KENAI RIVER REVIEW

FINAL

APRIL 1978

S. Department of the Army
Alaska District
Corps of Engineers

DEPARTMENT OF THE ARMY
ALASKA DISTRICT, CORPS OF ENGINEERS
P.O. BOX 7002
ANCHORAGE, ALASKA 99510
REGULATORY FUNCTIONS BRANCH
(907) 279-4123

REPLY TO
ATTENTION OF:

NPACO-RF
Kenai River

3 May 1978

SPECIAL PUBLIC NOTICE

NPACO NO. 071-OYD-2-780105

The purpose of this special notice is to inform the public of the lifting of the current moratorium on the processing and issuance of Department of the Army permits for certain activities on the Kenai River.

On 21 April 1976 the District Engineer announced plans for a comprehensive environmental review of the Kenai River from its headwaters at the upper end of Kenai Lake to its confluence with Cook Inlet. Since that time a contract was awarded, and the study has been completed. The purpose of this study is primarily to examine certain activities along the Kenai River that may have the potential for adverse cumulative effects. The results of this study is now available in the Alaska District office.

The Kenai River has been determined to be under the jurisdiction of the Department of the Army for regulatory permit purposes. Construction activities in the Kenai River are regulated by the U.S. Army Corps of Engineers under the authority granted by the Secretary of the Army and Section 10 of the River and Harbor Act of 1899 and Section 404 of the Federal Water Pollution Control Act as amended by Clean Water Act of 1977.

Section 10 of the River and Harbor Act of 1899 requires a Department of the Army permit for construction or the placement of any structure in, on, over, or under navigable waters of the United States. Such projects as docks, pilings, canals, etc. are covered by this act.

Section 404 of the Federal Water Pollution Control Act as amended by Clean Water Act of 1977 requires a Department of the Army permit for the discharge of dredged or fill material in waters of the United States and wetlands. Therefore, the Kenai River, its tributaries, and wetlands are under Department of the Army jurisdiction for the discharge of dredged or fill material. Some examples covered by this act are fills, groins, jetties, boat launching ramps, and erosion protection measures. However, this list is not complete.

27 APR 1978

NPAEN-PR-EN

The purpose of the permit authority vested in the Corps of Engineers is to insure that activities affecting navigable waters and waters of the United States are carried out in a manner which will prevent or minimize damage to navigation, fish and wildlife, water quality, and other values considered to be in the public interest. This authority is contained in Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the 1972 Federal Water Pollution Control Act as amended by the Clean Water Act of 1977.

Public involvement has been an integral part of the study, with numerous Federal, State, and local agencies, interested groups, and private citizens having provided invaluable input and assistance. A public workshop was held in Soldotna 15 February 1978 and a public meeting was held on 28 February 1978. The record was open for public comment until 10 March 1978 and all comments received prior to that date have been considered in developing the final document.

Sincerely,

George R. Robertson

GEORGE R. ROBERTSON
Colonel, Corps of Engineers
District Engineer

1 Incl
As stated

DEPARTMENT OF THE ARMY
ALASKA DISTRICT, CORPS OF ENGINEERS
P O BOX 7002
ANCHORAGE, ALASKA 99510

REPLY TO
ATTENTION OF:

NPAEN-PR-EN

27 APR 1978

Inclosed is the final report "Kenai River Review". The document is the result of a comprehensive 12-month study of the Kenai River, its major tributaries, and adjacent lands. The study was conducted by the firm of Wapora, Inc. under contract to the U.S. Army Corps of Engineers, Alaska District. The final report reflects modification, clarification, and corrections resulting from comments submitted by reviewers of the draft report which was circulated in February 1978. In final form, the Kenai River Review consists of a single document, whereas the draft report consisted of a "Technical" volume and a "Summary" document.

The report contains criteria and guidance related to determinations to issue, with or without special conditions, or deny U.S. Department of the Army permits for activities affecting waters classified as navigable (Kenai River, Kenai Lake, and Skilak Lake) and those activities involving discharge of dredged or fill materials into all waters of the U.S. (lakes with a surface area greater than 10 acres; wetlands and tributaries of the Kenai River). The guidance and criteria was developed from detailed profiles, also contained in the report, of major economic, social, and environmental components of the Kenai River and surrounding lands and communities.

Failure to obtain the necessary permit prior to beginning work is a misdemeanor and in some instances can result in up to 1 year of imprisonment and/or in fines up to $25,000 per day when the discharge of dredged or fill material is involved or in a maximum fine of $2,500 for all other activities. Likewise, a United States District Court may order removal of the work at the owner's expense.

The District Engineer will now begin processing the applications for Department of the Army permits received during the moratorium and will continue to accept and process all future applications. All applications will be processed in accordance with regulations, and decisions on issuance or denial will be made on a case-by-case basis. Any questions concerning whether an activity comes within any of these categories should be referred to the U.S. Army Corps of Engineers, Alaska District, Regulatory Functions Branch (752-4942).

FOR THE DISTRICT ENGINEER:

David L. Robbins

DAVID L. ROBBINS
Chief, Construction/Operations Divisi

KENAI RIVER

REVIEW

FINAL

U.S. Army Engineer District, Alaska
Corps of Engineers

April 1978

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CHAPTER I

OVERVIEW

The Kenai River and its excellent salmon fishery is a focal point for outdoor recreation in south central Alaska, drawing heavily from the State's largest population center, Anchorage. The 194 square mile corridor, which consists of State and privately owned lands paralleling both sides of the Kenai River along its lower reach, is not only attracting the development of recreation-oriented dwellings and businesses, but is also an area of rapidly expanding industrial development related to petroleum resources located on the Kenai Peninsula and in Cook Inlet.

Various agencies, organizations, and individuals have expressed growing concern for the welfare of the Kenai River and its continued use as a major salmon spawning stream. Recreational and commercial fishing associated with the Kenai River are major contributors to the economy of the area. Uncontrolled development poses a potential threat to the biological viability of the River and its attractiveness as a major outdoor recreational outlet accessible to a majority of Alaskan citizens.

The U.S. Army Corps of Engineers exercises regulatory authority over construction or other work affecting the Kenai River and Skilak and Kenai Lakes. In addition, the discharge of dredged or fill material into these waters, as well as all tributaries, lakes, and wetlands is regulated by the Corps of Engineers.

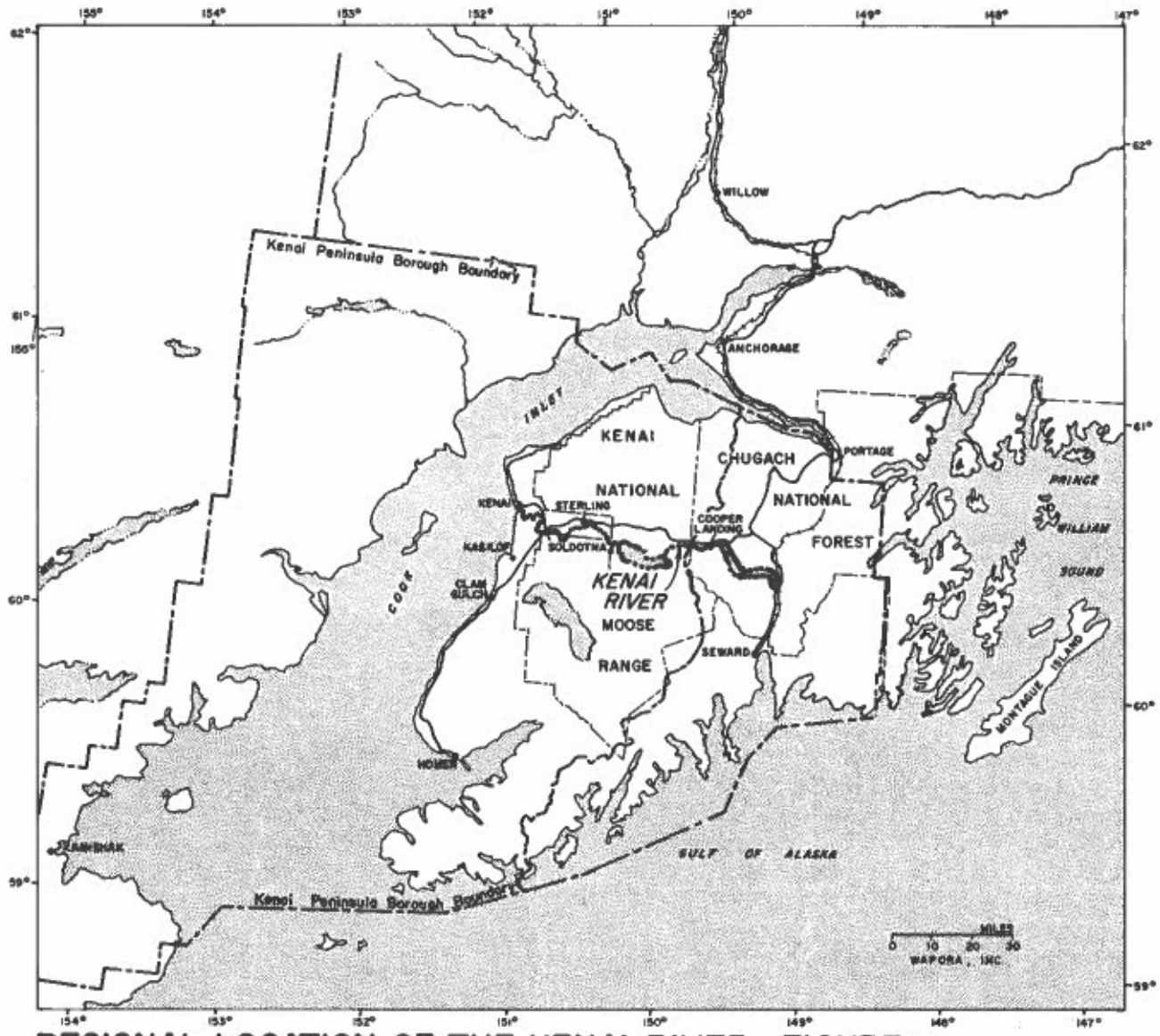
In undertaking any activity which falls within Corps of Engineers jurisdiction, property owners must apply for and receive a permit from the Corps of Engineers prior to starting work.

In view of anticipated continued rapid growth and development within the Kenai River "corridor" and on private holdings in the vicinity of Cooper Landing, this document has been prepared: (1) for use by the District Engineer in making a decision to issue, condition, or deny a Department of the Army permit, and (2) to provide information essential to permit applicants wishing to undertake activities on lands that fall within Corps of Engineers regulatory authority.

All permits issued with conditions are designed to ensure that the proposed activity is carried out in a manner that will minimize its effect on navigation, fish and wildlife, water quality, and other values considered to be in the public interest.

The Kenai River Review is a guideline and does not carry the force of law. Final decisions concerning issuance or denial of Department of the Army permits resides with the Alaska District Engineer or, in instances of insoluable controversy, at higher echelons within the Corps of Engineers.

As additional data are obtained or if changes occur in existing legislation, the Kenai River Review will be updated.



REGIONAL LOCATION OF THE KENAI RIVER - FIGURE 1.

STUDY CORRIDOR

STUDY AREA

KENAI NATION

MOOSE RANGE

KENAI MOUNTAINS

KENAI NATIONAL MOOSE RANGE

HARDING ICEFIELD

SOURCE - U.S.G.S., 1958
WAPORA, INC., 1977

NORTH

0 2 4 MILES

WAPORA, INC.

TOPOGRAPHY - FIGURE 2.

CORPS OF ENGINEERS' INVOLVEMENT IN THE KENAI RIVER

The U.S. Army Corps of Engineers' involvement in regulatory activities on the Kenai River began in 1965 when the Office of the Chief of Engineers, Army Corps of Engineers, published the results of a navigability study for the Kenai River. The study determined the Kenai River navigable by commercial craft from its mouth to a point 1.5 miles upstream and navigable by launch over its entire length. With this determination, activities were regulated by the Department of the Army under the authority delegated by Congress to the Secretary of the Army through Section 10 of the River and Harbor Act of 1899.

Section 10 of the River and Harbor Act of 1899 . . . prohibits the alteration of any navigable water of the United States. The construction of any structure in or over any navigable water of the United States, the excavation from or depositing of material in such waters, or the accomplishment of any other work affecting the course, location, condition, or capacity of such waters is unlawful unless the work has been recommended by the Chief of Engineers and authorized by the Secretary of the Army. (33 CFR 320.2 (b)).

For the purpose of this regulation "navigable water(s) of the United States" are those waters of the United States that are subject to the ebb and flow of the tide shoreward to the mean higher high water mark and/or are presently used, or have been used in the past, or may be susceptible to use to transport interstate or foreign commerce (33 CFR 322.2 (a)). Corps jurisdiction under Section 10 extends to the mean higher high water mark in tidally influenced waters and to the ordinary high water mark in non-tidal waters. Within the review area the Kenai River, Kenai Lake, Skilak Lake and the tidally influenced portion of Kenai River tributaries have been determined "navigable" waters of the United States.

Section 404 of the Federal Water Pollution Control Act as amended by the Clean Water Act of 1977 prescribes a Department of the Army permit for the discharge of dredged or fill material, usually referred to as filling, into all waters of the United States including wetlands. These include:

1. All water subject to the ebb and flow of the tide.

2. All coastal and inland waters, lakes, rivers, streams and artificial water bodies which are navigable waters of the United States including adjacent wetlands.

3. All tributaries to navigable waters of the United States, including adjacent wetlands.

4. All interstate waters and their tributaries, including adjacent wetlands.

5. All artificially created channels and canals used for recreation or other navigational purposes that are connected to other navigable waters.

6. All other waters of the United States such as isolated wetlands, lakes, intermittent streams, and pot holes, the degregation or destruction of which could affect interstate commerce.

Wetlands have been defined as those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include bogs, marshes, swamps, or similar areas. Wetlands separated from other waters of the United States by man-made dikes and barriers, natural river berms and beach dunes are considered adjacent wetlands (33 CFR 323.2(c) and 33 CFR 323.2(d)).

The Corps' jurisdiction under Section 404 extends to the high tide line in tidally influenced waters, to the ordinary high water mark in non-tidal waters, and wetlands of all waters of the United States. All waters of the Kenai River System and their wetlands are regulated under Section 404.

A nationwide permit was issued 19 July 1977 which permits some activities under 404 (see 33 CFR 323.4-3 in Appendix B in Technical Report) without applying for individual permits as long as specific management practices are followed to the maximum extent possible to minimize the adverse effects of the discharges on the aquatic environment. However, the District Engineer may require individual permits in areas under the nationwide permit if adverse impacts on the aquatic environment indicate a need for such action (33 CFR 323.4-4). Individuals planning activities in the Kenai River, Kenai Lake, Skilak Lake, their tributaries and/or wetlands should contact the Alaska District, Corps of Engineers, Regulatory Functions Branch prior to construction to determine if an individual permit is required for the proposed project.

THE PERMIT PROCESS

The Corps of Engineers regulates activities within their jurisdiction through the issuance of permits. Within the Alaska District, Corps of Engineers, applications for permits are accepted and processed by the Regulatory Functions Branch. The decision to issue or to deny a permit is made by the District Engineer based upon careful consideration of all information pertinent to the proposed project. Activities which ordinarily require permits include docks, pilings, dredge and fill, groins, rip rap, levees, boat ramps, underwater pipes, and overhead wires. Transportation related facilities such as bridges and causeways are regulated by the U.S. Coast Guard, but the Corps has the responsibility to comment on applications for permits received by the Coast Guard, and to issue permits under Section 404 for certain fills associated with the proposed structure.

Figure 3 represents the permit procedure as currently structured within the Alaska District, Corps of Engineers. The applicant initiates the permit process by submitting an application on a standard Corps form (Appendix A) along with a drawing of the proposed construction.

At this time, a preliminary environmental determination is made to identify the anticipated impacts of the proposed activity and to determine if a full Environmental Impact Statement should be prepared. The Corps then prepares a public notice reflecting the information supplied on the application plan and the preliminary environmental determination.

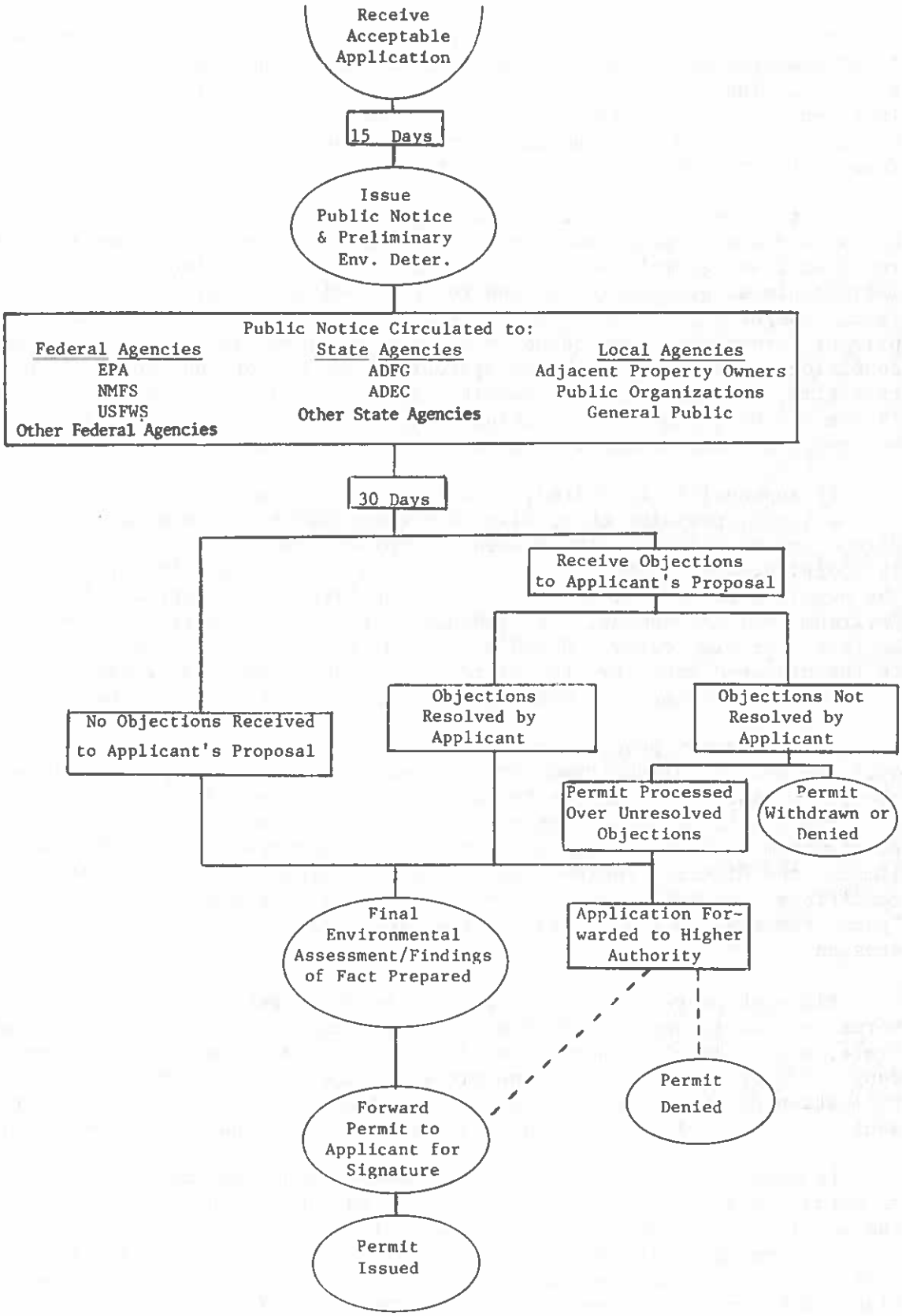


Figure 3. U.S. Army Engineer District, Alaska, Permit Procedure

The public notice is then circulated for review to federal, state, and local agencies and to interested organized groups and individuals. Each agency examines the permit request in light of their regulations and guidelines and reports its findings to the Corps of Engineers, Regulatory Functions Branch. Concerned citizens and representatives of organized groups also forward their comments for consideration.

As the comments concerning the proposed activity are received by the Corps they are reviewed and placed in an application file. When the comments received from federal, state, and local agencies, organized groups or individuals suggest modifications to the submitted plan, request special conditions, or object to the issuance of a permit, the Corps contacts the applicant forwarding these comments and recommending the applicant discuss the condition or objection with the appropriate agency or individual. During this time, the applicant may submit a revised plan or a compromise solution if one can be reached (e.g. making a dock smaller or less intrusive on the waterway) to meet a concern raised during the review.

If approval is indicated, a final Environmental Assessment is prepared by the Corps, revising the preliminary environmental determination in light of new issues raised in the review or project modifications that have occurred. In addition, a Findings of Fact is prepared summarizing all aspects concerning the permit application. At this time, the file for the application, the Environmental Assessment, and Findings of Fact are submitted to the District Engineer for his review. Based on careful consideration of all aspects related to the proposed activity, the District Engineer makes the decision to issue or to deny the permit and notifies the applicant of his decision.

If the review process produces no substantive objections to the proposed activity and the Alaska District Engineer finds that issuance is not against the public interest, the permit is approved and the applicant is notified that his permit will be issued subject to the standard conditions. However, when substantive concerns are raised but the activity can occur within specified limits, the District Engineer may issue the permit with appropriate special conditions attached. For example, a community slip may be constructed but the "permittee shall place rip rap on the sides and bottom of the slip to prevent erosion."

Although processing of an application for a Department of the Army permit normally proceeds concurrently with the processing of other required federal, state, and/or local authorization or certification, the District Engineer will deny a Department of the Army permit where the required authorization or certification has been denied. He may also deny a permit if the proposed activity would unduly impair navigation or adversely affect the aquatic environment.

In some cases, another federal resource agency may have a serious objection to permit issuance. When this occurs and the objection can not be resolved by the applicant, the applicant may either withdraw his application or request that processing of his application be resumed. If the applicant requests continued processing, the file for the application is forwarded with the District Engineers recommendation to higher authorities for a final decision.

KENAI RIVER: PRIVATE AND PUBLIC RIGHTS

The Kenai River Is a Navigable Water of the United States

"Navigable waters" is a jurisdictional term used to define the scope and extent of the regulatory powers of the federal government, as well as to define ownership of lands beneath the waters in a state. The Corps of Engineers has made an administrative determination that the Kenai River is a navigable water of the United States. The decision has three effects: First, title to and ownership of the lands and waters beneath the Kenai River between the high water boundaries, natural resources within such lands and waters and certain regulatory powers applicable to such lands, waters, and resources are vested in the State of Alaska. Second, the lands below the ordinary high water mark are subject to the federal navigational servitude. Third, the regulatory powers of the federal government extend to the entire Kenai River.

State of Alaska Owns the Bed of the Kenai River System

With few exceptions, the State of Alaska has title to and ownership of the lands beneath the waters of the Kenai River and the natural resources within the high water boundaries.[1] This ownership is subject to the superior federal navigational servitude.[2] The State of Alaska received title to the lands when it was accepted into statehood. Its title to all submerged lands depends on a determination that the waterway is a navigable waterway.[3]

In recognition of its ownership, the state has developed a number of laws regulating the lease of the submerged lands and their mineral rights to the public.[4] The state also has enacted laws and regulations regulating fish and wildlife.[5]

Riparian Rights Along the Kenai River System Are Subject to the Navigational Servitude

The servitude for navigation is limited to waters over which the federal government has jurisdiction. The power of the federal government to exercise jurisdiction over such waters stems historically from the Commerce Clause of the United States Constitution, Article 1, Section 8.[6] The navigational servitude extends to all waters that are navigable in fact when they are used, or susceptible of being used, in interstate commerce.[7] There are several examples of historic actual use of the entire Kenai River System in commercial navigation. The navigational servitude is a dominant easement. Regardless of whether title to the beds of streams and lakes is in private riparian ownership (ownership of land abutting the body of water) or retained by the state, the ownership and rights that accrue to such title holders are subordinate to the public's right of navigation and to the right of Congress to aid that navigation. Whatever the nature of the interest of a riparian owner in the submerged lands on a public navigable water, his title is not as full and complete as his title to land that has no direct connection with the navigation of such water. In other words, the riparian owner holds a qualified title.

Riparian owners along the Kenai River System have various rights guaranteed them by law. For example, owners of land bordering on the Kenai River System have the right of access to the waterway for the purpose of navigation.[8] This right of access does not, however, operate to vest any possessory right in the bed of the river itself. In addition, the riparian owner has the right to use the water for general purposes such as bathing and other domestic activities, to build piers or wharves if it can be done without interfering with navigation, to take title to accretions, and to make other beneficial use of the water.[9] All these rights can be exercised so long as the use does not unreasonably interfere with similar rights of other riparian owners or the rights of the public.[10]

The constitutional power of the federal government to regulate navigable waters has given rise to a limitation on riparian rights known as federal "navigational servitude," under which riparian rights are held at all times subordinate to such use of submerged lands and water flowing over them as may be consistent with or demanded by public rights of navigation.[11] This federal navigational servitude allows riparian rights to be taken without compensation if the taking is in aid of navigation and if there is no physical trespass of land above the mean higher high water mark.[12] Moveover, the Alaska Constitution allows the state to take riparian property rights for beneficial and public uses without paying compensation if the taking is in aid of navigation and there is no physical trespass of land above the mean higher high water mark.[13] Where the state takes the riparian property rights for uses other than in aid of water navigation, compensation must be paid.[14]

There Is Federal Jurisdiction Over the Kenai River System

The determination that the Kenai River system is a navigable waterway affected the entire river system because it meant the river system was subject to federal regulation pursuant to federal law. Several federal and state laws are made applicable to the Kenai River system as a result, but this study is concerned with the Federal Water Pollution Control Act and the Rivers and Harbors Act of 1899.[15] The Federal Water Pollution Control Act[16] dates back to 1948. However, it has been amended several times to make the law what it is today. It is essential that the riparian owner understand the effect of these laws.

One effect of the two acts is to give the Army Corps of Engineers regulatory power over all activities that occur between the ordinary high water mark on one bank of the Kenai River and the ordinary high water mark on the other bank. Before a person can build a dock, wharf an area, dredge, place a fill, permanently anchor a structure, or do any other activity that may or may not affect the navigable capacity of the river system, that person must apply for and receive a Department of the Army permit for the activity. There are other laws, both state and federal, that affect the riparian owner. However, they will not be discussed here.

The permit process involves the public. The law affords opportunity for the public to comment and, in certain instances, to request a public hearing on the activity. The rationale behind the regulations is

complex. While the regulations do recognize the riparian owner's right to protect his property from erosion and to have access to navigable waters, it is sufficient to remember that the rights of a riparian owner are all subordinate to the rights of the general public to navigate. For this reason, public involvement is essential to the regulatory process.

Between the Ordinary High Water Marks of the Kenai River Public and Private Rights Sometimes Conflict

The navigable status of the Kenai River means that in most instances the riparian owner owns only the upland property above the ordinary high water mark of the Kenai River. With a few exceptions, the State of Alaska owns the beds of the Kenai River and Kenai Lake between the ordinary high water marks. In any case, regardless of the ownership of the bed, all rights are qualified by the federal navigational servitude. This means that the federal government regulates certain activities affecting the Kenai River and it is a result of this jurisdiction that this review was undertaken.

Water Rights In Alaska

All surface and subsurface waters of Alaska are reserved to the people for common use and are subject to appropriation pursuant to the Alaska Water Use Act. A water right is a property right for the use of those public waters. A water right allows diversion, impoundment and/or withdrawal of a specified use. A water right, when granted, becomes appurtenant (attached) to the land where the water is used and continues in effect for as long as the water is used. If the land is sold, the water right goes with the land to the new owner unless it is specifically severed from the land with Department of Natural Resources approval.

The only method of obtaining water rights in Alaska is by submitting an application to the Alaska Division of Land and Water Management and obtaining a water permit and/or certificate of appropriation. A water permit allows a person to proceed with the construction necessary for appropriating water and a certificate of appropriation is the legal document which conveys water rights once water is being used. In Alaska, there are no inherent rights to groundwater by virtue of ownership of overlying land and there are no inherent rights to surface water by virtue of ownership of adjoining or surrounding land. Use of water without a permit or certificate does not vest the user with any rights to water no matter how long the water use continues.

CHAPTER 2
REVIEW FINDINGS

Figure 4. Kenai River Near Kenai
and Near Cooper Landing

AREA CLASSIFICATION AND ACTIVITY RATING SYSTEM

Several factors affect the administration of Corps of Engineers (COE) permit authority. To effectively convey the results of this Review, the following area classification and activity rating systems were developed.

