet and Kachemak Bay, and Prince William Sound and the northeastern Gulf of Alaska.

The western Gulf of Alaska has been the focus of extensive archaeological research since the 1930's. The area has interested archaeologists for several decades because it includes one of the hypothesized routes of diffusion of man between Asia and the New World. The western Gulf of Alaska is also an area of rich and diverse marine resources and the aboriginal **occupants**, the **Koniag** Eskimo, had a highly developed maritime economy and an elaborate culture. The prehistoric record is known to span nearly 6,000 years. This Pacific Eskimo area is thought to have played a significant role in the cultural history of coastal Alaska.

Archaeological research in the Kodiak area has been undertaken in two phases: Ales **Hrdlicka** conducted major excavations for the Smithsonian Institute in the 1930's, and the University of Wisconsin **Aleut-Konyag** Project undertook extensive survey and excavation in the 1960's. Archaeological research on the Pacific shore of adjacent northern Alaska Peninsula has been conducted since the 1960's and continues to the present.

Hrdlicka's fieldwork on Kodiak Island consisted of surveys, excavations and anthropometric study of the living **Koniag** Eskimo. His major publication, The Anthropology of Kodiak Island (1944), is a comprehensive report of these investigations. Although the report provides a good summary of the ethnography of the **Koniag** Eskimo, the usefulness of the skeletal and **artifactual** analyses is limited because of unsatisfactory excavation techniques.

Extensive research into the **prehistory** of this area began again in the 1960's with the **Aleut-Konyag** Prehistory and Ecology Project. The archaeological research for this project resulted in the identification of five phases of prehistoric culture.

Archaeological literature for the Kodiak Island area is extensive. It ranges from preliminary reports and unpublished manuscripts to readily available published documents. The scope of this literature also varies considerably, ranging from synthesis and overviews of Pacific Eskimo **prehistory** to very specific site reports.

General discussions of the **prehistory** of the Kodiak archipelago can be found in Kadyak (Buck, and others, 1975). An extensive bibliography, Koniag-Pacific Eskimo Bibliography (Clark, 1975), provides an excellent guide to the literature of the area. This bibliography also discusses the prehistoric occupations of the Kodiak Islands, the early explorers of the historic period and historical ethnographic literature sources.

More technical overviews of the **prehistory of** the area are provided by several works. **Koniag Prehistory** (Clark, 1974) is a primary reference, presenting a detailed analysis of the latest unit (**Koniag** phase) in the prehistoric sequence for the Kodiak Islands. It also is an excellent source of ethnographic and ethnohistoric information.

Several articles are available **which** discuss the long prehistoric occupation of Kodiak Island: Perspectives in the Prehistory of Kodiak Island, Alaska (Clark, 1966) and Technological Continuity and Change within a Persistent Maritime Adaptation: Kodiak Island, Alaska (Clark, 1975) are particularly useful. A comprehensive study of the **prehistory** of the southernmost island in the Kodiak-archipelago is provided by Contributions to the Prehistory of Chirikof Island, Southwestern Alaska (Workman, 1969).

A portion of the archaeological literature has been directed toward the analysis of Pacific Eskimo **prehistory** in relation to other arctic and subarctic areas. The Pacific Origin of Eskimo (Clark 1976) and Prehistory of the Western Subarctic (Clark, 1975) focus on this topic.

Many reports of major site excavations or extensive surveys have been published. D. W. Clark has undertaken an extensive amount of archaeological research on the Kodiak Islands and his **major site reports are:** Two Late Prehistoric Pottery-Bearing Sites on Kodiak Island, Alaska (1966), The Late Kachemak Tradition at Three Saints Bay and Craig Point, Kodiak Island Alaska (1970), Contributions to the Later Prehistory of Kodiak Island, Alaska (1974), and The Earliest Prehistoric Cultures of Kodiak Island, Alaska: 1971 Field Work, Preliminary Report (1974). Another important site report is Heizer's Archaeology of the Uyak Site, Kodiak Island, Alaska (1956). This monograph describes and analyzes Hrdlicka's excavations of the Uyak Site in the 1930's.

An important portion of the archaeological literature for this area is directed toward description and analysis of specific archaeological materials. Several of the most significant articles are: Incised Figurine Tablets from Kodiak, Alaska (Clark, 1964), Petroglyphs on Afognak Island, Kodiak Group, Alaska (Clark, 1970), Petroglyphs from Southwestern Kodiak, "Island, Alaska (Heizer, 1947) and Pottery from the Southern Eskimo Region (Heizer, 1948).

Reports of archaeological survey are for the most part in unpublished manuscript form, yet these are an important part of the archaeological literature for the Kodiak area. Of particular significance is Clark's Archaeological Surveys and Site Catalog (1972). This manuscript discusses each site encountered in an extensive survey of much of the Kodiak coastline.

A portion of the archaeological literature consists of descriptions of ethnographic collections from the Kodiak Islands: Early Collections from the Pacific Eskimo (Birket-Smith, 1941), A Pacific Eskimo Invention in Whale Hunting in Historic Times (Heizer, 1943), and Notes on Koniag Material Culture (Heizer, 1952) are of particular interest. Although **these articles** are not specifically archaeological in focus, they are of value because they aid greatly in the interpretation of archaeological remains.

Archaeological research on the northern Pacific shore of the Alaska Peninsula indicates that the cease of the **Shelikof Strait/Katmai** National Monument has been inhabited for nearly 6,000 years. The five cultural phases that have been identified in this area show many similarities to the Kodiak prehistoric record and appear to be substantially different from those of the interior and western coast of the Peninsula. Archaeological sites on the Pacific shore appear to be situated to facilitate the hunting of the abundant sea mammal resource of the coast.

Extensive archaeological research in this area began in the 1950's when the National Park Service began to assess the archaeological potential of the region. Several sites were tested in both the Naknek drainage and on the Pacific coast of the Peninsula. These researches are reported in Archaeological Investigations of Inland and Coastal Sites of the Katmai National Monument (Davis, 1954) and Prehistoric Sea Mammal Hunters at Kafiia, Alaska (Oswalt, 1955).

Survey and excavation on the Pacific coast continued in the

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Also resulting from these investigations is Archaeological Dating by Means of Volcanic Ash Strata (Nowak, 1968). Volcanic ash deposits from both sides of the Peninsula were analyzed and were assessed as to their ability to provide a reliable method of dating archaeological remains.

Summaries of the **prehistory** of the Pacific coast of the northern Alaska Peninsula have been presented in A Summary of Archaeology in the Katmai Region, Southwestern Alaska (**Dumond**, 1971), based on the archaeological investigations to 1971 for both **the** Naknek drainage and the Pacific coast of the Peninsula.

The **prehistory** of the Cook Inlet area has long held the interest of archaeologists. In prehistoric times the lower **Inlet** was occupied by Eskimo peoples. Archaeological evidence suggests that other areas of the **Inlet** were also occupied by Eskimo groups. Historically all but the outer reaches of the Inlet were occupied by Tanaina Athabascans. The movements of these two distinct groups has been the focus of much of the archaeological research in the area.

