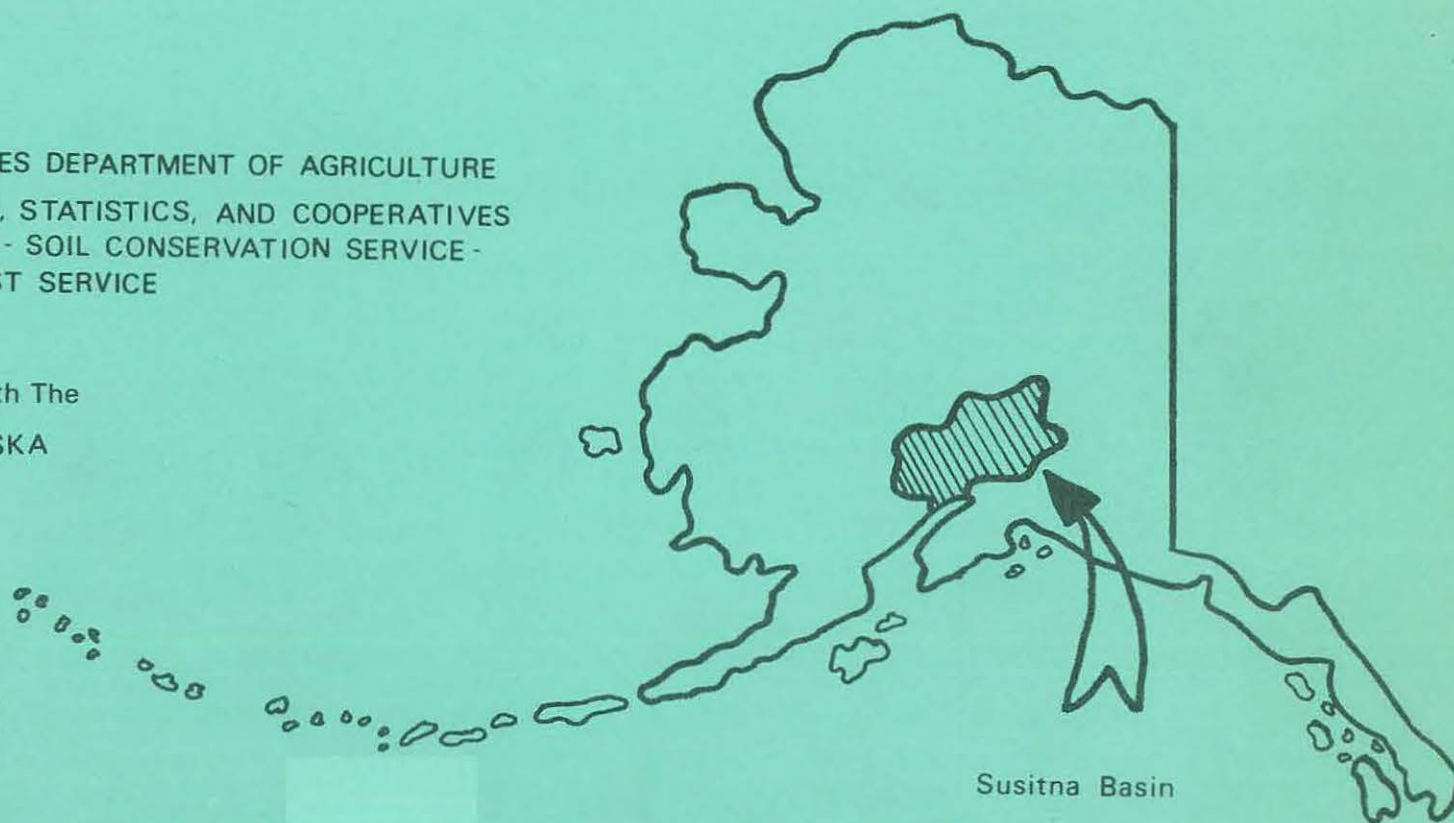


SUSITNA BASIN COOPERATIVE STUDY

PLAN OF WORK

UNITED STATES DEPARTMENT OF AGRICULTURE
ECONOMICS, STATISTICS, AND COOPERATIVES
SERVICE - SOIL CONSERVATION SERVICE -
FOREST SERVICE

In Cooperation With The
STATE OF ALASKA



Susitna Basin

P L A N O F W O R K

Alaska Rivers
Susitna Basin

Cooperative Study

State of Alaska

February 1978

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I. INTRODUCTION

A. Background

On February 27, 1976, the Department of Natural Resources for the State of Alaska requested the U. S. Department of Agriculture (USDA) to provide assistance through the Cooperative River Basin Studies Program in developing basic water and land planning information in Alaska. The Department of Agriculture-Soil Conservation Service responded affirmatively to the request in a letter dated June 25, 1976.

R. M. Davis, Administrator USDA-SCS, directed Weymeth E. Long, Alaska State Conservationist for the SCS, to proceed with the study and to advise appropriate state and federal agencies that USDA was prepared to cooperate with the State in making studies of Alaska rivers. A field Advisory Committee was formed, consisting of USDA representatives from the Soil Conservation Service, Forest Service, and Economics, Statistics, and Cooperatives Service with the SCS representative as the Chairman, in order to provide guidance for the study. The FAC was directed to prepare a plan of work mutually satisfactory to the USDA and the State of Alaska.

Meetings were held with Federal Agencies and State of Alaska Departments to explain the Cooperative River Basin Programs. The agencies and political subdivisions of the state government pledged support and assistance within their capacity. From their meetings, the State established the Susitna Basin for the initial study area.

B. Purpose

The Cooperative River Basin Study is a state-federal resource planning effort whose purpose is to deal with specific needs of the State of Alaska, consistent with the mission and responsibilities of USDA. The primary need of the State of Alaska is to refine and supplement the existing resource information by collecting and analyzing new field data. Other needs are to analyze and evaluate potential alternative resource uses and to provide guidelines for the resolution of conflicting resource uses. All this information is necessary to ongoing state and local land and water resources planning. The plan of work for the Study demonstrates how the Study will achieve its purpose.

C. Client Group

The Cooperative Study shall serve the resource planning and information needs of state, borough, and federal agencies by determining their interests and concerns, involving these entities in the formulation of the plan of work, in the review of reports, and by sharing final products, reports, maps, etc.

D. Authority

Cooperative River Basin Studies are carried out under Section 6, Public Law 83-566. The law authorizes the Secretary of Agriculture to cooperate with other federal, state, and local agencies in making investigations and surveys of the watersheds of rivers and other waterways as a basis for development of coordinated programs.

The USDA has the authority to perform field investigations; to collect new data on vegetation, soils, water, and other related resources; to evaluate this information and to present it to planning agencies for utilization in their water and land management programs.

Authority for the State Department of Natural Resource to cooperate with the USDA in River Basin studies is set forth in Title 38 of the Alaska Statutes.

II. DESCRIPTION OF STUDY AREA

A. Geography and Climate

The Susitna Basin is located in the southcentral region of Alaska and is bounded by the Copper River Basin and Matanuska River Basin on the east, the Tanana River Basin on the north, the Kuskokwim River Basin on the west, and the Cook Inlet on the south. The study area includes about 13,700,000 acres, or about 3% of the Alaska land area. Approximately 93% lies within the Matanuska-Susitna Borough boundaries, 3% lies within Kenai Peninsula Borough, and 4% in an unorganized borough. Topography varies from flat lands to very irregular mountainous areas. Elevations in the area range from Sea Level at Cook Inlet, to approximately 20,000 feet on Mt. McKinley.

The study area includes the primary drainage areas of the Susitna River, Little Susitna River, and Beluga River. Major streams within the area generally flow southward into the Cook Inlet. For more details, see Figure 1.

Three climatic zones are included in the Susitna Basin: the Continental, Transitional, and Maritime. Mean maximum July temperature is about 65°F. Mean annual precipitation ranges from about 15 inches to 80 inches, and mean annual snowfall from 70 inches to 400 inches.

B. Land Status and Population

Land ownership in the Basin is changing rapidly due to the Alaska Statehood Act of 1958, and the

Alaska Native Claims Settlement Act of 1971. Under these acts, state land holdings have increased significantly particularly within the Susitna Basin. Here, most land will or has changed from federal to state and private ownership. Based on present estimates, approximately 60% of the land in the Susitna Basin is state managed, 20% is privately managed, 3% is managed by the Matanuska-Susitna Borough, and 17% is federally managed. Present land uses in the Basin include agriculture, recreation, transportation, communities, residential, mining, grazing, timber, commercial, and industrial. Development (comprising approximately 500,000 acres or 3.6% of the area) is concentrated along the transportation corridor (the Alaska Railroad and the George Parks Highway) running between Anchorage and Fairbanks. There are approximately 500 miles of improved roads in the study area.

It is difficult to estimate the population in the Susitna Basin as the U.S. Department of Commerce used the entire Matanuska-Susitna Borough as a census tract for its 1970 Census. A large proportion of the Borough population is located in the Matanuska River Basin, especially around Palmer and Butte. Present Susitna Basin population is estimated at 9,000 by Mat-Su Borough and Department of Commerce sources. Total Mat-Su Borough population is approximated at 17,000.

Population between 1970 and 1977 has increased significantly in the Susitna Basin in the Matanuska Valley and Municipality of Anchorage. The Mat-Su Borough's population has increased an estimated 138% since 1970, Wasilla has had an

80% population increase between 1973 and 1976, and the Municipality of Anchorage's population went from approximately 126,000 in 1970 to approximately 175,000 in 1976.

Mat-Su Borough and Department of Commerce documents give the following 1976 population figures for area communities:

Palmer* (Corporate limits).....	1643
Palmer* (Surrounding areas:	
Palmer, Butte,	
Matanuska, Eska-Sutton)....	8147
Wasilla.....	1560
Talkeetna (city).....	328
Talkeetna (Surrounding areas).....	719
Big Lake.....	721
Willow-Houston.....	550
Montana.....	76
Tyonek.....	323

*not in Cooperative Study area

Economic activity and employment in the area includes government work, services, farming, construction, industry, tourism, recreation, and mining.

C. Natural Resources

The Susitna Basin is an area of great natural resource wealth. It contains forest resources, fertile land for agricultural production, hard rock minerals, coal, oil, and gas resources, some of the State's best recreational lands, a diverse array of wildlife habitats, and water.

The land and water resources are capable of supporting a wide variety of renewable and nonrenewable resource uses.

SUSITNA RIVER BASIN COOPERATIVE STUDY ALASKA

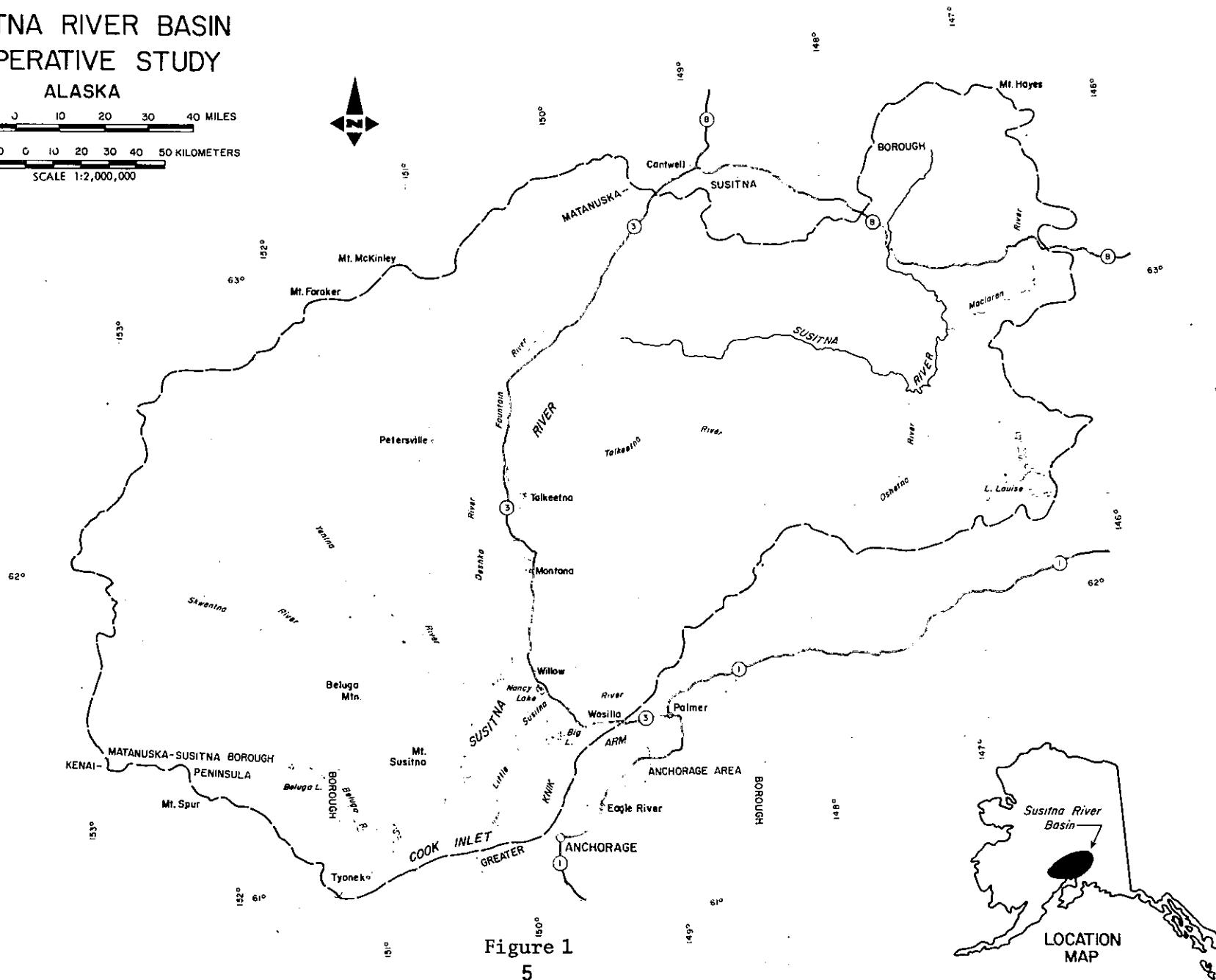
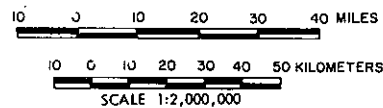


Figure 1
5

III. STATUS OF WATER AND RELATED LAND RESOURCE PROGRAMS

A. SCS

There are three soil conservation subdistricts within the Susitna Basin Cooperative Study area: Montana Creek, Wasilla, and a part of the Palmer Soil Conservation Subdistrict. The primary mission of the Conservation District is to provide technical assistance on soil, water, and related resources to private landowners. There are no PL-566 watershed programs or pending applications within the study area.

B. Level B Study

The Alaska Water Study Committee is sponsoring a Level B Southcentral Alaska Water Resources Study. The Southcentral Alaska Study area includes an area more than four times the size of the Cooperative Study. It includes the entire Susitna Basin as well as the Gulf of Alaska area, the Kenai peninsula and the Kodiak Shelikof area. The study was initiated on May 9, 1977, with completion scheduled for 1979. As the Level B Study does not have collection of new data as its primary function, resource information generated by the Cooperative Study will be provided to the Level B effort as appropriate. Members of the Cooperative Study Team are represented on work groups and policy and steering groups of the Level B Study to assure coordination and prevent duplication between studies.

C. Corps of Engineers

The Army Corps of Engineers is currently working on two water-related programs within the Susitna Basin. The Talkeetna River Project concerns construction of a dike and rock revetment at Talkeetna. The purpose of the structural measures is to prevent bank erosion due to flood waters of the Talkeetna and the Susitna rivers. The final Environmental Impact Statement was filed with the Council on Environmental Quality on December 17, 1976.

The second project is the proposed Devil's Canyon and Watana Creek Hydroelectric Dam project on the Susitna River. A draft Environmental Impact Statement for the project was made available to the public on October 3, 1975, and funds for further study have been authorized. A draft Plan of Study outlining additional investigations in the upper Susitna area was released in October 1977.

D. Forest Service

There are two ongoing Forest Service programs within the study area: (1) management assistance on nonfederal lands is provided by the cooperative State and Private Forestry Program; and (2) vegetation research is conducted by Pacific Northwest Forest and Range Experimental Station.

E. Other

There are numerous other resource related ongoing federal, state, and local programs, explained in detail in the Resource Bibliography for the Susitna Basin prepared by the Alaska Department of Natural Resources in cooperation with USDA, as part of this Cooperative Study.

IV. ISSUES, PROBLEMS, AND NEEDS

A. Issues

Within the Susitna Basin Study area, are several situations that will have significant impact upon the relatively undeveloped area in the near future. Some of them are explained below:

Increased Pressure from Anchorage - The Susitna River lies just north of the Municipality of Anchorage which contains approximately 60% of the population of the State of Alaska. Because of continued population growth in Anchorage, and its proximity to the Basin, more and more people working in Anchorage are making their homes in the lower Susitna Basin. Population growth in basin communities has been phenomenal in the last decade, and is likely to continue. In addition, many Anchorage residents have seasonal homes in the basin using the area intensively for weekend or summer recreation. Pressure is being exerted on land, water, recreation, fish, and wildlife resources from this Anchorage expansion.

Capital Relocation - The area to the east of the community of Willow has been designated by Alaska voters as the new capital site for the State of Alaska. The site lies within 100 square miles of undeveloped state-owned land. The Legislature is scheduled to convene at the new site by 1980. A population of 30,000 by 1990 is being planned for. The effects of building a state capital in such an undeveloped area will be significant.

Agricultural Classification - In 1976, state legislators issued a mandate for the State Department of Natural Resources to classify 650,000 acres of Class II and III soils land for agricultural uses within the next three years. The purpose is to encourage agricultural development in Alaska. Agricultural potential is high in the study area and land in the Susitna Basin is to be considered in this classification effort. Some of the issues which must be addressed are questions such as how much agricultural development should occur, where, what kind, and when development will start. There are over 200,000 acres of soil with the potential for crop production within the Study area. About 35,000 acres have been classified as agricultural land.

Land Trade - Through the Alaska Native Claims Settlement Act of 1971 and a special three-way land trade, the Cook Inlet Regional Corporation will obtain ownership to approximately one-third of the area of known coal deposits located in the Beluga River area. The State of Alaska has retained the authority over the remainder of the Beluga Coal Field. It is expected that the coal field development will begin within the next decade. The estimated area of the Beluga-Yentna coal reserve is 3.8 million acres.

B. Problems

The issues just explained present the general situation or broad view of the basin area. Of course there are more specific issues - actual existing resource problems to be considered,

which are expected to be intensified with future population growth and resource development. These surfaced through contact with individuals, local, and state and federal agencies and are summarized below.

1. Loss of agricultural land and imprudent land use was one of the major problems identified by local contacts. Unregulated development, uncontrolled speculation, and loss of valuable agricultural land to subdivisions and other development uses were noted. There is concern that Class II and III agricultural lands will continue to be lost to other uses unless it is identified and preserved solely for agricultural uses. Land best suited to other specific uses may be lost in the same way. The suitabilities and limitations of land and water resources must be determined to resolve this situation.
2. Flooding danger or development in flood plain was noted in the Talkeetna area, along the Little Susitna River and Houston area, along Willow Creek, along the Fishhook Road, and at other streams. With increasing development, especially along rivers and streams, the potential damage to life and property will increase. There are many acres of undeveloped land that has the potential for development and is inundated by flood water. These areas should be identified before development is initiated.
3. Reduction of fish and wildlife resources was another big concern felt for the whole

basin area due to growth and development. Without adequate protection, reduction of fish and wildlife will take place in the future as in the past.