Area Classification System

The Study Area has been divided into two units: The primary area comprises lands and waters directly under the jurisdiction of the Corps. Secondary areas are lands and waters outside the jurisdiction of the Corps. Because activities in secondary areas may affect areas under Corps jurisdiction, and, conversely, the Corps' permit authority may affect secondary areas, secondary areas are included in this Review.

Areas of Jurisdiction of the Corps of Engineers

Within the Review Corridor, shown in Figures 6, 7, 8, and 9 on pages 27, 31, 35, and 39, respectively, numerous requests for permits are anticipated although few permit applications are expected from the rest of the Review Area. The greatest part of the Corps responsibility to administer the permit program is based on Section 10 of the River and harbor Act of 1899 and Section 404 of the Federal Water Pollution Control Act as amended by the Clean Water Act of 1977 which may be found in the Regulatory Program of the U.S. Army Corps of Engineers of 19 July 1977 (43 FR 138; Chapter II, 33 CFR, Part 320-329). A copy of these regulations may be found in Appendix B and is the document cited in the following discussions concerning areas of jurisdiction within the Review Area.

Section 10 prohibits the construction of any structure or performance of any work in or over any navigable water of the United States that could obstruct or alter such waters in any way unless the structure or work has been authorized by the District Engineer (33 CFR 320.2(b)0.

Section 404 prohibits the discharge of dredged or fill material into most waters of the United States unless authorized by the District Engineer (33 CFR 320.2 (g)).

The Corps' jurisdictional boundaries for Section 10 purposes extend shoreward to the mean higher high water line in tidally influenced waters and to the ordinary high water line in non-tidal waters. For Section 404 purposes, the Corps' jurisdiction extends to the high tide line in tidally influenced waters and to the ordinary high water line in non-tidal waters. Section 404 jurisdiction is also extended to all wetlands affecting these waters (33 CFR 322.2 and 33 CFR 323.2).

All waters of the Kenai River, including Skilak Lake and up to and including Kenai Lake have been determined "navigable" on the basis that they are now used, or have been used in the past, or may be susceptible to use to transport interstate or foreign commerce. The Corps jurisdiction in tidal and non-tidal portions of these waters is under both Section 10 of the River and Harbor Act of 1899 and Section 404 of the Federal Water Pollution Control Act as amended by the Clean Water Act of 1977.

All wetlands adjacent to the entire Kenai River, including Kenai Lake, Skilak Lake, and tributaries, are regulated under Section 404 of the Federal Water Pollution Control Act as amended by the Clean Water Act of 1977. Should any of the wetlands be located below the mean higher water mark in tidally influenced water or below the ordinary high water mark in non-tidal water, they will also be regulated under Section 10 of the River and Harbor Act of 1899.

All other waters of the United States in the Kenai River watershed including isolated wetlands, isolated lakes, and intermittent streams, and potholes, the degradation or destruction of which could affect interstate commerce are regulated under Section 404 of the Federal Water Pollution Control Act as amended by the Clean Water Act of 1977 which applies to the discharge of dredged or fill material (33 CFR 323.2 (a)(5)).

Other critical environmental areas of special concern in evaluations of applications for permits include:

Properties listed, or eligible for listing, in the National Register of Historic Places (33 CFR 320.3 (j)).

Critical areas for species designated by the Secretary of the Interior as endangered or threatened (33 CFR 320.3 (j)).

Properties acquired or developed with assistance from the Land and Water Conservation Fund (33 CFR 320.3 (m)).

Flood plains of the Kenai River and its system or tributaries (33 CFR 320.4 (l)).

Important habitats for fish and wildlife, including such features as nesting areas of migratory birds (33 CFR 320.3 (c)).

The subarea maps of the Review Corridor are color coded to reflect the areas of Corps jurisdiction. Wetlands are green, water bodies and tributaries are blue. Although the Corps jurisdiction does not include the entire flood plain when no wetlands are adjacent, it is indicated on the maps to enable the applicant to wisely plan for activities.

ACTIVITY EVALUATION

The evaluation method for proposed activities within the Subareas is designed to provide interested parties with a system that is easily understood. Activities requiring Department of Army permits are reviewed as they relate to a subarea, based on information found in the Profiles. Each activity is evaluated within its subarea and designated as an activity that will be conditioned (C), ordinarily denied (OD), or not applicable (N/A). Activities in wetlands will have an additional activity evaluation unit (W) for evaluating permit requests for specific types. This unit alerts interested parties to the fact that permits are required for the discharge of dredged or fill material in wetlands.

These activity evaluations are offered as guides for the permit applicant, commenting agencies and individuals, As guides, the evaluations do not carry the force of law nor are they prejudgements of the

ultimate action to be taken on a specific permit application. Every permit application received by the Alaska District will continue to be processed and subsequent determinations made on a case-by-case basis.

The decision to condition or deny a specific permit is made by the Alaska District Engineer following a public interest review. The importance of the public interest review cannot be overemphasized. If through the public interest review it is determined that the granting of a specific permit with conditions will be in the public interest, the permit will be issued with said conditions. (No permits, unless under emergency situations, are granted without a public interest review.) Likewise, if during the public interest review it is determined that the granting of a specific permit is not in the public interest, the permit will be denied.

In making the decision to issue or deny a specific permit the Alaska District Engineer must follow general policies which govern permits. Discussions of the general policies, areas where permits are conditioned, areas where permits are ordinarily denied, and wetlands permitting policies follow.

General Policies Governing Permits

All applications for Department of Army permits for actions affecting the Kenai River, its tributaries, and wetlands undergo a public interest review following the publication of their respective public notices. These policies are derived from 33 CFR 320-329, other Federal regulations, and the profile information and findings of this review.

A permit will be granted only if its issuance is found to be in the public interest. Questions which must be answered during the public review are as follows:

1. Will the activity have adverse effects on the enhancement, preservation, or development of historic, scenic, wildlife, recreation, economic, and similar values?

2. Have applicable State or Federal water quality statutes, rules, and standards been met for the activity?

3. Will fish and wildlife resources be protected adequately or can they be protected by special conditions attached to the permit for the activity?

4. Has required local, State, or other Federal authorization been granted or denied for the activity?

5. Does the proposed activity conform to State, regional, and local land use goals, policies, plans and ordinances that apply to the land and water areas under review?

6. Does the activity tend to preserve and maintain agricultural land?

7. Will the activity increase flood hazard potential or will it locate a permanent structure in a hazardous area? If so, has the applicant demonstrated that there is an overriding necessity for the proposed activity?

8. Will the activity protect or increase erosion of stream bank or tidal flat that may be caused by wind or currents?

9. Does the activity improve public access to and public recreational use of the resources of the area? If so, will the resources of the area support such access and use?

10. Does the activity help to maintain or enhance the local and regional economy? If so, does it conflict with overriding State or national interest?

11. If the activity is to provide or improve major transportation facilities, will the social, economic, and environmental effects of the facility be acceptable?

12. Does the activity interfere unnecessarily with natural erosion and accretion processes?

13. Will the activity minimize the disturbance of adjacent vegetation?

The responses to this review must indicate clearly the proposed activity is in the public interest and will minimize adverse effects on the environment before a permit will be issued.

Areas Where Permits Are Conditioned

All permits issued for activities in the Kenai River, Kenai Lake, Skilak Lake, tributaries, and wetlands shall contain standard permit conditions, however, certain activities will require special conditions. These special conditions are designed to ensure that the proposed activities are carried out in a manner that will minimize their effect on navigation, fish and wildlife, water quality, and other considerations. For example, a permit for the construction of a floating dock on the Kenai River may be authorized provided the applicant agrees to conditions such as:

1. The dock is constructed of environmentally compatible and aesthetically pleasing materials.

2. The dock or dock platform is portable to facilitate removal and thereby minimize susceptibility of damage to the structure and damage caused by the structure from washouts during flooding.

3. The dock is no larger than the minimum size required to accomplish the desired purpose. Where a single boat will be docked, the facility should be no larger than the maximum length of one boat parallel and perpendicular to shore.

It must be emphasized that while the applicant must agree prior to permit issuance to meet the conditions for specific activities as described in the section of this review entitled "Permit Conditions and Recommended Management Practices", additional conditions may be placed on the permit as a result of the public interest review. Likewise, there may be instances where permits are issued with fewer special conditions. In any event, all applicants should be aware that no permits will be granted without conditions. The extent of the special conditions placed on a permit will come as a direct result of case-by-case examinations of individual permit applications and the public interest review procedure.

Areas Where Permits Are Ordinarily Denied

Any individual may apply for a Department of the Army permit for any activity proposed in areas within Corps of Engineers' jurisdiction, and the application will be processed on a case-by-case basis; however, several types of activities (work) in specific areas of the Kenai River and tributaries have been determined to be detrimental to the overall integrity of the system. An example of these activities would be groins, revetments, dams, gravel removal, canals, and navigation channels. In the Kenai River or tributaries the use of fill to construct a fill embankment, grcin, levee, or dam will ordinarily be denied. Interested parties should consult the individual subarea matrices to determine those specific activities which would ordinarily be denied.

Wetland Permitting Policies

Wetlands have been documented to exist within the Study Corridor. The methodology used to classify these areas as wetlands are explained in the following Profiles. Under current Section 404 regulations, the U.S. Army, Corps of Engineers exercises jurisdiction in these areas. Wetlands are one of the most important natural resources addressed by Corps of Engineers permit regulations. Wetlands are defined as:

> "... Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." 33 CFR 323.2 (c).

In reviewing permit applications, the Alaska District Engineer is required to take into account the interrelated nature of wetlands resources and to account for the cummulative effects of many piecemeal changes that may result in impairment of wetlands.

"No permit will be granted to work in wetlands identified as important. . . unless the District Engineer concludes, on the basis of the analysis required. . . that the benefits of the proposed alterations outweigh the damage to the wetlands resource and the proposed alteration is necessary to realize those benefits." (33 CFR 320.4 (b)(4)).

Wetlands that are considered to perform functions important to the public interest are described in the Corps regulations 33 CFR 320.4 (b)(2). They are as follows:

1. Wetlands which serve important natural biological functions, including food chain production, general habitat, and nesting, spawning, rearing, and resting sites for aquatic or land species.

2. Wetlands set aside for study of the aquatic environment or as sanctuaries or refuges.

3. Wetlands the destruction or alteration of which would affect detrimentally natural drainage characteristics, sedimentation patterns, salinity distribution, flushing characteristics, current patterns, or other environmental characteristics.

4. Wetlands which are significant in shielding other areas from wave action, erosion, or storm damage. Such wetlands often are associated with barrier beaches, islands, reefs and bars.

5. Wetlands which serve as valuable storage areas for storm and flood waters.

6. Wetlands which are prime natural recharge areas. Prime recharge areas are locations where surface and ground water are directly interconnected.

7. Wetlands that through natural water filtration processes serve to purify water.

To date, no quantitative data are known which document the importance of individual wetlands within the Study Corridor. In the absence of such data, the Alaska District will, upon request or upon receipt of a permit application, conduct on-site investigations to document whether or not a particular site is a wetland. (It should be emphasized that areas depicted as wetlands on the subarea maps were so designated merely as a guide for individual permit applicants and other interested parties. It is possible that physical and/or biological phenomena may have altered the extent of these wetland areas since publication of data used in their classification. At this time it is not known if a change has occurred, nor is it known that if in fact a change has occurred, the wetland areas have increased or decreased.)

The investigations will be done in areas designated as wetlands in this report or any other areas in question. All permit applications for work involving the discharge of dredged or fill material in wetlands will be processed on a case-by-case basis; however, permits will ordinarily be denied for activities in wetland areas identified during the public interest review to be wetlands performing functions important to the public interest and considered vital areas constituting a productive and valuable resource (see items 1-7 mentioned previously).

PERMIT CRITERIA BY SUBAREA

To facilitate the use of this Environmental Review, the Study Area has been divided into five subareas. The boundaries of these subareas are shown in Figure 5. The next five sections include a narrative summary of background profile information for each subarea. A map and table show for each of Subareas I through IV the classification given various permit activities.

No map of Subarea V is included because very little, if any, permit activity is anticipated in this section of the Study Area. Limited permit activity for public access facilities may be received, however, no additional private permit requests are expected since the majority of land in the area is controlled by the Federal Government.

The following procedure is suggested for utilization of Subarea maps and tables:

1. Locate the Subarea where the permit activity is anticipated on one of the following maps.

   A. Subarea I: Kenai River - Cook Inlet Confluence to Limit of Tide (River Mile 12, Page 25).

   B. Subarea II: Limit of Tide to Kenai National Moose Range Boundary (River Mile 12 to River Mile 25, Page 29).

   C. Subarea III: Kenai National Moose Range Boundary to Moose River (River Mile 28 to River Mile 36, Page 33)

   D. Subarea IV: Kenai River area to Kenai National Moose Range Boundary (River Mile 36 to River Mile 45, Page 37).

2. Locate the specific site where a permit activity is anticipated.

3. Match the activity (dock, slip, etc.) with the area in which the activity is anticipated (Kenai River, Tributary or Wetland).

4. Determine the permit classification

A. OD - Permit ordinarily denied

B. C - Permit ordinarily conditioned

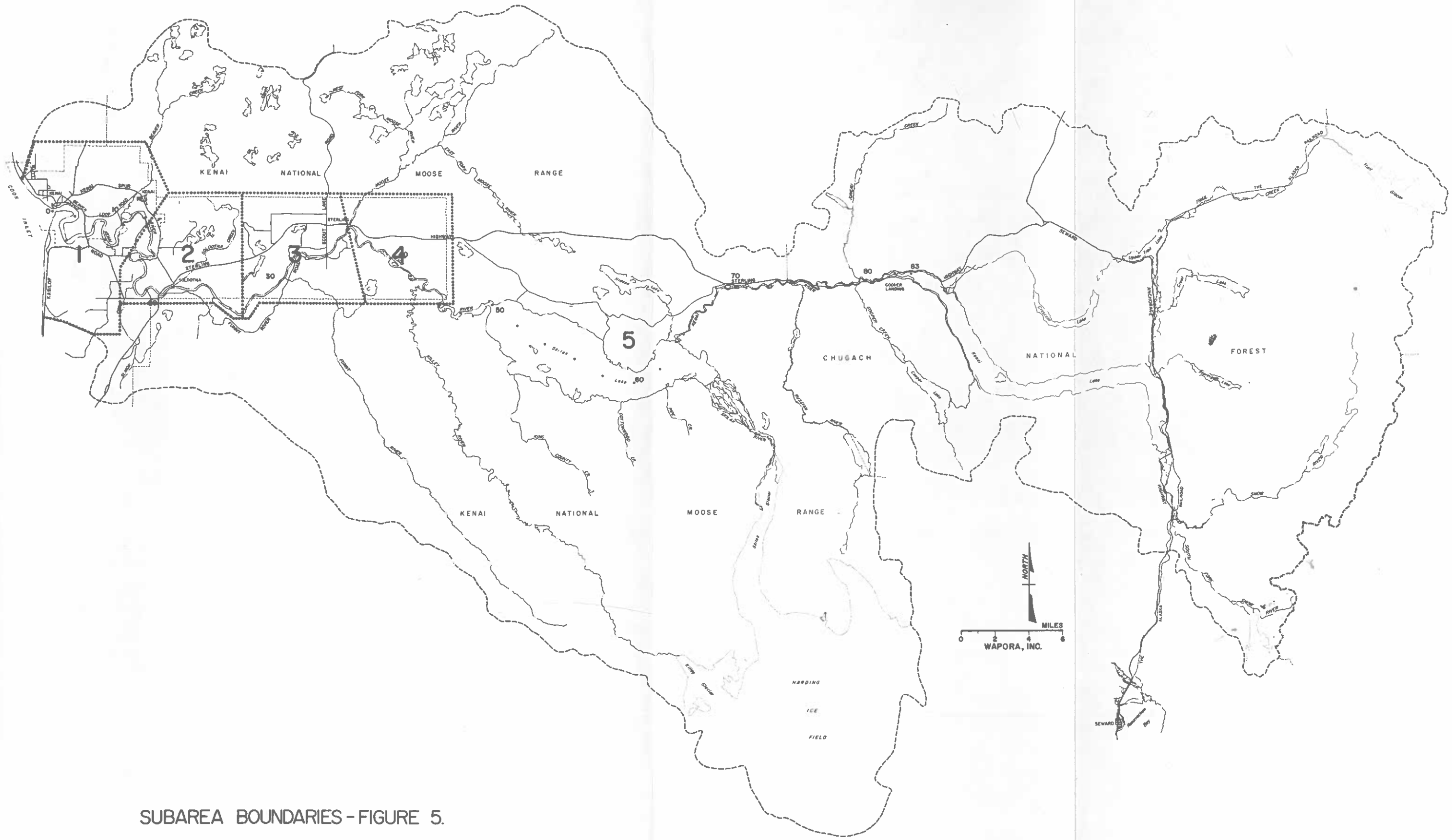
C. N/A - Not applicable, no permit required usually

D. W - Permit required for the discharge of dredged or fill material

5. If the classification is OD, an alternative activity may be considered.

6. It the activity was classified as C, it must meet certain conditions before a permit will be issued. These conditions are found by activity in the section entitled Permit Conditions on pages 41 to 52.

7. If the activity classification is W, permit applicants are urged to contact the Corps to arrange for an on-site inspection of the area in question.



SUBAREA BOUNDARIES - FIGURE 5.

Subarea I. Kenai River-Cook Inlet Confluence to Limit of Tide

From the confluence of the Kenai River and Cook Inlet, Subarea I extends 12 river miles upstream (Table 1 and Figure 6). The Kenai River estuary is an important biological resource. The tidal flats and tidal marshes provide habitat for shore birds and migratory waterfowl. Detritus formed from plants in the tidal marsh may serve as food for marine organisms in Lower Cook Inlet. The freshwater wetlands north of the city of Kenai provide summer range for the Kenai caribou herd.

Migratory salmon first enter the Kenai River through the estuary and later leave the river through the estuary. The integrity of the estuary must be maintained to ensure continued salmon migration. Subarea I may provide spawning habitat for pink salmon.

Beaver Creek enters Subarea I from the north at River Mile 10.5. There is evidence that Beaver Creek provides spawning and nursery habitat for four species of salmon.

The subarea is used for commercial, residential, and recreational purposes. The major commercial users of the area are canneries and commerical fishing boats. A bridge crossing the Kenai Flats (those wetlands areas adjacent to the river between the city of Kenai and Kalifonsky Beach Road) connects Beaver Loop Road to Kalifonsky Beach Road. There is residential housing along the bluffs of the lower portion and adjacent to Beaver Creek. A subdivision is under construction on the west side of Beaver Creek near its confluence with the Kenai River. There are isolated recreation structures upstream from the confluence of Beaver Creek and the Kenai River.

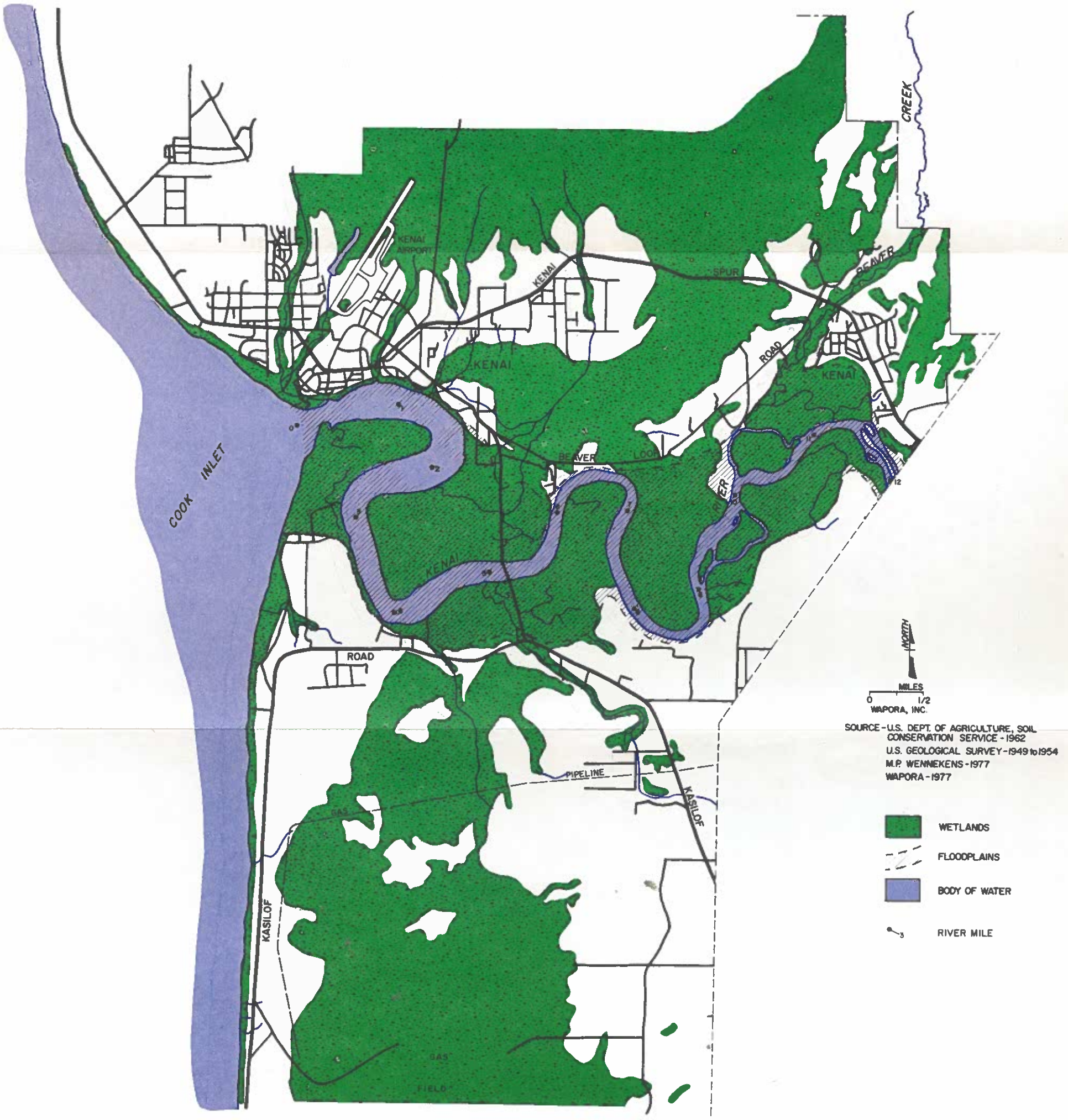
The subarea offers many aesthetic experiences. The dynamic tidal changes, the abundant vegetation and wildlife, against the backdrop of the Kenai Mountains to the east and the Alaska Range to the west, are visually pleasing.

Future permit requests are anticipated in Subarea I if commercial development increased along the estuary and as residential development progresses adjacent to Beaver Creek.

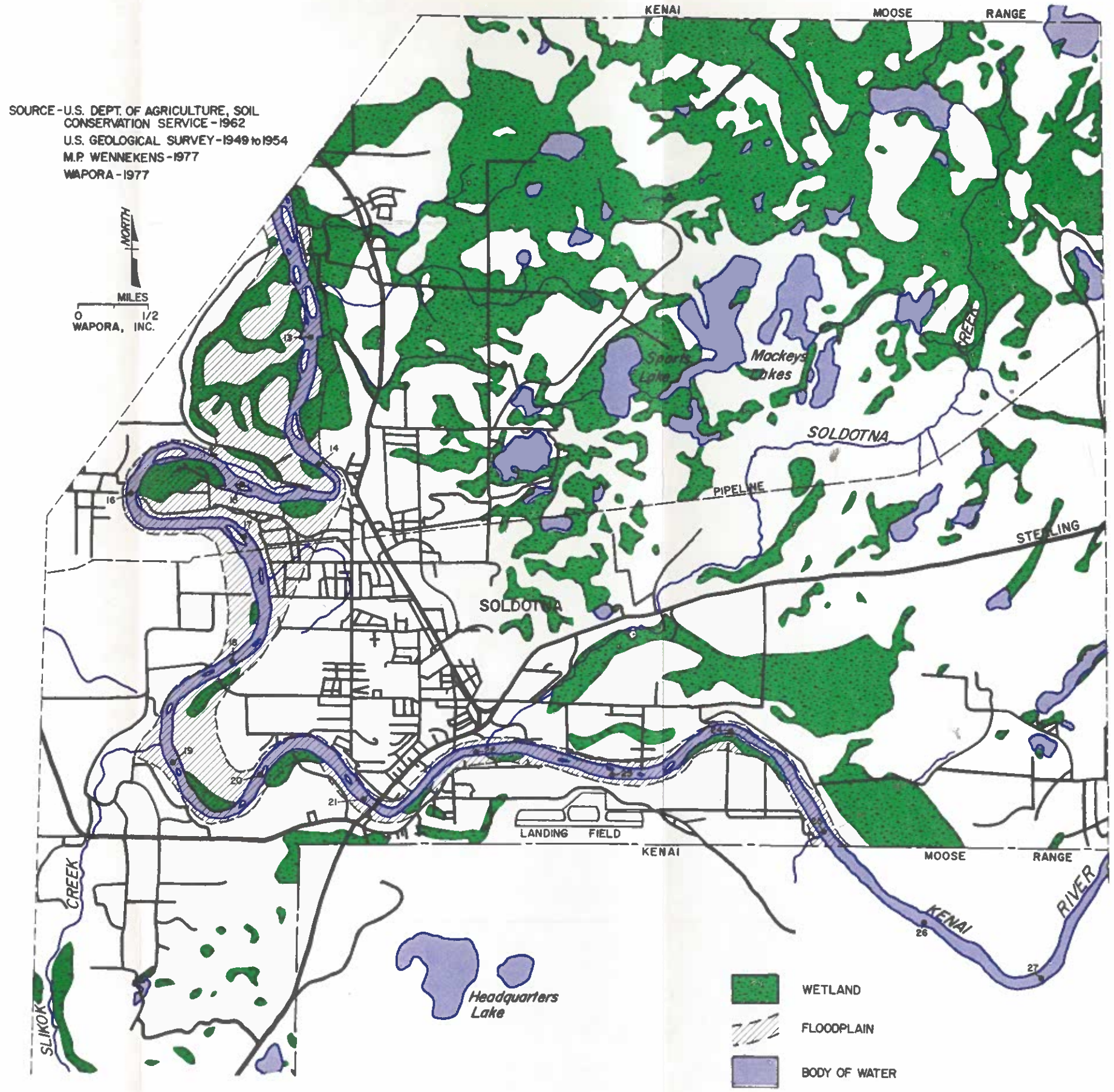
Table 1. Subarea I: Permit Activities Classification

ACTIVITY	KENAI RIVER	TRIBUTARIES	WETLANDS
STRUCTURES (no filling):			
DOCKS			
Floating	C	N/A	N/A
Piled	C	N/A	N/A
Crib (open)	C	N/A	N/A
Cantilevered	C	N/A	N/A
DOLPHINS	C	N/A	N/A
RAMPS	C	N/A	N/A
Small Private	C	N/A	N/A
Large Community	C	N/A	N/A
GROINS	O/D	N/A	N/A
REVETMENTS	C	N/A	N/A
DAMS	O/D	N/A	N/A
DISCHARGE LINES	C	N/A	N/A
SUBSURFACE UTILITIES	C	N/A	N/A
OVERHEAD UTILITIES	C	N/A	N/A
MOORING BUOYS	C	N/A	N/A
DREDGING:			
GRAVEL REMOVAL	O/D	N/A	N/A
CANALS*	O/D	N/A	N/A
NAVIGATION CHANNEL*	O/D	N/A	N/A
SLIPS*			
Shoreline Notch	C	N/A	N/A
Community Facility (Large)	C	N/A	N/A
FILLING:			
FILL EMBANKMENT**	O/D	O/D	W
RAMPS			
Small Private	O/D	O/D	W
Large Community	C	O/D	
GROINS	O/D	O/D	W
REVETMENTS	C	C	W
LEVEES	O/D	O/D	W
DAMS	O/D	O/D	W
CULVERTS & BRIDGE APPROACHES	C	C	W
SUBSURFACE UTILITIES	C	C	W
OVERHEAD UTILITIES	C	C	W
DISCHARGE OF FILL OR DREDGED MATERIAL	O/D	O/D	W W

Legend: C - Permits ordinarily conditioned. (see page 18)
O/D - Permits ordinarily denied. (see page 19)
W - Permit required for the discharge of dredged or fill material (see page 19)
N/A - Not applicable (No Department of the Army Jurisdiction).
* - Maintenance Dredging (Activities authorized by a Department of the Army permit or existing facilities which were constructed prior to 18 December 1968 are subject to a permit condition that requires the structure or work to be maintained in good usable condition.)
** - Examples: House pad, access road, etc.