The **only** published account of archaeological work on the **southern Kenai** Peninsula is The Archaeology of Cook Inlet, Alaska (de **Laguna**, 1934). This monograph is the result of survey and excavation, primarily in Kachemak Bay, in the 1930's. Several **deep midden sites** were excavated in the lower Inlet and in Prince William Sound, and the cultural sequences formulated on the basis of these investigations have provided the standard for **prehistory** of the Pacific Eskimo area.

Recent fieldwork in the lower Inlet includes an extensive survey of Kachemak by **Reger** (1973), testing of the **Chugachik site** by K. **Workman** (1974) and excavation of the Cottonwood Creek site by Workman and **Lobdell** (**Lobdell**, 1974). These investigations have greatly contributed to the understanding of the **prehistory of** the area.

The **prehistory** of northern Cook Inlet is poorly understood. Archaeological excavation has been limited, and the only site report is An Eskimo Site Near Kenai, Alaska (**Reger**, 1973). Limited testing of the **Beluga Point** site in Turnagain Arm is reported in Prehistory in the Upper Cook Inlet, Alaska (**Reger**, 1976). Numerous **surveys** have been conducted in the **northern Inlet**: Kent, and **others**, (1964), **Dumond** and Mace (1968) **Boraas** (1975), **Shields** (1975) and **Reger** and **Antonson** (1976).

In addition, archaeological surveys have been conducted by Dixon and Johnson (1973) and the Cook Inlet Historic Sites Project (Cook Inlet Native Association, 1975). These surveys have greatly added to the inventory of sites in the Cook Inlet region.

The interior area of western Cook Inlet has been the focus of **survery**, testing and excavation. These investigations are reported in several publications and unpublished manuscripts: Townsend and Townsend (1961), VanStone and Townsend (1970), Townsend (1970) and Smith and Shields (1976).

General discussions of the **prehistory** of the Cook Inlet area can be found in Prehistory of the Southern Kenai Peninsula (W. Workman, 1974), Prehistory of the Northern Kenai Peninsula (**Reger**, 1974), and Lower Cook Inlet: Final Environmental Impact Statement (U. S. Department of the Interior, 1976).

Prince William Sound was occupied in historic times by the **Chugach** Eskimo and Eyak Indians. The ethnography of the Chugach Eskimo has been documented by Birket-Smith (1953) and the ethnography of the Eyak is reported by **Birket-Smith** and de **Laguna** (1938). Very little is known archaeologically of the Eyak, but the ethnographic reports are helpful in the interpretation of the archaeological record.

The archaeology of Prince William Sound is known through de **Laguna's Chugach Prehistory: The Archaeology of Prince William Sound, Alaska** (1956). This report of survey and excavation in the 1930's has resulted in the formation of a 2,000 year archaeological sequence for this area.

Several surveys have recently been conducted in Prince William Sound by **Lobdell** (1976) and Reger. Many sites have been located but little testing has been done.

Very little archaeological research has been undertaken in the northeastern Gulf of Alaska. The first significant archaeological research in this area is reported in Archaeology of the Yakutat Bay Area, Alaska (de **Laguna and** other, 1964). This work was conducted in the **earlv** 1950's. The results de **Laguna's** researches are also **reported** in Under Mount Saint Elias: The History and Culture of the Yakutat **Tlingit** (1972). The next **major** archaeological investigations were at Glacier Bay **National** Monument (**Ackerman**, 1968-and 1974). This research resulted in the identification of five cultural sequences spanning nearly 10,000 years. An overview of the **prehistory** of the the northeastern Gulf of Alaska is presented in Northern Gulf of Alaska: Final Environmental Impact Statement (U. S. Department of the Interior, 1976).

Recreation, scenic and historic resources of the Gulf of Alaska region is discussed in general terms in Alaska Regional Profiles: Southcentral Region (**Selkregg**, 1974) and Southeast Region (**Selkregg**, 1976) with maps of historical settlement patterns in the **respective** regions, and are a useful overview of regional history from the earliest Native habitation through Russian

influence to present-day Alaska. Resources Inventory South-central Region Recreational and Preservation "Opportunities" (Stenmark and Schoder, 1974) evaluates recreational resources in the **Southcentral** region. Maps show scenic and natural areas around Cook Inlet and Kodiak Island. Activities in various recreational areas are discussed. Some of this data is superseded by current coastal recreation resource studies, which are **discussed** in "Current Research" below. Recreational and Heritage Resources of the Alaska Coastline (Alaska Division of Parks, 1975), cited earlier, inventories recreational resources on **1:250,000** scale maps. This is a useful unpublished inventory, available only in the Division of Parks, Anchorage, and the Governor's Office of Planning and Research in Juneau.

IV. CURRENT RESEARCH

Archaeological research is ongoing in **all** four regions discussed. This research is important to consider since it often is the most current information concerning the location of archaeological sites, may update the existing archaeological literature, and may add to the knowledge of the prehistory of an area.

Research with statewide relevance on recreation resources is being undertaken by the Alaska **Divison** of Parks and the National Forest Service:

- Alaska Outdoor Recreation Plan Elements. Nat M. Goodhue, Alaska Division of Parks, **Anchorage, Rural** Recreation Analysis, draft, June 1977: This study will evaluate total needs, available facilities, and additional facilities required in rural Alaska communities of less than 3,000 population, off the road or marine highway system. Field visits to **12** communities distributed among the 6 regions of the state are planned.

Information System, draft, April, **1977**. This element will collect complete, state-wide outdoor recreation facility information, with eventual computerized storage and access. Since computerization must cope with presently inconsistent federal, state and **local** data formats, this **will** be completed at a later date.

- Outdoor Recreation Facility Management on Forest Service Lands in Alaska. Wayne Thomas, University of Alaska, **Fairbanks, in progress**. **Development** of an analytical model of recreational **alternatives** and user rates as a management tool for U.S. Forest Service recreational areas.

- Beaufort Sea Region

Current research in the Beaufort Sea region **is** being conducted by State and federal agencies and by archaeologists doing academic research. The Office of History and Archaeology, Alaska Division of Parks maintains current research interests in **the** Beaufort Sea region. **The** National Park Service, Co-operative Park Studies Unit is currently involved in archaeological research related to section 14(h) of the Alaska Native Claims Settlement Act. The Cooperative Park Studies Unit is also involved in the archaeological survey of National Petroleum Reserve No. 4. The U. S. Fish and Wildlife Service is currently involved in archaeological survey of the national wildlife refuges in the area.

Archaeologists who are currently involved in academic research in the Beaufort Sea region include Edward Hall of the State University of New York, **Brockport**, who is working in north-western areas of the Arctic **Slope**; Anne D. **Shinkwin** of the University of Alaska, who is currently engaged in archaeological research at Point Hope; Dennis Stanford of the Smithsonian Institution, who is currently working on material from the Point Hope area; and Michael Kunz of the University **of Alaska**, who is currently working in the **Itkilik** River area. **John P. Cook** of the University of Alaska has recently completed **research** associated with the construction of the Alaska Pipeline in the Beaufort Sea region.