4. Inadequate water supply was cited along Fishhook Road, in the Talkeetna and Wasilla areas, and at the 100 square mile capital relocation site. Water supply may be inadequate in other areas of existing or potential population growth and resource development.
5. Water quality problems were recorded in Talkeetna, Trapper Creek, Wasilla, Big Lake, Lake Lucille, and at other locations. More people and activity in these areas will mean an increase in water quality problems, if proper planning does not proceed future development.
6. Erosion was noted at Talkeetna, along the Fishhook Road, along the Little Susitna, and along various other streams. Soil erosion will increase as development progresses unless proper plans for land use are made.
7. Irrigation problems were noted during dry periods. There are about 200,000 acres of potential cropland in the study area. Land developed for crop production will require irrigation. Problems are inevitable unless plans are developed beforehand.

8. Drainage problems were cited at Willow, Wasilla, Houston, and various other locations. As cropland is developed and irrigation water is applied, drainage problems will occur without proper planning.
9. Lack of Comprehensive Data - Existing resource inventories are generalized with many information voids. Soil surveys, mineral location maps, land status and use maps, vegetative data, and quite a volume of other information has been collected, but often at different levels of detail, or in different formats and scales. Some has been constantly updated; some has never been updated. Often information has never been compiled at anything but on a general basis. Area emphasis has been placed on historically important locations, and some areas of future importance are notably lacking in coverage. Many useful pieces of data have been compiled into the "Alaska Regional Profiles" by the Arctic Environmental Information and Data Center. The "Profiles" do provide the foundation of a sound data inventory, but are not sufficient for comprehensive regional resource management and planning. There is a pressing need for refined water and land resource data to provide a basis for solving or planning for the resource problems noted above.

C. Needs of Cooperating Agencies

One of the most pressing needs as explained above is for comprehensive resource inventory at consistent regional scales, and comprehensive resource analysis. Several state, federal, and local planning and resource management studies are underway or scheduled, to which the Cooperative Study has direct relevance, and will provide information. Some of these include:

1. The Land Management Plan for state-owned land in the Susitna Basin.
2. The Susitna Basin regional component to the State Water Plan.
3. The ongoing update of the Matanuska-Susitna Borough Comprehensive Plan.
4. The Level B Study for southcentral Alaska.

State and local governments also have day-to-day management responsibilities and related information needs which can be aided or met by the Susitna Study. These include:

1. Land Management responsibilities such as land classification, disposal, leasing, and permitting, and rights-of-way decisions.
2. Water appropriation program.

3. Forest management policy.
4. Park and outdoor recreation policies.
5. Fish and Wildlife management.
6. Refinement of statewide resource
inventory for Susitna River region.

V. GOAL, OBJECTIVES, SCOPE AND EXPECTED RESULTS

A. Goal

The goal of the Susitna Basin Study is to facilitate a coordinated effort for the conservation, development, utilization and management of the water and related land resources. The goal is to be accomplished through inventory, interpretation, analysis, and display of basin resource data. The data will be available to individuals, private groups, and local, state, and federal agencies.

B. Objectives

Resource planning for the study area will reflect national preference for attainment of the following goals as outlined by the Water Resources Council's Principles and Standards for national, state, and local areas.

1. Enhancement of economic development through increases in the value of the output of goods and services and improvement of economic efficiency.
2. Enhancement of the quality of the environment through the management, conservation, preservation, creation, restoration, or improvement of the quality of certain natural and cultural resources and ecological systems.

Given anticipated technical and social developments, it may be impossible to simultaneously achieve these objectives. Consequently, one of

the objectives of the study is to provide relevant data to assist decision makers in evaluating alternative courses of action for resource development in the study area. Information developed will be used by USDA to coordinate its water and land resource development and conservation programs with those of state and other federal agencies. Resource data will be developed and compiled to make it suitable for use by local decision makers and by state and federal agencies for developing management plans and initiating action programs for water and land resource conservations.

The patterns of water and land use to meet needs projected for 1985, 2000, and 2020 and the opportunities for USDA and other programs and projects to contribute to the attainment of these needs will be studied and evaluated in cooperation with other interested state and federal agencies. The area's water and land resource use and management of alternative patterns and schedules of development will be evaluated.

The specific objectives as set forth by the cooperating state agency are as follows:

1. Obtain baseline resource data of the Basin.
2. Make available an analysis of the resource data within a year by sub-basins to potential users.
3. Place data in computer storage where it can be recalled or updated on a continuing basis.

4. Evaluate resources and management alternatives.

C. Scope

The scope of the study shall address the priority areas established by the State (See Figure 2) as they relate to hydrologic sub-basins. Each sub-basin will be addressed in order of priority. The Study shall continue for about ten years starting in December 1976 and ending in 1986.

The Study of each sub-basin shall consist of three phases:

1. Organization.
2. Inventory and Analysis.
3. Development and Evaluation of Alternative Uses.

Interim reports for each sub-basin will follow completion of all three phases, and a basin report will follow completion of all sub-basin investigations. The Organization Phase is scheduled for completion upon approval of the Plan of Work. Phases 2 and 3 shall take place first on the Willow Sub-basin, next on the Talkeetna Sub-basin, next on the Beluga Sub-basin, followed by the Upper Susitna Sub-Basin.

The schedule set forth in this plan of work and work outline assume the completion of the entire basin. When the State's present priority areas have been addressed, the study effort may be

directed to other River Basin priority areas within the State of Alaska.

The estimated time schedule is as follows:

Willow Sub-basin	FY 1977 - 1982
Talkeetna Sub-basin	FY 1978 - 1984
Remainder	FY 1979 - 1986

The scope of the Study shall be the addressing of the issues, problems, and needs identified by the state and local governments within the legislative jurisdiction of the USDA. Work maps will be at 1:63,360 and 1:25,000 scale. The final report maps will be at a scale of 1:250,000.

Results of continuous public and state involvement program may show a need for changes in field work, study emphasis or direction. Problems and needs may evolve with time, and may change the priority of study areas. Therefore, priorities will be reviewed on an annual basis and revisions made in the Plan of Work as necessary.

D. Expected Results

The Study will provide water and related land resource managers with knowledge of the probable consequences of alternative courses of action, and as such, a sound basis for coordinated resource management planning. The information will be presented in map and narrative form, useful to land managers and planners. A series of consistent-scaled resource map overlays will

be produced, which used together will show composite limitations and suitability for resource uses. Several alternatives for resource use will be presented and evaluated. Narrative and tabular analysis will accompany overlay series material, evaluation of alternatives, and any other map material. Accessible computer storage will be provided for all relevant data. In addition to sub-basin interim reports, a final document summarizing the resource inventory and evaluation will be presented at completion of the study.

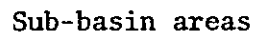
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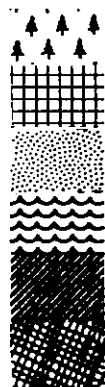
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LEGEND



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

State priority
areas



#1
#2
#3
#4
#5
#6

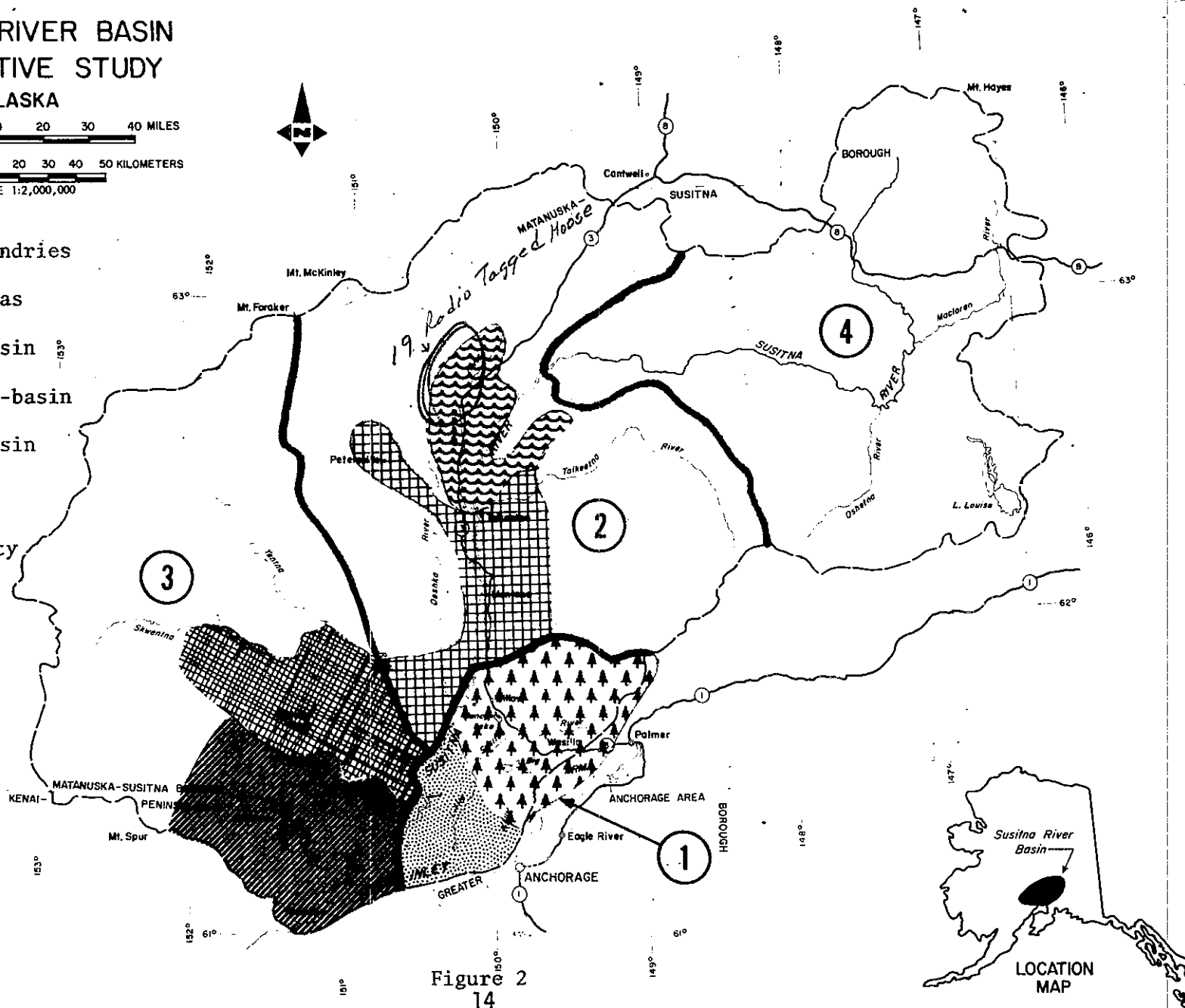


Figure 2
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VI. ADMINISTRATION OF THE STUDY

The administration of the Study is through the USDA Field Advisory Committee (FAC). The FAC members are:

Weymeth E. Long, Chairman, State Conservationist, Soil Conservation Service, Anchorage, Alaska

Marvin Meier, Director, State and Private Forestry, Region 10, U. S. Forest Service, Anchorage, Alaska

Dr. Clyde E. Stewart, Economics, Statistics, and Cooperatives Service, Logan, Utah

This committee will meet at the call of the chairman or at the request of any member to give direction, survey activities, consider budgetary needs, review reports and progress by the USDA Field Party and transact other business.

A. USDA Responsibilities

The Soil Conservation Service is responsible for administration of USDA activities in connection with river basin investigations and preparation of reports thereon. The SCS is responsible for development of general principles, criteria, and procedures.

The Soil Conservation Service is responsible for making physical appraisals of agricultural and rural water problems, and resource development needs and defining them in terms of meeting regional and community economic needs for water-related goods and services. The SCS determines

the conservation treatment needs for nonfederal open lands within river basins. The SCS determines the development potentials of upstream watersheds, including their physical and economic feasibility and effects; determines the scope and scale of upstream watershed development needed, and coordinates this with the proposals of other departments.

The Soil Conservation Service, with the Forest Service and the Economics, Statistics, and Cooperatives Service, coordinates with the Water Resources Council, federal, state, regional, and local organizations in program formulation, budget coordination, and development of guidelines and procedures. The SCS also reviews project proposals of other departments related to river basin activities, and assumes responsibility for the preparation of the USDA comments.

The Forest Service is responsible for all aspects of River Basin planning relating to woodlands and forested lands, federal and nonfederal, the rangelands within and adjacent to the National Forests, and other mountainous watershed wild lands. The FS provides the analyses and projections of economic activity related to the multiple uses and products from forests, woodlands, and wild lands, and interprets these projects with respect to the use of and requirements for water and related lands.

The Forest Service is responsible for appraising the suitability and capability of forested lands to satisfy future demands for products and services and determines the kinds, amounts, and costs of watershed management practices needed. The FS determines for forested and related wild

lands the hydrologic characteristics as to runoff, water yields, sediment, and erosion.

The Forest Service estimates and evaluates the impacts of water resource development plans and proposals of USDA and other agencies upon the forest resource - public and private. The FS carries out continuing coordination with other land management and conservation agencies - federal, state, and local. The FS participates in the identification of areas having opportunities for feasible USDA projects and programs (PL-566, RC&D, National Forest Development, etc.) to help meet the development needs of the River Basin.

The Economics, Statistics, and Cooperatives Service is responsible for economic aspects and elements of the USDA program in comprehensive River Basin planning. The ESCS develops and analyzes the agricultural economic base of the River Basin studies to include an appraisal of trends in land and water use. The ESCS develops projections of agricultural production, employment, income, rural population, and land use for the economic analysis of agricultural water management needs and potentials. ESCS also analyzes the economic impact of flood prevention, land drainage, irrigation, and other water development programs on production, employment, and income in agriculture and related sectors of the economy. The ESCS evaluates the demand for and the economic benefits of water-based recreation development. The ESCS also participates in the formulation of comprehensive plans for River Basin development including the analysis of economic benefits from alternative plans.

The overall responsibility of the Study will be assigned to the River Basin Planning Team under the guidance of the Field Advisory Committee. The agency responsible for data gathering and analysis is set forth in the work outline.

Leadership of the Study Team will be provided by the Project Leader. The River Basin Planning Team will work as an interrelated, inter-disciplinary team whenever possible. Due to the lack of a developed road system throughout the study area, aircraft and water transportation will be necessary for data gathering. The inter-disciplinary team approach will help cut transportation cost, and provide for continual sharing and comparing of data as it is collected.

B. State of Alaska Responsibilities

The State of Alaska, represented by the Alaska Department of Natural Resources, will work directly with the USDA throughout the life of the Study. The DNR will be involved in all phases of the project from development of objectives and priorities, to membership on the study team when appropriate, to review of schedules, drafts, interim, and final reports. State departments other than DNR will be contacted as appropriate for information, technical assistance, or direct participation.

C. Other Federal Agencies

Available data and expertise from other federal agencies will be utilized to the fullest extent possible. Federal agencies with interest in the Cooperative Study, such as USGS, USF & WS, Corps

of Engineers and others, will be contacted to provide technical assistance or direct participation to help accomplish the goals of the Study.

D. Arrangements for Coordination

The Study will require cooperation and coordination with local, state, and federal agencies. The planning team will make itself aware of and keep up with any relevant resource studies in the area to provide for maximum coordination and to prevent duplication or incompatibility. As information is collected, analyzed, and displayed, it will be provided to local and state agencies and to ongoing programs. Liaison between the Study Team and the Borough and the different public groups will be made through the State Department of Natural Resources, and maintained by the entire Study Team.

The use of computerized project control is anticipated for the Study. This tool can provide useful information concerning the status of the project at any point in time to managers. Schedule adjustments or schedule updates can be made.

It should be stressed that this cooperative study will and should maintain an "open ended" approach for items and procedures covered in the following work outline. The State of Alaska, with its great magnitude of uncommitted land and undefined natural resources, may, and no doubt will, change direction of predicted development or need of baseline information. The River Basin Cooperative Study must maintain its ability and diversity to meet this challenge.

In order to provide leadership and support to the Study, the following individuals, which are not shown in the work outline, will be needed:

Project Leader - full time (shown in part in work outline)

Engineer Technician - full time

Computer Programmer - part time

Secretary-Typist - part time

Secretary-Typist - part time

USDA MAN-YEARS REQUIRED BY AGENCY AND DISCIPLINE

	<u>1</u>	<u>2</u>	<u>Remainder of Basin</u>	<u>Basin- wide</u>	<u>Total</u>
<u>ESCS</u>					
Economist	1.9	1.8	1.6	1.6	6.9
<u>FS</u>					
Forester	1.4	1.6	2.6	1.9	7.5
<u>SCS</u>					
Hydraulic Engineer	2.2	2.2	3.6	1.9	9.9
Soil Scientist	.8	1.0	1.7	1.8	5.3
Geologist	1.1	1.1	2.1	.8	5.1
Economist	1.3	1.3	2.2	.6	5.4
Agronomist	1.0	1.0	1.8	.5	4.3
Soil Conservationist	.8	.8	1.4	.4	3.4
Range Conservationist	1.3	1.2	2.3	.9	5.7
Temporary	1.7	1.7	3.5		6.9
TOTAL	13.7	13.7	21.9	10.4	60.4

VII. WORK OUTLINE

A. Phase 1

Organization (Identify Problems and Needs and Establish Objectives) - This phase of the Study is devoted to organizational management activities and development of a plan of work. This includes identification of problems and needs, specific objectives, and development of a strategy for continuing public involvement throughout the life of the Study. Problems, needs, and objectives were determined by several State of Alaska departments, as well as by local, federal, and public and private groups. These have been utilized to direct field work and analysis to assure that data required for actual planning and resource management activities are provided by this cooperative River Basin Study. Priorities for investigation and analysis, have also been assigned by the state and local groups. These will be used by the River Basin Study Team in developing time schedules and budgets for the field work. After counseling with the State of Alaska and other sponsors, field work will progress in a coordinated manner to provide information for priority geographic areas and priority resource issues first.

B. Phase 2

Inventory and Analysis - This phase of study will include inventory and analysis of land and water resources by sub-basin with special consideration to state and local objectives. Along with resource inventories, an economic base inventory will be made, with projections of economic activity (population, employment, need

for resources) for 1980, 1985, 2000 and 2020. Once inventories have been completed, the information will be brought together for a look at the sub-basin resource situation. Socio-economic trends will be analyzed. Separate maps and overlays interpreting the newly-generated resource data may be used together for an idea of what the composite suitabilities and limitations of the land and water are. The opportunity to look at soils, water supply, vegetative, and demographic information simultaneously will show where potential or existing resource conflicts are, and give a preliminary idea of how or whether use of one resource will affect another. Composite suitability and limitations maps will be produced, flagging critical or conflict areas. These will be presented to and used by resource managers for their specific decisions. For example, where is the best or likely location for a new townsite or industrial complex, or park or wildlife preserve.

Data will be compiled by hydrologic units and displayed at scales of 1:25,000 in areas now being developed or scheduled for development within the next few years; 1:63,360 for areas which have a high probability for development in the near future; and 1:250,000 for the remaining area. The areas will be determined by the State and Borough. It will be digitized and stored in a permanent, retrievable computer file. It will be mapped and stored, and computer files will be updated as the Study progresses.

Relevant resource agencies - federal, state, and local - will be contacted as necessary. The detail to which the information will be collected will depend on state and local needs, status of

existing information, relative importance of the geographic area and resource issue.

C. Phase 3

Evaluation of Alternative Uses - In this phase, resource use alternatives will be selected and studied to show the range and implication of the resource suitability and limitations developed in Phase 2. Socio-economic study will be tied closely to this phase. Using the maps and the socio-economic trends and projections developed in Phase 2, the economic and environmental effects of each selected particular resource use will be studied. The effect of increased agricultural, timber, or outdoor recreation activity for example, on other resources and on the socio-economic base will be investigated. At the same time, the effects of predetermined socio-economic growth on needs for resources will be evaluated. After economic and environmental effects of different use alternatives are presented, guidelines for alternative selection will be formulated.

At least four alternative analyses will be conducted after present conditions are determined: (1) present conditions without a plan for development or other programs; (2) one emphasizing state and national economic development; (3) one emphasizing environmental quality; and (4) at least one based on local preferences. These alternatives will be based on projections for time periods 1980, 2000, and 2020.