SUBAREA 1 – FIGURE 6.



SUBAREA 2 - FIGURE 7.

Subarea II. Limit of Tide to Kenai National Moose Range Boundary

Subarea II begins at River Mile 12 and continues upstream to approximately River Mile 25 (Table 2 and Figure 7). Mainstream salmon spawning occurs in this subarea. Slikok Creek enters from the south at River Mile 19 and Soldotna Creek meets the mainstem from the north at River Mile 22. Both tributaries provide salmon spawning and nursery habitat. Wetlands associated with this subarea also are important for fish and wildlife.

Subarea II has more residential and recreational development than the other subareas. In 1977, there were 30 river-related groins, slips, docks, and canal systems in Subarea II.

The city of Soldotna is at River Mile 22, at the junction of the Sterling Highway and the Kenai Spur Road. Soldotna receives various benefits from an increasing tourist industry. Municipal treated wastewater from the city is discharged into the Kenai River.

The topography of the area is relatively flat, as is characteristic of the Kenai Lowlands (those lands between Cook Inlet and the Kenai Mountains). The backdrop of the Kenai Mountains to the east and mountains of the Alaska Range across Cook Inlet to the west add to the scenic quality of the region.

Future permit requests will come from those desiring river-related access. Additional requests may come from overhead line crossings as areas south of the Kenai River develop. Some requests also may come from those desiring to fill wetlands for construction purposes.

Table 2. Subarea II: Permit Activities Classification

ACTIVITY	KENAI RIVER	TRIBUTARIES & LAKES	WETLANDS
STRUCTURES (no filling):			
DOCKS			
Floating	C	N/A	N/A
Piled	C	N/A	N/A
Crib (open)	C	N/A	N/A
Cantilevered	C	N/A	N/A
DOLPHINS	O/D	N/A	N/A
RAMPS			
Small Private	C	N/A	N/A
Large Community	C	N/A	N/A
GROINS	O/D	N/A	N/A
REVETMENTS	C	N/A	N/A
DAMS	O/D	N/A	N/A
DISCHARGE LINES	C	N/A	N/A
SUBSURFACE UTILITIES	C	N/A	N/A
OVERHEAD UTILITIES	C	N/A	N/A
MOORING BUOYS	O/D	N/A	N/A
DREDGING:			
GRAVEL REMOVAL	O/D	N/A	N/A
CANALS*	O/D	N/A	N/A
NAVIGATION CHANNEL*	O/D	N/A	N/A
SLIPS*			
Shoreline Notch	C	N/A	N/A
Community Facility (Large)	C	N/A	N/A
FILLING:			
FILL EMBANKMENT**	O/D	O/D	W
RAMPS			
Small Private	O/D	O/D	W
Large Community	C	O/D	W
GROINS	O/D	O/D	W
REVETMENTS	C	C	W
LEVEES	O/D	O/D	W
DAMS	O/D	O/D	W
CULVERTS & BRIDGE APPROACHES	C	C	W
SUBSURFACE UTILITIES	C	C	W
OVERHEAD UTILITIES	C	C	W
DISCHARGE OF FILL OR DREDGED MATERIAL	O/D	O/D	W

Legend: C - Permits ordinarily conditioned. (see page 18)
O/D - Permits ordinarily denied. (see page 19)
W - Permit required for the discharge of dredged or fill material (see page 19)
N/A - Not applicable (No Department of the Army jurisdiction).
* - Maintenance Dredging (Activities authorized by a Department of the Army permit or existing facilities which were constructed prior to 18 December 1968 are subject to a permit condition that requires the structure or work to be maintained in good usable condition.)
** - Examples: House pad, access road, etc.

Subarea III. Kenai National Moose Range Boundary to Moose River Kenai River Area

Subarea III begins at approximately River Mile 28 and continues northwest to about River Mile 36 (Table 3 and Figure 8). Salmon spawning continues along the mainstem of the River with heavy pink salmon spawning from about River Mile 34 to about River Mile 36. Wetlands are not as prevalent in this subarea as in other subareas.

Only one major tributary, the Funny River at River Mile 30.5, enters the Kenai River in this subarea from the south. Juvenile fish found in the Funny River indicate possible spawning and nursery habitat for king and silver salmon.

Development is beginning in upland areas as several new subdivisions are either planned or under construction. This pattern is evident on both sides of the River. Most lowland areas have undergone some form of development, as evidenced by 23 separate boat slips and boat ramps--mostly small structures. Access is limited north of the Kenai River. To the south, the Funny River Road provides increased access and, consequently, increased development opportunities.

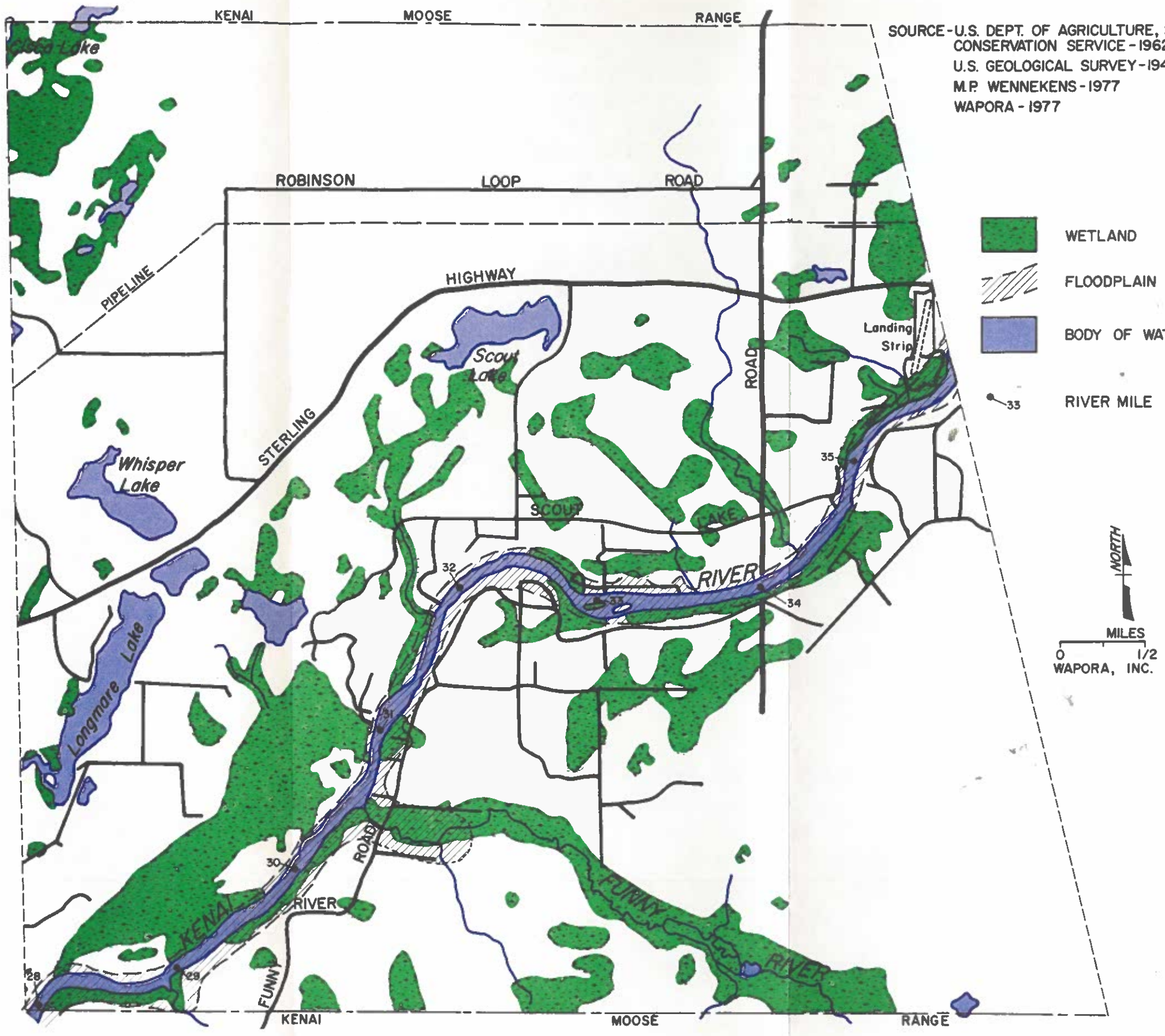
The topography and aesthetic qualities of the subarea are similar to those of Subarea II.

Future permit requests will come primarily from river-related activities as the area develops and new residents desire access to the Kenai River. Additional requests may come from those desiring to fill a wetland for construction purposes.

Table 3. Subarea III: Permit Activities Classification

ACTIVITY	KENAI RIVER	TRIBUTARIES & LAKES	WETLANDS
STRUCTURES (no filling):			
DOCKS			
Floating	C	N/A	N/A
Piled	C	N/A	N/A
Crib (open)	C	N/A	N/A
Cantilevered	C	N/A	N/A
DOLPHINS	O/D	N/A	N/A
RAMPS			
Small Private	C	N/A	N/A
Large Community	C	N/A	N/A
GROINS	O/D	N/A	N/A
REVETMENTS	C	N/A	N/A
DAMS	O/D	N/A	N/A
DISCHARGE LINES	C	N/A	N/A
SUBSURFACE UTILITIES	C	N/A	N/A
OVERHEAD UTILITIES	C	N/A	N/A
MOORING BUOYS	O/D	N/A	N/A
DREDGING:			
GRAVEL REMOVAL	O/D	N/A	N/A
CANALS*	O/D	N/A	N/A
NAVIGATION CHANNEL*	O/D	N/A	N/A
SLIPS*			
Shoreline Notch	C	N/A	N/A
Community Facility (Large)	C	N/A	N/A
FILLING:			
FILL EMBANKMENT**	O/D	O/D	W
RAMPS			
Small Private	O/D	O/D	W
Large Community	C	O/D	W
GROINS	O/D	O/D	W
REVETMENTS	C	C	W
LEVEES	O/D	O/D	W
DAMS	O/D	O/D	W
CULVERTS & BRIDGE APPROACHES	C	C	W
SUBSURFACE UTILITIES	C	C	W
OVERHEAD UTILITIES	C	C	W
DISCHARGE OF FILL OR DREDGED MATERIAL	O/D	O/D	W

Legend: C - Permits ordinarily conditioned. (see page 18)
O/D - Permits ordinarily denied. (see page 19)
W - Permit required for discharge of dredged or fill material (see page 19)
N/A - Not applicable (No Department of the Army jurisdiction).
* - Maintenance Dredging (Activities authorized by a Department of the Army permit or existing facilities which were constructed prior to 18 December 1968 are subject to a permit condition that requires the structure or work to be maintained in good usable condition.)
** - Examples: House pad, access road, etc.



SUBAREA 3 – FIGURE 8.

Subarea IV. Moose River-Kenai River Area to Kenai National Moose Range Boundary

Subarea IV begins approximately at River Mile 36 and continues to about River Mile 45 (Table 4 and Figure 9). Mainstem salmon spawning continues in this subarea with heavy spawning by pink, silver, and sockeye salmon beginning at River Mile 44 and continuing through the subarea boundary. Two major tributaries enter the Kenai River in this subarea. The Moose River enters from the north at River Mile 36.5 and the Killey River enters form the south at River Mile 44. The Moose River provides possible spawning and confirmed nursery habitat for king, sockeye, and silver salmon. King salmon may use the Killey River as spawning and nursery areas.

Extensive wetlands are associated with the Moose River. Wetlands also are observed south of the Kenai River near River Mile 42. Additional wetlands are seen on both sides of the Kenai River around River Mile 45.

The town of Sterling is located at about River Mile 36.7. Development in and around Sterling has progressed rapidly. Several new subdivisions are planned or under construction. Most construction has been in the form of residential housing. Most residents of the town work in Kenai, Soldotna, or North Kenai.

In 1977, there were 23 river-related structures along the Kenai River in this subarea. Six groins are located at about River Mile 39 on the inside river channel. Kenai Keys, a recreation development constructed around artificial canals, is located at River Mile 45. As with other canal developments on the river, flooding is a problem for seasonal residents.

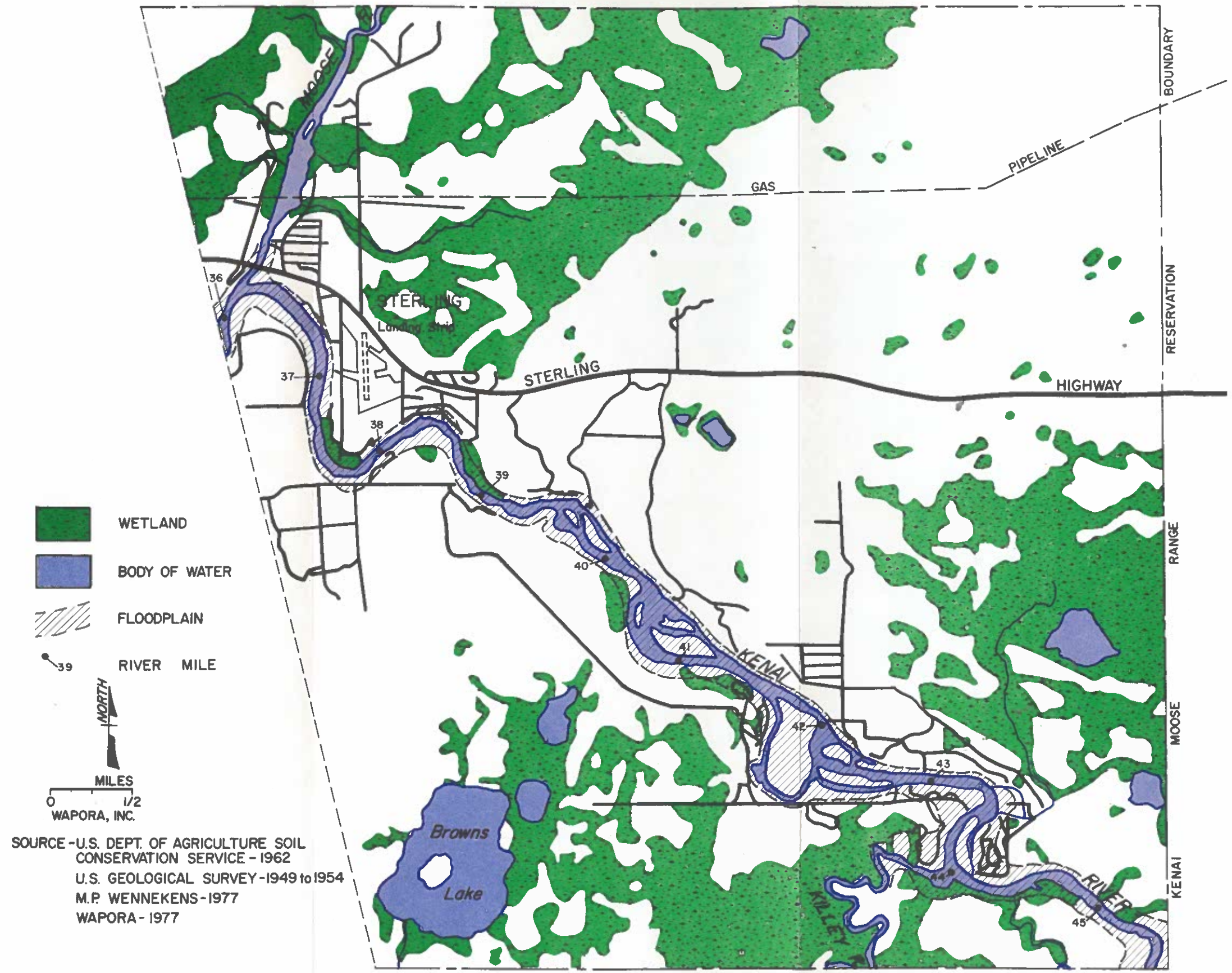
Near Sterling, the aesthetic quality of the subarea is very similar to that of Subareas II and III. Upstream of Sterling, and specifically in the area of Naptowne Rapids, aesthetic qualities increase.

Future permit requests are anticipated for structures that will provide river access. Requests also may arise for bank protection structures between Sterling and River Mile 38.5, as bank erosion is a continual problem. Additional requests may come from those desiring to fill wetlands for construction purposes. Some requests may come for additional overhead utility lines as the southern portion of the Kenai River continues development.

Table 4. Subarea IV: Permit Activities Classification

ACTIVITY	KENAI RIVER	TRIBUTARIES & LAKES	WETLANDS
STRUCTURES (no filling):			
DOCKS			
Floating	C	N/A	N/A
Piled	C	N/A	N/A
Crib (open)	C	N/A	N/A
Cantilevered	C	N/A	N/A
DOLPHINS	O/D	N/A	N/A
RAMPS			
Small Private	C	N/A	N/A
Large Community	C	N/A	N/A
GROINS	O/D	N/A	N/A
REVETMENTS	C	N/A	N/A
DAMS	O/D	N/A	N/A
DISCHARGE LINES	C	N/A	N/A
SUBSURFACE UTILITIES	C	N/A	N/A
OVERHEAD UTILITIES	C	N/A	N/A
MOORING BUOYS	O/D	N/A	N/A
DREDGING:			
GRAVEL REMOVAL	O/D	N/A	N/A
CANALS*	O/D	N/A	N/A
NAVIGATION CHANNEL*	O/D	N/A	N/A
SLIPS*			
Shoreline Notch	C	N/A	N/A
Community Facility (Large)	C	N/A	N/A
FILLING:			
FILL EMBANKMENT**	O/D	O/D	W
RAMPS			
Small Private	O/D	O/D	W
Large Community	C	O/D	W
GROINS	O/D	O/D	W
REVETMENTS	C	C	W
LEVEES	O/D	O/D	W
DAMS	O/D	O/D	W
CULVERTS & BRIDGE APPROACHES	C	C	W
SUBSURFACE UTILITIES	C	C	W
OVERHEAD UTILITIES	C	C	W
DISCHARGE OF FILL OR DREDGED MATERIAL	O/D	O/D	W

Legend; C - Permits ordinarily conditioned. (see page 18)
OD - Permits ordinarily denied. (see page 19)
W - Permit required for discharge of dredged or fill material (see page 19)
N/A - Not applicable (No Department of the Army jurisdiction).
* - Maintenance Dredging (Activities authorized by a Department of the Army permit or existing facilities which were constructed prior to 18 December 1968 are subject to a permit condition that requires the structure or work to be maintained in good usable condition.)
** - Examples: House pad, access road, etc.



SOURCE - U.S. DEPT. OF AGRICULTURE SOIL CONSERVATION SERVICE - 1962
U.S. GEOLOGICAL SURVEY - 1949 to 1954
M.P. WENNEKENS - 1977
WAPORA - 1977

SUBAREA 4 – FIGURE 9.

Subarea V. Kenai National Moose Range Boundary to Outlet of Kenai Lake

Subarea V begins at River Mile 45 and continues upstream to River Mile 83. Kenai River mainstem spawning is documented throughout the subarea. All major tributaries entering the River in this subarea except Cooper Creek are known to provide nursery habitat and may provide spawning habitat. Previous studies by the Alaska Department of Fish and Game have shown that sockeye salmon rearing occurs in Skilak Lake.

There has been little residential or commercial development in Subarea V, as the majority of land is controlled by the federal government. The major exception to this pattern is the settlement of Cooper Landing near the outlet of Kenai Lake, which is held by various private interests.

The topography of the area is flat west of Skilak Lake and mountainous to the east of the Lake. This subarea is considered the most aesthetically pleasing of the Study Area.

Future permit requests are anticipated from residents of the Cooper Landing area. As the settlement of Cooper Landing grows, future studies may be required to determine the suitability of proposed permit actions. Permit requests may arise also for additional public access facilities associated with the Kenai National Moose Range.

PERMIT CONDITIONS AND RECOMMENDED MANAGEMENT PRACTICES

In addition to standard conditions found on all permits, many activities in the Kenai River, Skilak Lake, Kenai Lake, their tributaries, and wetlands must meet specific conditions before a permit may be issued. These special conditions as they apply to the described activities requiring permits are included in the section along with recommended management practices which should be followed to the maximum extent possible to minimize potential adverse effects on the environment. (Although recommended management practices are not enforceable by the Corps of Engineers, the extent to which applicants agree to their adherence will be considered in the determination to issue or deny a permit.)

The conditions and management practices outlined in this section have been developed from the summary findings of the environmental profiles and have not been developed for those activities for which permits would ordinarily be denied. These profile conclusions are listed in parentheses behind each condition and can be found in their entirety on the following pages.

Docks

A dock is defined as a place (such as a wharf or platform) for loading or unloading goods or people. Floating, piled, and cribbed docks have been constructed on the Kenai River and serve as river access structures for boats or planes.

Although isolated, individual boat docks may not create significant impacts, the cumulative impact of several docks may be adverse. A proliferation of boat docks will reduce aquatic habitat, limit near-shore fishing, accelerate erosion, create additional flood hazard (debris), and diminish the aesthetic appeal of an area.

Community or shared facilities minimize the impacts caused by excessive numbers of smaller boat docks. Depending on the availability of community facilities, individual boat docks may not be needed. Permit applications for community or shared boat docks will be encouraged in place of individual facilities. Although permit requests for numerous types of boat docks are anticipated, cantilivered or floating structures will be encouraged over pile structures.

Special Conditions

a. Docks shall be constructed of environmentally compatible and aesthetically pleasing materials. (For example, railroad ties or creosote-treated wood would not be acceptable in that they may impart the preservative to the water and degrade water quality. Automobile bodies or discarded freezers may provide suitable foundations for docks but obviously would be environmentally unacceptable and aesthetically displeasing.) (Physical 9; Biological 3; Aesthetic 1,2, and 3; and Land and Water Use 2)

b. Docks or dock platforms shall be portable to facilitate removal and thereby minimize susceptibility of damage to the structure, and damage caused by the structure from washouts during flooding. (Physical 5; and Land and Water Use 1)

c. Docks shall be no larger than the minimum size required to accomplish the desired purpose (usually the maximum length of one boat parallel and perpendicular to shore for individual facilities). (Physical 2; and Aesthetic 2)

Recommended Management Practices

The following management practices should be followed to the maximum extent possible:

a. The dock should not be constructed in a manner that will adversely affect a wetland. (Physical 8; Biological 1; and Socio-economic 1)

b. The dock should not be constructed directly on a cut (high-energy) bank. (Physical 3)

c. Construction of roadways or access to the dock should be such that a minimum of vegetation is removed and that erosion is minimized. (Physical 1 and 4; and Biological 3)

Slips

A slip is defined as a sloping ramp extending to the water's edge to serve as a facility for landing or repairing ships (boats). Small and large slips have been constructed on the Kenai River

primarily as access sites. Small, isolated, individual slips may not produce significant impacts. Although small slips provide some benefit as nursery sites for salmon, the cumulative impact of slip proliferation may be adverse.

A proliferation of slips would cause removal of unacceptable amounts of shoreline vegetation, increase erosion potential, and diminish the aesthetic appeal of the area. Permit applications for community or shared slips will be encouraged over individual slips.

Special Conditions

a. Slips shall be constructed only during periods of low water and in areas where in riverbed excavation work is not necessary. (Biological 2 and 3; and Socioeconomic 3)

b. Excavated material shall be placed inland a sufficient distance to insure that it does not re-enter the river through erosion. (Physical 1; Biological 2 and 3; Land and Water Use 2; and Socioeconomic 3)

c. Slips shall not be constructed in a manner that would cause drainage of an adjacent wetland. (Physical 8; Biological 1; and Socioeconomic 1)

d. Riprap shall be placed on the sides and bottom of the slip to prevent erosion. The material should be of sufficient size to preclude washouts or erosion. Side and back slopes of the slip should be replanted with vegetation suitable to stabilize the slope and add aesthetic appeal. (Physical 1,4,7, and 9; Biological 2 and 3; Socioeconomic 3; and Aesthetic 1, 2, and 3)

e. Excavation for slips shall not extend below the ordinary low water mark. (Biological 2 and 3; and Socioeconomic 3)

Recommended Management Practices

a. Roadways or other access to the slip should be constructed in such a manner that minimizes vegetation removal or destruction. (Physical 1, 4, and 8; Biological 2 and 3; Socioeconomic 3; and Aesthetic 1)

b. Slips should not be constructed directly on a cut (high energy) bank. (Physical 3)

Ramps

A ramp is defined as a slope for launching boats. Ramps have been constructed along the Kenai River for that purpose. The slopes of some ramps on the river have been paved. Other slope stabilization materials such as metal landing mats have been used. In general, slope stabilization does not produce significant impacts. Ramps without stabilization materials, however, are subject to erosion. Ramp proliferation reduces the aesthetic quality of an area.

Community (or shared) ramps will be encouraged over private facilities. Such ramps, depending on location, would eliminate the need for individual facilities.

Special Conditions

a. Ramps shall be constructed only during periods of low water to minimize the discharge of excavated materials into the stream. (Physical 1, 7, and 8; Biological 2 and 3; and Socio-economic 3)

b. The slope of the ramp shall not exceed a grade of six to one (6 feet horizontal to 1 foot vertical). (Physical 1)

c. Ramps shall be designed and constructed in a manner that will avoid the alteration of the drainage patterns of adjacent wetlands. (Physical 8; Biological 1; and Socioeconomic 1)

d. Excavated material shall not be discharged into the stream but will be deposited at a distance from the ramp sufficient to prevent introducing the material into the waterway. (Physical 1; Biological 2 and 3; Land and Water Use 2; and Socioeconomic 3)

e. Ramps shall not extend below the ordinary lower water line. (Biological 2 and 3; and Socioeconomic 3)

f. The bottom surface of the ramp shall be stabilized to reduce erosion. (Physical 1 and 7; Biological 2 and 3; and Socio-economic 3)

g. Riprap of sufficient size to prevent washout shall be placed on the side slopes of the ramp. (Physical 7)

Recommended Management Practices

a. Ramps should not be constructed directly on a cut (high-energy) bank. (Physical 3)

b. Areas above the high water line should be revegetated where possible. (Physical 4; and Aesthetic 1)

c. Construction of roadways or access to the ramp should be such that a minimum amount of vegetation is removed and erosion is minimized. (Physical 1, 4, and 8; Biological 2 and 3; Socio-economic 3; and Aesthetic 1, 2, and 3)

Culverts

A culvert is a conduit (pipe, tile, or tube) over a transverse drain. Culverts are designed to carry water under a roadway, but often they cause barriers to fish passage by constricting flow, increasing current velocities, and creating waterfalls.

Special Conditions

a. The culvert shall not restrict normal water flow in a manner

which would increase current velocity. (The shape and dimensions of the culvert must be similar to the shape and dimensions of the stream bed.) (Physical 9; and Biological 3)

b. Culverts shall be placed at a depth sufficient to insure that artificial impoundments are not created upstream. (Biological 3)

c. Riprap or other stable fill material shall be placed at the outlet of the culvert to insure protection against erosion at the outlet. (Erosion at the outlet could create a waterfall that would become a barrier to fish passage.) (Physical 1 and 7; Biological 2 and 3; and Socioeconomic 3)

d. Culverts shall be constructed during the period between fry emergence and adult spawning. (Physical 1; Biological 2 and 3; and Socioeconomic 3)

e. In all cases, prevention of discharge into the stream of excavated material shall be ensured. (Physical 7; Biological 2 and 3; and Socioeconomic 3)

Recommended Management Practices

a. In general, culvert location should consider the natural terrain in such a manner that placement will require a minimum of backfill. (Physical 9; and Aesthetic 1 and 3)

b. Culverts should be constructed of materials (preformed cement or corrugated steel) that will be aesthetically acceptable. (Aesthetic 2 and 3)

c. Vegetation disrupted or destroyed during construction should be restored or replaced with those types of vegetation appropriate for disrupted areas. (Physical 4; and Aesthetic 1)

d. In known fish spawning or important nursery areas, a bridge structure should be considered over a culvert installation. (Biological 3; Socioeconomic 3)

Revetments

A revetment is defined as a facing (as of stone or concrete) to sustain an embankment. On the Kenai River, revetments have been constructed for bank erosion protection and bank stabilization.