Recreation research in this region includes:

- Recreation, Aesthetics and Use of the Arctic National Wildlife Range and Adjacent Areas, Northeastern Alaska, Renewable Resources Consulting Services, Fairbanks for Alaska Arctic Gas, in progress. Literature search, interviews and **field** work to inventory recreation and scenic resources and investigate potentials for these **uses** and potential conflicts of use.

- Bering Sea Region

Current research is being conducted in the Bering Sea Region by State and federal agencies as **well** as academic research by archaeologists. The Office of History and Archaeology, Alaska Division of Parks has continuing research interests in the area. The National Park Service, Cooperative Park Studies Unit has personnel involved in archaeological site location for the Alaska Native Land Claims Settlement Act. The U. S. Fish and Wildlife Service is currently developing an archaeological program which will **survey** the national wildlife refuges for archaeological resources.

Academic research in the Bering Sea Region is presently being conducted by Bruce Lutz of the State University of New York, **Binganton** in the **Unalakleet** area and by John **Bockstoe** of **the** Old Whaling Museum, New Bedford, Connecticut, in the Cape Nome area. Dorothy Jean Ray is currently researching settlement patterns in the Seward Peninsula and Bering Strait area. In **the Kotzebue** Sound area, Douglas Anderson **of** Brown University is involved in research concerning several coastal and interior sites. Edwin Hall of the State University of New York, **Brockport, is** involved in research in the **Noatak** River area. Linda **Olanna** of the University of Alaska and William S. Laughlin of the University of Connecticut are involved in demographic and settlement studies on King and Little **Diomed** Islands, and the Cape Prince of Wales area.

- Southwest Region

Current research in the Southwest region includes archaeological programs of the Office of History and Archaeology, Alaska Division of Parks, and by federal agencies, **including** the National Park Service and U. S. Fish and Wildlife Service. Academic research is being conducted in the area by several archaeologists.

Current research is being conducted in the Aleutians by Jean S. Aigner, Robert F. Black, and William S. Laughlin of the University of Connecticut in the area of Umnak and **Anangula** Islands. Christy G. Turner of Arizona State University is conducting research in the Eastern Aleutians; Douglas W. **Veltre** is conducting research on Atka Island in the central Aleutians; and David Yesner is conducting research on settlement and **subsis-**tence systems in the Aleutians.

In the Bristol Bay and Alaska Peninsula area, Don E. **Dumond** and **Winfield** Henn of the University of Oregon are engaged in research in the **Katmai** National Monument and in the **Ugashik** River areas of the Alaska Peninsula. Harvey M. Shields is currently involved in research in the Bristol Bay area.

The **Kuskokwim** Bay area is a continuing area of research for James **VanStone of the Field Museum of Natural History**, Chicago, as well as Robert E. Ackerman and Robert D. Shaw of Washington State University. Michael Nowak of Colorado College is currently involved in archaeological research in the **Kuskokwim** Bay area and on **Nunivak** Island.

- Gulf of Alaska Region

Current archaeological research in the Gulf of Alaska region is being undertaken by several state and federal government agencies, and conducted **by** several archaeologists.

The Office of History and Archaeology, Alaska **Division** of Parks is the major state agency which has research programs in archaeology. This office is involved in the **Gulf of Alaska** area with the salvage of disturbed archaeological resources and the locating and preservation **of** undisturbed archaeological resources. Several federal agencies are involved in programs which concern the archaeology of the **Gulf** of Alaska area. The National Park Service, Cooperative Park Studies Unit has assigned anthropologists to **Chugach, Inc.**, Cook Inlet Region, **Inc.** and **Koniag, Inc.**, who are involved with the recording and documentation of archaeological sites within each corporation's region in accordance with the Alaska Native Claims Settlement Act. The U. S. Fish and Wildlife Service is conducting archaeological surveys of national wildlife refuges to identify, record and document archaeological resources.

An overview **of** the prehistory of the Pacific coast of the **Alaska** Peninsula will be presented in the draft environmental impact statement, for the Western Gulf of Alaska **OCS** lease sale, now in preparation by the OCS office of the Bureau of Land Management. The section pertaining to the cultural resources of the Peninsula will also discuss potential impacts on archaeological sites resulting from the proposed oil and gas development.

Current archaeological research in the Gulf of Alaska area includes excavations in Kachemak Bay by John **Lobdell**, Karen Workman and William B. Workman of the University of Alaska and Anchorage Community College. Excavations in Cook Inlet and on the **Kenai** Peninsula include those of Douglas **Reger** of the Office of History and Archaeology and one archaeological survey and excavation on the **Kenai** Peninsula by Alan **Borggs** of **Kenai** Community College.

Recreation oriented research in the Gulf of Alaska Region is being completed by the Division of Parks:

- Coastal Recreation Resource **Studies**, Alan H, **Meiners**, Division of Parks **includes** detailed inventories of the natural and cultural environment in separate studies **of** the west **Kenai** (due Spring 1977), and Kodiak and **Yakutat** (due Fall 1977) coastal areas. **These** inventories will aid **the state** in the possible designation **of** new state parks in coastal areas.

v. DATA GAPS IN THE LITERATURE

Alaskan archaeological research has not been systematic. The focus of the archaeological literature in the four literature survey regions reflects the intensity of research in certain areas, and the minimal or absence of archaeological research in other areas. These biases toward areas of archaeological research have resulted in significant data gaps in the archaeological literature. Striking examples of these data gaps include the lack of archaeological literature for large coastal and interior areas of Alaska, and a lack of information concerning submerged archaeological resources on Alaska's outer continental shelf. A notable exception to the absence of archaeological literature concerning Alaska's outer continental shelf is **Dixon's Bering Land Bridge Cultural Resources Study** (1976).

Even in areas where archaeological research has been conducted, there can be data gaps in the literature. This happens for several reasons. Often archaeological literature can be biased as the result of particular research methods or techniques used. Gaps can also occur in the literature when research is inadequate or an absence of reporting of archaeological results occurs. The **inadequacies** of reporting is reflected in the large number of archaeological reports in manuscript or draft form. Inadequate reporting of archaeological data has resulted in inadequacies of the Alaska Heritage Resource Survey, the record of archaeological sites maintained by the Office of History and Archaeology of the Alaska Division of Parks.

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16. NATURAL CONSTRAINTS TO DEVELOPMENT

I. SUMMARY OF INFORMATION SOURCES

Natural constraints to development relate to those elements of the natural physical environment which either present constraints to petroleum development or may be impacted by petroleum development, and in turn impact the existing socioeconomic or cultural infrastructure.

Literature on the natural physical environment (geology, climatology, oceanography, etc.) in Alaska receives less emphasis at the site-specific or community level than in the Lower 48 states. This is in part due to the smaller population, larger area, and geographic isolation of the state. Nonetheless, there are useful, though limited, community-oriented documents on the physical environment, primarily devoted to larger communities such as Anchorage or Juneau.