Land and Water Management (Considered as Phase 4, but not part of this study) - Actual land

and water management and planning will not be accomplished by the Cooperative Study. Rather, the Cooperative Study will provide resource information, analysis, and guidelines (the basis of resource planning and management) to those doing the planning. Borough and State resource managers are now in need of such guidelines. The Matanuska-Susitna Planning Department is updating its Comprehensive Plan - the document which directs management of the resources for a period in which vast changes are expected. The State Department of Natural Resources will be involved in a major planning effort for state-owned land in the Susitna Basin, as well as in a regional water plan for the Susitna River area. Comprehensive data inventory and analysis provided by the Cooperative Study will be necessary to these as well as numerous other planning programs. Members of the Susitna Study Team as well as other USDA technical experts will be valuable participants in these programs. More detail of specific tasks and work activities involved in these four phases are presented in the following pages, and in a chart showing relationship of study phases.

NOTES

STUDY PHASES

PHASE 1

Organization and Setting of Objectives

1. Identify basin resource issues, problems, needs, and objectives by consulting state, federal, borough, and local resource agencies.
2. Involve local citizens, local government leaders, and special interest groups in formulating study objectives, issues, problems, and needs.
3. Determine priority geographical areas and issues for study.
4. Develop Plan of Work.

1. Assemble existing relevant published information, maps, etc.
2. Investigate other ongoing projects.
3. Annotate above information.

Publish and distribute a Resource Bibliography to all interested agencies.

COORDINATED EFFORT

PHASE 2

Inventory

WATER: Location, Quantity, Quality, Uses, Needs

SOILS: Soil Survey by Soil Types

SURFACE GEOLOGY: Hazard Identification, Potential Mineral Sources

VEGETATION: Quantity, Quality, Type Identification

FISH & WILDLIFE: Populations, Activities, Habitat Needs

RECREATION: Identify Areas with Opportunity for Conservation, Development, Enhancement

CULTURAL/HISTORICAL: Identify Sites

FLOODING: Potential Flood Area, Frequencies, Magnitude, Historical Information, Damageable Property

LAND USE: Existing Patterns

LAND STATUS: Proposed Changes

SOCIO-ECONOMICS: Baseline information, Historical Trends, Future Projections, and Demand for Resources

STUDY PHASES

PHASE 2

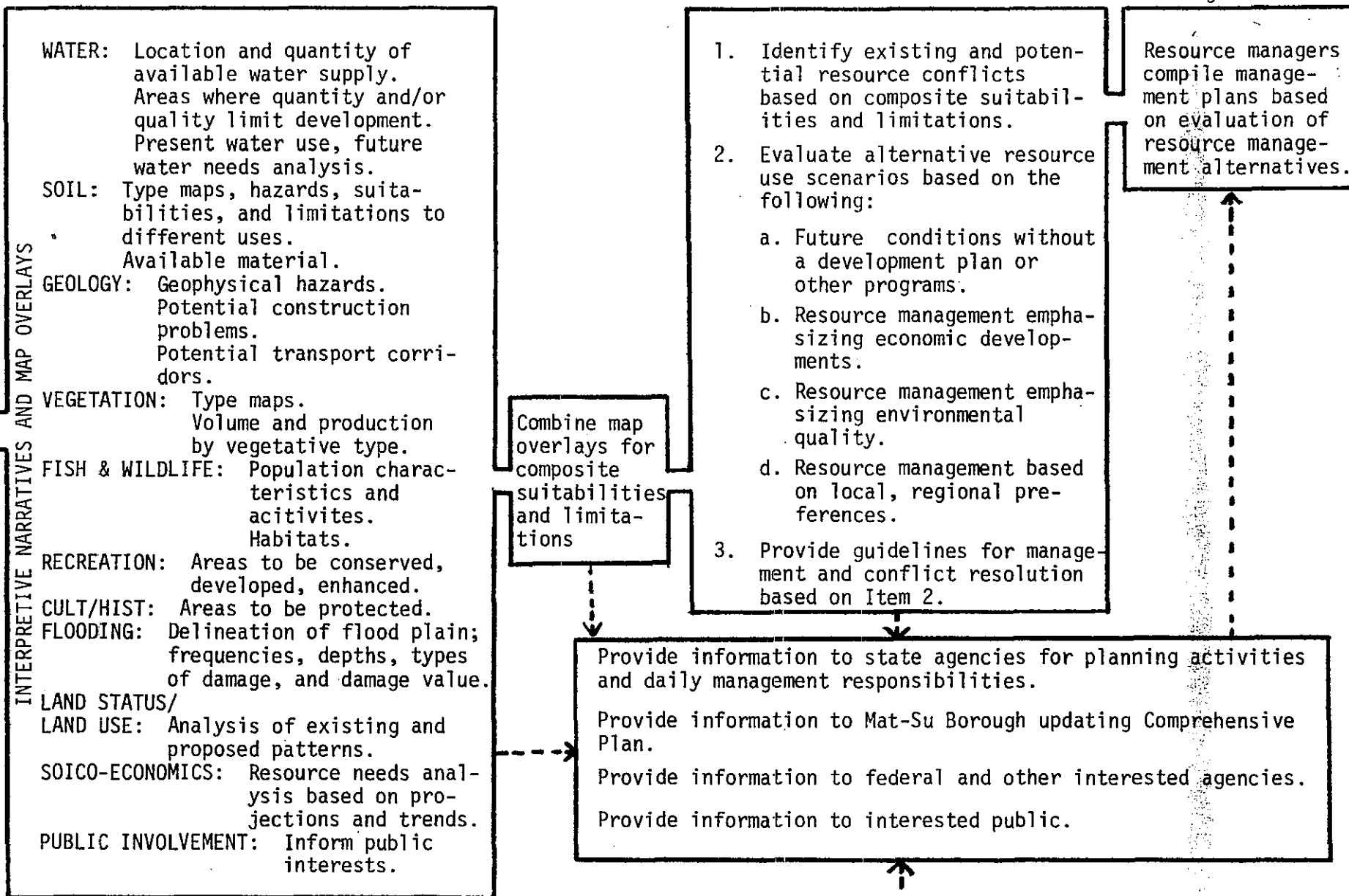
Analysis

PHASE 3

Evaluation of Alternatives

* PHASE 4

Land and Water Management



NOTES

PHASE 1
Organization

Key to Abbreviations Used in Charts

ESCS	-	Economics, Statistics, and Cooperatives Service
FS	-	Forest Service
SCS	-	Soil Conservation Service
DNR	-	Department of Natural Resources
USFS	-	United States Forest Service
USGS	-	United States Geological Service
E	-	Economist, ESCS
F	-	Forester, FS
HE	-	Hydraulic Engineer, SCS
SS	-	Soil Scientist, SCS
G	-	Geologist, SCS
SE	-	Economist, SCS
A	-	Agronomist, SCS
SC	-	Soil Conservationist, SCS
RC	-	Range Conservationist, SCS
T	-	Temporary, SCS
PL	-	Project Leader, SCS
B	-	Biologist, State/Federal

PHASE: 1 Organization

ACTIVITY: A Organization and Setting of Objectives

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
1A1	Determine general USDA management procedures with sponsoring agencies.	SCS	PL	06/76	06/77
1A2	Determine initial study team personnel and basic office equipment needs.	SCS	PL	06/77	11/77
1A3	Establish problems, needs, and objectives with sponsoring agencies.	SCS	PL	02/77	10/77
1A4	Establish specific component needs for study concerns established in item 3.	SCS	PL	04/77	10/77
1A5	Identify work items; determine who will be responsible for work item; determine number of days required to accomplish work item; determine duration, starting, and completion date for work items; estimate cost by USDA agencies.	SCS	PL	04/77	01/78
1A6	Prepare first draft of Plan of Work, and distribute for comments.	SCS	PL	05/77	03/78
1A7	Revise and prepare draft Plan of Work for WAC.	SCS	PL	03/78	04/78
1A8	Prepare final Plan of Work and distribute.	SCS	PL	04/78	05/78
	Sub-total of man-days Basinwide				
	Total man-days (Activity)				

MAN-DAYS BY AGENCY AND DISCIPLINE

Organization and Setting of Objectives

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
15	20	20	20							75	30					105
5	5	5	5							20	5					25
10	10	10	10		3					43	20					63
10	10	10	10		3					43	10					53
55	60	60	60							235	60					295
15	20	20	20							75	20					95
15	20	20	20		3					78	20					98
15	20	20	20		5					80	20					100
140	165	165	165		14					649	185					834
140	165	165	165		14					649	185					834

PUBLIC INVOLVEMENT

During Phase 1, activities to involve the public and relevant federal, state, borough, and local governments were of essential importance. In order to outline a study relevant to and used by resource managers and planners, the managers and planners themselves were involved in study formulation. To be sure that data collection is not duplicated, and that special expertise is utilized, federal, state, and borough resource agencies were also consulted. To provide for individuals to express their concerns and use to advantage the experience and knowledge stored over many years (or even a few years) by area residents, the general public was asked to participate. The public participation strategy for the Cooperative Study is to keep the public informed of study progress, and to involve them in every case when there is a realistic way to utilize their input.

In the winter of 1976, preliminary information explaining the nature of cooperative studies was sent to numerous federal and state agencies. Each was asked to comment and help identify study objectives and needs. At the same time a questionnaire was sent to over 300 study area residents, native groups, business groups, environmental groups, borough government members, local government members and special interest bodies, again explaining the study and requesting that area natural resource problems and study objectives be identified. In addition, the questionnaire was published in three Susitna Valley newspapers. Responses from both the

government groups and public were used in developing study plans, objectives, and in formulating the Plan of Work. All those responding to questionnaires were personally written thank you letters, with a summary of questionnaire results included. Special note was made of any returned questionnaires offering particular information or assistance. (Several people, in fact, offered data they had collected themselves over time).

Meetings were held with the Army Corps of Engineers, USGS, state departments, Matanuska-Susitna Borough, and numerous other groups to explain the study and solicit participation and interest. The first draft Plan of Study was reviewed by several state departments and the Matanuska-Susitna Borough.

During Phase 2, as milestones were reached (funding was appropriated, field work began, etc.) brief news releases were published in Susitna Valley and Anchorage newspapers. Very close contact between the Cooperative Study and the Matanuska-Susitna Borough Planning Department has been maintained, and contact has been very productive. The Borough has helped outline several projects of the Cooperative Study (the bibliography and land use atlas project are examples), guaranteeing their use upon completion.

A series of meetings to identify community goals boroughwide was held through the summer and fall of 1977. The meetings were organized by the Borough Planning Department and Borough Assembly with the express purpose of explaining the

planning process and the need for comprehensive planning in the area. Members of the Cooperative Study attended these meetings to meet and speak with the local participants, and gave short oral presentations explaining the Cooperative Study to the group upon being introduced by the Borough Planning Director.

State departments, federal agencies, and the Matanuska-Susitna Borough Planning Department will all receive copies of the final draft Susitna Study Plan of Work for review and comment. In addition, governmental agencies, such as the Corps of Engineers, USGS, State DGGs, Division of Parks, Department of Fish and Game as well as the Mat-Su Borough and others have been invited to meetings to help determine special requirements for each resource study (where water monitoring stations are needed for example).

Liaison between the Cooperative Study and the recently appointed Capital Site Planning Commission has been provided by the Department of Natural Resources. Liaison between the Cooperative Study and the Level B Study has been through Cooperative Study team member's participation in Level B Study Task Force Work Groups.

Meetings will be held with relevant agencies throughout Phase 2, with the goals of remaining responsive to changing priorities and needs and of preventing duplication. As appropriate, newspaper releases will be published. The study team will strive to keep itself aware of ongoing and upcoming programs, present updates, progress

reports, and public workshops as appropriate. (The annotated bibliography being prepared for the Cooperative Study will aid the team in keeping up with other projects and studies).

During Phase 3 the public and the borough as well as federal and state agencies will be involved in selection of alternative resource use scenarios for study and in determination of guidelines for resource uses. Workshops, displays, and further questionnaires will be used as appropriate during this phase. Newspaper and newsletter releases will continue as will liaison with borough, state, and federal agencies.

The results of public involvement throughout Phases 1, 2, and 3 will be used in Phase 4 (not part of this study), and will be a vital input to the management plans. Public involvement will be continuous throughout Phase 4.

PHASE: 1 Objectives and Plan of Work
 ACTIVITY: B Public Involvement Work Outline*

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
1B1	With state, federal, and advisory committees, determine public concerns within the basin through public meetings and mailing questionnaires to individuals living in the Basin.	SCS	DNR	09/76	04/78
1B2	Meet with sponsor and other government agencies to determine the needs and concerns within the basin.	SCS	DNR	10/76	02/78
1B3	Review and analyze responses from other government agencies, public meetings, and questionnaire. Use data interpretation for Phase 2 of the Plan of Work.	SCS	DNR	06/77	02/78
1B4	Prepare and provide study information to the news media.	SCS	DNR	06/77	04/78
1B5	Review and analyze local and borough comprehensive development plans and policies. Incorporate their needs and desires into the Plan of Work.	SCS	DNR	10/76	10/77
	Total man-days (Activity)				
	*Work to be done jointly under a cooperative agreement				

MAN-DAYS BY AGENCY AND DISCIPLINE

Public Involvement Work Outline

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
5	10	10	10							35	40					75
5	10	10	10							35	30					65
5	5	5	5							20	20					40
5	5	5	5							20	30					50
5	5	5	5							20	20					40
25	35	35	35							130	140					270

RESOURCE BIBLIOGRAPHY

Discussion - The Resource Bibliography for the Susitna River Basin was prepared from June to September 1977 by the Alaska Department of Natural Resources. The purpose of the project was to collect, annotate, and evaluate all existing resource data relevant to the Cooperative Study. The bibliographic search acts as a first step to the Cooperative Study, and to comprehensive planning. It reveals voids and weaknesses in resource information, acting as a reference point for further data inventory while preventing duplication of future data collection efforts. Only by identifying the state of the existing resource data base, can the Cooperative Study outline practical and relevant field work. The resource bibliography is directly useful to the DNR-SCS Cooperative Study, yet has a variety of other uses and applications. As the project is directly applicable to the Matanuska-Susitna Borough Comprehensive Plan Update, the Borough Planning Department was consulted on bibliography form and content at the start of the project. The project has provided for collection of two sets of the actual resource reports and maps annotated in the bibliography. One set will be given to the Matanuska-Susitna Borough, and one set will be shared by the Cooperative Study participants. The bibliography may be used by any resource agency now working or planning work in the Susitna Basin area, as an overview of what has already been done. It should be useful to the Capital Planning Commission, to the numerous federal and state agencies working in the vicinity, and to local governments.

Procedure - Research for the project involved contact and interviews with federal, state, and local resource agency representatives and review of resource libraries, other bibliographies, and retrieval systems to evaluate the state of the existing data base.

Published maps and documents and ongoing projects were annotated for the following resource categories: Geology, hydrology, soils, fish and wildlife, vegetation, recreation and archeology, land use and land status, climate, and miscellaneous references.

Annotations for published information specify title, author, and date of publication; area covered; interest level relative to the Susitna Cooperative Study; description of scope, methodology, and findings of the document; explanation of maps, tables, and charts included; and document availability. Annotations for ongoing programs include title, person to be contacted for more information, area covered, status, and duration of project.

An introduction to the bibliography includes a user's guide, a list of sources utilized for each resource topic, an evaluation of the existing data base, and suggestions for necessary future field work.

Because so many studies and resource investigations are ongoing or proposed for the next few field seasons, it is essential that the resource bibliography be continually updated. A concentrated update effort before each field season

would keep the field team responsive to ways of sharing and coordinating field work. Emphasis in the update would be placed on the geographic areas and resource inventories being covered in the coming field season. For the yearly update, progress and status of former ongoing projects should be checked, agencies recontacted, and newly generated information collected (for the Susitna library) and annotated as additional bibliographic entries.

The bibliography was printed in November 1977, and will have wide distribution. The document shall be bound so that update information can be published, sent out, and put in place in the original document. This will provide for a continually current document. One month per year, preferably March or April, should be adequate for the update. It was not possible to put the resource bibliography on computer storage and retrieval system in 1977. This task should be accomplished in 1978 along with the first year update.

PHASE: 1 Objectives and Plan of Work

ACTIVITY: C Resource Bibliography*

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
1C1	Contact Federal, State, Borough and local governments, and other persons for information on existing resource documents and continuing and proposed projects relevant to the Cooperative Study. Research resource libraries and resource information retrieval systems.	SCS	DNR	08/77	01/78
1C2	Collect and annotate documents. Prepare and publish a report on the findings.	SCS	DNR	08/77	01/78
1C3	Update bibliography before each field season during the life of the Study.	SCS	DNR	10/78	
1C4	Store bibliographic information in existing State of Alaska retrieval system.	SCS	DNR	01/78	
	Sub-total of man-days Basinwide				
	Total man-days (Activity)				
*By contract with the State of Alaska - Department of Natural Resources.					

MAN-DAYS BY AGENCY AND DISCIPLINE

Resource Bibliography

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
5	5	5	5		5					25	27					27
											80					105
											100					100
											5					5
5	5	5	5		5					25	212					237
5	5	5	5		5					25	212					237

NOTES

PHASE 2

Inventory and Analysis

WATER RESOURCES (Water Quantity, Quality, Use, and Management)

Discussion - The objective of the water resource studies is to determine the quantity, quality, and present and future uses and needs of surface and ground water. An SCS geologist will assist in the planning and the review of the ground water studies. This can assure that adequate geologic mapping has been done to delineate the sources and quantities of ground water that are available for development. His expertise will be especially valuable in the location and drilling of test wells. These studies are needed to assist planners in developing comprehensive land and water management plans.

In the study area there are about 800,000 acres of soils that have a potential for farming and pasture land development. The State of Alaska has classified 35,000 acres as agricultural land.

Water resources need to be more accurately defined before development starts so baseline data will be available for planning purposes and development of environmental impact statements. Details of the water monitoring system are set forth in the following sections: Surface Water, Ground Water, and Water Quality.

Water resource data will be displayed on maps, in charts and tables, and then coded and stored for use in the analysis section, Phase 3, of this study.

Climate is important in water resource studies. Precipitation, temperatures, and wind data are needed to make a complete analysis. Snow pack and rainfall data are needed to establish correlation with runoff gages. Climatological data is limited in the study area, and additional climatological data sites will be necessary. There may be gaps to fill in already published data, but most important, a few data sites are needed within the foothill areas to refine published weather service technical papers. These sites would be within the drainages of the proposed new stream gaging sites.

Procedure

Surface Water - Surface water data, USGS records, and other surface water records will be analyzed to determine the amount (acre feet, cubic meters, cubic feet per second, cubic centimeters per second) of surface water supply. Average monthly, average annual, and seasonal discharges will be estimated. Volume duration-probability analysis will be made to develop chance of occurrence levels. Daily discharges for specific months and/or seasons, and low flow for some streams, will be determined. Present water uses will be determined, and future uses and demands will be projected. This data will be used to determine the amount of surface water available, present water use, future water demands, and adequacy of supply in relation to future demands.

The available data will be analyzed and, with necessary correction factors, will be used to determine streamflow in ungaged areas. This will be difficult and at the best will be a rough estimate of surface water availability. The existing stream gaging system is mostly on the mainstem of the Susitna River (three gages), four gages on large tributaries, and one gage on a small tributary.

The hydrology and hydraulics of the areas gaged will differ tremendously from much of the ungaged areas. Most of the stream gages are located on streams that receive water from glacier melt, but snow melt is the source of water from much of the ungaged area.

Hydraulics of most of the gaged area are natural channels with normal obstructions, constrictions, etc. Hydraulics in much of the ungaged area is complicated by the streams passing through lakes and large areas of muskegs.

Adjustments to the existing data will be based on experience. Field reconnaissance, aerial photography, USGS quadrangles, landsat data, and other agency work will be used in an effort to make the best estimate possible.

Water monitoring system needs - The Work Outline proposes a minimum stream measuring and monitoring system which will bring the surface water data to a level needed for developing competent land use and water plans. Five continuous recording stream gaging stations, ten partial record stations, and measure of ten lakes with maximum and minimum levels have been determined necessary for this purpose.