The Kenai River is a swift flowing, meandering stream. As a result, natural erosion along the streambank is a constant problem for riparian landowners. The cumulative effect of the continuous restoration of eroded banks is potentially altered stream flow, reduced aquatic habitat, and diminished aesthetic quality. In some streams of the lower 48 states, bank protection measures have reduced streams to sterile, concrete channels. The question then arises, who is allowed to revet and who is not? Although it is beyond the scope of this review to make such decisions, it is hoped that local, state, and federal officials will formulate a management plan that

will offer solutions to the problem. In the absence of such a plan, the following guidelines are offered for various revetments that may be used on the Kenai River:

Natural vegetation is the first preference for revetment. Vegetation stabilizes banks, contributes detrital material for use by aquatic organisms, provides habitat for fish and wildlife, and provides a shoreline more aesthetically pleasing than one denuded. In many areas, however, vegetation alone will not reduce erosion. Cut (high-energy) banks are an example of such areas.

Where vegetation alone is not sufficient to control erosion, riprap in combination with vegetation is preferred. Riprap is acceptable if the material to be used is of sufficient size to resist erosion.

The grade of the newly riprapped or reveted bank is critical to its functional success. The U.S. Fish and Wildlife Service has suggested experimenting with bank slopes of four to one, or eight to one (horizontal to vertical) to provide more stable areas resistant to erosion and wave actions, and to permit the growth of selected vegetation. Various vertical-to-horizontal diagrams are shown in Figure 10.

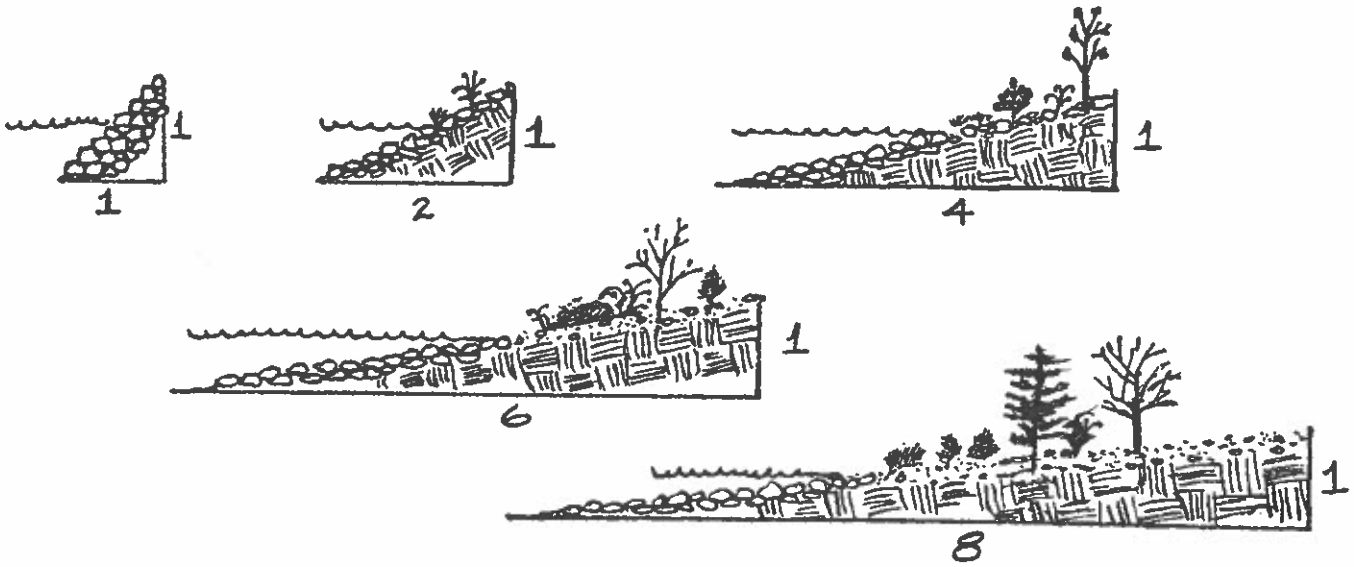


Figure 10. Slope Grade Diagrams (after Nehalem Wetlands Review, 1976).

Studies in Puget Sound[17] indicate that concrete stairsteps and rock riprap facings of moderate slope (one-horizontal-to-one-vertical or less steep slope) are least detrimental to survival of chum and pink salmon fry. Various revetment structures are shown in Figures 11 and 12.

Upon completion of rock placement, or during the placement of the top layers, material relatively higher in soil content can be added to provide a seed bed for vegetation. Revegetation could be accomplished by planting black cottonwood, Labrador tea, willows, and various grasses and sedges. Applicants should contact local

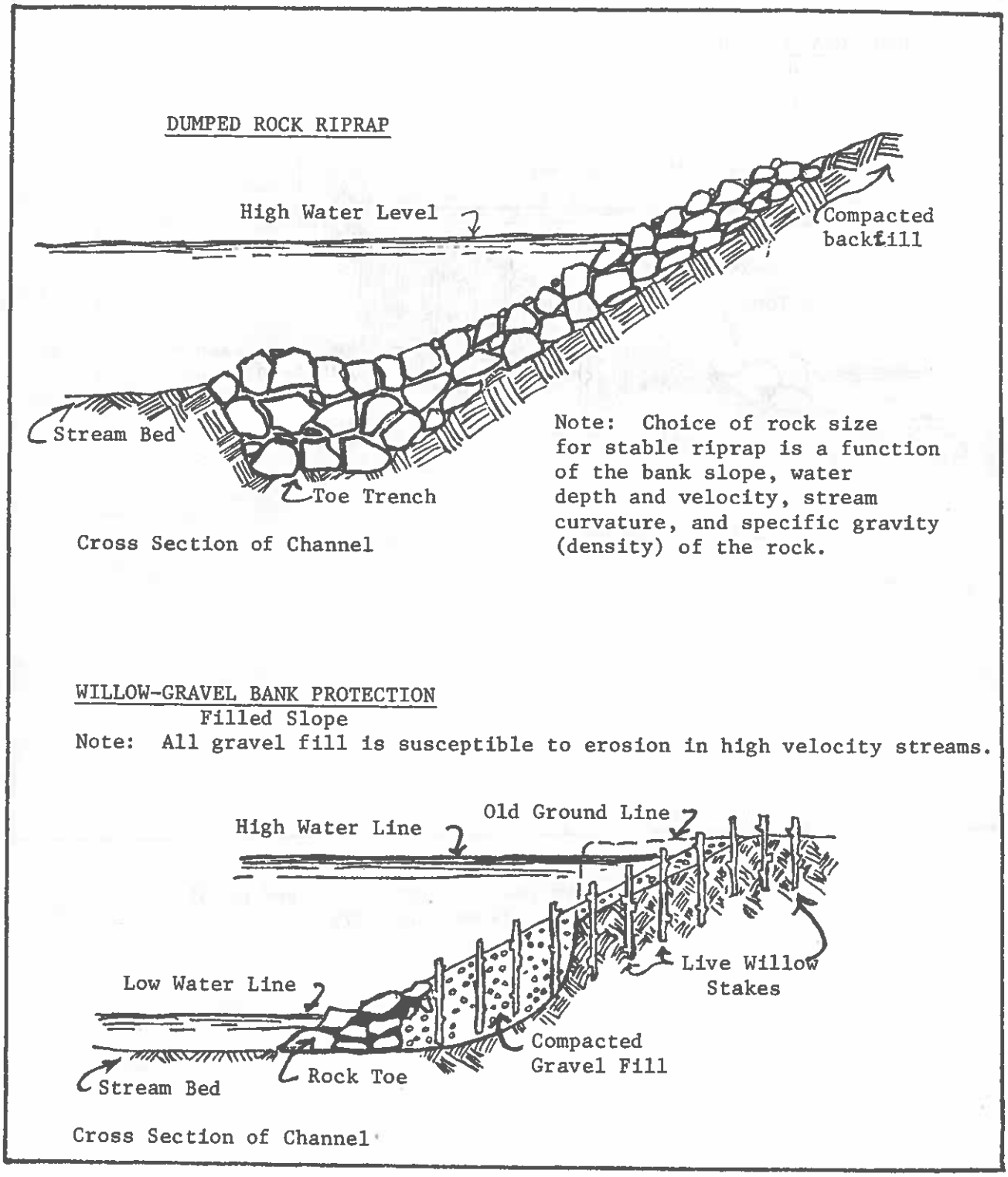


Figure 11. Revetment Structures (after Nehalem Wetlands Review, 1976).

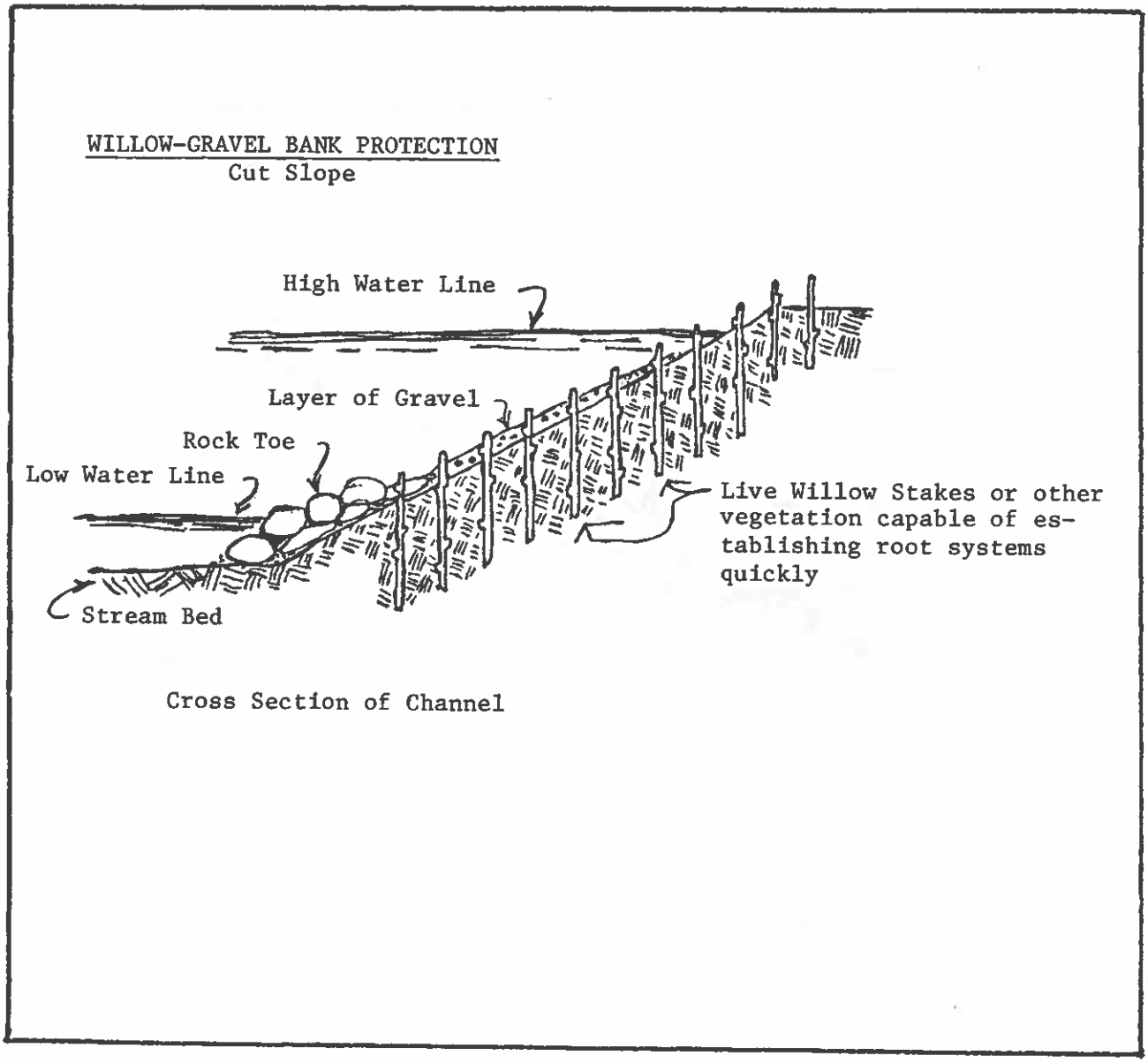


Figure 12. Revetment Structure (after Nehalem Wetlands Review, 1976).

Soil Conservation Service personnel for advice and suggestions on plantings.

Bulkheads (vertical or near-vertical structures parallel to the shoreline) provide efficient erosion control, but cause loss of aquatic habitat and degrade the aesthetic value of an area. Aquatic habitat is lost primarily through the destruction of niches that are normally available on the uneven surfaces of the stream slopes. These surfaces, usually gravel, may be used as salmon spawning sites and would provide habitat for macroinvertebrate populations. Installation of bulkheads, therefore, is strongly discouraged.

Special Conditions

a. Riprap material shall be of sufficient size and bulk to prevent the material from being washed away. (Physical 7)

b. Revetments shall be constructed only during periods of low water so that discharge of construction-disrupted material into the waterway will be minimized. (Physical 1 and 7; Biological 2 and 3; and Socioeconomic 2)

c. Permits will not be granted for revetments until the applicant demonstrates that the planned activity will produce the least adverse impact on spawning or nursery sites. (The applicant should be aware of the location and relative importance of spawning and nursery sites downstream from the activity site, importance of spawning and nursery sites at the proposed activity site, and should demonstrate ability to protect those critical habitats.) (Biological 2 and 3; and Socioeconomic 3)

d. Revetments shall be constructed in a manner that would not alter the flow or integrity of wetlands. (Physical 8; Biological 1; Land and Water Use 2; and Socioeconomic 1)

Recommended Management Practices

a. Natural vegetation is the preferred revetment and should be used whenever possible. (Physical 4)

b. Riprap revetments should be revegetated above the ordinary high water mark with appropriate ground-holding vegetation. (Physical 4)

Dredging

Dredging is defined as digging, gathering, or pulling material (in this case, from a navigable water) with some type of device. Dredging disturbs the stream substrate, may alter stream flow and current patterns, and may increase turbidity and the amount of sediment in the stream. Dredging is usually conducted to maintain the navigability of canal systems, to improve river access to facilities, or for the removal of gravel for construction purposes.

Special Conditions

a. Dredging shall occur only during those periods between fry emergence and adult spawning. (Physical 1 and 9; Biological 2 and 3; Land and Water Use 2; and Socioeconomic 3)

b. Dredging shall not occur in areas of known or suspected spawning or nursery activity. (Biological 2 and 3; and Socioeconomic 3)

c. The applicant shall. demonstrate that dredging will be done in a manner that will minimize in-stream resuspension of materials. (Physical 1 and 9; Biological 2 and 3; Land and Water Use 2; and Socioeconomic 3)

d. In-stream disposal of dredged materials is prohibited. (Physical 1 and 9; Biolgical 2 and 3; Land and Water Use 2; and Socioeconomic 3)

e. The disposal of dredged material shall be at a distance inland sufficient to prevent reintroduction of the material to the waterway, and should not be in a wetland. (Physical 1 and 9; Biological 2 and 3; Land and Water Use 2; and Socioeconomic 3)

Bridges and Bridge Approaches

A bridge is defined as a structure carrying a pathway or roadway over a depression. Bridge approaches are defined as pathways or roadways which connect to bridges. While the Corps of Engineers does not regulate bridges generally, they do comment on permits issued by the U.S. Coast Guard for such structures. The Corps, however, does regulate bridge approach fills. Four bridges having approaches cross the mainstem of the Kenai River. Several smaller bridges with approaches span Kenai River tributaries.

Special Conditions

a. Backfilling, where necessary, shall be of clean material free from pollutants.. (Physical 9; Biological 2 and 3; Land and Water Use 2; and Socioeconomic 3)

b. Bridge approaches shall be constructed only at periods of low water. (Physical 1 and 9; Biological 2 and 3; and Socioeconomic 3)

c. Bridges shall be of sufficient height to permit navigation.

Recommended Management Practices

a. In wetlands, piled bridges would be preferred to bridges built on fill. (Physical 8; and Biological 1)

b. Bridge pilings in tributary or mainstem channels should

be discouraged (long-span bridges would be preferred). (Physical 5)

Subsurface Utilities

Subsurface utilities are underground facilities (such as pipelines or cables) used to transport liquids or gases, transmit electric power, or transmit communication signals.

Special Conditions

a. Construction shall be done only in early summer, following fry emergence but prior to the onset of major sport fishing activity. (Physical 1 and 9; Biological 2 and 3; and Socioeconomic 3)

b. Vegetation within Corps jurisdictional boundaries removed adjacent to waterways shall be replaced using suitable practices. (Physical 1 and 4; Biological 2 and 3; Socioeconomic 1 and 3; and Aesthetic 1)

Recommended Management Practices

a. The applicant should demonstrate that construction methods will be designed to minimize adverse impacts.

b. Points of entrance to the waterways should not be in wetlands. (Physical 8; Biological 1; Socioeconomic 1)

Overhead Utilities

Overhead utilities include telephone, power transmission lines, and pipelines. Their effect on navigation, aviation, avifauna, and aesthetics are matters of public interest. Several overhead power transmission lines span the Kenai River and tributaries.

The minimum clearances shown in Table 5 are required for aerial electric power transmission lines crossing navigable waters of the United States. These clearances are related to the clearances over the navigable channel provided by existing fixed bridges, or to the clearances that would be required by the U.S. Coast Guard for new fixed bridges in the proposed power line crossing. The clearances are based on the low point of the line under conditions that produce the greatest sag, taking into consideration temperature, load, wind, length of span, and type of supports as outlined in the National Electric Safety Code.

Table 5. Minimum Clearances: Aerial Electric Power Transmission Lines Crossing Navigable Waters of the United States

Nominal System Voltage, kV	Minimum Additional Clearance (ft) Above Clearance Required for Bridges
115 and below	20
138	22
161	24
230	26
350	30
500	35
700	42
750-765	45

Special Conditions

a. No supporting structures shall be constructed within the mainstem of the Kenai River. (Physical 1, 2, and 8; Biological 1,

Recommended Management Practices

a. The applicant demonstrates that no other feasible means, such as subsurface routes or bridge attachment, are available.

b. Overhead utilities should cross navigable waters in areas not having intense waterfowl activity unless no alternatives are available.

Discharge Lines

A discharge line is defined as a pipe or system of pipes which release materials and/or effluents. Few discharge lines are known to exist on the Kenai River.

Special Conditions

Same as conditions for "Subsurface Utilities".

CHAPTER 3

PHYSICAL PROFILE

INTRODUCTION

The objective of this profile is to describe aspects of the physical environment of the Kenai River watershed. The profile also will present information specific to the Study Corridor where the majority of future permit requests will originate. Discussions will include such topics as climate, geology, hydrology and soils.

The Kenai River watershed lies in a transition zone affected by maritime and continental climates. Precipitation is greatest in the late summer and early autumn, and is least in spring. Temperatures in the Study Area are transitional.

A large portion of the Study Area is covered by unconsolidated glacial material of Pleistocene age or younger. These materials are susceptible to erosion.

Geologic resources including oil and gas, coal, and metallic deposits occur in the Study Area. In addition, gravel deposits suitable for construction purposes are found along the lower reaches of major streams.

The Study Area is within seismic risk zone 3. This is defined as a zone where earthquakes of Richter magnitude 6.0 to 8.8 could occur.

The quality of water in the Study Area varies from excellent to objectionally hard with quantities of iron or chlorides. Residents of the area receive water from either water table or artesian aquifers.

Soils in the area consist of unconsolidated material susceptible to erosion. Several steep slopes which are very susceptible to erosion occur in the Study Area. A large portion of land that could be used for farming has been usurped for private, residential development.

CLIMATE

The Kenai Lowlands are situated in the transition zone between the maritime climatic region, which is characteristic of the eastern Kenai Peninsula, and the continental climatic regions of interior Alaska. The maritime areas of Alaska are subject to cool summers, mild winters, high precipitation, and frequent storms with high winds. The interior of Alaska is characterized by cold winters, hot summers, infrequent precipitation, and moderate winds.

Long-term climatological data from the Study Area are available only from the city of Kenai. Additional information from Kasilof and Anchorage will be used to supplement the data from the Study Area. No long-term data on the climate of the interior of the Kenai Peninsula are available. The information cited herein is from Evans[18] and Gatto.[19]

Climatological data available from Anchorage and several stations on the Kenai Peninsula are summarized in Table 6. Annual precipitation on the western border of the Kenai Peninsula ranges from 15 inches at Anchorage, in the north, to 23 inches at Homer, in the south. Topography greatly influences precipitation on the Kenai Lowlands. The Kenai and Chugach Mountains, located in the eastern part of the Study Area, prevent moist air from the Gulf of Alaska from reaching the Kenai Lowlands. The air masses lose water in the mountains as they travel northwestward to the Kenai Lowlands. Precipitation exceeds 40 inches annually in the eastern mountainous parts of the Study Area (Figure 13). The high precipitation areas of the Chugach and Kenai Mountains are the head of drainage for the Kenai River and account for much of its flow.

Precipitation in the Kenai Lowlands is greatest during the late summer and early autumn, when it averages as much as 3.7 inches per month, and is least in spring, when average precipitation at the city of Kenai averages less than 1.0 inch during May. More than 50% of the annual precipitation fell during the 4 months from July through October during the period 1962-1971, whereas only 20% fell during the 5 months from January through May.[19]

Maritime influences on temperature are greater in areas around southern Cook Inlet than in the northern areas near Anchorage. Summer temperatures average less and winter temperatures more at Homer than at Anchorage. The temperatures at Kenai are transitional. During the winter months the temperature at Kenai averages about 13° F and in summer about 54° F.

Table 6. Climatological Data of Anchorage, Kenai, Kasilof, Homer, and Seldovia (Evans, 1972)

Station	January					July					Year							
	Temperature (°F)			Total		Temperature (°F)			Total		Temperature (°F)			Total				
	Min. Ave.	Mean Ave.	Max. Ave.	Precip. (inches)	Snow (inches)	Min. Ave.	Mean Ave.	Max. Ave.	Precip. (inches)	Snow (inches)	Min. Ave.	Mean Ave.	Max. Ave.	Precip. (inches)	Snow (inches)	Elev. (feet)	Prev. Wind Direct.	Mean Hourly Wind Speed (mph)
Anchorage Airport, 1943-1971	3.6	11.4	19.2	0.88	11.7	49.9	57.6	65.3	2.07	0.0	26.9	34.7	42.5	14.83	71.4	114	N	6.6
Kenai, 22 years	3.7	12.7	21.6	1.12	13.4	46.1	53.5	61.0	2.23	0.0	24.5	33.1	41.7	19.91	68.7	86	N	6.6
Kasilof, 32 years	3.7	12.2	20.6	1.12	10.4	45.2	55.0	64.8	2.00	0.0	25.3	34.4	43.6	17.77	55.6	80	N	
Homer, 1943-1971	14.0	20.7	27.3	1.73	10.4	44.6	52.4	60.2	1.69	0.0	29.2	36.4	43.6	23.08	55.4	67	NE	6.5
Seldovia*	18.1	23.2	28.2	2.3	10.2	48.6	55.8	57.7	1.40	0.0	33.7	41.0	48.2	26.3	50.8	0-30	N	11.5-17.5

*Unofficial local records

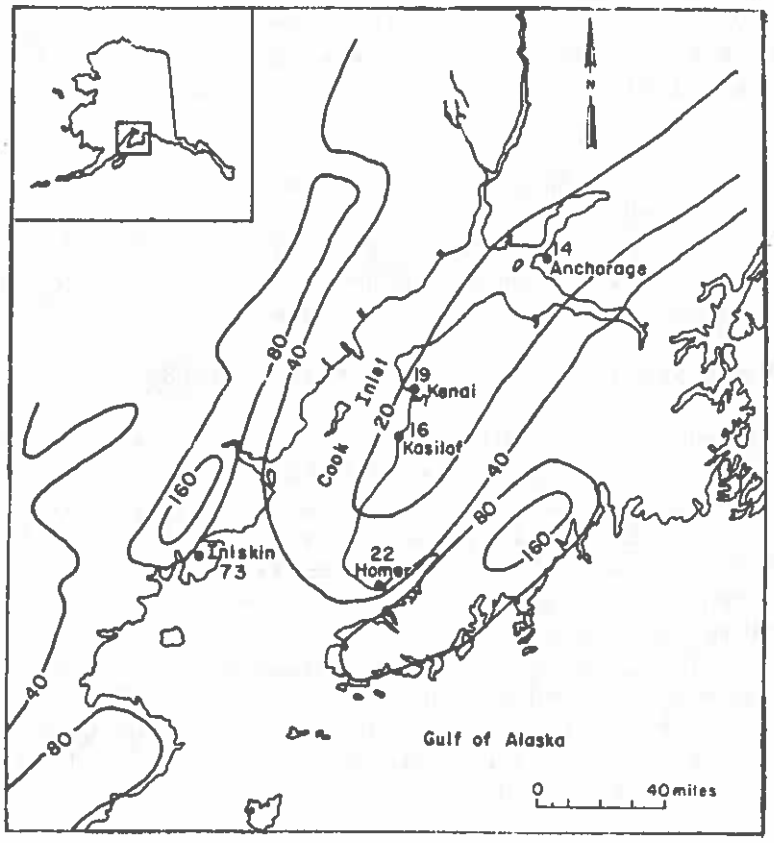


Figure 13. Mean Annual Precipitation (Inches) in the Cook Inlet-Kenai Peninsula Area of Alaska (after Gatto, 1976).

GEOLOGY

The Kenai Lowland region, which encompasses much of the Study Area, is part of the Cook Inlet Basin that has been uplifted to above sea level. The Basin is an elongated stratigraphic and structural trough that trends northeastward, which is the general direction of other tectonic features (Figure 14). The Basin is bordered on the northwest by the inactive Bruin Bay Fault and on the southeast by the inactive Border Ranges fault. The metamorphosed volcanic and sedimentary rocks of the Kenai-Chugach Mountains occur to the southeast of the Border Ranges fault. Igneous rocks of the Alaskan-Aleutian batholith occur northward of the Bruin Bay fault.

The bedrock of the Cook Inlet Basin is overlain, in places, by glacial and glacial-fluviatile sediments of Pleistocene and post-Pleistocene age. In the Kenai Lowlands these surficial sediments are several hundreds of feet thick and few exposures of the underlying bedrock occur. The geology of the Study Area is shown in Figure 15.

Bedrock Stratigraphy of the Kenai Lowlands

The Kenai Lowlands occur within the Matanuska-Wrangell depositional basin (Figure 14), which comprises an exposed part of a continental shelf and slope that has been subjected to periods of regional uplift and surface erosion.[20] The local pre-Quaternary stratigraphic record consists of approximately 40,000 feet of late-Paleozoic and Mesozoic age marine strata, which are overlain by approximately 30,000 feet of Tertiary age nonmarine and estuarine strata. These strata have been faulted and mildly folded, and are prone to subsidence and uplift. A generalized stratigraphic column (Figure 16) delineates the relationships and thicknesses of strata in the subsurface of upper Cook Inlet. These bedrock strata are overlain by quaternary age surficial sediments. They are discussed below, from oldest to youngest.[21]

Unnamed Rocks

Rocks of the Late Triassic age are found in outcrop at Tuxedni Bay and points farther to the south. These rocks consist of metamorphosed limestone, tuff, chert, sandstone, shale, and basaltic lava flows.

Talkeetna Formation

These rocks are of Early Jurassic age and are found in outcrop along the Bruin Bay fault, along the northwest side of Cook Inlet, and near Seldovia, along the southeast side of Cook Inlet. The strata near Seldovia consist of Volcanic tuff, agglomerate, breccia, and interbedded marine sandstone, shale, and limestone. These strata generally are poorly bedded, and are composed of rock fragments of various sizes and types. The Talkeetna Formation has an approximate dip of 30 degrees to the northwest.