Among the agencies conducting research on the physical and biological sciences offshore in Alaska are the University of Alaska, Institute of Marine Sciences; the U. S. National Oceanic and Atmospheric Administration, funded by the Bureau of Land Management; the National Marine Fisheries Service; the U.S. Geological Survey; and the Alaska Department of Fish and Game. Research on adjacent onshore areas is being conducted by a more diverse group of agencies, including the U.S. Geological Survey; the U.S. Forest Service; the U.S. Fish and Wildlife Service; the Alaska Department of Fish and Game; the Alaska Division of Geological and Geophysical Survey; and the University of Alaska, Institute of Water Resources.

- Statewide Literature

Literature with statewide relevance on natural constraints to development is limited, since useful natural environmental data are usually compiled with a regional or site-specific focus. Some statewide **physiographic** or water resource studies are available. The other main source of statewide data is environmental impact statements or other impact studies related to the **trans-Alaska** pipeline project.

- Community/Regional Literature

Data on the physical environment are more available for onshore and offshore areas in the Beaufort Sea and Gulf of Alaska than the Bering Sea and Aleutian regions. This reflects the research priorities of the governmental and scientific communities. In the case of the **Beaufort** Sea, it reflects the long-standing scientific interest in the unique Arctic environment, particularly

since the discovery of oil at Prudhoe Bay. Periodical literature includes specialized Arctic studies, journals, and reports from Arctic research laboratories. In the case of the Gulf of Alaska, it reflects the literature and impact statements prepared in connection with the first OCS lease sales.

- Form and Currency of Literature

Recent leasing of offshore tracts for petroleum exploration in the Gulf of Alaska and construction of the Alyeska oil pipeline have resulted in synopses of the available data, acquisition of new data on the physical and human environment, and further research. These data have statewide, regional and **community level** relevance, depending upon **the** scientific discipline and geographic significance of impacts. Environmental impact studies may provide **state-of-the-art** presentations of the data, but become dated since periodic updating may not be conducted. This contrasts with the currency of literature provided by journals and technical publications.

Much of the research, related to OCS development in Alaska has been compiled relatively recently, often by private sources. As a result, a significant amount of the data remains unpublished or proprietary.

11. LITERATURE WITH STATEWIDE RELEVANCE

The analysis of natural factors information related to OCS petroleum development primarily concerns regional or site-specific geographic areas. Literature with statewide relevance is of limited value in identifying either natural development constraints or potential socio-economic impacts. However, this literature does provide basic reference documents which identify the sources of more site-specific data. An example of such a reference is Physiographic Division-of Alaska (Wahrhaftig, 1975), which provides a **physiographic** classification of Alaska according to topography, geology, drainage and climate. Similarly, a statewide summary of water resources, Water Resources of Alaska (Feulner, Childers and Norman, 1971) provides important data related to community location and petroleum development activities.

Environmental impact statements compiled for petroleum development projects or other major development projects provide a good source of statewide data. These include the six-volume Final Environmental Impact Statement, Proposed Trans-Alaska Pipeline (U.S. Department of Interior, 1972) which also provides regional **and** community **level** data.

III. LITERATURE WITH REGIONAL RELEVANCE

- Beaufort Sea Region

A comprehensive regional treatment of the North Slope (onshore) and Beaufort Sea (offshore) describing the physical, biologic and human environments is Alaska Regional Profiles - Arctic Region (Selkregg,

1975), which is a primary and current reference source. The Arctic Environmental Information and Data Center plans to upgrade the Profile series periodically, and also to produce a series of community profiles.

Several bibliographies and indices cover material related to the Beaufort Sea, the Bering Sea, and western Alaska: A computer-maintained, cross-referenced index that covers all journals and periodicals dealing with the Arctic and subarctic regions of the Northern Hemisphere, including the Bering Sea, and western Alaska, is the KWIC Index, Northern Titles (Boreal Institute). Publications are cross-referenced with subject material.

Another bibliography of material concerning Arctic and subarctic regions including western Alaska and the Bering Sea is contained in Arctic Bibliography (Arctic Institute of North America, 1974). This is a 6-volume series with titles and English abstracts of more than 108,000 books and papers that have been originally published in 40 languages.

The Alaskan Arctic Coast: A Background Study of Available Knowledge (Arctic Institute of North America, 1974) provides a regional, state-of-the-art (to 1974) treatment of oceanography, geology, climatology, natural resources and biology of the North Slope, Beaufort and Chukchi Seas. The report also describes the social and economic characteristics of the Native populations and presents a community by community profile. The second part of the report analyzes the environmental and social impacts of onshore and offshore petroleum development.

The Coast and Shelf of the Beaufort Sea (Reed and Soter, eds., 1974) describes the physical environment of the Alaskan and Canadian Beaufort Sea and-coastline. This series of papers on oceanography, ice conditions, sedimentary processes, ecology and marine mammals provides important baseline information that relates environmental constraints to offshore petroleum development and potential impacts to the resource base of the Native population.

A comprehensive treatment of the onshore physical environment of the North Slope is the Alaskan Arctic Tundra (Britton, ed., 1973), a series of papers on the geology, biology and climatology of the Alaskan Arctic.

Water and gravel are two important resources that will be required in large quantities by petroleum development activities on the North Slope and Beaufort Sea and in the establishment of new communities. These resources are generally scarce on the North Slope, and there may be competition between the requirements of the petroleum industry and new or expanding communities. Information on these resources is relatively limited, although the available data are summarized

in such reports as Hydrology of the Central Arctic River Basins of Alaska (Kane and Carlson, 1973); Groundwater in the Permafrost Regions of Alaska (Williams, 1970); and U.S. Geological Survey Water Resource Data Reports. Studies similar to Fill Materials and Aggregate near Barrow, Naval Petroleum Reserve No. _____, Alaska (Labelle, 1973) are required for other areas of the North Slope.

Wildlife resources, particularly caribou and marine mammals, are an important subsistence food source of the Native population on the North Slope. Concern over the impact of petroleum development on these wildlife resources has fostered several biology studies including Narrative for the Beaufort Sea-Coastal Habitats (Alaska Department of Fish and Game, 1975) that describes the eco-systems, wildlife and fish resources of the offshore and coastal zones; and The Western Arctic Caribou Herd (Davis, Gramogel and Reynolds, 1976), a report which addresses the highly controversial issue of the apparent serious decline in size of the Western Arctic caribou herd.

The cultural, land use, socioeconomic features, and wildlife resources of the North Slope (including offshore) are shown on two unpublished maps--Native Place Names and Land Uses (Plate J) and Wildlife Distribution and Harvest Patterns (Plate 2) produced by the Inupiat Eskimos of the North Slope in cooperation with the Arctic Environmental Information and Data Center" (1975). Although region? in scale, these maps contain valuable information on cultural and wildlife features that have not been previously published, and that include data inputs of the Natives themselves.

Long-standing scientific interest in the unique Arctic environment is reflected in the number of journals and technical publications. These tend to be subject-specific and related to limited geographic areas. These periodicals, however, provide a continued updating of the literature and current state-of-the-art presentations on various subjects, unlike the comprehensive regional, studies.