Ground Water - Ground water studies will be made to locate ground water aquifers, and determine the depth, volume, and pumping rate of the aquifers. Available data will be used to the fullest extent possible. One well in the Wasilla area and one in the Beluga area have been drilled recently and could be used for test pumping. The rest of the wells are shallow, small diameter wells, and do not lend themselves to test pumping for large volumes of water.

Two deep wells are being proposed to enable the study to present more reliable ground water data. The wells will determine depth to water, drawdown, and type of aquifer. One is in the vicinity of Houston, and the other is in the vicinity of Talkeetna. Existing ground water supplies will be compared to future demand to determine adequacy.

Ground water aquifers and other ground water data will be displayed in general on maps at a scale of 1:250,000, but in specific areas of intense buildup, a map scale 1:63,360 will be used to show the necessary detail.

Water Quality - Water quality will be determined from the standpoint of water use - present and future. Available data will be analyzed and compared to standards set forth by EPA and the state. With these comparisons, use restraints incurred by water quality will be flagged. The main use of the data will be to determine existing water quality on some streams to establish baseline conditions with little or no development in the area. This baseline data can be used to determine the impacts of future development on water quality.

The main emphasis in this study will be placed on pollutants which will affect water use for residential, irrigation, recreation, fisheries, commercial and urban buildup, and the impacts that those uses may have on water quality. Point and nonpoint pollution problems will be identified, and alternatives for solving the problems will be evaluated and displayed. The water quality parameters of importance to consider for recreational, fish and wildlife, agricultural, and municipal-industrial uses are:

Discharge	Total Phosphorus
D.O.	Orthophosphate
Temp	Potassium
Turbidity	Magnesium
pH	Calcium
Color <u>1/</u>	Sodium
Suspended Sediment	Chloride
Conductivity - T.D.S.	Silica
Coliform (Total-Fecal)	Metals <u>2/</u>
Fecal Strept.	Pesticides <u>2/</u>
Alkalinity (As CaCO_3)	Phenols <u>3/</u>
Nitrate	Hardness as CaCO_3 <u>3/</u>
TKN	B.O.D. or C.O.D. <u>4/</u>

1/Questionable value for most water quality analyses.

2/The need for metal analysis will be based on the probability the metal is present in quantity of concern.

3/Primarily for municipal considerations.
May be omitted if municipal uses are not expected.

4/Normally be required if organic material is present in the water supply at a quantity to cause an oxygen demand.

Existing data defines water quality in a limited area of the basin. The study proposes additional water quality data be gathered in areas where there is no data available. This will be closely coordinated with USGS and Alaska Department of Environmental Conservation. These are located within or near areas with soils which have potential for farm and pasture land development. New water quality monitoring stations will provide baseline data that will enable a basis for sound decision making and planning, and the development of environmental impact statements when development is proposed.

PHASE: 2 Inventory and Analysis

ACTIVITY: A Water Resources - Surface Water Quantity

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
2A1	Analyze existing surface water data (use bibliography).	SCS	HE	04/78	09/78
2A2	Calculate average annual discharge (cubic feet per second (c.f.s.) and acre feet (A.F.)).				
a	Sub-basin 1	SCS	HE	04/78	06/78
b	Sub-basin 2	SCS	HE	04/81	06/81
c	Remainder of basin	SCS	HE		
2A3	Calculate average monthly discharge (c.f.s. and A.F.).				
a	Sub-basin 1	SCS	HE	04/78	01/79
b	Sub-basin 2	SCS	HE	04/80	01/81
c	Remainder of basin	SCS	HE		
2A4	Calculate daily discharge for specific months (c.f.s. and A.F.).				
a	Sub-basin 1	SCS	HE	04/78	03/79
b	Sub-basin 2	SCS	HE	04/80	03/81
c	Remainder of basin				
2A5	Develop average annual precipitation (inches).				
a	Sub-basin 1	SCS	HE	09/78	04/79
b	Sub-basin 2	SCS	HE	09/78	04/79
c	Remainder of basin	SCS	HE		
2A6	Determine low-flow discharge for specific streams (c.f.s. and A.F.).				
a	Sub-basin 1	SCS	HE	04/78	05/79
b	Sub-basin 2	SCS	HE	11/80	12/80
c	Remainder of basin	SCS	HE		
2A7	Locate new stream gaging stations with the State and USGS, and prepare a cooperative agreement with them for installation and operating of the new stations.				
a	Sub-basin 1	SCS	HE	04/78	09/78
b	Sub-basin 2	SCS	HE	04/78	09/78
c	Remainder of basin	SCS	HE		

MAN-DAYS BY AGENCY AND DISCIPLINE
Water Resources - Surface Water Quantity

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
											80					80
											40					40
											40					40
											80					80
											40					40
											40					40
											80					80
											40					40
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											80					80
											40					40
											40					40
											80					80
											20					20
											20					20
											40					40
		20		2							22		20			42
		20		2							22		20			42
		40		4							44		40			84

PHASE: 2 Inventory and Analysis

ACTIVITY: A Water Resources - Surface Water Quantity - continued

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
2A8	Determine surface water supply.				
a	Sub-basin 1	SCS	HE	09/78	11/78
b	Sub-basin 2	SCS	HE	11/80	01/81
c	Remainder of basin	SCS	HE		
2A9	Develop volume-frequency for 50% and 80% reliabilities.				
a	Sub-basin 1	SCS	HE	04/78	10/78
b	Sub-basin 2	SCS	HE	04/78	01/80
c	Remainder of basin	SCS	HE		
2A10	Determine surface water use.				
a	Sub-basin 1	SCS	HE	04/77	04/80
b	Sub-basin 2	SCS	HE	03/82	04/82
c	Remainder of basin	SCS	HE		
2A11	Map surface water resources.				
a	Sub-basin 1	SCS	HE	04/79	04/79
b	Sub-basin 2	SCS	HE	04/82	04/82
c	Remainder of basin	SCS	HE		
2A12	Digitize for use in alternative analysis.				
a	Sub-basin 1	SCS	HE	04/79	04/79
b	Sub-basin 2	SCS	HE	04/82	04/82
c	Remainder of basin	SCS	HE		
2A13	Develop interim report.				
a	Sub-basin 1	SCS	HE	04/78	11/80
b	Sub-basin 2	SCS	HE	11/80	11/83
c	Remainder of basin	SCS	HE		

MAN-DAYS BY AGENCY AND DISCIPLINE
Water Resources - Surface Water Quantity - continued

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
		30								30						30
		30								30						30
		60								60						60
		20								20						20
		20								20						20
		60								60						60
		10								10						10
		10								10						10
		20								20						20
		3								3						3
		3								3						3
		6								6						6
		2								2						2
		2								2						2
		4								4						4
		20								20						20
		20								20						20
		40								40						40

PHASE: 2 Inventory and Analysis

ACTIVITY: A Water Resources - Surface Water Quantity - continued

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
	<p>Sub-total of man-days</p> <p> Sub-basin 1</p> <p> Sub-basin 2</p> <p> Remainder of basin</p> <p> Basinwide</p> <p>Total man-days (Activity)</p>				

MAN-DAYS BY AGENCY AND DISCIPLINE

Water Resources - Water Surface Quantity - continued

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
		105		2						107	180		20			307
		105		2						107	180		20			307
		210		4						114	360		40			634
											80					80
		210		8						114	440		80			1328

PHASE: 2 Inventory and Analysis

ACTIVITY: B Water Resources - Ground Water Quantity

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
2B1	Analyze existing data to locate and map aquifers from available data (use annotated bibliography).	SCS	HE	05/78	10/78
2B2	Locate new well; develop cooperative agreement for well installation, pump testing and operations; supervise drilling and logging; and test well.				
a	Sub-basin 1	SCS	HE	04/78	09/78
b	Sub-basin 2	SCS	HE	04/78	09/78
c	Remainder of basin	SCS	HE	04/79	09/80
2B3	Estimate volume of ground water				
a	Sub-basin 1	SCS	HE	06/78	11/78
b	Sub-basin 2	SCS	HE	06/78	08/79
c	Remainder of basin	SCS	HE		
2B4	Update ground water aquifer location map, boundary, and depths.				
a	Sub-basin 1	SCS	HE	07/78	12/78
b	Sub-basin 2	SCS	HE	08/79	09/79
c	Remainder of basin	SCS	HE		
2B5	Locate and evaluate recharge areas.				
a	Sub-basin 1	SCS	HE	11/78	12/78
b	Sub-basin 2	SCS	HE	09/79	10/79
c	Remainder of basin	SCS	HE		
2B6	Estimate allowable pumping rates in ground water aquifers.				
a	Sub-basin 1	SCS	HE	12/78	02/79
b	Sub-basin 2	SCS	HE	11/79	01/80
c	Remainder of basin	SCS	HE		

MAN-DAYS BY AGENCY AND DISCIPLINE
Water Resources - Ground Water Quantity

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
				120						120						120
		7		25						32						32
		7		25						32						32
		14		50						64						64
				30						30						30
				30						30						30
				60						60						60
				10						10						10
				10						10						10
				20						20						20
				20						20						20
				40						40						40
				30						30						30
				30						30						30
				60						60						60

PHASE: 2 Inventory and Analysis

ACTIVITY: B Water Resources - Ground Water Quantity - continued

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
2B7	Determine ground water uses.				
a	Sub-basin 1	SCS	HE	01/79	02/79
b	Sub-basin 2	SCS	HE	01/80	01/80
c	Remainder of basin	SCS	HE		
2B8	Digitize and store maps for use in analysis phase.				
a	Sub-basin 1	SCS	HE	02/79	02/79
b	Sub-basin 2	SCS	HE	01/80	01/80
c	Remainder of basin	SCS	HE		
2B9	Develop interim report on ground water.				
a	Sub-basin 1 (1st draft)	SCS	HE	04/78	03/79
b	Sub-basin 2	SCS	HE	02/80	03/80
c	Remainder of basin	SCS	HE		
	Sub-total of man-days				
	Sub-basin 1				
	Sub-basin 2				
	Remainder of basin				
	Basinwide				
	Total man-days (Activity)				

MAN-DAYS BY AGENCY AND DISCIPLINE

Water Resources - Ground Water Quantity - continued

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
				10						10						10
				10						10						10
				20						20						20
				5						5						5
				5						5						5
				10						10						10
		10		20						30						30
		10		20						30						30
		20		40						60						60
		17		150						167						167
		17		150						167						167
		34		300						334						334
				120						120						120
		68		720						788						788

PHASE: 2 Inventory and Analysis
 ACTIVITY: C Water Resources - Water Quality

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
2C1	Analyze existing data for surface and ground water quality. (Use annotated bibliography)	SCS	HE	06/77	09/77
2C2	Compare water quality with EPA and state quality standards.	SCS	HE	06/77	01/78
2C3	Determine adequacy of water for different uses - municipal, industrial, recreation, agriculture, and fish and wildlife.	SCS	A	06/77	05/78
2C4	Locate areas with good water, and areas having water quality problems. Map respective areas.				
a	Sub-basin 1	SCS	A	06/77	05/78
b	Sub-basin 2	SCS	A	06/79	05/80
c	Remainder of area	SCS	A		
2C5	Locate nonpoint and point sources of pollution, and map the respective areas.				
a	Sub-basin 1	SCS	G	06/77	09/99
b	Sub-basin 2	SCS	G	06/79	09/79
c	Remainder of area	SCS	G		
2C6	Develop map showing surface and ground water quality and source of pollution.				
a	Sub-basin 1	SCS	G	05/78	05/79
b	Sub-basin 2	SCS	G	05/79	05/80
c	Remainder of area	SCS	G		

MAN-DAYS BY AGENCY AND DISCIPLINE
Water Resources - Water Quality

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
		20					8	8		36			80			116
		20								20			80			100
						40	40	40		120			120			240
						5	5	5		15			20			35
						5	5	5		15			20			35
						10	10	10		30			40			70
				10		3	5	2		20			25			45
				10		3	5	2		20			25			45
				20		6	10	4		40			50			90
				40						40			20			60
				40						40			20			60
				80						80			40			120

PHASE: 2 Inventory and Analysis

ACTIVITY: C Water Resources - Water Quality - continued

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
2C7	Digitize and store for use in analysis phase.				
a	Sub-basin 1	SCS	G	05/78	06/79
b	Sub-basin 2	SCS	G	05/79	05/80
c	Remainder of area	SCS	G		
	Sub-total of man-days				
	Sub-basin 1				
	Sub-basin 2				
	Remainder of area				
	Basinwide				
	Total man-days (Activity)				

MAN-DAYS BY AGENCY AND DISCIPLINE
Water Resoures - Water Quality - continued

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
				3 3 6						3 3 6			3 3 6			6 6 12
				53 53 106 0		8 8 16 40	10 10 20 48	7 7 14 48		78 78 156 136			68 68 136 280			146 146 292 416
		40 40		212		72	88	76		488			552			1040

WATER USE AND WATER NEEDS STUDY

Discussion - The purpose of this study is to define present water uses and project future water needs (1980, 2000, and 2020) providing a foundation to Phase 3 of the Cooperative Study and to planning in the Susitna River Basin. This information will be used in Phase 3 as one of the primary considerations in evaluating different resource uses. The information will also support formulation of the Susitna regional component of a State Water Plan. This regional component or regional planning guide will identify and evaluate water resource characteristics (uses, problems, and needs) particular to the Susitna region, and will be used as the basis for water appropriation and management policies.

Procedure - Water use records are sketchy and incomplete. The available records are in state offices; therefore, an agreement with the Alaska Department of Natural Resources will be developed to gather and assemble the data for the study team. An agreement between the Soil Conservation Service and the Department of Natural Resources for financing this effort will be developed for Fiscal Years 78 and 79. The Study will essentially pay the salary for a person to assist in this job. This will include a breakdown of water use by source, location, and each identifiable use.

Uses to be considered are: Municipal, rural, agricultural, industrial, fish and wildlife, recreation, and mining.

The summary of Cook Inlet water resources, nearing completion by the USGS, in addition to data

generated during field seasons in the Susitna Study will be used to full advantage to determine area water supply characteristics. Existing information on public water supply and systems will be obtained from the Alaska Department of Environmental Conservation.

The Department of Natural Resources water appropriation files will be reviewed to determine present permitted water use, and to estimate average appropriation for different uses. Non-public water users (miners, industry, irrigators, etc.) will be contacted as will wellowners and drillers for more specific information. Water uses in unincorporated areas will be estimated by activity (domestic, agricultural, mining, etc.), and by quantity. Use by fish and wildlife, mining, and recreation will be determined with the aid of relevant resource agencies.

On the basis of socio-economic projections and trends developed by socio-economic inventories and analyses in the Cooperative Study, and other investigations related to potential resource development, future water needs will be projected for each major use. Demands will be compared with supply characteristics to establish guidelines for future regional water management and appropriation.

NOTES

PHASE: 2 Inventory and Analysis
 ACTIVITY: D Water Resources - Water Use and Needs

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
2D1	Analyze existing data from State and local water users for water use. (see annotated bibliography)	SCS	HE	06/77	11/79
2D2	Determine quantities of water used for municipalities, rural communities and fish and wildlife. Also determine water use in recreational, industrial and agricultural development.	SCS	HE	09/77	01/79
2D3	Determine effective rainfall for crop production.				
a	Sub-basin 1	SCS	HE	12/80	12/81
b	Sub-basin 2	SCS	HE	12/80	12/81
c	Remainder of Basin	SCS	HE		
2D4	Determine lake evaporation rates.				
a	Sub-basin 1	SCS	HE	01/81	02/81
b	Sub-basin 2	SCS	HE	01/81	02/81
c	Remainder of Basin	SCS	HE		
2D5	Determine crop irrigation requirements.				
a	Sub-basin 1	SCS	HE	02/81	03/81
b	Sub-basin 2	SCS	HE	02/81	03/81
c	Remainder of Basin	SCS	HE		
2D6	Determine present water depletions.				
a	Sub-basin 1	SCS	HE	02/81	04/81
b	Sub-basin 2	SCS	HE	02/81	04/81
c	Remainder of Basin	SCS	HE		
* By contract with the State of Alaska - Dept. of Natural Resources.					

MAN-DAYS BY AGENCY AND DISCIPLINE

Water Resources - Water Use and Needs

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
		20								20						20
	40	120				20	20	40		240	210		80			530
		10								10						10
		10								10						10
		20								20						20
		30								30						30
		30								30						30
		60								60						60
		10				10	5			25						25
		10				10	5			25						25
		20				20	10			50						50
		20								20						20
		20								20						20
		40								40						40

PHASE: 2 Inventory and Analysis

ACTIVITY: D Water Resources - Water Use and Needs - continued

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
2D7	Based on projected land use, determine future water needs.*				
a	Sub-basin 1	SCS	HE	05/81	05/81
b	Sub-basin 2	SCS	HE	05/81	05/81
c	Remainder of Basin	SCS	HE		
2D8	Determine low flow requirements to support fish and wildlife on specific streams.**	SCS	HE	05/81	07/81
2D9	Compare the total water needs to the actual supply, availability and quality of water.***	SCS	HE	07/81	12/81
2D10	Determine and locate water problems and develop alternatives to resolve the problems.				
a	Sub-basin 1	SCS	HE	12/81	01/82
b	Sub-basin 2	SCS	HE	12/82	01/83
c	Remainder of Basin	SCS	HE		
2D11	Develop a map to indicate the amounts and areas of water use.				
a	Sub-basin 1	SCS	HE	01/82	01/82
b	Sub-basin 2	SCS	HE	01/83	01/83
c	Remainder of Basin	SCS	HE		
<p>*By a cooperative agreement with the State of Alaska - Department of Natural Resources.</p> <p>**By a cooperative agreement with the State of Alaska - Fish & Game.</p> <p>***By a cooperative agreement with the State of Alaska - Department of Natural Resources and Department of Fish and Game.</p>					

MAN-DAYS BY AGENCY AND DISCIPLINE

Water Resources - Water Use and Needs - continued

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
30		20			20	5	5			80						80
30		20			20	5	5			80						80
60		40			40	10	10			160						160
		20								20			80			100
		80				40				120			40			160
	15	20	5	5		15	20	15		95	15		30			140
	15	20	5	5		15	20	15		95	15		30			140
	30	40	10	10		30	40	30		190	30		60			280
		5								5						5
		5								5						5
		10								10						10

PHASE: 2 Inventory and Analysis

ACTIVITY: D Water Resources - Water Use and Needs - continued

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
2D12	Digitize and store for use in the analysis phase of the Study.				
a	Sub-basin 1	SCS	HE	12/78	01/82
b	Sub-basin 2	SCS	HE	12/78	01/82
c	Remainder of Basin	SCS	HE		
2D13	Develop interim reports on water use and quality.				
a	Sub-basin 1	SCS	HE	09/77	03/82
b	Sub-basin 2	SCS	HE	10/77	03/83
c	Remainder of Basin	SCS	HE		
	Sub-total of man-days				
	Sub-basin 1				
	Sub-basin 2				
	Remainder of Basin				
	Basinwide				
	Total man-days (Activity)				

MAN-DAYS BY AGENCY AND DISCIPLINE
Water Resources - Water Use and Needs - continued

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
		5								5						5
		5								5						5
		10								10						10
	10	10		10		10	10	10		60	10		20			90
	10	10		10		10	10	10		60	10		20			90
	20	20		20		20	20	20		120	20		40			180
30	25	130	5	15	20	40	40	25		330	25		50			405
30	25	130	5	15	20	40	40	25		330	25		50			405
60	50	260	10	30	40	80	80	50		660	50		100			810
0	40	240	0	0	0	60	20	40		400	210		200			810
120	140	760	20	60	80	220	180	140		1720	310		400			2430

SOILS

Discussion - The object of this part of the Cooperative Study is to provide soil information, classification and interpretation of soils, and land forms within the study area.

The knowledge of the soils, their suitabilities, and limitations are basic to sound management and planning, and essential to resource alternative decisions.

The soil surveys should provide a vital input in the delineation and identification of flood prone areas, and establishment of flooding frequencies.