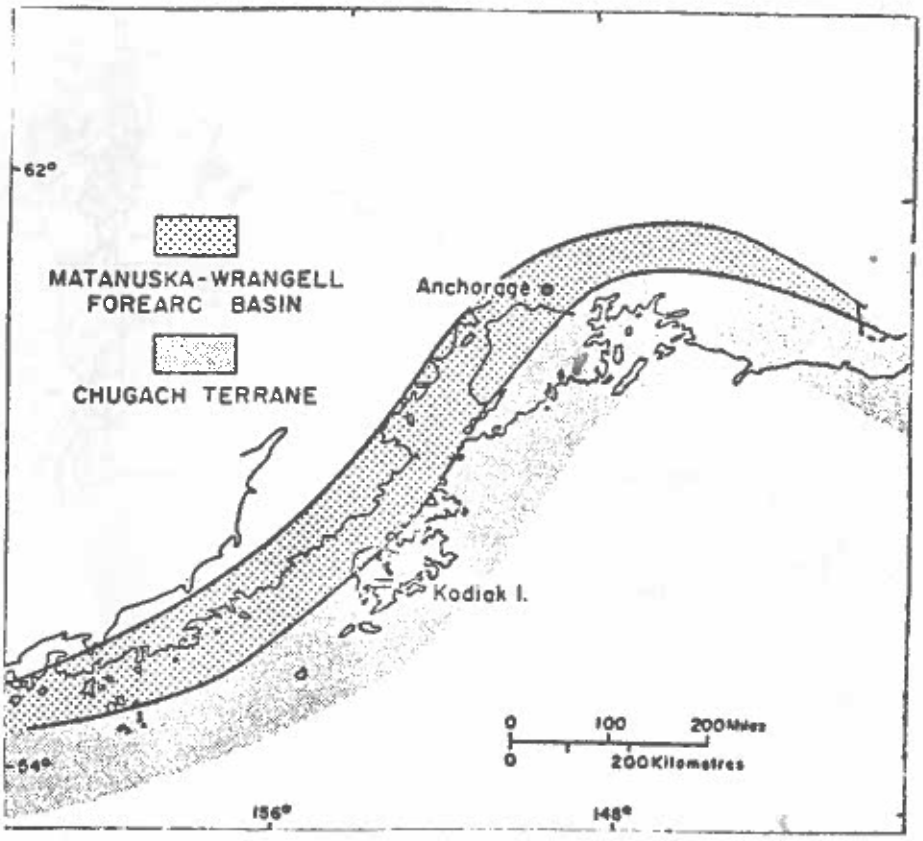
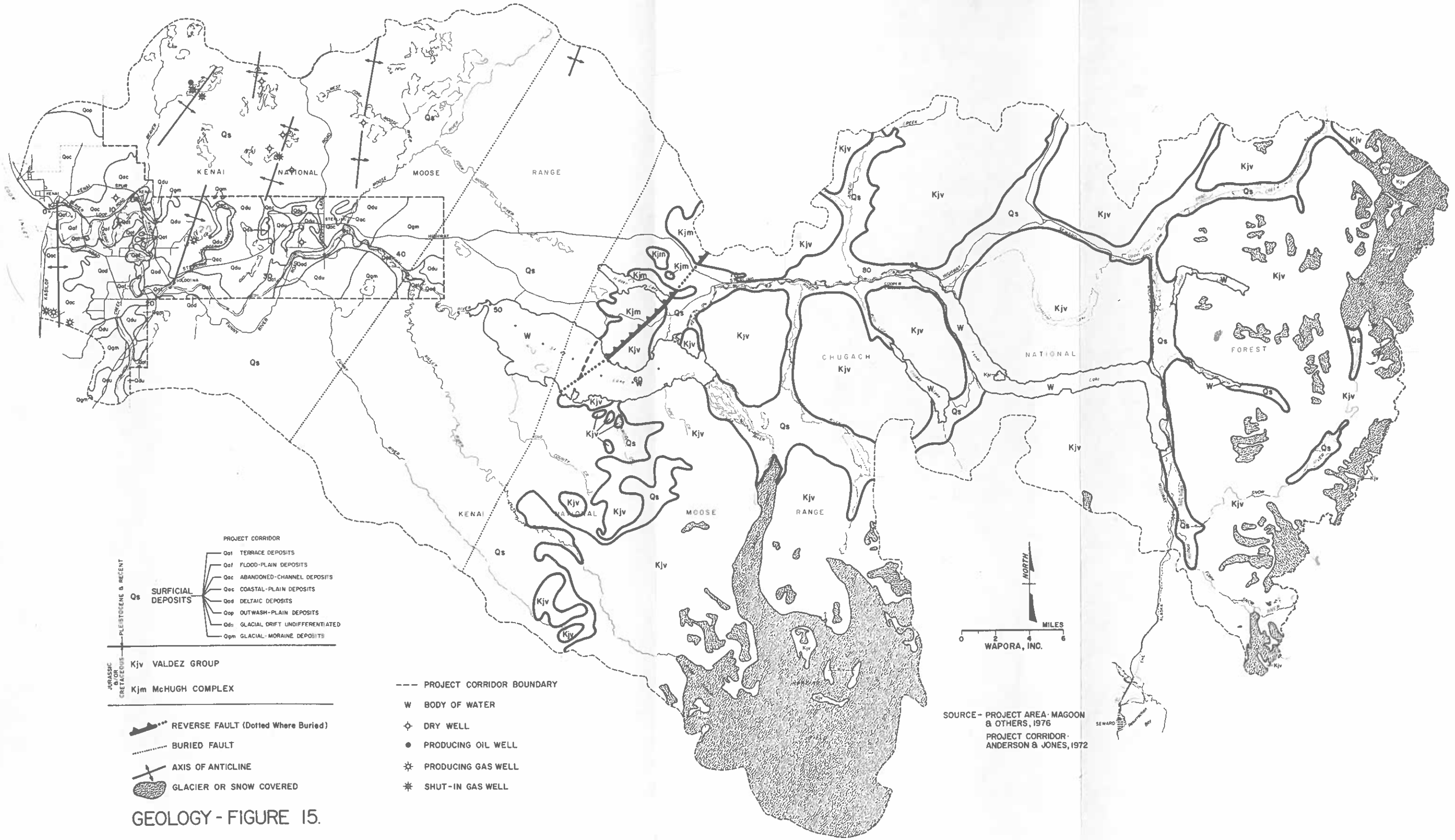


Figure 14. Structural Configuration of Cook Inlet Basin and Vicinity (after Magoon and others, 1976).



GEOLOGY - FIGURE 15.

ERA	SYSTEM	SERIES		UNIT	THICKNESS (feet)
CENOZOIC	TERTIARY	Pliocene	UL	Sterling Fm	6,000
	Neogene	Miocene	UML	Beluga Fm	5,000
				Tyonek Fm	7,000
	Paleogene	Oligocene	UL	Hemlock Conglomerate	1,475
		Eocene	UML	Period of nondeposition	
				West Foreland Fm	3.300
		Paleocene	UL	Period of nondeposition	
				Matanuska Fm	8,500
MESOZOIC	CRETACEOUS	Upper		Period of nondeposition	
				Matanuska Fm	2,400
				Period of nondeposition	
		Lower		Nelchina Limestone	700
				Period of nondeposition	
	Jurassic	Upper		Naknek Fm	7,200
		Middle		Chinitina Fm	2,350
		Lower		Tuxedni Group	9,700
				Talkeetna Fm	8,400
	Triassic	Upper		Unnamed Rocks	1,300
		Lower			

Figure 16. Stratigraphic Column of Upper Cook Inlet Basin after Fisher and Magoon (1977), Evans (1972), and Magoon and others (1976).

Taxedni Group

These strata are of Middle and Late Jurassic age. They consist of alternating beds of fossiliferous graywacke, sandstone, and siltstone. The Tuxedni Group rests unconformably on the Talkeetna Formation.

Chinitna Formation

The Late Jurassic age Chinitna Formation unconformably overlies the Tuxedni Group. The Chinitna consists of dark gray marine siltstone with large concretions.

Naknek Formation

This Late Jurassic age formation unconformably overlies the Chinitna Formation. The Naknek is composed of fossiliferous marine conglomerate, sandstone, and siltstone. Deposition of the Naknek formation was followed by approximately 15 million years of nondeposition and probable erosion.

Nelchina Limestone

This Lower Cretaceous Formation consists of siltstone and sandstone beds that are rich in Inoceramus fragments. The Nelchina rests unconformably on the Naknek Formation. Deposition of the Nelchina was followed by approximately 15 million years of nondeposition and probable erosion.

Matanuska Formation

These Upper Cretaceous strata rest unconformably on the Nelchina Limestone. The strata consist of (in upward order) shallow-marine sandstone, gray siltstone with bedding disturbed by organisms during deposition, and sandstone and siltstone that were deposited by turbidity currents. Deposition of the Matanuska Formation was interrupted for approximately 10 million years. Consequently, an unconformity exists within the Formation. The upper part of the Matanuska Formation has been correlated with beds of the Kaguyak Formation to the south. The two formations are differentiated by latitude; north of Seldovia, the beds are assigned to the Matanuska, whereas south of Seldovia, the beds are assigned to the Kaguyak.

West Foreland Formation

This Late Paleocene and Early Eocene age formation consists of tuffaceous, conglomerate that contains pebbles of volcanic rocks, sandstone, and siltstone. It is separated in time from the underlying Matanuska Formation by approximately 10 million years of nondeposition, and it marks the base of the Tertiary record in the Kenai Lowlands.

Kenai Group

The Kenai Group is an Oligocene-to-Pliocene age progression of strata, which consists of sandstone, siltstone, conglomerate, and coal. The base of the Kenai Group is separated from the top of the West Foreland Formation by approximately 20 million years of nondeposition. Fisher and Magoon[21] and Magoon and others[22] exclude the West Foreland from the Kenai Group because of 1) the large break in the stratigraphic record between the West Foreland Formation and the overlying Hemlock Conglomerate[21] and 2) the considerable difference in lithology between the highly tuffaceous West Foreland Formation and the conglomeratic Hemlock Formation.[22] The formations that constitute the Kenai Group are described below, from older to younger.[18]

Hemlock Conglomerate. These strata are Upper Oligocene sandstones and conglomerates. The Hemlock is sometimes mapped with the younger Tyonek Formation as a unit.

Tyonek Formation. This Lower-to-Middle Miocene Formation consists of sandstone, claystone, and siltstone interbeds, and massive subbituminous coal beds. The Tyonek rests conformably on the older Hemlock Conglomerate.

Beluga Formation

The Upper Miocene to Lower Pliocene Beluga Formation consists of claystone, siltstone, and thin sandstone beds, and thin subbituminous coal beds. This formation lies unconformably on the Tyonek Formation.

Sterling Formation

This Lower to Upper Pliocene Formation marks the top of bedrock in the Kenai Lowlands. The Sterling consists of massive sandstone and conglomerate beds with occasional thin lignite beds, and unconformably overlies the older Beluga Formation.

Bedrock of the Kenai and Chugach Mountains

The bedrocks of the mountainous sections of the Study Area consist of structurally complex materials of sedimentary origin. Data on their age, geological relations to the bedrock of the lowland area, and structures are incompletely known. The data summarized below are from Magoon and others.[22,23]

McHugh Complex

The weakly metamorphosed strata of the McHugh Complex are possibly of Middle to Late Jurassic age, but are at least as old as the Early Cretaceous. These rocks consist of siltstone, graywacke, arkosic and conglomeratic sandstone, metamorphosed shales and sandstones, and argillite.[23] The sediments that formed these rocks derived from the

uplifted Alaska-Aleutian batholith, and were deposited in the Aleutian Trench, which was on the ocean side of the Border Ranges fault (Figure 14). This deposition was probably contemporaneous with deposition of the Tuxedni Group, Chinitna Formation, and Nakuek Formation.[22] The McHugh complex comprises one of the rock units encountered in the Kenai-Chugach Mountains, but has not been encountered in the subsurface of the Kenai Lowlands.[18]

Valdez (?) Group

The weakly metamorphosed strata of the Valdez (?) Group are of possible Early Cretaceous age, and are at least as old as the Late Jurassic. These rocks consist of locally phyllitic metagraywacke, metasandstone, and argillite. Sediments of the Valdez (?) Group were deposited in essentially the same trench environment as the older McHugh Complex, and are encountered in the Kenai-Chugach Mountains, but not in the subsurface of the Kenai Lowlands.[22]

Intrusives and Volcanics

Most surface exposures of intrusive and volcanic rocks near the Cook Inlet basin are found in the Alaska-Aleutian Range batholith, which is located to the west of the Bruin Bay fault (Figure 14). Some Triassic and Permian metamorphic and volcanic rocks have been mapped in the Chugach Terrane of the Kenai Peninsula, and Quaternary and Tertiary volcanics have been mapped near Mount Douglas and Mount Augustine in the southwest part of the Inlet. West of the Bruin Bay fault, igneous and metamorphic rocks are generally of Jurassic age or younger, although Triassic and Permian age metamorphic rocks have been mapped near Williamsport and Bruin Bay.[20]

Reed and Lanphere[24] have proposed that the Alaska-Aleutian Range batholith may be considered as "the roots of an early Mesozoic magmatic arc that probably formed above a descending oceanic plate." Five periods of plutonism are recognized within the batholith:[24]

- Lower to Middle Jurassic--165 million to 180 million years. These plutons commonly are diorite and quartz diorite, but range in composition from gabbro to granodiorite. Coeval volcanism is represented by the Talkeetna Formation.

- Late Cretaceous--72 million to 84 million years. These plutons consist of granodiorite and quartz monzonite.

- Paleocene to Early Eocene--34 million to 40 million years. These plutons vary in composition from granite to quartz diorite. Evidence for coeval volcanism is found within the West Foreland Formation.

- Late Eocene to Early Oligocene--34 million to 40 million years. These granitic plutons were vented violently, showering the northwest side of the Alaska batholith with lava and pyroclastic material.

- Late Oligocene--25 million to 30 million years. A small granitic pluton is located on the Bruin Bay fault near Kulik Lake, and is intact where it crosses the fault.[22]

Evidence for Quaternary volcanic activity can be found at Mounts Spurr, Redoubt, Iliamna, and Augustine (Figure 17). This volcanicity can be ascribed to activity along the zone of subduction at a depth of approximately 70 miles.[18]

Surficial Geology

Glacial deposits of Pleistocene age or younger blanket the Kenai Lowland from the vicinity of the Border Ranges fault to the shores of Cook Inlet. With the exception of an area south of Tustumena Lake and along Kachemak Bay and Cook Inlet coastlines no exposures of pre-Quaternary rocks are known. The pre-Quaternary deposits consist of the Miocene age Beluga Formation and the Miocene-Pliocene age Sterling Formation.

Karlstrom[25] indicated five periods of Pleistocene glaciation and two minor post-Pleistocene glacial advances. From oldest to youngest the periods of glacial advance are known as the Mount Susitna glaciation, Caribou Hills glaciation, Eklutna glaciation, Knik glaciation, and Naptowne glaciation. The most recent glacial advances (i.e., those that occurred during the past 3,500 years) are named the Tustumena and Tunnel advances of the Alaskan glaciation.

These repeated glaciations produced the present topography of the Kenai Lowland. Single and compound ice lobes, fed from multiple mountaintop ice centers, advanced through major valleys to deposit a composite morainal system in the Kenai Lowlands. Ice lobes advanced southeastward from ice centers in the Aleutian and Alaska Ranges, southward to the Susitna Lowland from Alaska Range and Talkeetna Mountain ice fields, westward through the lower Matanuska Lowland from Talkeetna and Chugach Mountains ice fields, and southwestward and northwestward through the Kenai Lowland from Kenai Chugach Mountain ice fields. These advances and subsequent recessions resulted in deposition and preservation of up to several thousand feet of glacial till in some areas of the Kenai Lowlands.

Subsequent glacial advances are assigned to the Alaskan glaciation, which attained its greatest extent about 3000 B.C. Older moraines found near the head of Tustumena Lake and near the section house of the Alaska Railroad at Tunnel in the Kenai Mountains are called the Tustumena advances; younger moraines found in the same locales are called the Tunnel advances. Other Alaskan age land features, such as the talus cones, alluvial fans, rock glaciers, and valley bottom terraces are found in ice-free upland-valley heads of the Kenai Mountains.

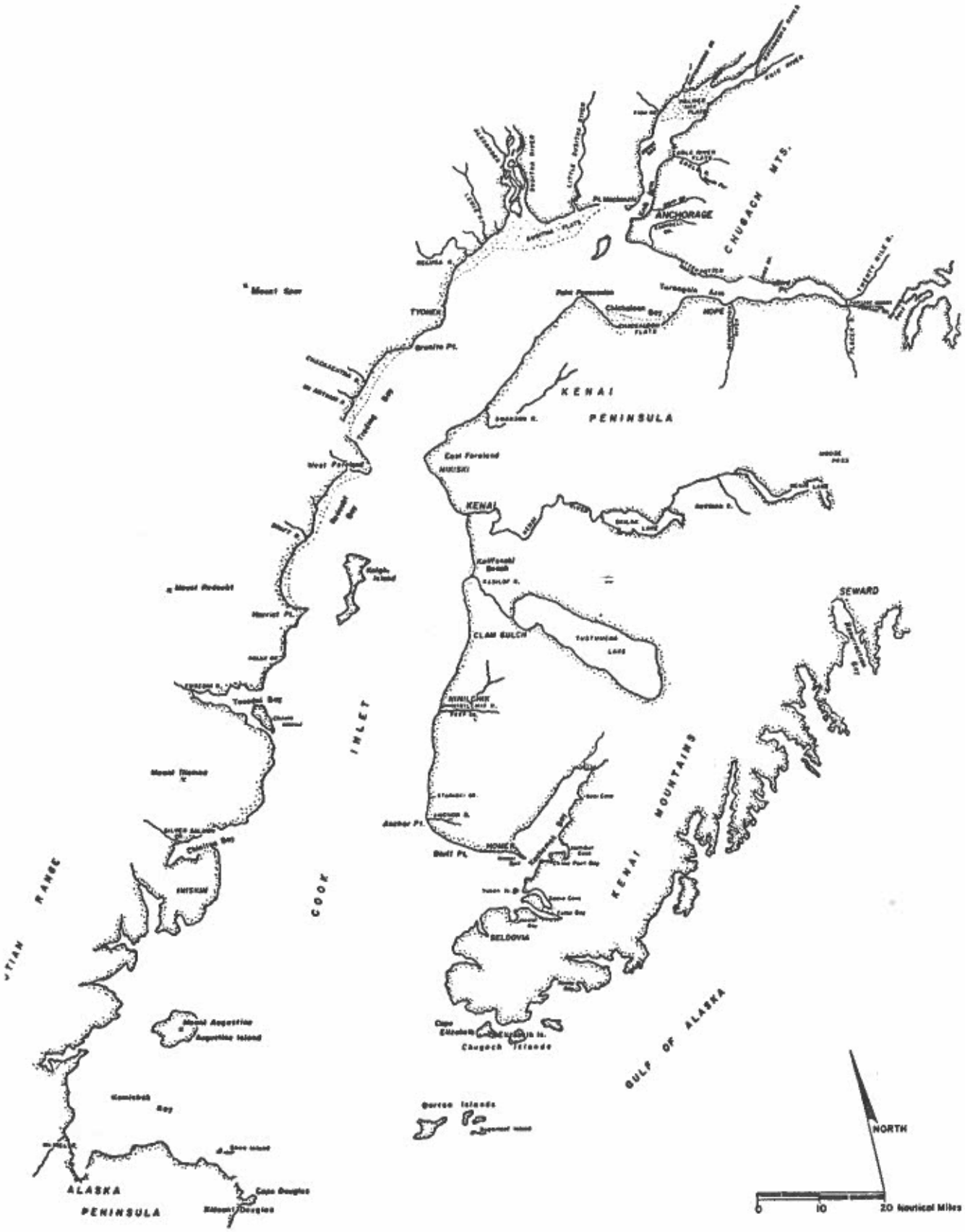


Figure 17. Distribution of Quaternary Age Volcanos (Evans and others, 1972).

Surficial Geology of the Study Corridor

Local surface deposits consist of silt, clay, sand, and gravel. Distribution of these deposits reflects relatively recent or ongoing geological processes that have included erosion and deposition by surface waters and glaciers.

Glacial Moraine Deposits

These sediments consist of a heterogeneous mixture of clay, silt, sand, and gravel in deposits 100 to 400 feet thick. Sorted sand and gravel of glaciofluvial origin may be found in thin, localized deposits that overlie the thicker morainal material. Below 100 feet, sediment grain sizes decrease to predominantly fine sand, silt, and clay.

Glacial Drift

These deposits consist of well-stratified to lenticular sand, gravel, and silt, which interfinger with or overlie a heterogeneous mixture of clay, silt, sand, and gravel. These sediments are 100 to 400 feet thick, the upper 100 feet consisting of well-stratified sand and gravel. The upper 100 feet of sediments grade downward to finer sediments, which include sand, silt, and clay. These deposits form rolling to steep hills and broad, nearly level plains, and many lakes occur in the depressions formed by the irregular depositions of drifts.

Outwash Plain Deposits

These deposits consist of well-sorted coarse sand and gravel. They generally are about 100 feet thick and overlie and grade into stratified clay, silt, fine sand, and gravel. Outwash plain deposits occur in a small part of the Study Corridor north of Kenai.

Deltaic Deposits

Those sediments consist of sand and lenticular gravel. The upper 100 feet of these deposits are generally stratified sand and gravel, which grade downward into finer sands, silt, and clay. Deltaic deposits occur in hummocky to nearly level plains near Soldotna, and along sections of the Kenai River valley.

Coastal Plain Deposits

These sediments consist of well-stratified to lenticular gravelly sand, generally 50 to 100 feet thick, and overlie stratified clay, silt, and sand up to 600 feet thick. Coastal plain deposits have been mapped in broad, level plains near the coast, north and south of the Kenai River Valley.

Abandoned Channel Deposits

These sediments consist of well-stratified to lenticular gravelly sand in deposits 50 to 100 feet thick. These strata overlie stratified clay, silt, fine sand, and gravel. They occur in broad, flat valleys entrenched in older sediments, and appear to be old meltwater channels formed during glacial withdrawals.

Terrace and Floodplain Deposits

These sediments consist of sandy gravel and stratified silt. These deposits are usually less than 50 feet thick and overlie silt, clay, and sand. They occur in tidal flats, low terraces, and floodplains of the Kenai River Valley.

Aeolian Deposits

Rieger[26] reported that fine-grained, windblown sediments called loess, which range in thickness from a "few inches to several feet" (p. 1), occur over the entire area. Karlstrom[25] reported that loess in the Kenai Lowland area "ranges in thickness from a film to more than 6 feet but is generally from 2 to 4 feet thick" (p. 26). Minor amounts of wind-deposited sediment occur in the Study Corridor, but the distribution of these sediments was not mapped by Anderson and Jones.[27]

Areas of Unique or Scientific Interest

According to available information, there are no unique areas of geologic interest in the Study Area.

Geologic Resources

Oil and Gas

Upper Cook Inlet oil and gas fields lie between Kalgin Island and the Susitna River (Figure 18), onshore and offshore. Cumulative production of oil, as of December 1975, reached approximately 677 million barrels. About 80% of this oil is produced from the Late Tertiary Hemlock Conglomerate. Approximately 20% is produced from the overlying Tyonek Formation. Less than 2% is produced from the West Foreland Formation. Gas is produced in association with the foregoing oil-bearing strata, and from older formations, probably from anaerobic digestion of organic debris associated with coal deposits. These older formations produce only minor amounts of gas.[22,23]

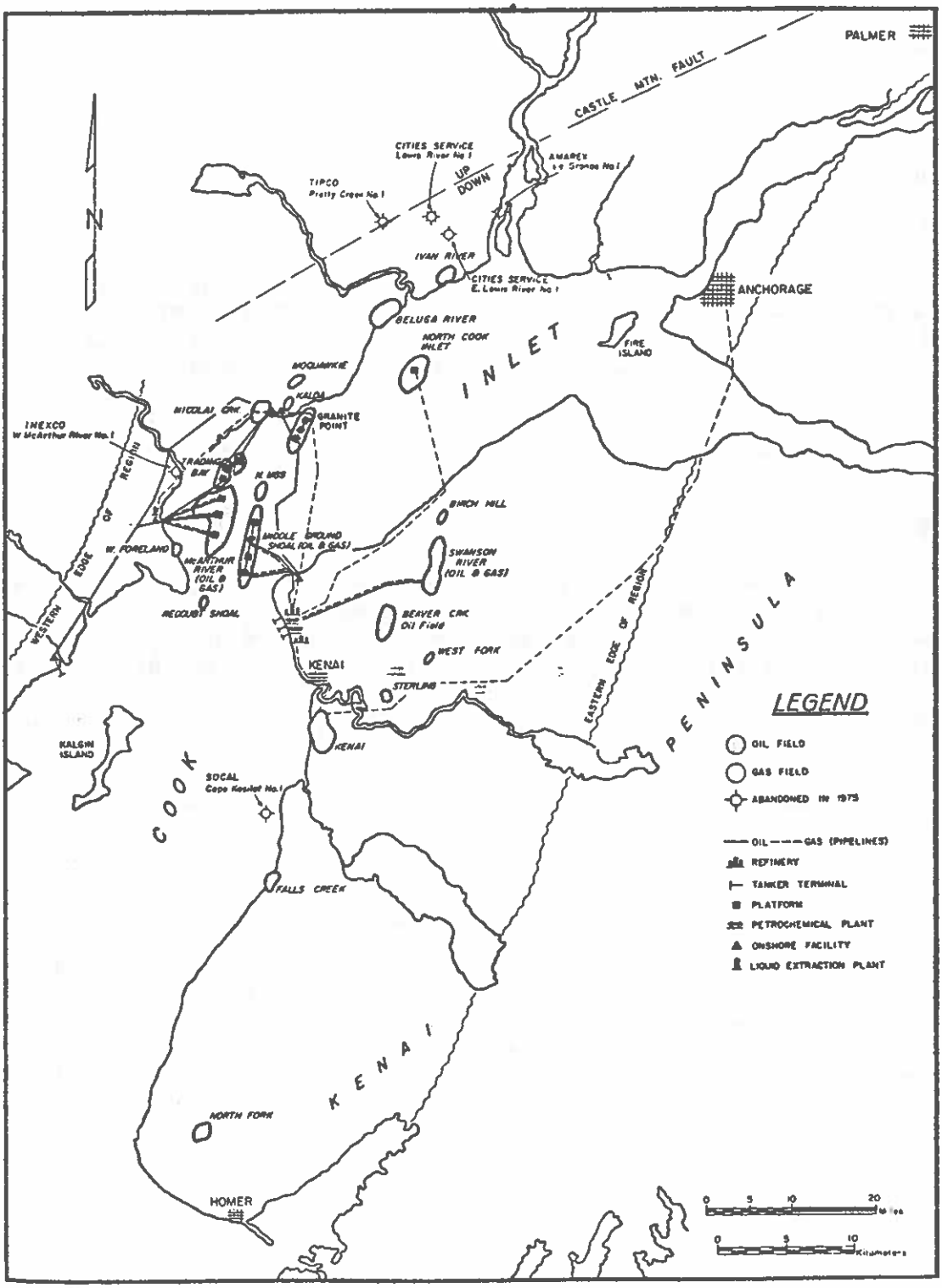


Figure 18. Oil and Gas Fields of the Cook Inlet and Adjacent Areas in Alaska (Kugler, 1976).

Coal

Coal is found on both sides of the Upper Cook Inlet, and reserves of over 100 million tons of high-volatile "B" grade coal have been estimated for the Matanuska field alone. No coal is currently produced, however, from fields in the Cook Inlet Basin.

Metallic Deposits

Preliminary reconnaissance indicates a high potential for economic mineral deposits within the Cook Inlet basin (Figure 19). Placer deposits of gold and tungsten have been found in the foothills of the Kenai Mountains in the vicinity of Bear and Round Mountains, northeast of Skilak Lake.[28]

Based on available information, however, the exploitability of these deposits is not yet public.