Among the more important science journals that regularly include articles on Arctic Alaska are Arctic, which covers a range of disciplines including geology, biology, meteorology, and anthropology; and Arctic and Alpine Research, which is oriented toward the earth and biological sciences,

Important technical publications that regularly present data on Arctic Alaska are AIDJEX bulletins (Arctic Ice Dynamics Joint Experiment) which cover ice dynamics relating to sea ice, the most critical environmental condition affecting offshore operations and development in the Beaufort Sea; and the Beaufort Sea Project technical reports which cover a range of scientific disciplines such as oceanography, marine biology, ice dynamics and such technological problems as offshore drilling and oil spills. Although these relate to the Canadian section of the Beaufort Sea, they cover topics of

direct relevance to the Alaska Beaufort, including topics that have, as yet, received little investigation. 'U. S. Army Cold Regions Research and Engineering Laboratory (CRREL) technical reports cover engineering, geotechnical and earth science subjects relating to cold regions, particularly Arctic Alaska; U.S. Tundra Biome Data Reports are concerned with the biology (particularly botany) and soil science of the U.S. Arctic.

The primary data gathering areas on the North Slope have been related to petroleum development such as the trans-Alaska pipeline corridor, Prudhoe Bay, and the proposed Arctic Gas pipeline corridor across the Arctic National Wildlife Range. Particular attention to the natural factors and socioeconomic literature has been devoted to National Petroleum Reserve No. 4 (formerly Naval Petroleum Reserve No. 4), located on the western portion of the North Slope, and Barrow and vicinity--the largest community on the North Slope and the location of the Naval Arctic Research Laboratory. This literature includes several recent environmental and socioeconomic impact studies, such as the Final Environmental Impact Statement Continuing Exploration and Evaluation of NPR-4, Alaska (U.S. Department of the Navy, 1977). This basic reference source, however, is partially superseded by more current impact analyses. One such report is The Exploration Development and Production of Naval Petroleum Reserve 4 (Resource Planning Associates, 1976) which discusses alternative management programs and socioeconomic impacts, and relates potential environmental impacts to socioeconomic and cultural impacts.

● Bering Sea Region

The majority of literature relevant to the Bering Sea region, as defined in this survey, actually covers a large area of the Bering Sea and western Alaska. Site-specific studies are limited compared, for instance, to the Gulf of Alaska area.

The KWIC Index, Northern Titles, and Arctic Bibliography, cited above, are also a source of data for this region.

A comprehensive work concerning the Bering Sea region is Chukchi Sea: Bering Strait - Icy Cape (University of Alaska, Arctic Environmental Information and Data Center, 1976). It consists of an extensive bibliography, by discipline; and a set of physical and biological maps that characterize the coastal zone and marine environment for the region. This reference is particularly important because it was designed as a planning tool for future OCS development.

Other comprehensive discussions of the region are included in Alaska Regional Profiles - Northwest Region (Selkregg, 1976) and Yukon Region (1977), which provide mapped and illustrated text on the physical, biotic and human environments of a region which encompasses

the western **Alaska** coast from **Kotzebue** Sound to the Yukon **Delta**.

PROBES: A Prospectus on Processes and Resources of the Bering Sea Shelf (University of Alaska, Institute of Marine Science, 1974) is a compendium of discussions concerning necessary research and known data gaps regarding the biology, geology and physical and chemical oceanography of the shelf.

An impact assessment of offshore **placer** mining near Nome is contained in Environmental Study of the Marine Environment Near Nome, Alaska (Hood, and others, 1975). A **socio-economic** study is combined **with the** baseline data on the sedimentary, biological and physical/chemical environments in the Nome vicinity.

Selected Bibliography on Birds in the Bering Sea and Arctic Ocean as Related to Outer Continental Shelf Areas Under Consideration for Leasing (Bartonek, 1974) is an important biological document that is a basic reference source for any investigations on potential **OCS** petroleum development impacts.

Availability and Utilization of Migratory Waterfowl in Western Alaska (Klein, 1965) is a significant report that relates to the renewable resources of the region.

Extensive environmental research conducted in the 1960's by the Atomic Energy Commission in the vicinity of Cape Thompson is covered in Environment of the Cape Thompson Region, Alaska (Wilimovsky and Wolfe, 1966). This work **and** Chukchi Sea: Bering Strait - Icy Cape are indicative of the substantial data collected in and around Kotzebue Sound.

Water resources data are contained in such publications as Bibliography of Arctic Water Resources (Hartman and Carlson, 1970), Summary of Water Supplies at Alaska Communities, Northwest Region, Kotzebue Sound Sub-region (Feulner, 1973), and a similar report by **Feulner** for the Norton Sound Sub-region.

The oceanography and marine sciences of the Bering Sea have been studied extensively over the years, principally by the University of Alaska's Institute of Marine Science, the University of Washington, and concerned government agencies. Comprehensive works such as Coastal Ecosystems of Alaska (McRoy and others, 1969), Oceanography of the Bering Sea (Hood and Kelley, 1974), and Oceanographic Cruise, U.S. Coast (Guardtter-"Northwind," Bering and Chukchi Seas, July-September 1962 (Aagaard and Coachman, 1964) are a few of the current **broad-based publications**.

Good geologic summaries of the Bering Sea region are contained in Geology, Ore Deposits, and Mineral Potential of the Seward Peninsula (Sainsbury, 1965) and Preliminary Inventory of Minerals, Energy, and Geology, Northwest Region (Williams and others, 1974).

The latter study was undertaken by the Joint Federal-State Land Use Planning Commission.

Terrestrial vegetation and wildlife, for the most part, duplicate species found in other **physiographically** similar regions, such as the Arctic. The Proceedings of the Symposium on the Impact of Oil Resource Development on Northern Plant Communities (McCown and **Simpson, 1972**) is an important work concerning the impact of oil on vegetation that is relevant to the Alaskan northwest.

Two significant works on **avian** fauna are Distribution and Movement of Birds in the Bering and Chukchi Seas (Swartz, 1967) and Checklist of the Birds of the Seward Peninsula (Kessel, 1968).

- Southwest Region

The Alaska Regional Profiles - Southwest Region (**Selkregg, 1976**) provides a comprehensive data base from which to begin any study of the Aleutians or the eastern Bering Sea. This publication includes a comprehensive summary of the physical, biotic and human features of the region. The geographic coverage of this volume broadly coincides with the Southwest region defined in the literature survey.

A second comprehensive source publication concerning the Southwest region is The Bristol Bay Environment: A Background Study of Available Knowledge (University of Alaska, Arctic Environmental Information and Data Center, 1974). This document was prepared for the U.S. Army Corps of Engineers to be used as a basis for environmental impact statements. The report summarizes available knowledge on the physical, biological, and **socio-economic** factors of the Bristol Bay onshore and offshore areas. Potential conflicts between the environment (natural and man-made) and future petroleum development are discussed.

The KWIC Index, Northern Titles, and Arctic Bibliography are also general reference for this region.