Procedure - The soil survey will be conducted in order of the state priority areas for the areas not covered by SCS published detail soil survey.

The SCS soil survey long range plan has a detail soil survey scheduled for the area west of the present published areas that incorporates the state's priority areas. Areas outside scheduled detail soil survey will be covered by a reconnaissance soil survey where needed.

The soil survey will be conducted in conjunction with the vegetation and water resources inventory, and thus provide input to site indexes, range sites, wildlife habitats, flood-prone areas, etc.

Soil Interpretations - Soil suitabilities and limitations will be determined by soil characteristics for standard SCS engineering interpretations of soil properties and suitability of soil uses as per USDA-SCS National Soils Handbook. General intake rates will be established for sprinkler system application.

Suitabilities and limitations of the soil will be determined for recreational development, sanitary facilities, building site development, construction materials, and water management. Agriculture capability classification and estimated yields per acre of crops, along with range and woodland sites, engineering properties and classification, physical and chemical properties of the soils, and soil and water features will be determined. Local expert sources will be used to establish the above information. Soil erosion hazard will be determined.

Analysis and Evaluation - Results of the soil survey, the soil maps, and the interpretations will be entered into a computer system; thus, providing access to suitabilities, limitations, and "trade-off" for resource or use alternatives. Also, from computer capabilities, tabulations, extents of and location maps of the various land and water related resources, can be obtained.

Logistics, Arrangements, and Timing - The soil survey will be conducted as part of a multi-discipline field team, and will require movement by helicopter and air taxi in the roadless,

remote areas. Base maps will be developed from high altitude, color infrared photography. Remote sensing will be used to the fullest extent on a trial area in the Willow Sub-basin by using landsat imagery and interpretation provided through the Geophysical Institute of the University of Alaska.

Field sheets will be completed and interpretations will be developed after each field season, in order to provide State and River Basin staff with data pertinent to that priority area.

Soil surveys of priority areas within the Willow Sub-basin have been completed and are published or are scheduled for completion during the 1977 field season. Priority areas within the Talkeetna Sub-basin will be completed in the 1978 field season, and in the Beluga Sub-basin completed in 1979. It is proposed that survey crews, consisting of 9 or 10 soil scientists and aids, will be necessary to complete the needed soil survey by 1979 for both the 1978 and 1979 field season.

PHASE: 2 Inventory and Analysis

ACTIVITY: E Soil Survey

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
2E1	Analyze existing data (use annotated bibliography).	SCS	SS	11/76	02/77
2E2	Prepare base map showing existing data.	SCS	SS	12/76	02/77
2E3	Obtain photo coverage of the Basin and develop a photo index map.	SCS	SS	03/77	02/77
2E4	Determine and affix match lines on field sheets.	SCS	SS	02/77	03/78
2E5	Conduct field soil survey - detail* and reconnaissance.				
a	Sub-basin 1	SCS	SS	06/77	10/77
b	Sub-basin 2	SCS	SS	06/78	10/78
c	Remainder of basin	SCS	SS	06/79	10/81
2E6	Develop interpretations from soil characteristics*.				
a	Sub-basin 1	SCS	SS	01/78	03/78
b	Sub-basin 2 (requires 5 days of soil engineer's time) <u>1</u> /	SCS	SS	10/78	01/79
c	Remainder of basin (requires 10 days of soil engineer's time) <u>2</u> /	SCS	SS	10/79	01/81
2E7	Develop erosion hazard map.				
a	Sub-basin 1	SCS	SS	01/79	03/79
b	Sub-basin 2	SCS	SS	01/79	03/79
c	Remainder of basin	SCS	SS	01/80	03/81
2E8	Determine the suitability and limitations of soils for alternative uses.*				
a	Sub-basin 1	SCS	SS	11/78	03/79
b	Sub-basin 2	SCS	SS	01/79	03/79
c	Remainder of basin	SCS	SS	01/80	03/81
2E9	Develop broad base map for general planning.				
a	Sub-basin 1	SCS	SS	10/78	02/79
b	Sub-basin 2	SCS	SS	11/78	02/79
c	Remainder of basin	SCS	SS	11/79	02/81

*Does not include time of ongoing soil survey program in the Basin.

MAN-DAYS BY AGENCY AND DISCIPLINE

Soil Survey

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
			10							10						10
			4							4						4
			40							40						40
			70							70						70
			30							30						30
			80							80						80
			160							160						160
			20			5	5			30						30
			20			5	5			35						35 $\frac{1}{2}$
			40			10	10			70						70 $\frac{2}{2}$
			20				5			25						25
			5							5						5
			10							10						10
			10							10						10
			15							15						15
			30							30						30
			5			2	2			9						9
			10							10						10
			20							20						20

PHASE: 2 Inventory and Analysis
 ACTIVITY: E Soil Survey - continued

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
2E10	Determine present soil erosion rates per acre per year.				
a	Sub-basin 1	SCS	SS	10/78	02/79
b	Sub-basin 2	SCS	SS	11/78	02/79
c	Remainder of basin	SCS	SS	11/79	02/81
2E11	Project soil erosion rates based on existing programs.				
a	Sub-basin 1	SCS	SS	02/79	03/79
b	Sub-basin 2	SCS	SS	02/79	04/79
c	Remainder of basin	SCS	SS	02/80	04/81
2E12	Determine present and future sediment yields.				
a	Sub-basin 1	SCS	SS	02/79	04/79
b	Sub-basin 2	SCS	SS	02/79	04/79
c	Remainder of basin	SCS	SS	02/80	04/81
2E13	Determine monetary loss due to loss of production of eroded areas.				
a	Sub-basin 1	SCS	SS	02/79	04/79
b	Sub-basin 2	SCS	SS	02/79	04/79
c	Remainder of basin	SCS	SS	02/80	04/81
2E14	Determine monetary damage of sediment to downstream reservoirs, flood plains, navigable channels, urban areas, highways, roads, and bridges.				
a	Sub-basin 1	SCS	SS	01/79	04/79
b	Sub-basin 2	SCS	SS	02/79	04/79
c	Remainder of basin	SCS	SS	02/80	04/81
2E15	Prepare appropriate displays, maps, tables, etc.; code and enter data in computer.				
a	Sub-basin 1	SCS	SS	10/78	04/79
b	Sub-basin 2	SCS	SS	10/80	04/81
c	Remainder of basin	SCS	SS	10/80	04/81

MAN-DAYS BY AGENCY AND DISCIPLINE

Soil Survey - continued

ESCS	FS	SCS									STATE		STATE/ FEDERAL	FEDERAL		
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary	TOTAL	DNR		Biologist	USFS For. Survey	USGS	COMBINED TOTAL
		3	20 10 20			10 10 20	10 5 10			43 25 50						43 25 50
			10 10 20			5 5 10	5 5 10	5 5 10		25 25 50						25 25 50
			5 5 10			2 2 4	2 2 4	2 2 4		11 11 22						11 11 22
			2 2 4		3 3 6	2 2 4	4 4 8			11 11 22						11 11 22
		3 3 6	2 2 4				2 2 4			7 7 14						7 7 14
			10 10 20							10 10 20						10 10 20

PHASE: 2 Inventory and Analysis
 ACTIVITY: E Soil Survey - continued

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
2E16	Prepare interim reports.				
a	Sub-basin 1	SCS	SS	02/79	04/79
b	Sub-basin 2	SCS	SS	02/79	04/79
c	Remainder of basin	SCS	SS	02/80	04/81
	Sub-total of man-days				
	Sub-basin 1				
	Sub-basin 2				
	Remainder of basin				
	Basinwide				
	Total man-days (Activity)				

MAN-DAYS BY AGENCY AND DISCIPLINE

Soil Survey - continued

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
			10							10						10
			10							10						10
			20							20						20
		6	139		3	26	35	7		216						216
		3	179		3	24	23	7		239						239
		6	358		6	48	46	14		478						478
			124							124						124
		15	800		12	98	104	28		1057						1057

LAND TREATMENT AND AGRONOMY

Discussion - The function of this portion of Cooperative River Basin Study is to provide land treatment alternatives that will reduce erosion on existing developed lands, prevent erosion on lands that will be developed, and to provide practices and/or treatments to maximize yields, maintain productivity, and minimize or prevent pollution.

Procedure - Using results of the soil survey and geology inventory, the erodability of soil will be determined, and an erosion hazard map developed. Best management practices and resource management systems will be developed for each land use by soil types. Consumptive use by plants will be determined.

Analysis and Evaluation - Land treatment alternatives, management practices, erosion hazards, and productivity information will be entered into a computer system and will provide trade-off values required in planning and establishment of policies.

Logistics, Arrangements and Timing - The SCS agronomist, working with a soil scientist, geologist, and soil conservationist, will determine soil erosion values, using an adaption of the universal soil loss equation and other established methods. Land treatments and management practices will be obtained from SCS technical guides, input from Forest Service and Bureau of Land Management, and assigned to soil survey mapping units. Adapted crop and range varieties

will be provided by SCS technical guides, and Extension Service guides.

NOTES

PHASE: 2 Inventory and Analysis
 ACTIVITY: F Land Treatment and Agronomy

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
2F1	Analyze existing data in land treatment and agronomy practices (use annotated bibliography).	SCS	A	02/78	05/78
2F2	Develop erosion hazard map (conjunction with soil survey).				
a	Sub-basin 1	SCS	A	01/79	03/79
b	Sub-basin 2	SCS	A	01/79	03/79
c	Remainder of Basin	SCS	A	01/80	03/81
2F3	Develop practices and/or treatments to maximize yields, maintain productivity and minimize or prevent pollution.				
a	Sub-basin 1	SCS	A	06/78	02/79
b	Sub-basin 2	SCS	A	02/79	10/79
c	Remainder of Basin	SCS	A	02/80	10/81
2F4	Determine adapted crop and range plant varieties by soil types.				
a	Sub-basin 1	SCS	A	06/78	02/79
b	Sub-basin 2	SCS	A	03/79	10/79
c	Remainder of Basin	SCS	A	03/80	10/81
2F5	Analyze efficiency and suitability of irrigation methods.				
a	Sub-basin 1	SCS	A	06/78	11/78
b	Sub-basin 2	SCS	A	07/78	12/78
c	Remainder of Basin	SCS	A	07/79	12/80
2F6	Determine water consumption for various crops (vegetables and small grain).				
a	Sub-basin 1	SCS	A	06/78	11/78
b	Sub-basin 2	SCS	A	07/78	12/78
c	Remainder of Basin	SCS	A	07/79	12/80

MAN-DAYS BY AGENCY AND DISCIPLINE

Land Treatment and Agronomy

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
						40				40						40
						20	20			40						40
						20	20			40						40
						40	40			80						80
						10	10			20						20
						10	10			20						20
						20	20			40						40
						10	10			20						20
						10	10			20						20
						20	20			40						40
10					40	40	40			130						130
10					40	40	40			130						130
10					40	80	80			210						210
		10				20	10			40						40
		10				20	10			40						40
		20				40	20			80						80

MAN-DAYS BY AGENCY AND DISCIPLINE
Land Treatment and Agronomy - continued

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
						5				5						5
						5				5						5
						10				10						10
		5				30	10			45						45
		5				30	10			45						45
		10				60	20			90						90
10		15			40	135	100			300						300
10		15			40	135	100			300						300
10		30			40	270	200			550						550
0		0			0	40	0			40						40
30		60			120	580	400			1190						1190

GEOLOGY

Discussion - The object of the geology segment of the Cooperative Study is to provide the location and extent of geologic hazard areas, identification of seismic areas, the location and extent of mineral and energy resources, to identify potential construction problems along transportation corridors, and to estimate relative construction costs. A general geology map will be provided. The knowledge of hazard areas and location of mineral and energy resources are basic to planning of land and water resources.

Procedure - The geology inventory will be conducted in order of state priority areas. The geologic hazard inventory will be produced through a combination of existing information, (Bureau of Mines, State of Alaska, etc.), interpretations from soil surveys, interpretations from landsat imagery, and field observation will be made to evaluate and qualify the data. The location and extent of mineral and energy resources will be obtained from a literature research. A surficial geology map will be produced from an ongoing project by the State of Alaska.

Analysis and Evaluation - Results of the geology inventory, maps, and limitations will be entered into a computer system; thus providing location and extent when determining "trade-offs" for resource or use alternatives.

Logistics, Arrangements, and Timing - The geology inventory will be organized by SCS personnel,

and priority areas will be addressed before and during the field seasons. The existing data will be reviewed, analyzed and made available for annual reports. Hazard maps will be produced at a scale of 1:250,000 except where a greater detail is required by planned or existing development.

NOTES

PHASE: 2 Inventory and Analysis
 ACTIVITY: G Geology

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
2G1	Analyze existing data on mineral and energy resources (see annotated bibliography).	SCS	G	05/78	06/78
2G2	Conduct a field reconnaissance of potential/actual mineral and energy deposits.	SCS	G	08/78	09/78
2G3	Identify potential mineral transportation corridors, construction problems, and estimate road construction cost.				
a	Sub-basin 1	SCS	G	08/78	03/79
b	Sub-basin 2	SCS	G	04/79	03/80
c	Remainder of basin	SCS	G	04/80	
2G4	Identify coal areas.				
a	Sub-basin 1	SCS	G	06/78	11/78
b	Sub-basin 2	SCS	G	06/78	11/79
c	Remainder of basin	SCS	G	04/80	
2G5	Identify potential earthquake areas.				
a	Sub-basin 1	SCS	G	05/78	01/79
b	Sub-basin 2	SCS	G	02/79	01/80
c	Remainder of basin	SCS	G	02/80	
2G6	Identify areas with high potential for landslide, roadslide, and avalanches.				
a	Sub-basin 1	SCS	G	05/78	01/79
b	Sub-basin 2	SCS	G	02/79	01/80
c	Remainder of basin	SCS	G	02/80	
2G7	Develop maps, tables, charts, etc., code and enter data into storage.				
a	Sub-basin 1	SCS	G	02/79	03/79
b	Sub-basin 2	SCS	G	02/80	03/80
c	Remainder of basin	SCS	G	02/81	

MAN-DAYS BY AGENCY AND DISCIPLINE

Geology

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
10				20						20						20
10				10						10						10
20				5		5				20						20
				5		5				20						20
				10		10				40						40
				5						5						5
				10						10						10
				20						20						20
				5						5						5
				5						5						5
				10						10						10
				5						5						5
				5						5						5
				10						10						10
				5						5						5
				5						5						5
				10						10						10

PHASE: 2 Inventory and Analysis
 ACTIVITY: G Geology - continued

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
2G8	Develop interim reports.				
a	Sub-basin 1	SCS	G	03/79	04/79
b	Sub-basin 2	SCS	G	03/80	04/80
c	Remainder of basin	SCS	G	03/81	
	Sub-total of man-days				
	Sub-basin 1				
	Sub-basin 2				
	Remainder of basin				
	Basinwide				
	Total man-days (Activity)				

MAN-DAYS BY AGENCY AND DISCIPLINE

Geology - continued

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
				5						5						5
				5						5						5
				10						10						10
10				30	5					45						45
10				35	5					50						50
20				70	10					100						100
				30						30						30
40				165	20					225						225

VEGETATION

Discussion - The objective of the vegetative inventory is to provide information on the total vegetation, forest, forest understory, and range. The inventory will establish and identify areas for potential forestry industry on a sustained yield basis; the amount of land suitable for range and its present and potential production; types of wildlife habitat and critical habitat areas; and identify vegetation types and areas for potential recreation sites.

The present vegetative inventory in the Susitna Valley consists of a forest resource inventory conducted in 1964-1965 by a cooperative effort between the State Department of Natural Resources and the Institute of Northern Forestry. The purpose of the inventory was to determine the total area of forested lands, the commercial forest area and timber volume, and the condition and growth of this resource. The inventory was limited to the lower Susitna Basin, the Matanuska Valley, and the south side of Knik Arm. Neither the forest understory or range vegetation was included in the inventory. Since this date, the State Forestry Section has conducted a detailed forest inventory on twelve townships.

The data collected previously provided only a broad knowledge of the timber resources in the Susitna Basin, and is not sufficient for determining resource alternatives for land management planning. In order to obtain this information, an integrated resource inventory will be conducted to collect new, refined data on the

forest resources along with the forest understory and range resources.

Procedures - The inventory will be a cooperative adventure between the Institute of Northern Forestry - Forest Survey, the State Division of Lands Forestry Section, and the USDA River Basin Planning Team. Forest Survey has been assigned the leading role in developing the methodology and procedures for the inventory, working with the Forest Service's Resource Evaluation Techniques Committee in Fort Collins, Colorado, the Soil Conservation Range Specialist, and the U.S. Fish and Wildlife Service.

A vegetation type map and soil survey will be the basis of the inventory. The typing will be done on high altitude, infrared photos with commercial and noncommercial forest land typed to 10 acres, and the nonforest land to 160 acres. The typing will be field checked by gathering vegetative data at selected, random plots in classified types, along with reading a percent of the old inventory plots to determine forest growth and mortality. The type map will be compared to landsat imagery of sub-region 1 to determine if it could be used as a working tool to update the inventory periodically in the future and facilitate field mapping.

Sufficient data will be collected on the ground to determine the forest site index, density, size class, condition class, volumes, growth, mortality, productivity class, and age class. On forest understory and range the data will be information as to the species composition, range

site and condition, understory forage values production, plant vigor stocking, species, and range condition trends on both the brush and forb species. A percent of the forest understory and range plots read early in the summer will be read later in the season to determine a growth factor for calculating the maximum growth of the earlier read plots.

Analysis and Evaluation - The data will be entered into a computer bank for further analysis by the appropriate agencies; timber by Forest Survey, forbs and grasses by the Soil Conservation Service, and brush by U.S. Fish and Wildlife Service. The evaluation will determine the volume and annual production by vegetative types for each management unit, and for major landowners based upon no-restraints for the areas, and on restraints placed upon them because of other resource values. Data will be available to and used with fish and wildlife work habitat mapping analysis. The total BTU and/or megalocalories per acre will be derived for the management units.

From the analysis and evaluation, land management decisions can be derived such as classifying land for forest and range management, or multi-use management. The appropriate land manager then can take the data collected and produce useful management plans for the areas.