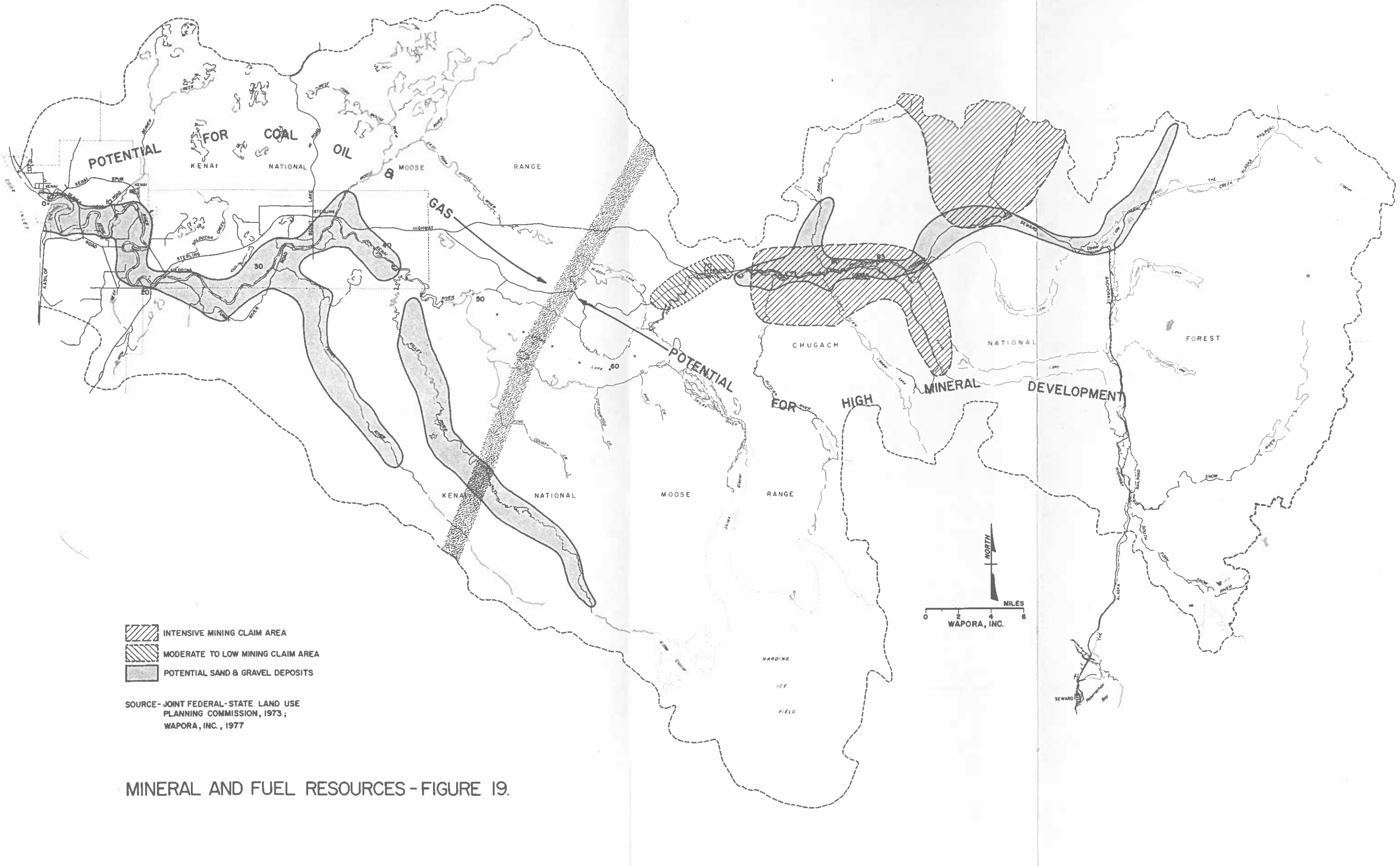
Nonmetallic and Industrial Minerals

River gravel deposits are generally suitable as sources for road and concrete aggregate. Potential source areas of river gravel in the Kenai Lowland generally lie along the lower reaches of major streams and rivers (Figure 19). Glacial material may or may not be suitable for backfill material; suitability is generally determined from grain size distribution and from the nature of the particular application involved. Glacial deposits as a rule are not suitable as economic sources for road and concrete aggregate because of the inordinate effort required to remove fines and other deleterious materials. Available information (Figure 19) indicates that other nonmetallic industrial minerals have not been encountered.

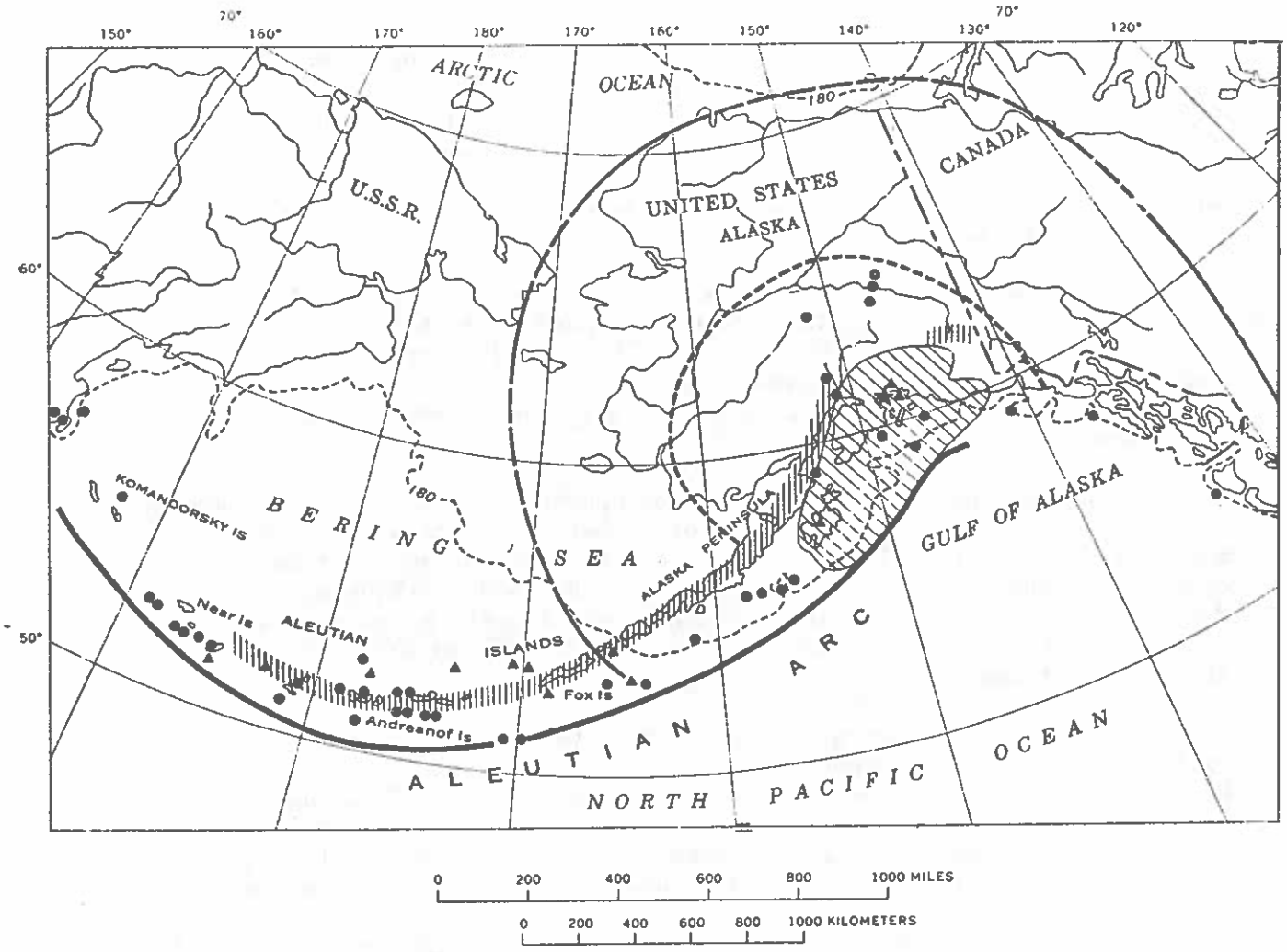
Geologic Hazards

Several types of geologic hazards exist in the Kenai Lowland. Most of the hazards are related directly to, or are exacerbated by, local earthquake activity. Such hazards include earthquake shocks, ground fissures, ground subsidence or uplift, earthquake-induced tidal waves, and ground failure. Other hazards, such as those associated with volcanic activity, are independent of local earthquake activity.

The Kenai Lowland is included in seismic risk zone 3, defined as areas susceptible to earthquakes of Richter magnitude 6.0 to 8.8 and where major structural damage could occur. The last major earthquake to affect the Kenai Lowland occurred on 27 March 1964 near Prince William Sound (Figure 20), and registered a Richter magnitude between 8.3 and 8.7. Since 1899, 82 earthquakes of Richter magnitude 6.0 or greater have occurred in the Cook Inlet area.[22]



MINERAL AND FUEL RESOURCES - FIGURE 19.



EXPLANATION

★ Epicenter of the 1964 earthquake

Approximate limit of human perceptibility
Dashed where inferred

Approximate limit of landslides, avalanches, and ground cracks

Approximate area of major tectonic deformation
Dashed where inferred

● Shallow depth (<70 km)
▲ Intermediate depth (70–200 km)
Large earthquake epicenters ($M > 7$) for period 1904–52
(From Gutenberg and Richter, 1954)

Aleutian Trench

Aleutian volcanic arc

180
Approximate outer edge of continental shelf
Depth in meters

Figure 20. Alaska and Adjacent Areas, with the Location of the 1964 Earthquake, the Area Affected by the Earthquake, Epicenters of Previous Major Earthquakes, Belts of Active Volcanism, and the Aleutian Trench (Plafker, 1969).

Earthquake shocks, or ground shaking, can produce heavy damage to man-made structures. Susceptibility of the ground to intense shaking is usually highest in areas underlain by saturated unconsolidated sediments and lowest in areas underlain by solid bedrock. Ground shaking can also destroy the competency of unconsolidated sediments, and thereby produce landslides, mudslides, avalanches, and ground fissures or cracks.

Foster and Karlstrom[30] reported extensive ground fissures from the 1964 earthquake in the Kenai Lowlands Study Area (Figure 21). They speculated that the fissuring could be located over a buried fault. Tysdal[31] cited extensive geophysical evidence to refute the buried fault hypothesis, but offered no independent explanation of the phenomena.

Earthquakes may accompany permanent movement of the ground surface, either horizontally, or vertically, or a combination of both. These movements may occur as relative displacement along a fault, or as a change in ground surface elevation. After the 1964 earthquake, it was found that ground surface elevations had been lowered by as much as 2 feet in the Kenai Lowland, and by as much as 6 feet in the Kenai-Chugach Mountains.

Horizontal displacements up to 70 feet were recorded in the vicinity of the earthquake epicenter at Prince William Sound. Horizontal surveys for the Kenai Lowland were not reliable enough to yield meaningful displacement data. Moreover, these displacements did not necessarily take place along known or suspected faults, although they were related to the fault distribution pattern in a complex way.[32]

Tsunamis or seismic sea waves are produced by displacement of large volumes of sea water either by uplift of the sea floor or by landslides. Tsunamis produced by the 1964 earthquake caused extensive damage along the coast of the Kenai Peninsula, and a wave of 30 feet was reported to have run up on the shore of Kenai Lake.[32]

Hydrology

Surface Hydrology

The Study Area is the watershed of the Kenai River, which includes about 2,148 square miles (Figure 2). The federal government controls about 91% of this area including about 1,159 square miles in the Kenai National Moose Range and about 795 square miles in the Chugach National Forest (Figure 2). Within the Study Area about 194 square miles of the lower Kenai River watershed are in private ownership (Figure 2).

The Kenai River begins at the outlet of Kenai Lake, near Cooper Landing and flows about 18 miles to Skilak Lake at an average gradient

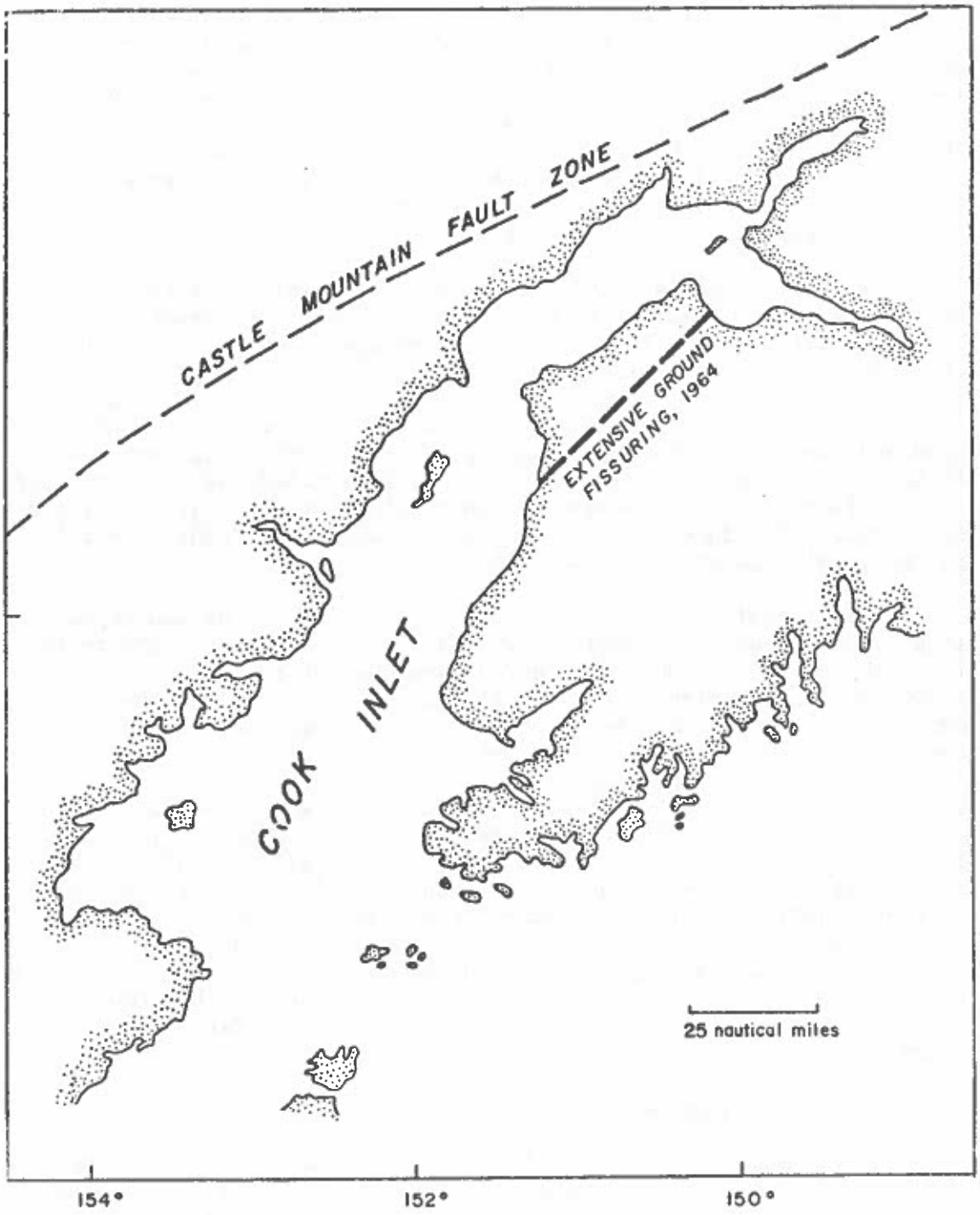


Figure 21. Location of 1964 Earthquake Ground Fissures (Magoon and others, 1976).

of 24.2 feet per mile. The Kenai River flows about 50 miles from the outlet of Skilak Lake to its mouth at Cook Inlet at an average gradient of 4.1 feet per mile (Figure 2). Ten tributaries enter the Kenai River: Beaver Creek at River Mile 10.5, Slikok Creek at River Mile 19, Soldutna Creek at River Mile 22, Funny River at River Mile 30.5, Moose River at River Mile 36.5, Killey River at River Mile 44, Skilak River at Skilak Lake (near River Mile 64), Russian River at River Mile 73.5, Cooper Creek at about River Mile 79, and Juneau Creek at River Mile 79.5 (Figure 2).

The Kenai River is subject to tidal action inland as far as River Mile 12.[27] Salinity in the lower reaches of the River is as high as 25% (September 1972[19]). The encroachment of saltwater into the river on 2 May 1969 is given in Figure 22.

The tides in Cook Inlet are mixed and they comprise two unequal high and two unequal low tides during a 24-hour 50-minute tidal-day.[19] At Kenai the mean tidal range is about 17.7 feet and the extreme range is 32.0 feet.[18] Tidal currents in Cook Inlet are as great as 5 knots near Kenai. No long-term records are available on current velocities in the tidal segment of the Kenai River.

Streamflow in the watershed of the Study Area is of two types: 1) glacial streams (the Kenai River and its tributaries originate in the Kenai or Chugach Mountains and derive much of their flow from snowfields and glaciers and 2) nonglacial streams (streams that derive their flow from precipitation). Flow in glacial streams is high, and it reflects the greater precipitation in the mountains. At Cooper Landing (Figure 23) the average flow of the Kenai River is equivalent to 58.4 inches of precipitation in the watershed. In contrast, the flow near the mouth of Beaver Creek, a nonglacial stream located entirely in the Kenai Lowlands, is equivalent to 5.89 inches of precipitation annually on the watershed.[27] Glacial streams typically display a period of high flow during the summer months and a period of low flow during the winter months. Nonglacial streams generally exhibit high flows during late autumn and during the spring (Figure 23). Low flows occur in midwinter and baseflow is maintained by groundwater recharge in the Kenai Lowlands and by discharge from large lakes in the mountains.

Stream Dynamics (General)

The force of gravity moves water in a stream, and causes bank erosion, transportation of sediment, channel meandering, and deepening. Water at high elevation, such as the water at the outlet to Kenai Lake, has a high potential energy. As the water flows, the potential energy is converted to kinetic energy. The energy of moving water in streams is converted to heat by friction and also erodes channels and transports stream sediments.

Most of the Kenai River and its tributaries are streams with

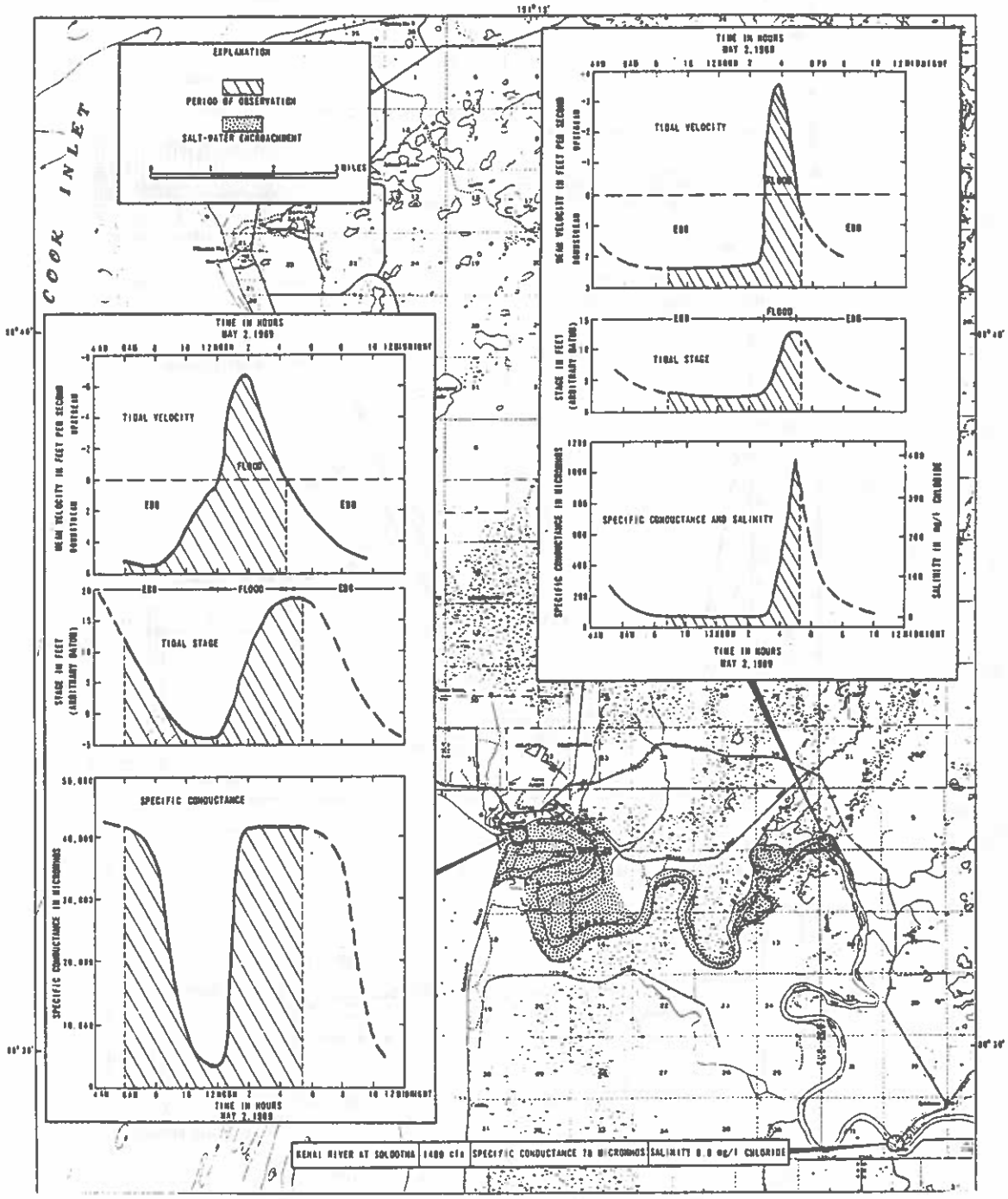
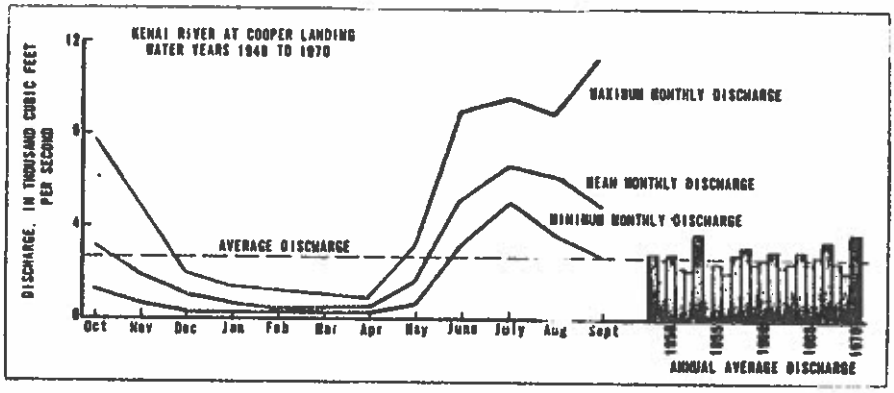
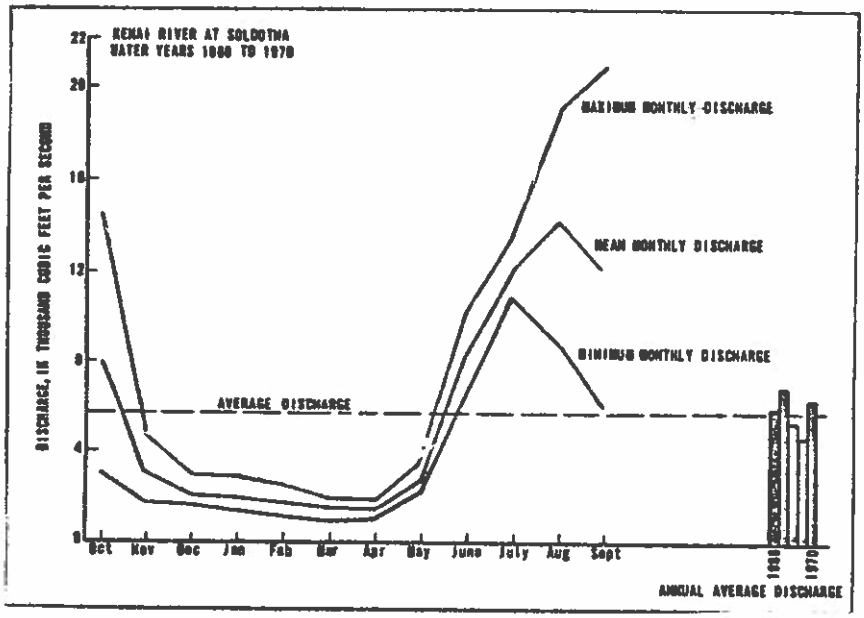


Figure 22. The Encroachment of Saltwater into the Kenai River at Kenai and River Mile 12, 2 May 1969 (Anderson and Jones, 1972).





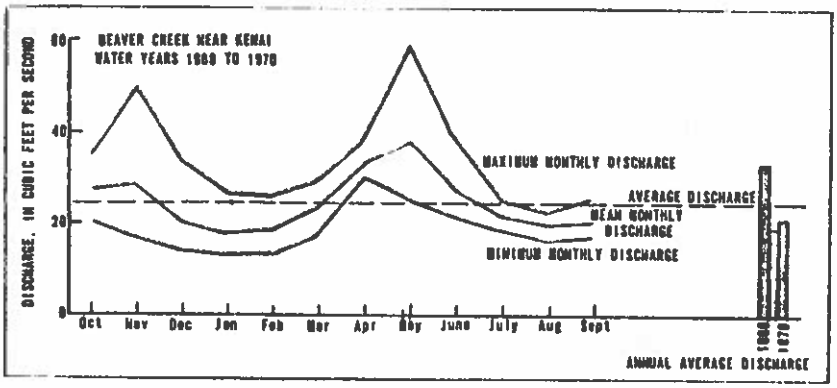


Figure 23. Hydrographs of Maximum, Minimum, and Mean Discharge of the Kenai River at Cooper Landing, the Kenai River at Soldotna, and Beaver Creek Near Kenai During a Water Year (Anderson and Jones, 1972).

channels in unconsolidated sediment and most are in dynamic equilibrium. For any given condition of stream gradient velocity (and discharge) the channel cross-sectional area, the roughness of the channel wall, and the length of the channel are in equilibrium with streamflow characteristics. Thus, as velocity, gradient, or discharge changes, channel characteristics will change.

In general, as streamflow increases the sediment-carrying capacity also increases, not only in quantity but also in maximum size of transported particle of the stream. To accomodate the increased volume, the channel deepens. Decreases in friction and greater discharges occur as the channel smoothes and becomes circular. As streamflow decreases, a reverse in channel characteristics and sediment load occurs. Sediment load decreases and channel cross-sectional shape changes by becoming shallower and less circular.

Bank erosion is a common phenomenon and is apparent in all meandering streams. A bend in a stream diverts the down-gradient, straight flow of water. Greater velocities occur and much of the energy of streams is directed toward the outside of meanders. Undercutting of banks and steeper bank slopes consequently are more common in these areas than along associated straight sections or the inside of meanders, and reflect the greater erosive power. Conversely, the insides of meanders are low slope areas and can be areas of active deposition of stream sediment. Areas of active bank-erosion on the Kenai River are shown in Figure 24.

The above characteristics of stream dynamics are valid as long as the stream is underloaded with respect to its sediment-carrying capacity. Some of the kinetic energy of streams is used to transport sediment. If more sediment is added to a stream and there is no increase in streamflow, there will be less erosion, less meandering, and less stream-channel deposition of sediment. As the channel changes and as sediment is deposited, a new dynamic equilibrium is established.

Man most commonly interferes with stream dynamics by changing gradients (which can be accomplished with dams or other structures by placing obstructions in a stream path only on one side of the channel), by inducing an acceleration of streambank or watershed erosion and thereby increasing stream load, or by channelizing flow along sections of a stream. Of these man-made modifications, permanent structures, such as dams or groins, have immediately evident effect. The effects of accelerated erosion rates are less discernible; they may, however, be severe on aquatic biota of the stream and may be irreversible.

Variability of Streamflow

In addition to seasonal variation of streamflow, there also are long-term variations that reflect long-term changes in precipitation

patterns, as well as short-term flood flows and flooding ice dams.

The area of the Kenai River that would be inundated by the standard project flood is depicted in Figure 24.

The streams of the Study Area are subject to flooding as a result of the formation of ice jams. The glacial streams also may flood during the outburst of water from glacial lakes. Ice jams normally form during the spring thaw and can occur at almost any point along the stream, although they are most likely to form in areas where the stream channel is restricted, thereby preventing the free flow of ice. Ice dams inhibit discharge and cause the river to rise upstream from the dam. Water may overtop the banks and cause flooding in floodplain areas.