Oceanography of the Bering Sea, Phase I: Turbulent Upwelling and Biological Productivity Mechanisms in Southwestern Bering Sea and Aleutian Islands (Hood and others, 1971) covers the physical, chemical, geological and biological characteristics of **upwelling**, turbulent tidal mixing, and seasonal ice throughout the southeast Bering Sea and along both the Pacific and Bering shores of the Aleutian Islands.

On the Alaska Streams in Summer (**Ohtani, 1956**) describes temperature regimes in the **Alaska** Current, which flows west, south of the Aleutians, which is an important fishing area.

Other important oceanographic works include Oceanographic Conditions in the Central Subarctic Pacific Region, Winter 1966 (Dodimead, 1968) and New Map of the Pacific Ocean Relief (Skilkin, 1966). The latter contains a bathymetric and physical factors map of the Bering Sea and Aleutian areas.

Baseline meteorological information for the Aleutians can be gathered from Seasonal and Long-Term Variation of Intensity and Geographic Position of the Aleutian Low of Atmospheric Pressure for the Period 1899-1951 (Maksimov and Karklin, 1970). Results of this study indicate 3-year, n-year and 19-year cycles of variation of intensity in this low pressure center.

The Aleutian chain is one of the most seismically active areas of the world, a major safety consideration in OCS petroleum development. Seismic information for the Aleutian chain is contained in The Geotectonic Significance of the Earthquake Focus Mechanism (Scheidegger, 1965). Other sources of seismic data on the Aleutians and the southwestern area are: Tectonics of the March 27, 1964 Alaska Earthquake (Plafker, 1969), Seismic Wave Arrivals from Long Shot, 0° to 27° (Carder and others, 1967), and Tectonic Map of the Pacific Segment of the Earth (Akademiya Nauk SSSR, 1970).

Biologically and economically, the Southwest Region is rich in important fishery resources on a local and world-wide basis. The National Marine Fisheries Service has done extensive research in the region. Other agencies with significant involvement in the Southwest Region include the U.S. Fish and Wildlife Service, the Alaska Department of Fish & Game, the U.S. Bureau of Commercial Fisheries, and the Fisheries Institute of the University of Washington. Generally, the investigations have been site-specific. Salmon, the principal resource, has been studied from numerous environmental, commercial, and legal standpoints. These studies include Fisheries of the Bering Sea: The State of Existing Knowledge and Requirements for Future Effective Effort (Wilimovsky, 1974), and "Energy Requirements of Bristol Bay Sockeye Salmon in the Central Bering Sea" (Nishimaya, 1974), articles in Oceanography of the Bering Sea, cited earlier.

Current information on western Alaska fisheries is produced by the Alaska Department of Fish and Game, Division of Commercial Fisheries, in Annual Report - Bristol Bay Area (1975) and Annual Report Arctic Yukon - Kuskokwim Area (1975).

Water resources of the Southwest are discussed comprehensively in Water Resources of Alaska (Feulner, Childers, and Norman, 1971), and the bibliography cites a number of site-specific publications. These include: Ground Water Reconnaissance of Five Eskimo Villages in the Lower Kuskokwim-Yukon River Area, Alaska (Wailer, 1958), Water resources Reconnaissance of the Kwiguk (Emmonak) Area, Alaska (Feulner 1970), Water Supplies in Eskimo Villages of Western Alaska (Page, Hub

and Eaton, 1958), and Ground Water and Permafrost at Bethel, Alaska (Wailer, 1957').

- Gulf of Alaska Region

Interest in the potential petroleum and gas resources of the Gulf of Alaska tertiary province, which culminated in the 1976 OCS lease sale, is reflected in a considerable increase in the geologic and marine sciences literature from the 1960's to the 1970's. Studies of the Gulf and adjacent onshore areas have been stimulated recently by the location of the marine terminus of the **trans-Alaska** pipeline at **Valdez** in Prince William Sound, and the proposed terminus of a gas pipeline at **Gravina** Point between **Valdez** and **Crodoва**. The 1964 Alaska earthquake, centered in Prince William Sound, also stimulated scientific interest in the area, particularly the western Gulf. Despite these considerations, the published data base on natural factors for the Gulf of Alaska is relatively limited, although it is expanding rapidly because of considerable ongoing research.

A comprehensive regional treatment of the physical, biological and human environments that covers the Gulf of Alaska and adjacent onshore areas between longitude 141° west and Stepovak Bay on the Alaska Peninsula is Alaska Regional Profiles - Southcentral Region (Selkregg, 1974).

The western Gulf of Alaska and specifically Kodiak Island is described in Kadyak: A Background for Living (Buck and others, 1975) which is a comprehensive treatment of the geography and environment of Kodiak Island, onshore and offshore, with special reference to marine resources.

A broad review of the present state of knowledge of the oceanography and renewable marine resources of the Gulf of Alaska is **provided** in A Review of Oceanography and Renewable Resources of the Northern Gulf of Alaska by the University of Alaska (Rosenberg, 1973).

The Final Environmental Impact Statement, Proposed OCS Oil and Gas Lease Sale, Northern Gulf of Alaska, OCS Sale No. 39 (U.S. Bureau of Land Management, 1976), an extensive four-volume document, describes the **physical** and biological environment of both the Northern **Gulf** of Alaska and a broader area of the North Pacific, emphasizing oceanography and marine resources. The onshore physical environment receives less emphasis.

The development of the Gulf of Alaska's petroleum resources may create new coastal **communities** to serve offshore facilities and place demands on the natural resources of the existing communities. In addition, the opening of previously undeveloped, inaccessible areas by petroleum development may spur the development of onshore mineral resources. As such, both geological locational determinants and onshore mineral resources need to be evaluated. Onshore geology and mineral resources along the Gulf of Alaska rim were mapped

during the 1950s and 1960s by the U.S. Geological Survey; these data include Geologic Map of the Gulf of Alaska Tertiary Province, Alaska (Plafker, 1967); Geologic Map of the Yakutat District, Gulf of Alaska Tertiary Province, Alaska (Miller, 1961). More **site-specific** geological data for Gulf of Alaska communities are not available;

Particularly important with respect to possible offshore petroleum development and location of structures and facilities is the **ongoing** U.S. Geological Survey environmental geology **program on** the continental shelf of the Gulf of Alaska and Kodiak Island. The Report on the Environmental Geology OCS Area, Eastern Gulf of Alaska (Molnia, Carlson and Burns, 1976) describes sub-marine geology and potential geology hazards. A Summary of Potential, Environmental Geology, and the Technology, Time Frame, and Infrastructure for Exploration and Development of the Western Gulf of Alaska (Von Huene and others, 1976) identifies potential geologic hazards and describes probable development scenarios. Although these reports do not directly identify socioeconomic impacts, they provide important data on hazards that may result in environmental impacts, as well as data on the magnitude of petroleum activities in terms of onshore facility, equipment, material, and manpower requirements.

IV. CURRENT RESEARCH

- Beaufort Sea Petroleum Development Region

Arctic research has been conducted for many years by various agencies and institutions, including the U.S. Geological Survey; the U.S. Navy Naval Arctic Research Laboratory; Arctic Institute of North America; the U.S. Coast Guard; and the University of Alaska.