PHASE: 2 Inventory and Analysis

ACTIVITY: H Vegetation Inventory

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
2H1	Inventory and Analyze existing forest resource data.	FS	F	06/77	12/77
2H2	Contract for landsat imagery of Willow area with University of Alaska.	SCS	SS	10/77	05/78
2H3	Make interpretive assignments of imagery and compare with photo interpretation.	FS	F	05/78	06/78
2H4	Determine methodology and field procedure for the vegetative inventory.	FS	F	06/77	02/78
2H5	Make a vegetative type map of the Basin.				
a	Sub-basin 1	FS	F	10/77	04/78
b	Sub-basin 2	FS	F	10/77	03/79
c	Remainder of Basin	FS	F	10/77	03/81
2H6	Determine random plots for field checking to type map.				
a	Sub-basin 1	FS	F	04/78	05/78
b	Sub-basin 2	FS	F	04/78	04/79
c	Remainder of Basin	FS	F	03/80	04/81
2H7	Conduct field work.				
a	Sub-basin 1	FS	F	06/77	09/78
b	Sub-basin 2	FS	F	08/78	08/79
c	Remainder of Basin	FS	F	08/79	08/81
2H8	Determine forest resource volumes and allowable cut by management units and land owners with and without other resource restraints.				
a	Sub-basin 1	FS	F	10/78	03/79
b	Sub-basin 2	FS	F	10/79	03/80
c	Remainder of Basin	FS	F	10/80	03/82

MAN-DAYS BY AGENCY AND DISCIPLINE
Vegetative Inventory

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
	20									20	5					25
			5							5						5
	5		5					5		15				5		20
	65							20		85			5	45		135
	15							5		20				80		100
	5							5		10				180		190
	10							10		20				300		320
	2							2		4				20		24
	2							2		4				30		34
	4							4		8				60		68
	100	4	2					110	440	656	265		10	120		1051
	100	2	2					110	440	654	265		10	120		1049
	150	4	1					220	880	1255	460		20	240		1975
2	10		2		2			5		21			10	30		61
2	10		2		2			5		21			10	30		61
2	30		4		2			10		48			20	90		158

PHASE: 2 Inventory and Analysis

ACTIVITY: H Vegetation Inventory - continued

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
2H9	Determine annual production per hectare of range and forest understory by management units and land ownership.				
a	Sub-basin 1	FS	RC	10/78	03/79
b	Sub-basin 2	FS	RC	10/79	03/80
c	Remainder of Basin	FS	RC	10/80	03/82
2H10	Evaluate productivity, condition and trend of the vegetation resource.				
a	Sub-basin 1	FS	F/RC	10/78	03/79
b	Sub-basin 2	FS	F/RC	10/79	03/80
c	Remainder of Basin	FS	F/RC	10/80	03/82
2H11	Identify potential transportation corridors, construction problems and estimated road construction cost for timber and agricultural development.				
a	Sub-basin 1	FS	F	06/78	12/78
b	Sub-basin 2	FS	F	06/79	12/79
c	Remainder of Basin	FS	F	06/80	12/81
2H12	Code and enter data into computer.				
a	Sub-basin 1	FS	F/RC	04/79	08/79
b	Sub-basin 2	FS	F/RC	04/80	08/79
c	Remainder of Basin and report	FS	F/RC	04/81	08/82
2H13	Display as appropriate with maps, charts, tables etc.				
a	Sub-basin 1	FS	F/RC	04/79	10/79
b	Sub-basin 2	FS	F/RC	04/80	10/79
c	Remainder of Basin and report	FS	F/RC	04/81	10/82

MAN-DAYS BY AGENCY AND DISCIPLINE
Vegetation Inventory - continued

ESCS	FS	SCS									STATE		STATE/ FEDERAL	FEDERAL		
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary	TOTAL	DNR		Biologist	USFS For. Survey	USGS	COMBINED TOTAL
2	5					2		30	10	49			20			69
2	5					2		30	10	49			20			69
2	15					4		70	25	118			60			178
	5					2		5		12			5	20		37
	5					2		5		12			5	20		37
	15					4		15		34			25	40		99
	5		2		2			5		14			10	5		29
	5		2		2			5		14			10	5		29
	15		6		6			15		42			20	15		77
	5	2						5		12						12
	5	2						5		12						12
	15	6						15		36						36
	10							10		20				10		30
	10							10		20				10		30
	30							30		60				30		90

PHASE: 2 Inventory and Analysis

ACTIVITY: H Vegetation Inventory - continued

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
2H14	Develop interim reports by sub-basin.				
a	Sub Basin 1	FS	F/RC	03/79	05/79
b	Sub Basin 2	FS	F/RC	03/80	05/80
c	Remainder of Basin and report	FS	F/RC	03/81	05/83
	Sub-total of man-days				
	Sub-basin 1				
	Sub-basin 2				
	Remainder of Basin				
	Basinwide				
	Total man-days (Activity)				

MAN-DAYS BY AGENCY AND DISCIPLINE

Vegetation Inventory - continued

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
2	20	2			2	2		20		48	2		5	10		65
2	20	2			2	2		20		48	2		5	10		65
6	60	6			6	6		60		144	6		15	30		195
6	117	8	6		6	6		197	450	856	267		60	295		1478
6	167	6	6		6	6		197	450	844	267		60	405		1576
12	344	16	11		14	14		449	905	1765	466		160	805		3196
	90	0	10		0	0		25	0	125	5		5	50		185
24	778	30	33		26	26		868	1805	3590	1005		285	1555		6435

RECREATION

Discussion - There is a need to identify potential recreational, unique, and wilderness areas within the Basin. With its vast, roadless area along with the numerous clearwater streams and lakes plus the large glacial rivers, one would expect an abundance of established public sites. This is not the case. Many of the choice recreational development sites throughout the whole Basin have been settled or filed on, and are now under private ownership. Nearly every lake that is large enough to land a float plane on and every navigable clear-water stream has a number of privately owned tracts on them.

Before commitment of land resource to specific uses or any further planning takes place, a recreational inventory of the Basin is needed to identify areas for new state parks, wilderness, and public recreation areas. Otherwise, the few remaining choice sites may be lost to other level classification.

The present Recreation Demand Study for the area is outdated. It was conducted prior to the large population growth of the Anchorage-Palmer-Wasilla area over the last decade. The development of the new capital site at Willow along with the expected demand for utilizing the resources found in the Basin will continue the population expansion. The State Division of Parks recognizes this and is in the process of developing a new Demand Study in 1978 providing Level B funds become available.

Procedure - The inventory will consist of identifying potential sites for state park additions, public recreation sites, unique sites, and wilderness areas. The sites will be determined through contacts made with various past and present land managers, talking to land users, and from actual on-the-ground visits in the area by a recreation planner along with various parties of the River Basin field crews. Each site visited will be evaluated for its recreational values. Data gathered from the other resource inventories, where applicable, will be used to assist in evaluating the quality of the site.

Direct participation will be made with the State Division of Parks on the proposed Demand Study by helping them develop the questionnaire so it will apply to the Basin, and by providing financial help in conducting the study.

Upon completion of each sub-region, reports will be prepared describing and evaluating each area.

NOTES

PHASE: 2 Inventory and Analysis

ACTIVITY: I Recreation*

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
2I1	Inventory existing developed recreation areas.	FS	DNR	03/78	09/78
2I2	Participate in updating the State's Outdoor Recreation Demand Survey, in 1978. This will include specific information for the Susitna Basin.	FS	F/DNR	02/78	08/78
2I3	Determine demands and needs for recreation activities using the Demand Study and the Alaska Outdoor Recreation Plan.				
a	Sub-basin 1	FS	F/DNR	10/78	12/78
b	Sub-basin 2	FS	F/DNR	10/78	12/79
c	Remainder of Basin	FS	F/DNR	10/78	03/79
2I4	Inventory future water and land recreational sites.				
a	Sub-basin 1	FS	F/DNR	03/78	12/78
b	Sub-basin 2	FS	F/DNR	03/78	12/79
c	Remainder of Basin	FS	F/DNR	03/79	
2I5	Identify potential transportation corridors, construction problems and estimate road construction costs.				
a	Sub-basin 1	FS	F/DNR	03/78	12/78
b	Sub-basin 2	FS	F/DNR	03/78	12/79
c	Remainder of Basin	FS	F/DNR	03/79	
2I6	Make appropriate charts, maps, graphs, etc.				
a	Sub-basin 1	FS	DNR	01/79	02/79
b	Sub-basin 2	FS	DNR	01/80	02/80
c	Remainder of Basin	FS	DNR	01/81	
*Work to be done jointly under a cooperative agreement with the State Department of Natural Resources.					

MAN-DAYS BY AGENCY AND DISCIPLINE

Recreation

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
	10									10	10					20
	10									10	40					50
6	5				2					13	5		5			23
6	5				2					13	5		5			23
8	10				4					22	10		10			42
	30	3	3							36	65		15			116
	20	2	2							24	65		15			104
	40	5	5							50	130		30			210
	3	3	3		2					11	8					19
	2	2	2		2					8	7					15
	5	5	5		4					19	15					34
	3									3	7					10
	3									3	7					10
	6									6	14					20

PHASE: 2 Inventory and Analysis
 ACTIVITY: I Recreation - continued

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
2I7	Code and enter data into computer.				
a	Sub-basin 1	FS	F/DNR	01/79	02/79
b	Sub-basin 2	FS	F/DNR	01/80	02/80
c	Remainder of Basin	FS	F/DNR	01/81	
2I8	Prepare interim reports by sub-basins and final report.				
a	Sub-basin 1	FS	F/DNR	02/79	04/79
b	Sub-basin 2	FS	F/DNR	02/80	04/80
c	Remainder of Basin	FS	F/DNR	02/81	
	Sub-total of man-days				
	Sub-basin 1				
	Sub-basin 2				
	Remainder of Basin				
	Basinwide				
	Total man-days (Activity)				

MAN-DAYS BY AGENCY AND DISCIPLINE

Recreation - continued

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
	2									2	2					4
	2									2	2					4
	4									4	4					8
	15									15	50		3			68
	15									15	50		3			68
	30									30	100		6			136
6	58	6	6		4					80	137		23			240
6	79	4	4		4					65	136		23			224
8	95	10	10		8					131	273		46			450
	20	0	0		0					20	50		0			70
20	252	20	20		16					296	596		92			984

ARCHEOLOGICAL AND HISTORICAL CULTURE

Discussion - Little is known about the archeologic and historic resources in the Susitna Basin. As a planning tool, these areas should be identified in order to provide them the necessary protection under both state and federal regulations. By the identification of the sites, the land management planners can provide the necessary treatment to these areas when making both short and long range resource management decisions.

Procedure - Under the direction of the State Archeologist, a trained archeologist will examine current records for any known sites in the area. In addition, he will interview various individuals that have an extensive knowledge in the area for possible leads in identifying new sites. Aerial photo interpretation, using existing low altitude photos, will be conducted to identify other possible sites.

Throughout the field season, the archeologist, working with the other field parties, will conduct a reconnaissance type examination of all the previously identified, actual or potential, sites along with other possible sites located during the field season. No exploration digging will be done other than sufficient digging to verify the area is an actual site.

At the completion of each sub-basin, a archeological-historical report will be prepared showing the findings and recommendations on each site found. This report will then be used to develop alternative resource uses on the area for the land management planners.

NOTES

PHASE: 2 Inventory and Analysis
 ACTIVITY: J Archeological and Historical Culture*

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
2J1	Inventory historical and archeological sites utilizing State Heritage Resource Plan.	FS	DNR	03/78	10/78
2J2	Obtain historical background and determine importance of the areas for possible classification as historical sites.				
a	Sub-basin 1	FS	DNR	06/77	10/79
b	Sub-basin 2	FS	DNR	06/77	10/79
c	Remainder of Basin	FS	DNR	06/77	10/79
2J3	Examine aerial photos for possible sites.				
a	Sub-basin 1	FS	DNR	03/78	04/78
b	Sub-basin 2	FS	DNR	02/79	03/79
c	Remainder of Basin	FS	DNR	02/80	03/81
2J4	Conduct a field reconnaissance examination of the Basin.				
a	Sub-basin 1	FS	DNR	06/78	10/78
b	Sub-basin 2	FS	DNR	06/79	10/79
c	Remainder of Basin	FS	DNR	06/80	06/81
2J5	Develop appropriate maps, displays, etc. Code and enter into computer.				
a	Sub-basin 1	FS	DNR	11/78	03/79
b	Sub-basin 2	FS	DNR	11/79	03/80
c	Remainder of Basin	FS	DNR	11/80	03/82
*Under a cooperative agreement with the State of Alaska - Division of Natural Resources					

MAN-DAYS BY AGENCY AND DISCIPLINE
Archeological and Historical Culture

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
											10					10
	2									2	30					32
	2									2	30					32
	4									4	60					64
	2									2	5					7
	2									2	8					10
	4									4	16					20
	10									10	80					90
	10									10	80					90
	20									20	160					180
	4									4	7					11
	4									4	7					11
	9									9	14					23

PHASE: 2 Inventory

ACTIVITY: J Archeological and Historical Culture - continued

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
2J6	Make interim reports.	FS	DNR	11/78	03/79
a	Sub-basin 1	FS	DNR	11/79	03/80
b	Sub-basin 2	FS	DNR	11/80	03/82
c	Remainder of Basin				
	Sub-total of man-days				
	Sub-basin 1				
	Sub-basin 2				
	Remainder of Basin				
	Basinwide				
	Total man-days (Activity)				

MAN-DAYS BY AGENCY AND DISCIPLINE
Archeological and Historical Culture - continued

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
	4									4	25					29
	4									4	25					29
	10									10	60					70
	22									22	147					169
	22									22	150					172
	47									47	310					357
	0									0	10					10
	91									91	617					708

FISH AND WILDLIFE

Fish, Wildlife, and Associated Habitat

Discussion - The objective of this aspect of the Cooperative Study is to determine kinds and abundance of fish and wildlife in relation to carrying capacity of associated habitats in the study area wherein impacts on them can be predicted and/or monitored in the future "when and if" change occurs. It is set forth that alternative resource use scenarios of Alaska's lands and waters will have predictive effects on fish and wildlife. The alternatives may destroy, improve, or create new habitat. The effects may be large and relevant, or small and irrelevant; and there must be concern that cumulative irrelevancies may equal a large relevant situation. There is a need for an adequate fish and wildlife and associated habitat appraisal to allow the State and other decision makers to know and show what the significant fish and wildlife trade-offs are. A model will be developed to predict changes in fish and wildlife communities, based on predictable land and water use changes per given unit of time. The study will concentrate in the priority subregions of the basin, and will focus on indicator species of fish and wildlife.

Inventories of fish and wildlife, as associated with life forms (plant communities and stages of succession), establish probabilities or potentials of fish and wildlife resource occupancy.

These probabilities, in turn, provide a basis of analysis, evaluation, and value judgements needed in the planning process. Additionally, a knowledge of the baseline situation can provide the basis for planned mitigation of adverse impacts of resource use changes, as well as provide the scope and magnitude of vegetation manipulation and wildlife husbandry opportunities.

Vegetation, Fish, and Wildlife Habitat Inventory

Methodology and Background - The first step in appraising the fish and wildlife resource lies in a literature survey and assimilation of existing information. The second step will be an analysis and mapping of vegetation and water regimen. The inventory provides a basis for identifying plant species/animal relationships. The vegetation and water regimen inventory will provide a basis for a classification system for fish and wildlife habitat. The assistance of Alaska Department of Fish and Game and U.S. Fish and Wildlife biologists will be solicited to develop fish and wildlife habitat classification, and to equate them with the successional habitats.

Additional fish and wildlife concerns to be addressed are observation of animals and associated critical habitats that are threatened with extinction.

Terrestrial Habitat Inventory

From the forest understory and range inventory, the species composition, range site and condition, production, plant vigor, stocking, composition changes, range condition trends, and

grazing values of forest understory will be determined for each management unit. From this the annual and total production rate expressed as weight of dry matter and megacalories per acre and/or hectare will be derived for the basins.

Using the vegetative inventory, key habitat will be determined for indicator wildlife species. Where needed, food requirements, critical reproduction and survival factors, and critical use periods will be established for indicator species. The habitat will be rated for the various species. From available literature supplemented by field observations, special habitat considerations such as wetlands, calving areas, salt licks, denning areas, etc., will be identified.

Fishery Habitat Inventory

From available data supplemented by field observations, streams and lakes will be inventoried and investigated for their ability to support fish. Using Alaska Department of Fish and Game techniques, the type, quality, and quantity of aquatic habitat will be determined in various streams and lakes. Using this data with water quality data, the streams and lakes will be classified according to their ability to support a fishery. Prime spawning areas will be identified and described. Nutrient sources to the streams and lakes, productivity per acre and hectare of lake surface, productivity of streams and riparian environment will also be determined.

Fish and Wildlife Population Inventory

Fish and wildlife species occurrence, distribution, relative abundance, migration patterns, and special use areas will be determined. As previously noted, the populations will be equated to life forms and stages of succession of the plant communities. Of particular interest will be water productivity-soil-vegetation-fish-waterfowl relationships.

Analysis and Evaluation

It is proposed that computer technology will be used to project the current status of fish and wildlife habitat and levels of populations through future years of interest (1985-2000, 2020). Future probabilities of succession can be estimated. Habitat relationships and associated fish and wildlife populations in the Willow area will be registered with landsat imagery that has been compared with high altitude photography, and further checked on the ground as a function of the vegetation inventory. By having the current status of fish and wildlife registered and associated with life forms and stages of succession, it will then be possible to predict the magnitude of impacts for projected "status quo," as well as determining probable magnitude of impacts of alternative resource use scenarios on fish and wildlife habitat and populations for the projected periods.

Logistics, Arrangements, and Timing

A wildlife biologist will be assigned to work with the River Basin field party to: (1) assimilate and analyze existing information by literature and open file searches; (2) conduct the fish and wildlife observations (by seasons as needed); (3) assist in the analysis and evaluation of findings; (4) determine the fish and wildlife impacts of the alternative resource scenarios; and (5) provide a basis for meaningful environmental impact assessments of area development plans. During the field seasons, the biologist will be an integral part of and will share transportation and support facilities with other disciplines gathering basic water and related land resource data. During the "inclement season," the biologist will make needed winter studies, compile field observation notes, coordinate with other team members and other agencies, and develop relationships of living resources. In the analysis and evaluation processes, the biologist will be responsible for biological input into the analytical programs and displays of the fish and wildlife impacts of resource alternatives.

NOTES

PHASE: 2 Inventory and Analysis

ACTIVITY: K Fish and Wildlife

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
2K1	Analyze existing data.	SCS	PL	04/78	06/78
2K2	Develop habitat classification system for indicator wildlife species.	SCS	PL	04/78	06/78
2K3	Using the vegetation inventory data, develop a habitat map showing primary and secondary habitats for indicator wildlife species.				
a	Sub-basin 1	SCS	PL	02/79	04/79
b	Sub-basin 2	SCS	PL	02/80	04/80
c	Remainder of Basin	SCS	PL	02/81	
2K4	Identify special habitat considerations such as wetlands, calving areas, salt licks, denning areas, etc.				
a	Sub-basin 1	SCS	PL	03/79	05/79
b	Sub-basin 2	SCS	PL	03/80	05/79
c	Remainder of Basin	SCS	PL	03/81	
2K5	Inventory and investigate streams and lakes for their capability to support fish, based upon type, quality and quantity of aquatic habitat. Classify them accordingly.				
a	Sub-basin 1	SCS	PL	06/78	11/78
b	Sub-basin 2	SCS	PL	06/79	11/79
	Remainder of Basin	SCS	PL	06/80	
2K6	Identify and describe prime spawning areas.				
a	Sub-basin 1	SCS	PL	06/78	11/78
b	Sub-basin 2	SCS	PL	06/79	11/79
c	Remainder of Basin	SCS	PL	06/80	

MAN-DAYS BY AGENCY AND DISCIPLINE

Fish and Wildlife

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
	5									5			80			85
	5									5			20			25
	10					5		10		25			20			45
	10					5		10		25			20			45
	20					10		20		50			40			90
	2									2			5			7
	2									2			5			7
	4									4			20			24
	5	10								15			50			65
	5	10								15			50			65
	10	20								30			100			130
		5								5			10			15
		5								5			10			15
		10								10			20			30

PHASE: 2 Inventory and Analysis
 ACTIVITY: K Fish and Wildlife - continued

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
2K7	Determine nutrient sources to streams and lakes, productivity of lake surfaces, streams and riparian environment.				
a	Sub-basin 1	SCS	PL	06/78	09/79
b	Sub-basin 2	SCS	PL	06/79	09/80
c	Remainder of Basin	SCS	PL	06/80	
2K8	Determine fish and wildlife species occurrences, distribution, relative abundance, migration patterns and special use areas.				
a	Sub-basin 1	SCS	PL	06/78	09/79
b	Sub-basin 2	SCS	PL	06/79	09/80
c	Remainder of Basin	SCS	PL	06/80	
2K9	Analyze landsat imagery of sub-basin 1 as to the areas capability to relate to wildlife habitat and populations.	SCS	PL	05/78	10/78
2K10	Project demands and needs for consumptive and non-consumptive usage.	SCS	PL	10/78	02/79
2K11	Determine economic value of wildlife and fish for recreation and subsistence.	SCS	PL	10/78	05/79
2K12	Prepare maps, tables, displays, etc. on data collected.				
a	Sub-basin 1	SCS	PL	10/79	12/79
b	Sub-basin 2	SCS	PL	10/80	12/79
c	Remainder of Basin	SCS	PL	10/81	
2K13	Code and store information into computer.				
a	Sub-basin 1	SCS	PL	06/78	11/78
b	Sub-basin 2	SCS	PL	06/79	11/79
c	Remainder of Basin	SCS	PL	06/80	

MAN-DAYS BY AGENCY AND DISCIPLINE
Fish and Wildlife - continued

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
20		10								10			30			40
		10								10			30			40
		20								20			60			80
	10									10			40			50
	10									10			40			50
	20									20			80			100
													10			10
										20			20			40
	10				60					70			20			90
													10			10
													10			10
													20			20
													5			5
													5			5
													10			10

PHASE: 2 Inventory and Analysis
 ACTIVITY: K Fish and Wildlife - continued

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
2K13	Prepare interim reports.				
a	Sub-basin 1	SCS	PL	01/80	11/80
b	Sub-basin 2	SCS	PL	10/81	11/81
c	Remainder of Basin	SCS	PL	10/82	
	Sub-total of man-days by sub-basin				
	Sub-basin 1				
	Sub-basin 2				
	Remainder of Basin				
	Basinwide				
	Total man-days (Activity)				

MAN-DAYS BY AGENCY AND DISCIPLINE
Fish and Wildlife - continued

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
	5									5			30			35
	5									5			30			35
	10									10			60			70
	32	25				5		10		72			200			272
	32	25				5		10		72			200			272
	64	50				10		20		144			410			554
20	20	0			60	0		0		100			150			250
20	148	100			60	20		40		388			960			1348

FLOOD DAMAGES

Discussion - The objectives of this portion of the study are to determine (1) the area inundated by flood waters by streams, lakes, and the Cook Inlet under present and future conditions; (2) physical and monetary damages; (3) prevent flood damages in the future by providing data to assist local governments in developing land use and management plans; and (4) determine the need for flood protection and prevention measures.