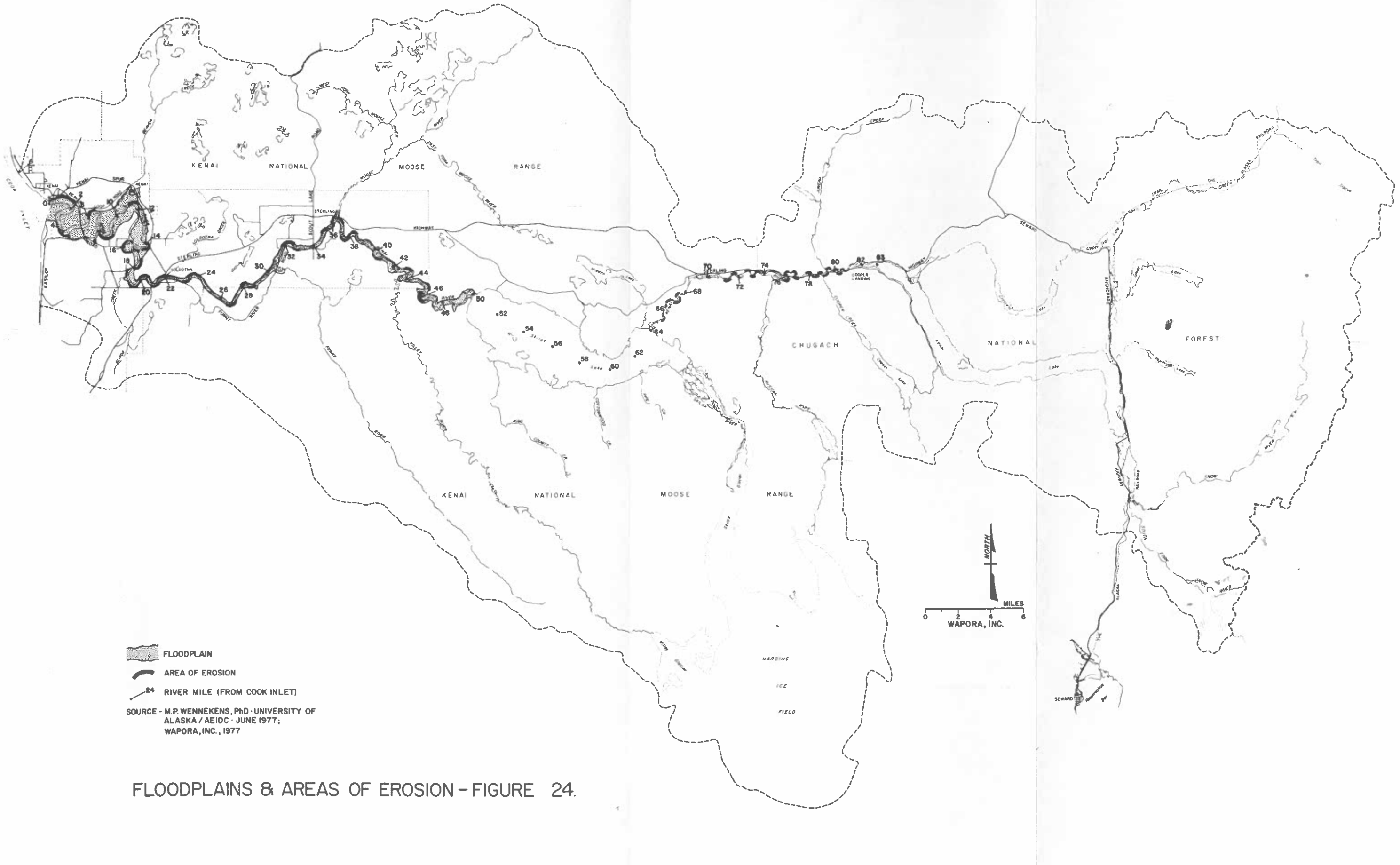
Of greater concern, however, is the flooding that might be caused by the sudden release of water from lakes that are glacially dammed. These sudden outbursts, termed "jökulhlaup," are significant hazards to property and human life, because unlike predictable magnitudes of flooding caused by storms or snowmelt, neither the magnitude nor the timing of glacial outbursts can be predicted.

Areas flooded by glacially dammed lake outbursts are subject to serious damage. Floodplains can be inundated to unusual depths, even though the period of flooding may be short. The rapid flow of water can cause severe erosion, rapid deposition as flood water recedes, and alterations in channels.

Glacial outbursts can occur at any time of the year. During periods of high streamflow caused by normal snowmelt, the additional flow might produce significant flooding. During the winter an outburst might dislodge ice to produce ice jams, which in turn cause upstream flooding. In January 1969, a glacial dam upstream from Skilak Lake burst, and, despite a release of water that was equivalent only to 0.8 feet at Skilak Lake, the water was sufficient to fracture the ice on the Kenai River near Soldotna. It produced an ice jam that covered the floodplain in the vicinity.[33]

Groundwater. Groundwater is the major source of potable water in the Study Area. The major aquifers in populated sections of the Study Area are some of the surficial sediments of Pleistocene and post-Pleistocene age. All these sediments contain water but some, particularly the tills and peaty clays, yield water so slowly that they cannot be considered aquifers.

Water occurs in aquifers under one or two general conditions. Where water fills the permeable strata only partly, the upper surface of the saturated zone (the water table) is free to rise and fall. The water in such aquifers is "unconfined," or under water table conditions. When a well is constructed in a water table aquifer, the



FLOODPLAINS & AREAS OF EROSION - FIGURE 24.

level of the water in the well is equal to that in the aquifer. When water completely fills an aquifer that is overlain by a confining bed (aquiclude), the elevation of the upper surface of the saturated zone in the aquifer remains fixed. Water in such aquifers is said to be "confined," or under "artesian conditions." When a well is constructed in an artesian aquifer, the level of the water in the well rises above the elevation of the top of the aquifer. In the Kenai Lowland area of the Study Area, potable water occurs under both artesian and water table conditions.

Water Table Aquifers. Water table aquifers that range in thickness from 5 to 100 feet occur in most parts of the Study Area and can yeild modest quantities of potable water.[27] Recharge to the water table aquifers was estimated to range from 4 to 15 inches of precipitation.

Following infiltration, flow in the water table aquifer is from areas of recharge, which typically are permeable topographic highs, to topographically lower areas of discharge. Discharge from the water table aquifer occurs from a number of seeps along the cliffs of Cook Inlet and the banks of the Kenai River, where underlying clay forces water to come to the surface, and as groundwater recharge of streams. Groundwater recharge constitutes the base flow of the streams in the Kenai Lowlands. Data are few, but Anderson and Jones[27] report that groundwater recharge to Beaver Creek was equivalent to 4 inches of precipitation during the 1969 and 1970 water years.

The water table in the Study Area shows marked seasonal fluctuations as well as long-term fluctuations that result from changes in precipitation. The water table usually is highest during the latter part of the summer and early autumn. This period corresponds with the rainy season in the Kenai Peninsula. After the ground freezes in autumn, recharge rates to the aquifer are reduced. The lowest water table levels, therefore, normally occur during the early spring. As the ground thaws, recharge to the water table aquifer resumes, and the water table again rises.

The elevation of the water table also responds to changes in precipitation. From the autumn of 1967 to the winter of 1970, the water table dropped 4 feet. During the same interval, the precipitation deficiency was 18 inches.[27]

Artesian Aquifers. During 1970, about 2.8 mgd (82%) of the 3.4 mgd pumped came from artesian aquifers 100 to 300 feet below the surface. The artesian aquifers underlie sediments composed of clay, silt, and till that act as semipervious beds and retard the free flow of water vertically. These leaky, confining beds, many of which were deposited by glaciers directly, range from 20 to 100 feet thick. The artesian aquifers are discontinuous beds of fine sand that are interbedded with coarse sand or gravel. Although they are discontinuous,

and some may be lens-shaped, the artesian aquifers are hydraulically connected and form an artesian system that extends over much of the Kenai Lowlands.

Water Supply. Water is abundant in the Study Corridor. The supply for two populated areas, Kenai and Soldotna, will illustrate water availability.

The city of Kenai is situated on outwash and coastal plain shoreline sediments. The principal aquifer is unconfined, ranging in thickness from 10 to 80 feet. Water pumpage in Kenai was estimated to be about 200,000 gpd during 1970, almost all from the water table aquifer; the estimated sustainable yield ranges from 2 to 7 mgd.[27] No noticeable effects on the water table aquifer have resulted from withdrawals, and none are anticipated in the future.

Water pumpage from the area of Soldotna is principally from the artesian aquifer, which consists of up to 60 feet of sand and gravel occurring from 75 to 220 feet below the surface. Well yields from the artesian aquifer range from 10 gpm to 516 gpm. Although there has been a decline of the potentiometric head of the artesian aquifer in the vicinity of the high-yield wells, the decline is normal and there is sufficient groundwater for future development.

Water Quality. Water in the Kenai Lowlands varies in quality from excellent to objectionably hard with quantities of iron or chlorides. The greatest difference locally occurs between water quality of the water table aquifer and that of the artesian aquifer (Table 7). Water table aquifers as a rule produce hard water (having carbonates and bicarbonates of calcium and magnesium) that may contain objectionable quantities of iron. Iron is commonly found in objectionable quantities in water table aquifers along the coast and near Sterling; iron content is most objectionable from the water table aquifer wells near the city of Kenai, where the aquifer is associated with poorly drained swampy areas.

The quality of water from artesian wells varies from superior to objectionable. Artesian aquifer water often fails to meet one or more U.S. Public Health Service standards for drinking water in the vicinity of the city of Kenai, as well as elsewhere along the coast of Cook Inlet (Table 7). Water from artesian aquifers near Cook Inlet may contain in excess of 250 mg/l chloride and may taste salty. The salty water probably was trapped in sediments when they were deposited and have not been completely flushed by freshwater.[27] Artesian water may contain objectionable quantities of iron near the inland recharge areas, but in the part of the Study Area between the recharge areas and the coastline, water from artesian aquifers is superior.

Table 7. Relationship of 112 Chemical Analyses by Geohydrologic Groupings to U.S. Public Health Service Water Quality Limits

Water quality groupings	Iron		Dissolved solids		Chloride		Color		Percent with no excessive concentrations
	Average mg/l	Percent greater 0.3mg/l	Average mg/l	Percent greater 500mg/l	Average mg/l	Percent greater 250mg/l	Average units	Percent greater 15 unit	
1. Water table acquifers (32 samples)	2.28	66	111	0	3.7	0	15	23	38
2. Artesian aquifers generally suitable (50 samples)	0.52	52	203	0	18	0	15	26	38
3. Artesian aquifers generally inferior quality (30 samples)	0.54	52	420	27	99	20	70	44	30

Source: U.S. Public Health Service, 1962

Soils

Introduction

Soil is composed of mineral matter, dead organic material, living organisms, gases, water, and dissolved substances. The soil types of an area are formed under the influence of local climate, geologic parent materials, groundwater, vegetation, and animal activities; they are modified by wind and water erosion as well as by the actions of man. Soil types, therefore, are indicators of other environmental conditions. They also form the uppermost layer of the ground and, thus, are important determinants of land use capabilities.

Soil surveys provide a variety of information that can be used to identify areas in which special engineering design is required for property construction and to identify areas that may be susceptible to environmental impacts if development were to occur. For this study, the soil survey provides information on wetlands slopes and prime agricultural land.

The discussions that follow are based on the soil survey of the Kenai-Kasilof area.[26] Only soils found in the Study Corridor are considered, as no detailed soil surveys of the rest of the Study Area are known.

Wetlands

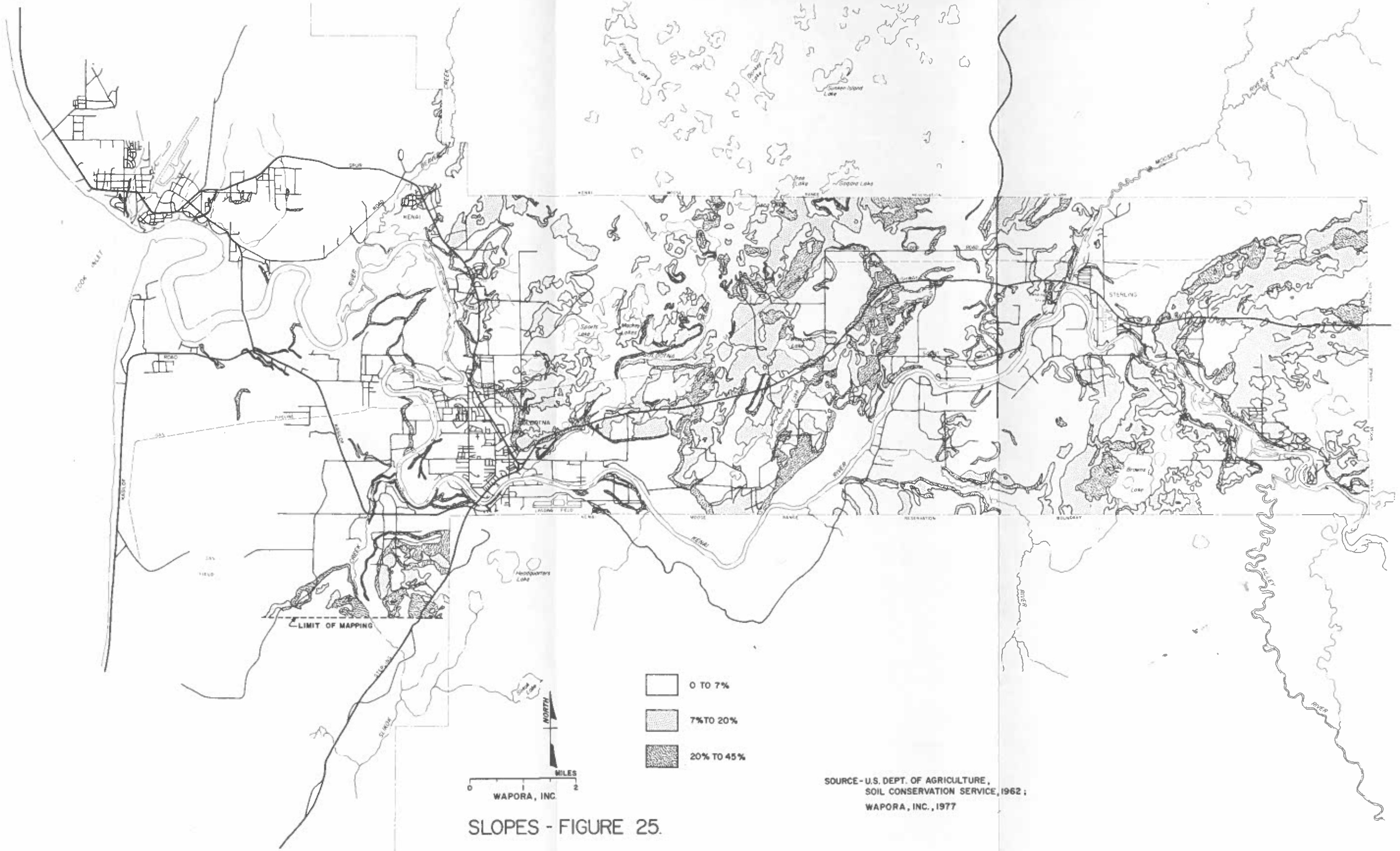
Twenty-eight soil series have been recognized and mapped in the Study Corridor.[26] Twelve have constant water to depths of 1 foot or less. Soil series in this category include Clam Gulch silt loams, Clunie peat, Doroshin peat, Foreland silt loam, gravelly beach, Kalifonsky silt loam, Moose River silt loam, Moose River silt loam shallow, Salamatof peat, Salamatof peat forested, tidal flats, and tidal marsh. Field investigations conducted by WAPORA, Inc., in 1977 indicated wetland vegetation associated with these soil series. These twelve soils and associated vegetation are the basis for areas considered as wetlands as shown on the subarea maps.

Slopes

Soil types of a soil series commonly are differentiated by occurrence on various slope categories. Categories recognized in this survey are:

A - 0-3%
B - 3-7%
C - 7-12%
D - 12-20%
E - 20-30%
F - 30-45%

Figure 25 identifies ranges of slopes in the Study Corridor. The unshaded part is the area that is nearly flat. Also shown are an area



SOURCE - U.S. DEPT. OF AGRICULTURE, SOIL CONSERVATION SERVICE, 1962; WAPORA, INC., 1977

SLOPES - FIGURE 25.

with moderate slopes (7-20%) and one with steep slopes (20-45%).

Because soils of the area consist of unconsolidated material, natural erosion occurs to varying degrees depending on slope. Slope analysis may establish the degree of restriction on development or the types of conditions that development must meet to ensure that erosion is maintained at natural levels.

A properly designed construction project on nearly flat areas does not usually accelerate erosion. Construction in slope areas disturbs vegetation and thereby accelerates erosion. The products of erosion may have significant adverse impacts downstream of the disturbed area. Construction activities should not be permitted in areas of steep slopes.

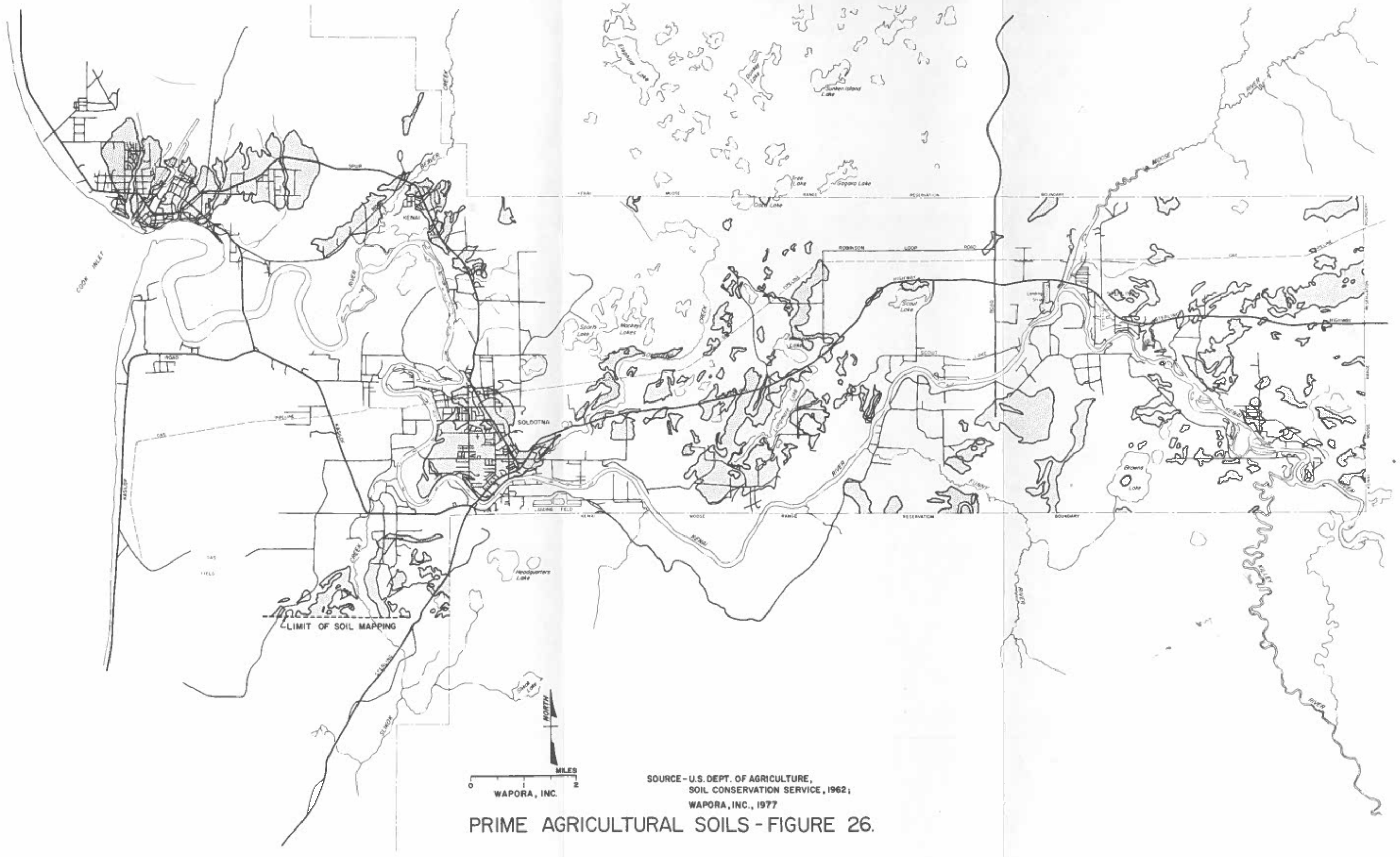
Prime Agricultural Land

Prime agricultural soils include those mapped as Soil Capability Classes I and II by the Soil Conservation Service. Soils included in these classes are suitable for most field crops, and few (Class I) or moderate (Class II) limitations reduce the choice of crops because of soil limitations. No Class I soils were mapped in the Study Corridor, but Class II soils do occur, including the following types:

Boulder Point very fine sandy loam, gently sloping
Cohoe silt loam, nearly level
Cohoe silt loam, gently sloping
Island silt loam, nearly level
Island silt loam, gently sloping
Naptowne silt loam, nearly level
Naptowne silt loam, gently sloping
Soldatna silt loam, nearly level
Soldatna silt loam, gently sloping
Tustumena silt loam, nearly level
Tustumena silt loam, gently sloping

Figure 26 shows the distribution of prime agricultural land in the Study Corridor. The total area mapped as prime farmland, however, exceeds greatly the area of prime farmland that has been or currently is being farmed. Some of the prime farmland has been usurped for other uses, primarily development. Other areas have not been cleared for agriculture. No measurements of the area of prime farmland or that part of it usurped for development have been made. Development has occurred on nearly flat to gentle sloping, well-drained soils.

In a letter to heads of federal agencies (30 August 1976) Russell W. Peterson (Chairman of the Council on Environmental Quality) proposed that areas of prime agricultural soils be included under Paragraph 101(b)(4) of NEPA, which establishes the policy of the federal government to preserve important natural resources. The



SOURCE - U.S. DEPT. OF AGRICULTURE, SOIL CONSERVATION SERVICE, 1962; WAPORA, INC., 1977

PRIME AGRICULTURAL SOILS - FIGURE 26.

letter recommends that the existence of prime farmland be analyzed in federal environmental impact statements under Section 102(2)(c) of NEPA (National Environmental Policy Act). Construction activities, changes in land use patterns to continued use, and viability of prime agricultural lands are to be reviewed if major federal actions are involved. Development on land identified as a prime agricultural area in the Study Corridor constitutes usurpation of that land area. Moreover, development pressure, by itself, could induce changes in land-use patterns.

SUMMARY

Geology and climate directly influence the Study Area. Unconsolidated sediments of recent and Pleistocene age are up to several hundred feet thick in the Kenai Lowlands and in the valleys of mountain streams. The bedrock underlying the Kenai Lowlands and Kenai Mountains are of Jurassic and Cretaceous age.

Unconsolidated material is readily susceptible to erosion; material that is ultimately eroded increases the sediment load of the Kenai River. Erosion occurs primarily along high-energy banks of the River. Development activities along the River have accelerated rates of natural erosion and little has been done to reduce erosion during development activity.

Major geologic hazards to development include earthquakes, flooding, and high water tables. If there is major concern for the danger of flooding, which may result from several combinations of factors including spring snow melt, ice jams, and glacial lake release, then development in areas identified as wetlands or floodplains should be precluded or limited.

The quality of the surface waters generally is excellent, although iron, chloride, and sediment levels may be high for certain uses. No data are available on bacteria levels.

The estuary has not been studied extensively. Known data on the salinity patterns are limited, but it is probable that salt water is mixed with the river water to about River Mile 12. Swift currents in the estuary and shifting bottom sediments pose navigational hazards.

The findings of the Physical Profile lead to the following conclusions with regard to Corps' permit authority:

- Physical 1: Activities that would increase erosion should not be permitted unless the applicant demonstrates that adequate measures will be taken to minimize its effects.
- Physical 2: Structures in the floodplain should be discouraged.
- Physical 3: No structures should be permitted that disturb high-energy (cut) banks.
- Physical 4: Activities that would remove vegetation, thereby increasing erosion, should not be permitted unless the applicant demonstrates that adequate revegetation measures will be taken.

- Physical 5: Floating structures should be considered more desirable than structures on piles and piled structures more desirable than structures on fill.

- Physical 6: Bank stabilization structures should be allowed only in areas where there is an identifiable erosion problem, and only to protect or maintain existing uses.

- Physical 7: Riprap material should be of sufficient size to ensure that it will not be carried into the stream by ordinary currents or those expected during flooding.

- Physical 8: Filling of wetlands should not be permitted, as these areas retard flooding, reduce river sediment load, and function as water reserves.

- Physical 9: Activities that restrict river flow, alter stream configuration, or alter stream water quality should not be permitted unless the applicant demonstrates that adequate measures will be taken to reduce these effects to environmentally compatible levels.

CHAPTER 4

BIOLOGICAL PROFILE

INTRODUCTION

The primary objective of this profile is to describe the biological characteristics of the Kenai River watershed. The profile will identify those organism groups, and their habitats, likely to be influenced by human activities, and will provide a basis for evaluating the ecological impact of those activities.

The Kenai River watershed lies in a transition zone between the Pacific rain forest biome and the Arctic-alpine biome.[34] Eight major terrestrial vegetation types have been noted for the Kenai River watershed:[35]

Coastal western hemlock-Sitka spruce forest
Upland spruce-lowland spruce-hardwoods
Lowland spruce-hardwoods
High brush
High brush (burned)
Muskeg
Moist tundra
Alpine tundra and barren

Details of climate, precipitation, and geology are presented in Chapter 3.

Aquatic habitats of the Kenai River watershed are primarily comprised of tidal and upland wetlands, cold, swift-flowing glacial and nonglacial streams, and the mainstem Kenai River with several large interconnecting lakes.

As discussed in Chapter 3, streamflow is derived from glacial melt and precipitation. The quality of surface water is generally good. Water in glacial streams contains low concentrations of dissolved solids but contains "glacial flour" (a colloidal suspension of very fine inorganic particles); it is, therefore, turbid through most of the year. Nonglacial streams, which derive flow primarily from groundwater runoff, have a lower sediment load than the glacial streams.[27]

Measured surface water temperature in the Kenai-Soldotna area has been reported[27] to range from near freezing to 17° C (62° F). The highest temperatures occur in the summer months. Wide diurnal fluctuations occur from May to July. Beaver Creek, a nonglacial stream under tidal influence, is ice covered from mid-October to mid-April or May and, therefore, temperatures are below 0.3° C (32.5° F) approximately 50% of the time.

Water temperature records for the Kenai River at Soldotna indicate a seasonal trend similar to that of Beaver Creek. Total ice cover does not, however, occur until mid-November or December, and ice breakup can occur as early as February.[27]

Flowing water, especially that typical of the Kenai watershed, with steep gradients and the consequent swift flow, is usually saturated with dissolved oxygen. Dissolved oxygen concentrations can, however, become a limiting factor in streams with high biochemical oxygen demand (BOD) and with extended periods of ice cover. No dissolved oxygen data are known for the Kenai River but, because there are conditions of low suspended solids concentrations and swift flow, biological activity in the Kenai River is most likely not oxygen limited at present. High oxygen demand materials (such as industrial wastes from canneries or food-processing plants, sewage effluents, and organic sediment) introduced into the river system could combine with long periods of ice cover when little reoxygenation could occur to create oxygen conditions limiting to biological activities.

AQUATIC BIOTA

The dominant biological characteristic of the Kenai River system (of interest to man) is its use by salmon as a spawning and nursery site. Information pertaining directly to the aquatic biota of the watershed is limited, therefore, primarily to those aspects relating to salmon. The following text summarizes the results of numerous surveys (mostly salmon escapement studies) conducted by the Alaska Department of Fish and Game (ADF&G), the U.S. Fish and Wildlife Service (FWS), and to a survey conducted by WAPORA, Inc., during June 1977. Published information relevant to describing the ecological requirements of the aquatic biota, and the impact of man-induced activities on that biota, is also included.

Macroinvertebrates

Macroinvertebrates are a major group of consumers in the aquatic ecosystem. Included are organisms that dwell in or on the lake or flowing water substratum. The group is composed primarily of immature or larval insects. It constitutes an important link in the aquatic food chain and provides a food forage base fo most fish and other aquatic vertebrates. This group feeds on detritus, other insects, bacteria, plankton, and larval fish, and in turn is consumed by larger organisms. Changes or disruptions in the aquatic environment, such as changed temperature regimes, increased turbidity, sedimentation of the stream bed, and lowered dissolved oxygen concentrations, can influence markedly the number and types of macroinvertebrates present. Such changes can alter utlimately the numbers and types of fish (including salmon) that the water body can sustain. Since macroinvertebrates are sampled easily, and are affected quickly by changes in water quality, they can serve as convenient early indicators of possible changes in water quality.