Among the more important current research projects are:

- Range Interrelationships of the Western Arctic Caribou Herd (D.R. Klein and others, University of Alaska, Alaska Cooperative Wildlife Research Unit). A study of the quality and productivity of range lands utilized by the western Arctic caribou herd.
- Arctic Water Resources and Environmental Studies (J. M. Childers and others, U.S. Geological Survey). An investigation of water resources and hydrologic hazards with respect to potential impacts on water resources from development along the **Trans-Alaska** pipeline route.
- Mechanics of Origin of Pressure Ridges, Shear Ridges, and Hummock Fields in Landfast Ice (L. H. Shapiro, University of Alaska Geophysical Institute). One of several studies sponsored by the National Oceanic and Atmospheric Administration, and Bureau of Land Management on ice dynamics in the Beaufort Sea, a major

environmental problem relating to offshore petroleum development technology and feasibility.

- Marine Mammals of the Arctic Ocean and Bering Sea (C. H. **Fiscus**, National Marine Fisheries Service). A study to determine the status of the bowhead whale stock in the Beaufort, **Chukchi** and Bering Seas, which provides a major food source for the Native population.
- Marine Environmental Problems in the Ice-Covered Beaufort Sea Shelf and Coastal Regions (**D. Barnes**, U.S. Geological Survey). One of several studies being conducted by the U.S. Geological Survey which investigates sedimentary processes, **surficial** geology, bottom morphology and ice dynamics of the Beaufort Sea shelf and coast.

- Bering Sea Region

Much current research in this region is produced under the auspices of the Outer Continental Shelf Environmental Assessment Program (**OCSEAP**), a **NOAA/BLM** directed effort. To date the majority of work has been done in the disciplines of oceanography, intertidal biology, and coastal morphology.

Most of the biological investigations are surveys or inventories, although some work is focused on analysis of various biological interrelationships necessary for making useful projections of impact of OCS development.

OCSEAP studies are being carried out at the University of Alaska, Institute of Marine Sciences, Oregon State University, and U.S. Fish and Wildlife Service.

Southwest Region

Several federal and State agencies have been **conducting** research **along** the Alaska Peninsula, the Aleutians, and in the southeastern Bering Sea for many years, and much of this work is funded by the **NOAA/BLM OCSEAP** program described above.

Fishery resource studies are being carried out by the Alaska Department of Fish and Game and National Marine Fisheries Service. Oceanographic work is being carried out by universities cited above.

- Gulf of Alaska Region

Ongoing programs (offshore) in the physical and biological sciences sponsored or conducted by the Bureau of Land Management and the National Oceanic and Atmospheric Administration for the Alaskan Continental Shelf are summarized in volumes by discipline in Program Work Statements, Environmental Assessment of the Alaskan Continental Shelf. Data gathered

in these programs are **summarized** in the Alaskan Outer Continental Shelf, Principal Investigations, Annual Reports. Other agencies conducting or sponsoring research offshore in the Gulf of Alaska include the University of Alaska, Institute of Marine Science; U.S. Geological Survey; National Marine Fisheries Services; and Alaska Department of Fish and Game.

Onshore areas of the Gulf of Alaska rim appear to be stimulating less research in the physical and biologic sciences than offshore areas, although agencies currently conducting research include the U. S. Geological Survey, U.S. Forest Service, and the U.S. Fish and Wildlife Service.

Among the more important current research projects are:

- Chugach National Forest Wildlife and Fisheries Inventory--Upper Prince Williams Sound (N. R. Hause, U.S. Forest Service). One of several studies evaluating the natural resources (timber, soils, **water, fish** and wildlife) of **Chugach National Forest** and related land-use planning problems. The geographic coverage of these studies includes potential OCS marine bases.
- Coastal Habitat Protection Programs--Coastal Zone Management Project (Alaska Department of Fish and Game). This project encompasses the entire Alaskan coastline. The Alaska Department of Fish and Game is one of several State and federal agencies conducting studies that involve several disciplines (biology, geology, land **planning**) devoted to establishing a comprehensive management program consistent with minimal environmental and socioeconomic impacts and optimum use.
- Environmental Geology and Geomorphology of the Gulf of Alaska Coastal Plan (P. J. Cannon, University of Alaska). One of several coastal geology studies sponsored by the Bureau of Land Management, National Oceanic and Atmospheric Administration to evaluate natural and man-induced changes in coastal morphology. Such studies are relevant to assessment of port and community development and coastal zone management with respect to OCS development.
- Eastern Gulf of Alaska Tertiary Province (G. Plafker, U. S. Geological Survey, and others). Evaluation of onshore and off-shore-geologic features and resources of the tertiary basin. This program, coupled with U.S. Geological Survey's continental shelf environmental geology program, provides important information on the resources that may be impacted by OCS development. Such investigations are also important with respect to geologic hazards.

- Distribution, Abundance, Diversity and Productivity of Benthic Organisms in the Gulf of Alaska (H. M. Feder, University of Alaska). One of several biology studies in the Gulf of Alaska conducted by the University of Alaska, Institute of Marine Science, and sponsored by the U. S. Bureau of Land Management and U. S. National Oceanic and Atmospheric Administration. Other investigations include studies of marine mammals and plankton. Fish resource studies are primarily conducted by the National Marine Fisheries Service.

DATA GAPS

● Beaufort Sea Region

The **available** data describe the physical and biotic environments of the Alaskan Beaufort Sea and adjacent onshore areas in general terms except for such specialized investigations as the AIDJEX ice studies program. A comprehensive scientific program similar to that ongoing in the Canadian Beaufort Sea off the Mackenzie Delta (Beaufort Sea Project) **is required**.

Geographically specific in-depth data tend to be restricted to current areas of interest on National Petroleum Reserve No. 4, the **trans-Alaska** pipeline corridor, **Prudhoe** Bay and the Arctic gas pipeline corridor. Data gaps on the physical and biotic environments, especially as they relate to the socioeconomic and cultural infrastructure of the North Slope, include:

- Technology to drill, produce and transport oil offshore in the shore ice and pack ice zones.
- Potential oil spill data on the behavior of oil on and under ice, its dispersion and methods of detainment.
- Oceanography data gaps include the need for: (1) updated bathymetric charts to identify potential port sites, the location of shipping activities and the location of borrow operations; and (2) information on **nearshore** currents which is needed to assess impact of oil spills, facility location, and borrow activities.
- Gravel resources are a critical construction material. Data are needed on the quality, quantity, and location of gravel and the environmental and socioeconomic impacts of extraction.
- Water resources, as freshwater **supplies**, are required for both community and industrial use, and are in short supply on the North Slope. More data are required on the quality, quantity and location of the resource with respect to projected demands and environmental impacts of resource demands.

- o Marine mammals are an important food resource of the Native population, and data are required on the modification of their activities and environment by petroleum development.
- . Multidisciplinary studies **should** be prepared that **relate** impacts the physical and biotic **environments** **resulting** from petroleum development **to** the **social**, economic and cultural infrastructure of the Native population.