Procedure - The first step is to analyze available streamflow data to evaluate the adequacy of that data. Then peak discharge-frequency curves for the 10, 50, 100 and 500-year events will be developed. Frequency curves will be developed using the Log Pearson Type III frequency method. There are eight surface water gaging stations within the study area; two of these have records in excess of 25 years, two with 17 years, one with 18 years, one with 12 years, one with 2 years, and one with one year. This data is not adequate for determining peak frequencies with accuracy to use in the development of land use plans. It is proposed that additional sites are needed to develop peak frequencies for determining areas inundated. In a few years this data would be used to more accurately define the flood-prone areas to control development in the flood plains.

USGS topographic quadrangles, 1:63,360, and aerial photography will be used to tentatively locate channel cross-sections to be surveyed for channel routing. Elevations will be taken from points identified on the topographic quads. The

cross-section will be surveyed, plotted, and stage-discharge curves developed. Slopes will be determined from topographic quadrangles. The stage-discharge curves will be used for determining high water elevations for the 10-year, 50-year, 100-year, and 500-year frequency events. Detailed soil surveys will be utilized to the fullest extent possible to determine areas inundated by flood water. A map indicating areas inundated will be developed and flood damages for both present and future conditions will be estimated.

The Corps of Engineers is in the process of making flood studies on Deception Creek and the Little Susitna River. These data will be used to map the area inundated by these two streams.

Historical information on flood damages will be collected by conducting personal interviews with people in the flood-prone areas. These data will be used to assist in determining existing flood damages, as a check on the synthetic flood analysis, and determining the need for flood protection measures. Alternatives for flood protection and impacts of each alternative will be developed and displayed in the four accounts.

The flood-prone area map will be digitized and stored on tape for future reference, and in the analysis portion, Phase 3, of the Study.

NOTES

PHASE: 2 Inventory and Analysis

ACTIVITY: L Flood Damages

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
2L1	Analyze stream gage data for flooding information (use annotated bibliography).	SCS	HE	04/78	06/78
2L2	Develop peak-frequency curves for old/new stream gage records.				
a	Sub-basin 1	SCS	HE	06/78	09/78
b	Sub-basin 2	SCS	HE	06/78	09/79
c	Remainder of basin	SCS	HE		
2L3	Determine adequacy of frequency curves for use in the basins.				
a	Sub-basin 1	SCS	HE	06/78	08/78
b	Sub-basin 2	SCS	HE	06/78	08/79
c	Remainder of basin	SCS	HE		
2L4	Develop frequency curves for use in flood routing.				
a	Sub-basin 1	SCS	HE	06/78	08/78
b	Sub-basin 2	SCS	HE	06/79	08/79
c	Remainder of basin	SCS	HE		
2L5	Locate, survey, and plot key cross-sections of areas inundated.				
a	Sub-basin 1	SCS	HE	06/78	09/78
b	Sub-basin 2	SCS	HE	06/79	09/79
c	Remainder of basin	SCS	HE		
2L6	Develop stage discharge curves.				
a	Sub-basin 1	SCS	HE	09/78	11/78
b	Sub-basin 2	SCS	HE	09/79	11/79
c	Remainder of basin	SCS	HE		
2L7	Develop water surface profiles based upon 100 and 500-year frequency peaks.				
a	Sub-basin 1	SCS	HE	09/78	11/78
b	Sub-basin 2	SCS	HE	09/79	11/79
c	Remainder of basin	SCS	HE		

MAN-DAYS BY AGENCY AND DISCIPLINE

Flood Damages

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
		10								10						10
		20								20						20
		10								10						10
		15								15						15
		20								20						20
		20								20						20
		20								20						20
		40								40						40
		20								20						20
		15								15						15
		15								15						15
		20								20						20
		45								45						45
		10								10						10
		10								10						10
		12								12						12
		10								10						10
		25								25						25
		36								36						36

PHASE: 2 Inventory and Analysis
 ACTIVITY: L Flood Damages - continued

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
2L8	Collect historical data on flooding from local residents, and field check the areas.				
a	Sub-basin 1	SCS	HE	05/78	08/78
b	Sub-basin 2	SCS	HE	05/78	08/78
c	Remainder of basin	SCS	HE		
2L9	Develop damage-frequency curve.				
a	Sub-basin 1	SCS	HE	06/78	09/78
b	Sub-basin 2	SCS	HE	06/78	09/79
c	Remainder of basin	SCS	HE		
2L10	Determine average annual damages.				
a	Sub-basin 1	SCS	HE	06/78	09/78
b	Sub-basin 2	SCS	HE	06/79	09/79
c	Remainder of basin	SCS	HE		
2L11	Inventory and classify material and man-made channels.				
a	Sub-basin 1	SCS	HE	06/78	09/79
b	Sub-basin 2	SCS	HE	06/79	09/79
c	Remainder of basin	SCS	HE		
2L12	Determine stability of channels; stable, aggrading, or degrading.				
a	Sub-basin 1	SCS	HE	06/78	10/78
b	Sub-basin 2	SCS	HE	06/79	10/79
c	Remainder of basin	SCS	HE		
2L13	Develop maps, charts, displays, etc., and enter data in computer.				
a	Sub-basin 1	SCS	HE	11/78	03/79
b	Sub-basin 2	SCS	HE	11/79	03/80
c	Remainder of basin	SCS	HE		

MAN-DAYS BY AGENCY AND DISCIPLINE

Flood Damages - continued

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
		15			20					35						35
		30			20					50						50
		20			15					35						35
		2			20					22						22
		2			20					22						22
		4			15					19						19
		2			5					7						7
		2			5					7						7
		4			5					9						9
		11								11						11
		15								15						15
		24								24						24
		20								20						20
		20	30							50						50
		40	17							57						57
	5	20	10	5						40						40
	5	20	10	5						40						40
	10	15	10	10						45						45

PHASE: 2 Inventory and Analysis
 ACTIVITY: L Flood Damages - continued

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
2L14	Prepare interim reports by sub-basin.				
a	Sub-basin 1	SCS	HE	03/79	05/79
b	Sub-basin 2	SCS	HE	03/80	05/80
c	Remainder of basin	SCS	HE	03/81	05/81
	Sub-total of man-days				
	Sub-basin 1				
	Sub-basin 2				
	Remainder of basin				
	Basinwide				
	Total man-days (Activity)				

MAN-DAYS BY AGENCY AND DISCIPLINE

Flood Damages - continued

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
	5	10	5							20						20
	5	10	5							20						20
	10	20	10							40						40
	10	195	15	5	45					270						270
	10	204	45	5	45					309						309
	20	270	37	10	35					372						372
		10								10						10
	40	679	97	20	125					961						961

LAND STATUS ATLAS

Discussion - The purpose of the land status atlas is to provide the Cooperative Study with an overview of land ownership patterns, and subsurface/surface uses as baseline information of existing water and land resource uses and activities. The atlas will also be valuable to land managers in regional planning work. An understanding of current land status is a preliminary requirement to resource management and planning.

Before this land status atlas project began, very little of the information shown here had been mapped at scales other than 1:250,000 or 1:1,000,000 at the generalized extreme and at the status plat scale (in chains per inch) at the detailed extreme. This project is the first attempt at showing as much land status information on overlays at a regional scale, and is extremely helpful to a variety of users. The Matanuska-Susitna Borough, the Capital Site Planning Commission, and several other resource groups have already expressed interest in having copies of overlays for their work. The land status maps will be used in Phase 3 of this study as one of the many determinants to preparing guidelines to alternative resource uses.

Procedure - Information will be transferred from state and federal (BLM) land status plats to overlays at scale 1:250,000 for the entire Susitna River Basin, and at scale 1:63,360 for the State priority areas (see study area map). 1:250,000 and 1:63,360 USGS maps will be used as base maps. Overlays are easily updated and

reproduced, so they may be used by federal, state, and local agencies now and in the future.

For the 1:250,000 scale, 3 overlays showing: (1) land ownership, (2) subsurface use, and (3) surface use, will be produced. Each will be drafted on mylar, printed on acetate, and screened in one of three color shade films. Overlays may be used together with the base map for the "total picture," or one at a time with the base map for specific information.

The atlas will include a user's guide explaining the project's limitations and uses. A brief explanation of the permits, leases, classifications, etc., will be given. Information from this atlas will be computer stored.

As land status changes continually, frequent update of land status overlays is required. Updates are planned and will involve checking status plat changes, updating maps and reprinting acetates.

NOTES

PHASE: 2 Inventory and Analysis

ACTIVITY: M Land Status

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
2M1	Map land ownership, and surface and sub-surface uses at a 1:250,000 and 1:63,360 scale.*	SCS	DNR	08/77	09/78
2M2	Compile land status atlas.*	SCS	DNR	08/77	09/78
2M3	Code and place data into computer.*	SCS	DNR	10/78	01/79
2M4	Update land status map and atlas and place data in storage.				
a	Sub-basin 1	DNR	DNR	01/79	02/79
b	Sub-basin 2	DNR	DNR	01/80	03/80
c	Remainder of Basin	DNR	DNR	01/81	
	Sub-total of man-days				
	Sub-basin 1				
	Sub-basin 2				
	Remainder of Basin				
	Basinwide				
	Total man-days (Activity)				
	*By cooperative agreement with the State of Alaska - Department of Natural Resources.				

MAN-DAYS BY AGENCY AND DISCIPLINE
Land Status

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
											90					90
											15					15
											10					10
											30					30
											30					30
											60					60
											30					30
											30					30
											60					60
											115					115
											235					235

LAND USE ATLAS

Discussion - The purpose of the cultural land use atlas is to record existing human uses of land resources in narrative form and on map overlays. This information will be used by the socio-economic inventory and analysis, and is relevant to other Phase 3 tasks of the Cooperative Study in providing guidelines to future resource management. Existing human uses of land are as important as suitabilities and limitations of land in formulating these guidelines. The project is of lasting value as updates are to be made on original information. Trends and conflicts in man's land uses will be revealed by comparing old maps and noting changes. Excluding this effort, no comprehensive land use maps at these scales (useful to land managers) exist. This project relates directly to needs of the Matanuska-Susitna Borough and State planning agencies; a preliminary step to their planning for future resource management is a comprehensive portrayal of the existing human uses of resources.

Procedure - Windshield survey in areas with road access in addition to use of high altitude photography and contact with the Borough and other relevant agencies, will be required to collect land use information. Map overlays at scales of 1:25,000 and 1:63,360 (to be used with USGS base maps) will be produced for the State priority areas (see study area map) and at 1:250,000 for the outlying areas. As the information is especially important to the Matanuska-Susitna Borough Planning Department, this agency

has been directly involved in the project formulation-scales, legends, format, etc. The major classifications to be shown include: Agriculture, residential, commercial, public services, resource extraction, etc. Each major category is further broken down; for example, the residential category is divided into low, medium, and high density categories. Acreages in each use will be tabulated.

In addition to existing conditions, proposed or known future land uses changes will be shown on overlays. Major proposed transportation corridors, or industrial sites are examples of what would be shown on land use change overlays.

Analysis and Evaluation - Narrative analysis of land uses and probable trends, as well as a preliminary discussion of land use conflicts - existing and potential - will be included in this project. Information will be computer stored for easy access by planning agencies.

The field work done for the land use mapping project will be valuable as field checking for landsat imagery as well as for high altitude photography. The land use maps will be used extensively in Phase 3 adding existing human uses of land to the consideration of utilizing, conserving, or developing resources in the future, and by state and borough planning agencies in their day-to-day resource management responsibilities.

As in any program of mapping existing conditions, this project will require updates.

NOTES

PHASE: 2 Inventory and Analysis

ACTIVITY: N Land Use Atlas

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
2N1	Conduct a land use survey and produce a land use map of the area at a 1:250,000 and 1:63,360 scale*	SCS	DNR	08/77	09/78
2N2	Compose a narrative analysis of land use and trends on the basis of field work and public contacts.*	SCS	DNR	08/77	09/78
2N3	Compile a land use atlas.*	SCS	DNR	08/77	09/78
2N4	Code and place into computer.*	SCS	DNR	10/79	12/79
2N5	Update land use maps and atlas. Place data into storage.				
a	Sub-basin 1	SCS	DNR	01/79	02/79
b	Sub-basin 2	SCS	DNR	01/80	03/80
c	Remainder of Basin	SCS	DNR	01/81	
	Sub-total of man-days				
	Sub-basin 1				
	Sub-basin 2				
	Remainder of Basin				
	Basinwide				
	Total man-days (Activity)				
	*Under a cooperative agreement with the State of Alaska - Department of Natural Resources.				

MAN-DAYS BY AGENCY AND DISCIPLINE

Land Use Atlas

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
											160					160
											20					20
											20					20
											30					30
											20					20
											20					20
											40					40
											20					20
											20					20
											40					40
											230					230
											310					310

SOCIAL AND ECONOMIC INVENTORY AND PROJECTIONS

Discussion - The purpose of this element of the Cooperative Study is to gather economic data needed to quantify, qualify, and analyze economic facts of Alaska's water and related land resources. There is need to establish the economic and social values of water, land, and living resources - both currently and for projection years in relation to varying (alternative) intensities of use. The social and economic study for priority areas of the Susitna Basin, thus, is proposed to be an inventory and analysis of the existing basin economy, and its relationship to the State's economy. The study will define and analyze those conditions leading to future basin development. Projections of the state and basin economies will be developed, and will be used to estimate the water and related land use requirement demands for the Basin.

The economic base study and projections will proceed through various stages. Initially, the major emphasis will relate to the total Susitna Basin. Then as study proceeds by sub-basin, more detailed analysis will be available and projections will be made for the individual sub-basin on a priority basis. A re-look will be made of basin and sub-basin projections following detailed analysis of Phase 3, as appropriate revisions made. The major activities in chart 2-0, Phase 2, should be viewed as a sequence that will be followed for the total basin and for each sub-basin.

Procedure

1. Develop data inventory of existing basin economy with historical time trends.
 - a. Review literature
 - b. Historical data
 - (1) Population
 - (2) Labor force, employment, and unemployment
 - (3) Industrial output by sectors
 - (4) Incomes
 - (5) Transportation
 - (6) International trade
 - (7) Recreation
 - (8) Wild gather
 - (9) Government
2. Analyze the growth trends of basin economy.
 - a. Economic analysis based on data from Activity 1.
 - b. Analyze relationships of basin economy to state, federal, and other economies.

3. Define and analyze past economic growth conditions.

Agriculture, climate, geography, forestry, military, government, oil and gas, native regional corporations, other.

4. Define and analyze conditions leading to future basin growth.

Agriculture, capital relocation, resource development (energy, minerals, etc.), forestry, transportation, government, native regional corporations, other.

5. Develop projections of the economy of the State.

- a. Review OBERS and other existing projections and methodology.
- b. Utilize existing models and model systems (e.g., ISER's map model, DEE's AEIRS system).
- c. Develop consensus projections.

6. Develop projections of the economy of the Basin.

- a. Review OBERS and other existing projections and methodology.
- b. Utilize existing models and model systems (e.g., ISER's map model, DEE's AEIRS system).

- c. Develop consensus projections.

7. Relate state and basin projections to future water and related land requirements.

- a. Develop water and related land demand coefficients by user type.
 - (1) Historical and present relationships
 - (2) Probable future relationships
- b. Apply future water and related land demand relationships to projections of basin economy.

Reports - An Economic Base and Preliminary Projections report will be prepared early in the Study for the Susitna Basin and for each sub-basin as the Study progresses. Projections will later be revised as detailed analysis warrants.

PHASE: 2, Inventory and Analysis

ACTIVITY: 0 Economic and Social Inventory and Projections

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
201	Review existing literature on basin economy and prepare bibliography of relevant studies, programs, and methodologies that might be useful to this study.	ESCS	E	07/78	11/78
202	Collect and inventory historical economic and social base data - foreign population, labor force, output and income by industries, transportation, international trade, and public service.				
a	Sub-basin 1	ESCS	E	08/78	01/79
b	Sub-basin 2	ESCS	E	08/78	01/80
c	Remainder of basin	ESCS	E	08/78	
203	Analyze growth trends with special emphasis on agriculture and forestry - historical agriculture development, past and current trends in forest products, output, processing and marketing of major industries, and analyze relations of economy to state, United States, and economies.				
a	Sub-basin 1	ESCS	E	09/78	01/79
b	Sub-basin 2	ESCS	E	09/78	01/80
c	Remainder of basin	ESCS	E	09/78	
204	Analyze unique economic and institutional characteristics of the Basin as related to future resource development - Alaska Native Claims Settlement Act, basin wild gather, government structure and functions, corporation versus traditional family farms, marketing facilities, agriculture product demands, community services, etc.				
a	Sub-basin 1	ESCS	E	10/78	02/79
b	Sub-basin 2	ESCS	E	10/78	02/80
c	Remainder of basin	ESCS	E	10/78	

MAN-DAYS BY AGENCY AND DISCIPLINE
Economic and Social Inventory and Projections

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
15					5					20						20
15					10					25						25
10					5					15						15
5					5					10						10
20	10				10	10		10		60						60
10	5				5	5		5		30						30
10	5				5	5		5		30						30
30					10	5				45			5			50
10					5	5				20			5			25
15					5	2				22			2			24

PHASE: 2 Inventory and Analysis

ACTIVITY: 0 Economic and Social Inventory and Projections - continued

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
205	Preliminary projections of resource development and economic activity - review OBERS, develop input - output programming models, and prepare economic projections.				
a	Sub-basin 1	ESCS	E	01/79	03/79
b	Sub-basin 2	ESCS	E	01/79	03/80
c	Remainder of basin	ESCS	E	01/79	
206	Relate projections to future lands and water requirements.				
a	Sub-basin 1	ESCS	E	04/79	06/79
b	Sub-basin 2	ESCS	E	02/80	04/80
c	Remainder of basin	ESCS	E	02/81	
207	Prepare graphs, charts, maps, etc., code and enter data into storage.				
a	Sub-basin 1	ESCS	E	06/79	06/79
b	Sub-basin 2	ESCS	E	05/80	05/80
c	Remainder of basin	ESCS	E	05/80	
208	Prepare economic base reports.				
a	Sub-basin 1	ESCS	E	06/79	07/79
b	Sub-basin 2	ESCS	E	06/80	07/80
c	Remainder of basin	ESCS	E	06/81	
	Sub-total of man-days				
	Sub-basin 1				
	Sub-basin 2				
	Remainder of basin				
	Basinwide				
	Total man-days (Activity)				

MAN-DAYS BY AGENCY AND DISCIPLINE
Economic and Social Inventory and Projections - continued

ESCS	FS	SCS									STATE		STATE/ FEDERAL	FEDERAL		
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary	TOTAL	DNR		Biologist	USFS For. Survey	USGS	COMBINED TOTAL
40 20 25					20 10 15					60 30 40						60 30 40
20 10 10	2 2 1	5 5 2		5 5 2	10 5 5		5 5 2			47 32 22			2 2 1			49 34 23
5 5 5					5 5 5					10 10 10						10 10 10
5 5 5					5 5 5					10 10 10						10 10 10
15 135 70 75	12 7 6	5 5 2		5 5 2	5 70 40 45	15 10 7	5 5 2	10 5 5		20 257 147 144			7 7 3			20 264 154 147
295	25	12		12	160	32	12	30		568			17			585

PHASE: 2 Inventory and Analysis
 ACTIVITY: P Public Involvement*

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
2P1	Conduct periodic meetings, explaining field study progress and plans, soliciting interest, direction, and participation. Record and document response.	SCS	DNR	02/78	
2P2	Attend meetings related to the Basin Cooperative Study.	SCS	DNR	02/78	
2P3	Disseminate monthly progress reports to sponsors and other interested and relevant agencies, providing opportunity for comment.	SCS	DNR	02/78	
2P4	Publish news releases giving report of progress, additional information, and directing interested parties to contact Study Team for further updates.	SCS	DNR	02/78	
	Sub-total of man-days Basinwide				
	Total man-days (Activity)				
	*By cooperative agreement with State of Alaska - Department of Natural Resources				

MAN-DAYS BY AGENCY AND DISCIPLINE
Public Involvement

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
10	10	10	10							40	100					140
10	5	5	5							25	50					75
10										10	40					50
10										10	20					30
40	15	15	15							85	210					295
40	15	15	15							85	210					295

NOTES

PHASE 3

Evaluation of Alternative Uses

EVALUATION OF ALTERNATIVE USES

This phase will involve using the information and maps created in Phase 2 to test the range of alternatives for resource use, and to present alternate resource management schemes. In Phase 3, information on the potential for developing, preserving, or utilizing each separate resource will be generated, and the probable impacts of development, preservation, or utilization of each upon the regional environment and economy will be established. The Cooperative Study will not present alternative plans, but will evaluate alternative resource uses. These use alternatives will be presented to the State of Alaska, to the public, and to local government to be used as a basis for their plan formulation.

First, areas with high potential for conflicting resource uses will be identified. This will involve delineating areas with high value developable resource, land highly valued for preservation, critical habitats, etc.; in short, delineating environmentally or economically important resource areas with competition or conflict potential.

Next, resources are to be considered for alternative uses. Four assumptions will be used to examine the alternatives.

That a resource management scheme would:

1. follow present conditions with no management plan or programs.
2. emphasize local, state, and national economic development.
3. emphasize environmental quality.

4. be directed by local preference.

A final report will be prepared to include inventories, projections, needs, resource potentials, management alternatives, and opportunities for implementation. The outline of the final report is as follows:

Chapter I	Summary
Chapter II	Introduction
Chapter III	Natural Resource Base
Chapter IV	Human and Economic Resources
Chapter V	Water and Related Land Resource Problems
Chapter VI	Present and Future Needs for Water and Related Resources
Chapter VII	Water and Related Land Resource Potential
Chapter VIII	Management Alternatives
Chapter IX	Opportunities for Development and Impact of USDA Programs
Chapter X	Coordination and Programs

Phase 4 will not be a part of this cooperative study, but the resource inventories and analysis of alternative uses will be used by federal, state, and local planners. USDA and other federal agency expertise will play an important roll in the development of the comprehensive plans and management decisions.

PHASE: 3 Evaluation of Alternative Uses

ACTIVITY: A Evaluate Alternatives

Code	Work Item	Responsible Agency	Responsible Discipline	*Starting Date	*Completion Date
3A1	Summarize agriculture, cropland, and pasture land data from phase 2 for potential alternative basin resource uses.				
	a. Identify high, medium, and low potential areas, and areas physically suitable for cropland and pasture.	SCS	SS		
	b. Analyze cost of land development - clearing, treatment, drainage, irrigation, fencing, etc.	SCS	SE		
	c. Analyze production cost by type of crop or livestock enterprise. Analyze operating expenses and minimum farm size.	SCS	SE		
	d. Analyze existing and needed marketing and processing facilities and estimated cost.	ESCS	E		
	e. Estimate social impacts of agriculture - schools, utilities, etc.	ESCS	E		
	f. Estimate environmental impacts of agriculture.	ESCS	E		
	g. Estimate impacts of new agriculture - benefits costs, employment, and income.	ESCS	E		
	h. Analysis of institutions (laws, regulations, policies, customs, etc.) that may influence the implementation of agriculture, forestry, and other resource development use.	ESCS	E		
3A2	Summarize areas and acres of commercial saw timber, pulpwood, and other uses from phase 2 data for potential alternative basin recourse uses.				
	a. Determine logging methods, logging and haul cost and access.	FS	F		

MAN-DAYS BY AGENCY AND DISCIPLINE

Evaluate Alternatives

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
20	5	5	5	5	20		5	5		70	10					80
40	10	60	10	5	10	20	10			165	10					175
40					10	5	5			60						60
35					10	10				55						55
50					10					60	10					70
50	10	10	10	10	10	10	10	10		130	15		20			165
120					30					150	5					155
50					10					60	5					65
	20	5	5		30					60	30		10			100

PHASE: 3 Evaluation of Alternative Uses
 ACTIVITY: A Evaluate Alternatives - continued

Code	Work Item	Responsible Agency	Responsible Discipline	* Starting Date	* Completion Date
	b. Inventory existing and needed wood-processing facilities and markets.	FS	F		
	c. Estimate reforestation and stand improvement cost.	FS	F		
	d. Estimate environmental impacts of the timber industry.	FS	F		
	e. Estimate social impact of timber industry - schools, housing, etc.	ESCS	E		
	f. Estimate economic impacts of timber development - benefits, costs, employment and income.	ESCS	E		
3A3	Summarize fish and wildlife from phase 2 data for potential alternative basin resource uses.				
	a. Summarize habitat location and populations, and list potential wildlife preserves.	SCS	PL		
	b. Estimate carrying capacities.	SCS	PL		
	c. Estimate hunting and fishing days and harvest rates.	SCS	PL		
	d. Estimate subsistence use and recreation use.	SCS	PL		
	e. Estimate economic impacts - revenues, expenditures, and employment.	SCS	PL		
	f. Estimate environmental impacts.	SCS	PL		
	g. Estimate social impacts.	SCS	PL		

MAN-DAYS BY AGENCY AND DISCIPLINE
Evaluate Alternatives - continued

ESCS	FS	SCS									STATE		STATE/ FEDERAL	FEDERAL		
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary	TOTAL	DNR	ADEC	Biologist	USFS For. Survey	USGS	COMBINED TOTAL
	5				10					15						15
	20				5					25						25
10	10	10	10		5	10	10	10		75	15		20			110
10					5					15	10					25
20	5				10					35						35
	5				5			5		15	10		40			65
	5				5			20		30			40			70
	5				5			20		30			40			70
	5				5			20		30	5		20			55
					15					15			20			35
	5	5	5	5	5			5		25	10		10			45
					5					5	5		10			-20

PHASE: 3 Evaluation of Alternative Uses
 ACTIVITY: A Evaluate Alternatives - continued

Code	Work Item	Responsible Agency	Responsible Discipline	* Starting Date	* Completion Date
3A4	Summarize range land from phase 2 data for potential alternative basin resource uses.				
	a. Summarize and locate potential grazing areas.	ESCS	E		
	b. Evaluate domestic grazing potential.	ESCS	DNR		
	c. Evaluate environmental impacts of domestic grazing.	ESCS	E		
	d. Estimate economic impacts - cost benefits, employment, income, etc.	ESCS	E		
	e. Estimate marketing, processing, and transportation needs.	ESCS	E		
	f. Estimate social and economic impacts.	ESCS	E		
3A5	Summarize commercial fisheries from phase 2 data for potential alternative basin resource uses.				
	a. Summarize and locate potential spawning areas.	FS	F		
	b. Evaluate development of new spawning areas.	SCS	SE		
	c. Evaluate environmental impacts of commercial fisheries.	SCS	SE		
	d. Estimate economic impacts - value of catch, market expansion, employment, income, and processing costs.	ESCS	E		
	e. Estimate social impacts.	ESCS	E		

MAN-DAYS BY AGENCY AND DISCIPLINE

Evaluate Alternatives - continued

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
	5				5			10		20						20
	5				5			20		30						30
	5	5	5		5	5	5	10		40	5		10			55
40	5				15			5		65						65
10								5		15	5					20
20					10					30	5					35
		5			5					10			10			20
		5			5					10			10			20
	5	5			5			5		20			10			30
					40					40			5			45
					10					10	5					15

PHASE: 3 Evaluation of Alternative Uses
 ACTIVITY: A Evaluate Alternatives - continued

Code	Work Item	Responsible Agency	Responsible Discipline	* Starting Date	* Completion Date
3A6	Summarize outdoor recreation from phase 2 data for potential alternative Basin resource uses.				
	a. Summarize past, present, and future outdoor recreation use in Basin.	SCS	RC		
	b. List areas with potential for outdoor recreation development.	SCS	RC		
	c. Estimate development cost, access, needs, user days, etc.	SCS	RC		
	d. Estimate economic impacts - revenues, expenditures, etc.	ESCS	E		
	e. Estimate environmental impacts.	ESCS	E		
	f. Estimate social and economic impacts.	ESCS	E		
3A7	Summarize potential wilderness areas and wild and scenic rivers from phase 2 data for potential alternative Basin resource uses.				
	a. Estimate economic values forgone, and development costs.	SCS	PL		
	b. Estimate environmental impacts.	SCS	PL		
	c. Estimate social impacts.	SCS	PL		
3A8	Summarize the effect of future urban development on the Basin from pahse 2 data for potential alternative Basin resource uses.				
	a. Summarize land use changes, transportation, and housing needs	SCS	PL		

MAN-DAYS BY AGENCY AND DISCIPLINE

Evaluate Alternatives - continued

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
10	5									15	10		5			30
5	5		5					5		20	10					30
15	2									17	5					22
10	2									12	5					17
5	5	5	5					5		25	20		10			55
5										5	5					10
	20	5	5	5	20			10		65	30		20			115
	5				5					10	5					15
	5				10			5		20	15		10			45
10	5	5		5	5			5		35	15					50

PHASE: 3 Evaluation of Alternative Uses
 ACTIVITY: A Evaluate Alternatives - continued

Code	Work Item	Responsible Agency	Responsible Discipline	*Starting Date	*Completion Date
	b. Estimate public facility needs.	ESCS	E		
	c. Estimate environmental impacts.	SCS	SE		
	d. Estimate social and economic impacts.	ESCS	E		
3A9	Identify areas of potential complimentary and competitive land uses, water quality, water supply, water needs and environmental quality from identified alternatives.	ESCS	E		
3A10	Determine trade-offs of economic and environmental components.	ESCS	E		
3A11	Present trade-offs in maps, charts, tables, and other appropriate displays.	ESCS	E		
	Sub-total of man-days				
	**Sub-basin 1				
	Sub-basin 2				
	Remainder of Basin				
	Total man-days (Activity)				
	Draft of sub-basin report				
	Sub-basin 1	SCS	PL	07/78	12/82
	Sub-basin 2	SCS	PL		12/84
	Remainder of Basin	SCS	PL		12/86
	*Starting or completion dates not determined as time and results from this Phase will be expended and realized throughout Phase 2, as each Sub-basin is completed.				
	**Sub-basin time breakdown is estimated by Total only for agency and discipline because many work items interrelate sub-basin to sub-basin and the Basin as a whole.				

MAN-DAYS BY AGENCY AND DISCIPLINE

Evaluate Alternatives - continued

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
5					5					10	10					20
	5	5	5	5	5			5		30	10		10			50
5					5					10	5					15
20	10	10	10	10	10	5	5	10		90	10		20			120
285	20	15	15	15	100	10	15	20		495	20		30			545
20	5	5	5	5	10	5	5	5		65	10		10			85
410	105	70	45	32	222	36	32	100		1052	112		178			1342
270	70	45	30	31	148	24	21	65		694	75		119			888
230	59	35	25	17	125	20	17	55		583	63		98			744
910	234	150	100	70	495	80	70	220		2329	250		395			2974

PHASE: 3 Evaluation of Alternative Uses
 ACTIVITY: B Public Involvement*

Code	Work Item	Responsible Agency	Responsible Discipline	**Starting Date	**Completion Date
3B1	Develop, conduct, and analyze a public questionnaire based upon data and information collected in phase 2 of the Study.	SCS	DNR		
3B2	Develop information for the news media concerning information and data gathered in phase 2 of the Study on how it relates to alternative basin resource uses.	SCS	DNR		
3B3	Develop slide program, maps and charts as required in agenda for public meetings to explain and discuss the alternative basin resource uses.	SCS	DNR		
3B4	Hold public meetings on draft report, and analyze the public response.	SCS	DNR		
3B5	Present final report to public. Explain how the report can be used in the planning process, and how USDA can be of assistance in their programs	SCS	DNR		
	Total man-days (Activity) ***Sub-basin 1 Sub-basin 2 Remainder of Basin *Under cooperative agreement with State of Alaska - Department of Natural Resources. **Starting or completion dates not determined as time and results from this Phase will be expended and realized throughout Phase 2 as each sub-basin is completed. ***Sub-basin time breakdown is estimated by total only for agency and discipline because many work items interrelate sub-basin to sub-basin and the basin as a whole.				

MAN-DAYS BY AGENCY AND DISCIPLINE

Public Involvement

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USCS	
5	5	5	5	5	5			5		35	20		5			60
											25					25
15	15	15	15	15	15		10	15		115	60		15			190
15	15	15	15	15	15			15		105	20		15			140
5	5	5	5	5	5		5	5		40	40		5			85
40	40	40	40	40	40		15	40		295	165		40			500

PHASE: 3 Evaluation of Alternative Uses

ACTIVITY: C Final Report

Code	Work Item	Responsible Agency	Responsible Discipline	Starting Date	Completion Date
3C1	Prepare draft of the Susitna Basin report for FAC and State review.	SCS	PL	12/86	06/87
3C2	Receive and incorporate comments into draft report.	SCS	PL	*	
3C3	Prepare final report for WAC review and approval.	SCS	PL	*	
3C4	Print and disseminate to interested parties.	SCS	PL	*	
	Total man-days				
	*Not determined				

MAN-DAYS BY AGENCY AND DISCIPLINE

Final Report

ESCS	FS	SCS								TOTAL	STATE		STATE/ FEDERAL	FEDERAL		COMBINED TOTAL
Economist	Forester	Hyd. Eng.	Soil Scientist	Geologist	Economist	Agronomist	Soil Conserv.	Range Conserv.	Temporary		DNR		Biologist	USFS For. Survey	USGS	
30	30	30	30	10		5	5	30		170	30		60			260
15	15	15	15	10		5	5	15		95	15		30			150
15	15	15	15	5		5	5	15		90	15		30			135
5	5	5	5					5		25	5		5			35
65	65	65	65	25		15	25	65		390	65		125			580

FUNDING

Estimated expenditures by USDA for Fiscal Years 1977 through 1986.

<u>Fiscal Year</u>	<u>ESCS</u>	<u>Agency FS</u>	<u>SCS</u>	<u>Total</u>
1977	22,827	35,000	346,000	403,827
1978	56,000	56,250	772,000	884,250
1979	66,000	130,000	1,020,700	1,216,700
1980	67,000	140,000	880,000	1,087,000
1981	67,000	100,000	412,400	579,400
1982	67,000	80,000	401,000	548,000
1983	67,000	60,000	290,000	417,000
1984			290,000	290,000
1985			165,000	165,000
1986		50,000	296,000	346,000
Total	412,827	651,250	4,873,100	5,937,177

In witness whereof, the Alaska Department of Natural Resources and the Soil Conservation Service, USDA, have concurred in the Plan of Work for the Alaska Rivers, Susitna Basin Cooperative Study, as of the date hereon written.

U.S. Department of Agriculture
Soil Conservation Service
Forest Service
Economics, Statistics, and
Cooperatives Service

Alaska Department of Natural Resources

By: _____
David G. Hanson
Chief, Natural Resources Planning
and Research

Date: _____

By: _____
Weymeth E. Long
Chairman, FAC Committee

Date: _____

NOTES

ACTIVITY SCHEDULE
PHASE 2
Sub-basin 1

06/77 04/78 Surface Water Quantity 12/80

05/78 Ground Water Quantity 03/79

06/77 Water Quality 06/79

06/77 Water Use and Needs 03/82

06/77 Soil Survey 04/79

02/78 Land Treatment and Agronomy 04/79

06/77 Geology 05/79

05/78 Vegetation Inventory 04/79

02/78 Recreation 02/79

06/77 Arch. and Hist. Culture 03/79

04/78 Fish and Wildlife 04/80

04/78 Flood Damages 05/79

08/77 Land Status 02/79

08/77 Land Use Atlas 02/79

07/78 07/79 (Economic and Social Inventory and Projections)

02/78 Public Involvement 03/82

ACTIVITY SCHEDULE
PHASE 2
Sub-basin 2

06/78

02/83

04/81 Surface Water Quantity 03/83 →

06/78 Ground Water Quantity 03/80

06/79 Water Quality 05/80

12/80 Water Use and Needs 03/83 →

06/78 04/79 (Soil Survey)

01/79 04/79 (Land Treatment and Agronomy)

04/79 Geology 04/80

04/79 03/80 (Vegetation Inventory)

02/79 Recreation 04/80

03/79 Arch. and Hist. Culture 03/80

12/79 Fish and Wildlife 11/81

06/78 Flood Damages 05/80

01/80 03/80 (Land Status)

01/80 03/80 (Land Use Atlas)

08/78 Economic and Social Inventory and Projections 07/80

06/78 Public Involvement 03/83 →

Relationship of Phase 2, Inventory and Analysis, to Phase 3, Evaluation of Alternative Uses, and Final Report.

<u>PHASE 2</u>	<u>MAJOR INPUT TO PHASE 3</u>	<u>INPUT TO FINAL REPORT</u>
<u>Activity</u>	<u>Activity</u>	<u>Chapter</u>
2A	3A3, 3A5, 3A6, 3A8, 3A9, 3A10, 3A11	III, V, VI, VII, VIII, IX, X
2B	3A1, 3A8, 3A9, 3A10, 3A11	III, V, VI, VII, VIII, IX, X
2C	3A3, 3A5, 3A6, 3A7, 3A9, 3A10, 3A11	III, V, VI, VII, VIII, IX, X
2D	3A1, 3A3, 3A5, 3A6, 3A8, 3A9, 3A10, 3A11	III, V, VI, VII, VIII, IX, X
2E	3A1, 3A2, 3A4, 3A6, 3A9, 3A10, 3A11	III, VII, VIII
2F	3A1, 3A4, 3A8, 3A9, 3A10, 3A11	VI, VIII, IX, X
2G	3A1, 3A6, 3A8, 3A9, 3A10, 3A11	III, VII, VIII
2H	3A2, 3A3, 3A4, 3A6, 3A8, 3A9, 3A10, 3A11	III, VII, VIII
2I	3A3, 3A6, 3A8, 3A9, 3A10, 3A11	VI, VII, VIII, IX, X
2J	3A6, 3A8, 3A9, 3A10, 3A11	VIII
2K	3A3, 3A6, 3A9, 3A10, 3A11	III, VI, VII, VIII, IX, X
2L	3A1, 3A2, 3A6, 3A8, 3A9, 3A10, 3A11	V, VI, VIII, IX, X
2M	3A9, 3A10, 3A11	IV, VIII
2N	3A9, 3A10, 3A11	VIII, IX, X
2O	3A1, 3A2, 3A3, 3A4, 3A5, 3A6, 3A7, 3A8, 3A9, 3A10, 3A11	IV, VI, VII, VIII, IX, X
2P	3A9, 3A10, 3A11	VIII, IX, X