- Bering Sea Region

In general, a substantial data base exists for the Bering Sea region but few studies have been oriented to the needs **of OCS** development and the potential impacts on onshore communities. The one investigation undertaken to date, specifically for this purpose, is Chukchi Sea: Bering Strait - Icy Cape (University of Alaska, Arctic Environmental Information and Data Center, 1976), a study requested by the Arctic Slope Regional Corporation as a scientific-base for petroleum and mineral development.

The entire **OCS** exploration and development problem and its relationship to the socioeconomic infrastructure of the affected villages and **communities** requires examination.

Detailed investigations must be undertaken to determine the **dependence** of coastal-communities upon the **following** resources:

- Marine mammals
- Fisheries
- Migratory waterfowl
- Terrestrial **mammals**

Other data gaps include:

- The potential demands of **OCS** development **on** the natural resource base **of** coastal communities and potential use conflicts.
- Existing or potential port sites that may be utilized to serve offshore petroleum exploration and development.
- Sea ice conditions, especially with respect to the problem presented to offshore drilling and production, **marine** traffic and port location.
- Bathymetric and oceanographic conditions **with** respect to offshore drilling and production, marine traffic, port location and oil spills.

- Southwest Region

Since there is a similar, overlapping data base to that of the Bering Sea region, similar data gaps also exist in the Southwest Region. Whereas sea ice is an important environmental consideration in OCS development in the Bering Sea Region, seismic activity and related geologic hazards are important factors that require **additional** research in the Southwest Region. Other data gaps cited under Bering Sea Region **apply** to this region.

- Gulf of Alaska Region

As with other regions, the available data are general in terms of both depth and geographic coverage. There is, however, a wealth of proprietary data on the physical environment (oceanography, meteorology, etc.) for the Gulf of Alaska OCS lease sale area. Consequently, the identification of data gaps is somewhat tenuous.

The marine geology and geologic hazards data base of the Gulf has increased considerably in the past five years, and **is** relatively good compared with other physical sciences.

The major data gap in the biological sciences relates to near-shore ecosystems. This is an important concern, since it is the coastal areas of the Gulf of Alaska rim and Kodiak Island that could be impacted by offshore oil spills.

Other data gaps include:

- Natural resource base of existing coastal communities, including water, gravel, minerals, timber and fish.
- Potential demands of **OCS** petroleum development on natural resources of adjacent onshore areas and communities.
- Studies of the geographic determinants that will dictate the location of new coastal **communities** resulting from the demands of petroleum development.
- Near-shore ecosystems data required to formulate coastal zone management programs that will minimize environmental impact.

VI. SUBJECT CHAPTER BIBLIOGRAPHY: NATURAL CONSTRAINTS TO DEVELOPMENT

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III. MASTER BIBLIOGRAPHY

The master bibliography represents a comprehensive overview of the literature available on the socioeconomic and natural environment of Alaska. The literature included in the bibliography was selected through a series of screenings. First, bibliographies published in impact statements, regional profiles and research reports were examined and lists of potentially useful documents were drawn from these bibliographies. Second, additional potentially useful literature was surveyed at research libraries, public agencies and private consultant firms. Third, bibliographic searches within specialized subject areas were conducted by individuals and institute libraries, (e.g. , the Arctic Environmental Information and Data Center).

All of the literature included in the master bibliography was reviewed and evaluated: additional citations to potentially useful documents which could not be located and reviewed within the time available for the literature survey were not included as part of the master bibliography.

The entries compiled in this bibliography are documents that have geographical relevance to the four petroleum development regions, topical relevance to **OCS-related** socioeconomic impact studies, or current relevance in a particular field. The last criteria applies to some works which are not recently published, but are still considered useful documents in that field, such as certain archaeological literature.

The master bibliography lists references alphabetically by author, following the Library of Congress format. Subject referencing is provided by the Index which follows it.

Two types of notations have been added to the Library of Congress format. First, if a **work is unpublished**, this is indicated at the end of the bibliographic entry. Second, literature included in the subject chapter bibliographies is noted in the master bibliography through a bracketed **arabic** numeral at the end of the bibliographic entry. In cases where a work is cited in more than one subject chapter bibliography, more than one **arabic** numeral appears at the end of the entry. The list of subject chapters with their number designation appears below.

1. ECONOMY
2. OIL AND GAS
3. POPULATION
4. REVENUE AND TAXATION
5. GOVERNANCE
6. EDUCATION
7. HEALTH
8. SOCIAL SERVICES
9. PUBLIC SAFETY
10. CULTURAL PATTERNS
11. SUBSISTENCE

12. LAND USE AND LAND STATUS
13. TRANSPORTATION, COMMUNICATIONS AND UTILITIES
14. HOUSING
15. ARCHAEOLOGICAL/HISTORICAL AND RECREATIONAL/SCENIC RESOURCES
16. NATURAL CONSTRAINTS TO DEVELOPMENT

Included at the end of the master bibliography is a section entitled "Selected Bibliographies in Specialized Subject Areas." This section includes bibliographies of potentially useful documents in subject areas related to the socioeconomic studies program.

Most of these bibliographies relate to relevant subject categories rather than Alaska-specific information; and much of the literature was not available in the State nor obtainable within the time frame of the study. They have been included here as an additional source of data for further review during the course of the socioeconomic studies program.

Also included is a list of indices to periodicals with relevance to Alaska or petroleum development.

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IV. INDEX TO MASTER BIBLIOGRAPHY

The purpose of the index is to provide access to literature in the master bibliography. Since the most important retrieval requirement for the Socioeconomic Studies Program is the need to extract studies by petroleum development region, the literature is first organized into four geographic categories, including the two regions in the first year's program.

- Statewide literature, including literature related to regions other than the designated petroleum development regions.
- Beaufort Sea Region.
- Bering Sea Region.
- Southwest Region.
- Gulf of Alaska Region.
- Comparative study areas outside of the state.

Within these geographic areas, the literature is organized into the 16 subject categories established for the literature survey, and then broken down further by a series of keywords related to each subject category. The keywords are comprehensive enough to provide a sufficiently broad data base, yet specific enough to yield references focused on a particular topic. In order to ensure broad access to the literature, references **are often** cited in under both the general subject category and specific key words.

To use the index, the researcher first selects the appropriate regional index; then selects the subject category most similar to the desired topic (e. g., Land use and Land Status) ; and then selects the key word most similar to the desired topic (Native Land Claims). The list of subject categories and key words contained in the index appears in alphabetical order below. Opposite each keyword is referenced the subject category or categories under which the key word is to be found.

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AND UTILITIES

ALASKA NATIVE CLAIMS
SETTLEMENT ACT

See 5. GOVERNANCE

ALCOHOLISM

See 7. HEALTH

ARCHAEOLOGICAL SITES

See 10. CULTURAL PATTERNS
" 15. ARCHAEOLOGICAL/HISTORICAL AND
RECREATIONAL/SCENIC RESOURCES

BIOLOGY

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