Alpine cold-water streams are occupied by a definite, although limited, very-cold-water macroinvertebrate fauna, which is adapted to specific conditions sharply defined by consistently low temperatures and (often) the unique characteristics of glacial meltwater.[36] The implication

is that even relatively minor alterations in these habitats may reduce both the macroinvertebrate fauna and the fish fauna (which depend on the macroinvertebrates as a food source). Widespread alterations in habitat conditions could eliminate potentially the macroinvertebrate and fish fauna of these alpine cold water streams because few, if any replacement species would be available to occupy the new habitat.

The results of a survey conducted by WAPORA, Inc., during early June 1977, are presented in Table 8. The cursory study was limited to the mainstem Kenai River and the lower reaches of major tributaries; it concentrated on mayflies and stoneflies because these groups are known to be important to immature salmon as a food source and because they are often sensitive to changes in stream conditions. Sampling procedure involved kicking the substrate upstream from a stationary small-mesh screen or net and hand-picking larger rocks and logs. Species identifications were based on adult, mature pupae, and occasionally on larvae of well studied genera. Approximately one-half hour was spent at each site. Several forms indicative of very cold environments were found to be widespread in the Study Area.

Fish

In the freshwater ecosystems, fish are upper-level consumers in the food chain. They are also the most conspicuous biological feature, attracting the most attention from man. Fish use all trophic levels as a food forage base. Some species feed primarily on phytoplankton and zooplankton; some feed on larger invertebrates such as insect larvae, scuds, fairy shrimp, and worms; others prey primarily on smaller fish. In any aquatic system, a balanced species diversity within a fish community is important, therefore, because the reduction or elimination of any species or species group could result in changes in other community components.

Twenty-one species of fish have been reported to occupy the Kenai River system. A list of these species (Table 9) has been compiled from studies conducted by the Alaska Department of Fish and Game,[37] and from a study conducted by WAPORA during June 1977. Twelve of these species (all those in Table 9 except the lamprey, sculpin, stickleback, herring, flounder, and sucker) are members of the family Salmonidae, the dominant family in the northern freshwaters of North America, Europe, and Asia.[38] Salmons, trouts, chars, whitefishes, and grayling constitute the salmonid family.

As stated earlier, the most obvious (from a human perspective) and important biological characteristic of the Kenai River system is its use as a habitat for reproduction by anadromous fish.

An anadromous species is defined as one that migrates upstream from salt water to freshwater to spawn. Five species of Pacific salmon, Dolly Varden char, and eulachon smelt are anadromous and use the Kenai River. The most dramatic and economically important species

Table 8. Macroinvertebrates Collected in June 1977 by WAPORA, Inc., by Site.*

Taxa Phylum/Class/Order/Family/Genus species	Sites *
P-Annelida	
C-Hirundinella (leeches)	
Haemopsis marmorata (tentative)	9
Placobdella parasitica (tentative)	9
P-Arthropoda	
C-Crustacea	
O-Amphipoda (scuds)	
F-Gammaridae	
Gammarus lacustris	9
G. (Anisogammarus) confevicolus	1
C-Insecta	
O-Coleoptera (beetles)	
F-Gyrinidae	
Gyrinus picipes	5
G. minutus	4
G. pleuralis (tentative)	4
F-Hydraenidae	
Octhebius disrectus	1
F-Dytiscidae	
Agabus anthracinus	2, 5
A. verus	4
Illybius augustior	2, 4, 5
Hydroporus tartaricus	5, 15
H. occidentalis	15
H. griseostriatus (tentative)	2
H. tademus	15
Hygrotus sp.	4
Rhantus wallisi (tentative)	2,4
R. suturellus	15
F-Hydrophilidae	
Helophorus auricollis	15
H. fenniculus	15
H. splendenoides (tentative)	2
Hydrobius fusipes	4

See end of table for footnotes.

O-Diptera (flies)	
F-Chironomidae (at least 4 species)	1, 5, 7, 11, 13, 16
F-Dolichopodidae (undet. genus, larvae in coastal marsh)	1
F-Empididae	11
Wiedomannia sp. (tentative)	16
Undetermined genus	16
F-Tipulidae	
Tipula sp.	4
F-Simuliidae (diversity not considered)	2, 13, 16
F-Tabanidae	
Tabanus sp. (coastal marsh only)	1
O-Ephemeroptera	
F-Ephemerellidae	
Ephemerella (*Drunella*) *doddsi*	6, 13, 16
E. inermis	2, 5, 6, 7, 10, 13-15
F-Baetidae	
Baetis sp. (two tails)	11, 13, 15, 16
Baetis sp. (three tails)	2, 4-6, 10-14
Baetis sp.	3
F-Heptageniidae	
Epeorus (*Ironopsis*)sp.	16
Cinygma sp.	11
Cinygmula sp.	10, 12, 13, 16
F-Siphlonuridae	5, 16
Ameletus validus	16
O-Hemiptera (true bugs)	
F-Corixidae	15
F-Saldidae	
Soldula sp.	1
O-Odonata (dragonflies and damselflies)	
F-Aeshnidae	
Aeshna juncea	4, 5

O-Plecoptera (stoneflies)	
F-Pteronarcidae	
Pteronarcella badia	7, 11-13
F-Perlidae	
Alloperla sp.	5, 6, 10-12, 14, 15
F-Perlodidae	
Isoperla sp.	2, 4-7, 10-14, 16
F-Nemouridae	
Nemoura (*Zapoda*) sp.	5, 16
F-Leuctridae	
Leuctra occidentalis (tentative)	16
F-Capniidae	
Eucapnopsis brevidens	13, 16
O-Trichoptera (caddisflies)	
F-Rhyacophilidae	
Rhyacophila sp. 1	2
Rhyacophila sp. 2	15, 16
Rhyacophila sp. 3	13, 16
F-Glossosomatidae	
Glossosoma alascense	5
G. intermedium	5, 13
Glossosoma sp.	5, 12, 16
F-Philopotamidae	
Wormaldia sp.	16
F-Hydropsychidae	
Arctopsyche ladogensis	13
Hydropsyche sp. (H. bifida group)	12
F-Hydroptilidae	
Oxyethira sp.	9

F-Limnephilidae	2, 3, 8, 9, 16
Ecclisomyia conspersa	2, 12-14
Nemotaulius hostilis	1
Hesperophylax designatus	5
Onocosmoecus unicolor	2-7, 9-16
Limnephilus sp.	
Unidentified genera	2
White medianstripe, gills all single	6
F-Leptoceridae	
Ceraclea excisa	9
F-Lepidostomatidae	
Lepidostoma roafi	12
F-Brachycentridae	
Brachycentrus americanus	2, 4, 5, 7, 8, 10, 12-15
P-Mollusca	
C-Gastropoda (snails)	
Stagnicola sp. (heavy bodied)	9
Stagnicola sp. (slender bodied)	9, 10
Gyraulus sp.	2, 3, 5, 9, 10
C-Pelycupoda (clams)	
F-Unionidae	
Anodonta imbecilis	10
F-Sphaeriidae	
Sphaerium sp.	2

* Site key

1 - Kenai River marshes near mouth
2 - Beaver Creek at Sterling Highway
3 - Kenai River between Moose River and Soldotna Creek
4 - Slikok Creek at Kasilof Road
5 - Soldotna Creek at Sterling Highway
6 - Kenai River at Soldotna Campground
7 - Funny River approximately
8 - Kenai River between Beaver Creek and Soldotna Creek
9 - Moose River approximately
10 - Kenai River at Naptown rapids
11 - Killey River at mouth
12 - Hidden Creek at road to Skilak Lake Campground
13 - Russian River
14 - Kenai River below mouth of Russian River
15 - Juneau Creek at mouth
16 - Cooper Creek approximately one-quarter mile above mouth

Table 9. Fish Species Reported to Occur in the Kenai River System, by Site.*

Species Common Name(s) (scientific name)	Site* Mainstem Kenai	Site* Perennial Tributaries (selected)
arctic lamprey (Lampetra japonica)**	none	6-8
king (chinook) salmon (Oncorhynchus tshawytscha)	1-5	6-11, 15-20
sockeye (red) salmon (Oncorhynchus nerka)	1-5	10-11, 13-15, 17-21
silver (coho) salmon (Oncorhynchus kisutch)	1-5	all except 12
chum salmon (Oncorhynchus keta)	1,2	none
pink (humpback) salmon (Oncorhynchus gorbuscha)	1-5	6, 7, 9, 10, 15
rainbow trout (Salmo gairdneri)	2-15	all except 12
Dolly Varden (Salvelinus malma)	1-5	all except 12
Northern Pike (Esox Lucius)***	none	8
lake trout (Salvelinus namaycush)***	2-5	19
eulachon (Thaleichthys pacificus)***	1,2	none
longfin smelt (Spirinchus thaleichthys)***	1,2	none
sculpin (Cottus sp.)**	2-5	all
slimy sculpin (Cottus cognatus)**	2-4	7-10, 13, 15, 16
coastrange sculpin (Cottus aleuticus)**	2,4	9,13

See end of table for footnotes

Species common name(s) (specific name)	*Occurrence mainstem Kenai	perennial tributaries (selected)
staghorn sculpin (Leptocottus armatus)**	1	none
round whitefish (Prosopium cylindraceum)	2-5	none
threespine stickleback (Gasterosteu aculeatus)	1-5	all
ninespine stickleback (Pungitius pungitius)**	none	6-8
Pacific herring (Clupea harengus pallasi)***	1 only	none
starry flounder (Platichthys stellatus)***	1 only	none
longnose sucker (Catostomus catostomus)***	none	14
Arctic grayling (Thymallus arcticus)***	3-5 (including Kenai Lake to Snow River)	21

*Site
1 - intertidal
2 - Lower Kenai (intertidal to Skilak Lake)
3 - Skilak Lake
4 - Upper Kenai (Skilak Lake to Kenai Lake)
5 - Kenai Lake
6 - Beaver Creek
7 - Slikok Creek
8 - Soldotna Creek
9 - Funny River
10- Moose River
11- Killey River
12- King County Creek
13- Hidden Creek
14- Jean Creek
15- Russian River
16- Cooper Creek
17- Juneau Creek
18- Quartz Creek
19- Trail Creek
20- Ptarmigan Creek
21- Snow River

** - species collected only by WAPORA, Inc., during 1977.
***- species reported by Alaska Department of Fish and Game only.

Note: Sites (above) 1-4,6-11, 11, 15-17 were sampled by WAPORA, Inc., during June, 1977.

Unless otherwise noted, species have been reported by the Alaska Department of Fish and Game and by WAPORA. (Developed from personal communication, B. Barret, 1977, and WAPORA field studies.)

are king (chinook), sockeye (red), silver (coho), and pink salmon. Chum salmon occur in estuarine waters of the Kenai, but their use of the river is minimal. Table 9 shows known occurrence of the species in the Kenai system.

The annual commercial harvest of thousands of pounds of salmon and the tremendous attraction of sport fishing has made salmon a dominant factor in the area economy (Chapter 6). With appropriate resource management and protection of the critical reproductive habitats, salmon should continue to provide a valuable resource.

The general life history of five species of Pacific Salmon in Alaska have been summarized by Merrell[41] and are shown in Table 10. It should be noted that exceptions to these general features occur frequently.

The relationship between salmon and the Kenai system is important in that the fish use the area only to carry on reproductive and early lifestage functions. Adult fish migrate from the sea to spawn and then die. Young salmon inhabit the area for a short time, migrate to the sea where they grow rapidly into adults, and return to the river. In terms of energetics, the salmon require little from the system but contribute much to it. Assuming that the sea will continue to support the salmon, the river need only be preserved in a usable state to continue to provide a valuable and readily exploitable resource.

Scientific investigations of salmon use of the river began in 1925 and have continued to the present.[39] The surveys have been directed primarily towards determining spawning time and areas and the relative magnitude of escapement.[40]

In the Kenai River system, silver salmon migrate in two runs. The first run begins in late July and continues until mid-August. The second (or late run) occurs from mid-August to December, but late run activity has been observed in the Cooper Landing area in early April. Early run silver salmon average 7.9 pounds while late run fish, which have remained in salt water for a longer period, average 10.2 pounds.[40]

The preferred spawning substrate of silver salmon is composed of medium size gravel. The female prepares the nest (redd) and will spawn with one male. Several males may be in attendance but only the dominant male will spawn with the female. Smaller males may, however, deposit sperm at this same time.[37] It is estimated that early run spawners will deposit approximately 3,700 eggs, late run approximately 4,100.[40] Eggs are covered with upstream gravel. Females guard the nest as long as possible but die soon after spawning. Hatching usually occurs in 35-50 days, depending on water temperature. The alevins (yolk sac fry) remain in the gravel for 2-3 weeks and then emerge as free-swimming (swim-up), actively feeding fry. Some fry migrate immediately to the sea. Most immediately take up residence in the shallow gravel areas near the streambank, feed voraciously, and grow quickly. Most remain in freshwater for at least 1 year (often 2 years) before seaward movement. Premigration juveniles are referred to

Table 10. Pacific Salmon in Alaska-Life Features

Species of salmon		Time spent in fresh water after emergence from gravel	Time spent at sea	Age at spawning	Average weight of adults[1]	Average eggs per female
			Years	Years	Pounds	Thousands
Chum	–	Less than 1 month	2-4	3-5	8	3.0
Pink	–	Usually less than 1 month	1	2	4	2.0
Silver (Coho)	–	12-36 months	1	3-4	9	3.5
Red (Sockeye)	–	12-36 months	1-4	3-6	6	3.5
King	–	3-12 months	1-6	3-7	20	8.0

[1]Weight of whole or round fish. Source: Int. N. Pac. Fish. Comm., Bull. 12, p. 48.

as "parr" while migrating juveniles are known as "smolts." Silvers spend at least 1 year in the ocean.

Young silver salmon in Alaska feed mainly on insects including dipterous larvae and trichopteran, and coleopteran juveniles. Other species of salmon fry, including sockeye, are also important food sources.

Sockeye (red) salmon also migrate up the Kenai in two runs. The first run begins in mid to late May and continues through late June. The second run begins in late June and continues through mid-August. Early run fish of the 6-year class will average 5.6 pounds, while 5-year class fish (late run) will average 5.0 pounds. The difference in weight is the result of the additional years spent as sea by early run fish.[40]

Sockeye prefer a spawning substrate consisting of fine gravel. Eggs are deposited in pockets overlying larger gravel. Early run fish are estimated to average 3,700 eggs per spawning female, while late run spawners average 3,500 eggs.[40] (Note: These estimates are for Russian River fish and may not represent other Kenai River sockeye).

Newly emerging fry migrate to lakes to rear. Most juveniles produced in the Russian River migrate to Upper Russian Lake and remain in the lake for 2 years. Fry produced in other tributaries to the Kenai, upstream of Skilak Lake, will migrate to Skilak Lake and remain there for 1 year before moving seaward. Other lakes (e.g. Jean Lake) also serve as nursery areas.[42]

Odd-year pink salmon enter the Kenai River in early to mid July. Even-year pinks enter in late July. Pink salmon in the Kenai average 4.2 pounds. This weight is based on one sampling and does not reflect year to year fluctuations.[40]

Pink salmon prefer spawning substrates composed of medium size gravel. The redd, usually a trough that may measure 3 feet long and 18 inches deep, is built in 1-2 feet of water. Small particles are removed until a firm gravel bed is reached. Several males may spawn with one female, and a single female may construct more than one redd.[37] It is estimated that females deposit an average of 2,000 eggs.[40]

Newly emerged fry move downstream to the estuary where they remain for up to 6 months before moving to the open sea.[43] Following a 15-month residence at sea, pink salmon return to the Kenai. Both odd- and even-year runs of pink salmon occur. Currently, the even-year run has far greater magnitude than the odd-year run.

King (chinook) salmon enter the river in two distinct runs. The first run peaks in mid-June and ends by the first of July. The second run begins in early July, peaks in late July, and ends by mid-August. Early run salmon average 30 pounds, while late run fish average 37 pounds. The difference in weight is added during the additional time in salt water.[40]

King salmon prefer to spawn in deeper water on larger gravel beds, and in much larger redds, than the three preceeding species. Spawning behavior is similar to that of silver salmon.

Early run fish usually spawn above Skilak Lake. It is estimated that females deposit an average of 7,600 eggs. Late run fish usually spawn below Skilak Lake and females deposit an average of 8,100 eggs.[40] Young will spend 1 year in the Kenai before moving to sea. Seaward migration as a rule occurs in late June before the seaward migration of sockeye. Kings return after 2 to 6 years at sea.[44]

Sea run Dolly Varden char spend most of their time in freshwater. Year Class III or IV fish will migrate to the sea in late May. The fish return to the Kenai to spawn after 30 to 45 days in the ocean.

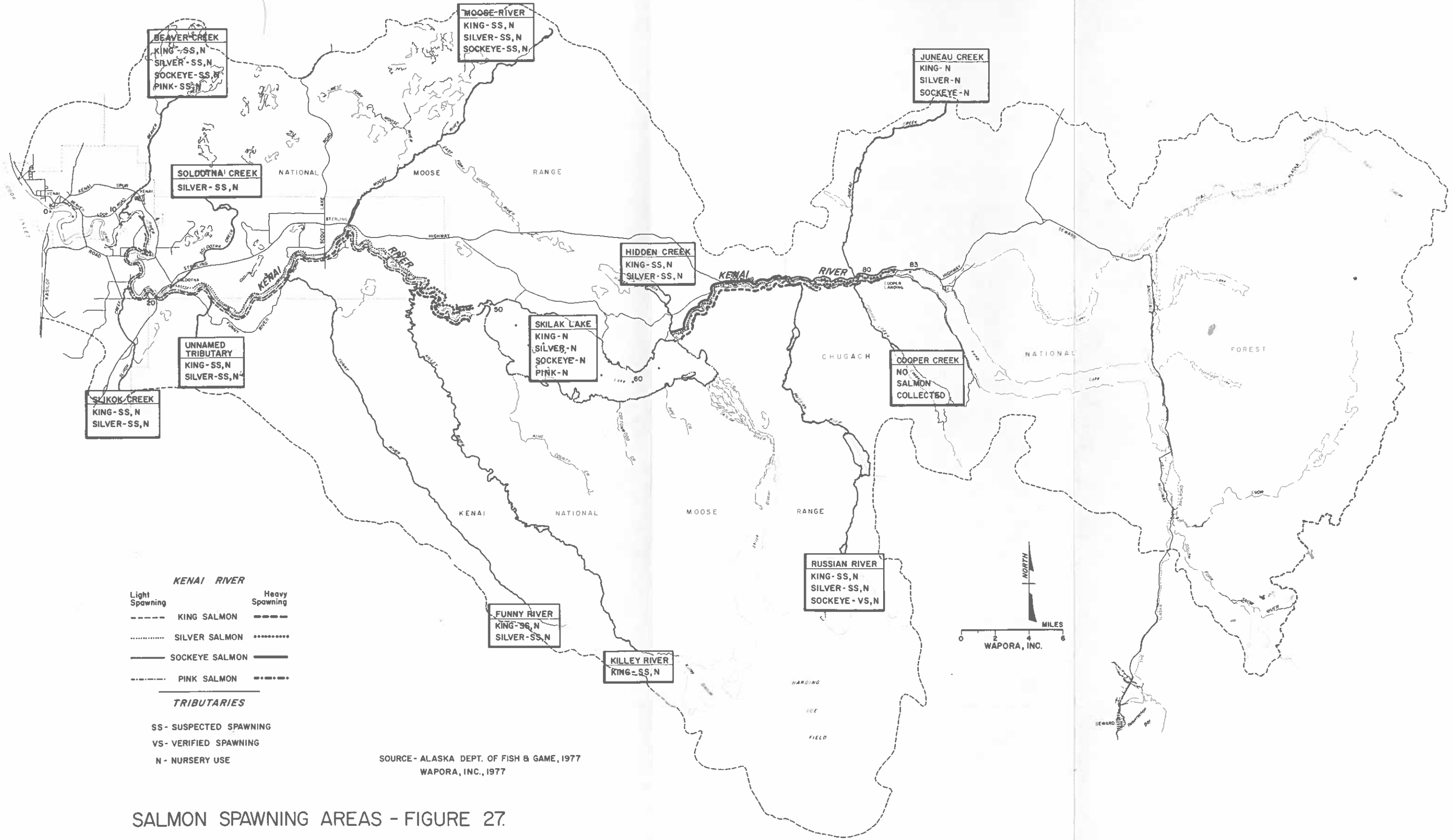
Nearly all of the mainstem Kenai River and tributaries are known or suspected spawning sites for salmon. Figure 27 shows tributary and mainstem spawning sites. A survey conducted by WAPORA during early spring, 1977, resulted in the designation of the tributaries shown as suspected spawning sites. Tributary streams were designated "suspected spawning" sites if large numbers of young-of-year salmon were observed in areas upstream of high-velocity currents (i.e., upstream of where the stream passes through a culvert or series of rapids) that contained suitable spawning substrates and that were a significant distance from the Kenai mainstem. Distance and current were considered to be barriers to upstream migration by young-of-year juveniles.

Not all tributaries were sampled, but, taking into account the characteristics common to all tributaries in the area and the high percentage of tributaries meeting the criteria of "suspected spawning sites," all tributaries should be considered important spawning areas until further studies can confirm or reject that hypothesis. The Russian River is a confirmed and well-documented spawning site for sockeye salmon.

Known or suspected salmon spawning areas in the mainstem Kenai River have been identified by the Alaska Department of Fish and Game. Figure 27 shows that light silver salmon spawning areas exist from immediately upstream of the Soldotna Bridge to an area approximately 7 miles upstream of Sterling. From there, heavy spawning sites exist to the outlet of Skilak Lake. Light spawning sites then exist from the inlet of Skilak Lake to a point approximately 2.5 miles upstream of the confluence of the Russian and Kenai Rivers.

Areas of light pink salmon spawning exist from approximately 11 miles upstream from the mouth of the Kenai River (the limit of tidal influence) to a point approximately 2 miles downstream of Sterling. Areas of heavy spawning exist from there to the confluence of the Moose River-Kenai River. Areas of light and heavy spawning exist from that point to the outlet of Skilak Lake. Pink salmon are known to spawn in the Russian River above Skilak Lake.

Areas of light king salmon spawning exist from 13 miles upstream of the river mouth to 5 miles downstream of the outlet of Skilak Lake.



SALMON SPAWNING AREAS - FIGURE 27.

From that point to the outlet of Skilak Lake and from the inlet of Skilak Lake to the Russian River areas of heavy spawning occur. Light spawning resumes at the Russian River and continues to the outlet of Kenai Lake.

There is an area of light sockeye spawning at the outlet of Skilak Lake. Areas of heavy sockeye spawning occur from the inlet to the lake to the Russian River. Heavy spawning has also been documented in the Russian River. Areas of light spawning occur upstream of the Russian River to the Kenai Lake.

Figures 28 and 29 detail the areas of Upper Russian Lake where there is known sockeye spawning activity.

Interest in factors that determine the size and frequency of salmon spawning migrations has prompted much research on the growth, reproduction, and behavior of this commercially and recreationally important fish. Factors that determine spawning and hatch success have been studied by Royce,[46] Foerster,[47] Wickett,[48,49] White,[50] Hunter,[51] Cooper,[52] McNeil,[53] and Chambers et al.,[54] among others.

Royce[46] summarized the factors that determine the level of egg survival from deposition to migrating fingerling:

Access to Spawning Sites: Most basic to hatch success is the ability of migrating salmon to reach the spawning sites. Any delay by low water, dams, or other obstructions may result in lowered efficiency of spawning and, quite commonly, retention of eggs by females. Obviously, the number of eggs deposited is basic to determining the number of adults that will result.

Freedom from Disturbance: Once the redds are established and eggs are deposited, disturbances may increase egg mortality. Flooding with consequent washouts and disturbances caused by later spawners using the same area are two natural disturbances.

Predation by Other Animals: Invertebrate organisms (oligochaete worms, insect larvae, etc.) that invade the redds will cause egg mortality. Other fish (often juvenile salmon) commonly prey on eggs dislodged from the redds by flow or other disturbances.

Diseases. Infection by aquatic fungi (Saprolegnia sp.) will cause egg mortality.

Fertilization. Eggs not fertilized by males during deposition will not develop. This factor is minor, because populations tend to have a balanced sex ratio.

Water Quality and Quantity: If the water contains deleterious chemicals and is not adequately oxygenated, is of unsuitable temperature, and does not flow properly around the eggs and larvae, significant mortality in the redd will result.

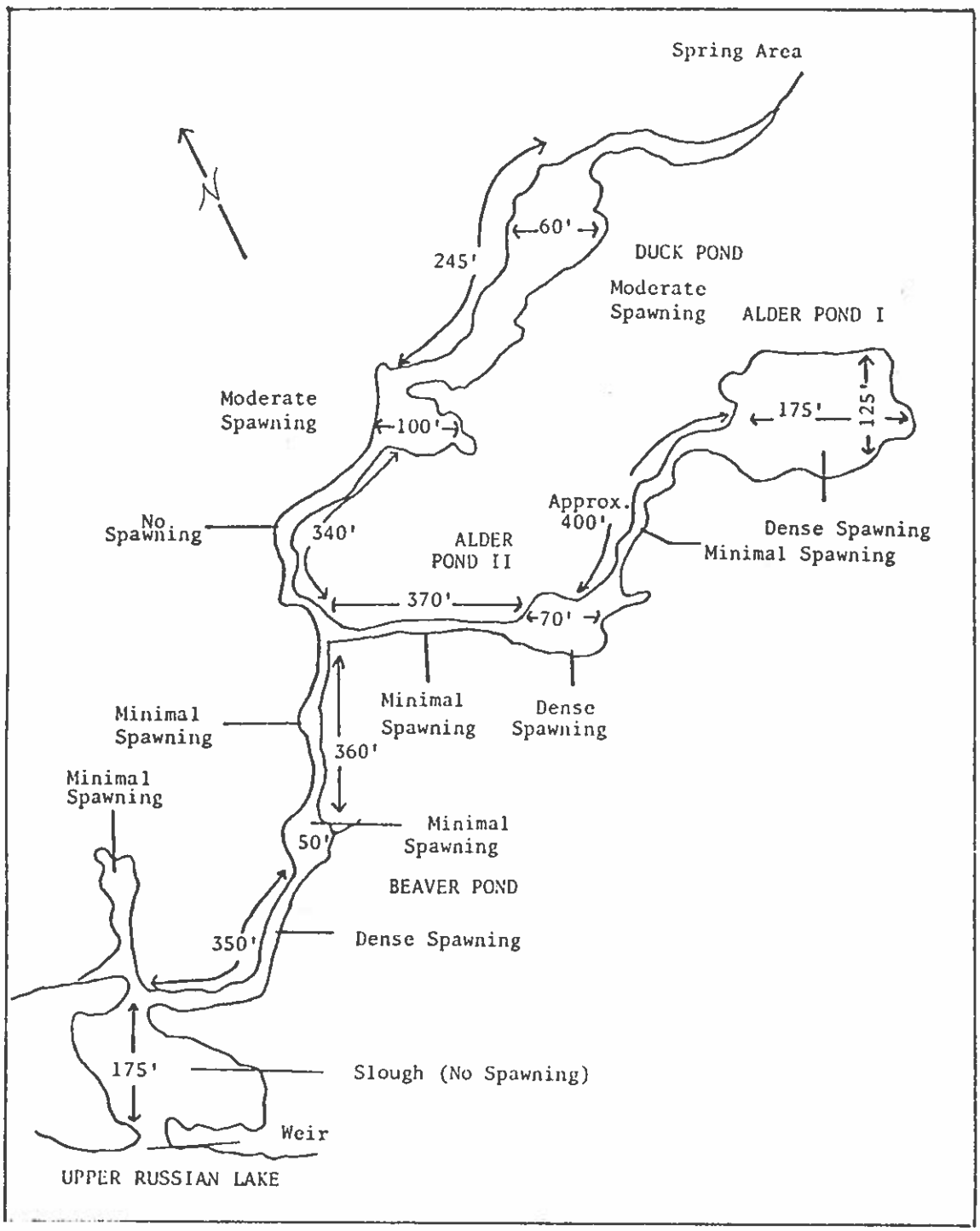


Figure 28. Schematic Diagram of Bear Creek and Upper Russian Lake Showing Sockeye Spawning Areas (not to scale) (Nelson, 1976).

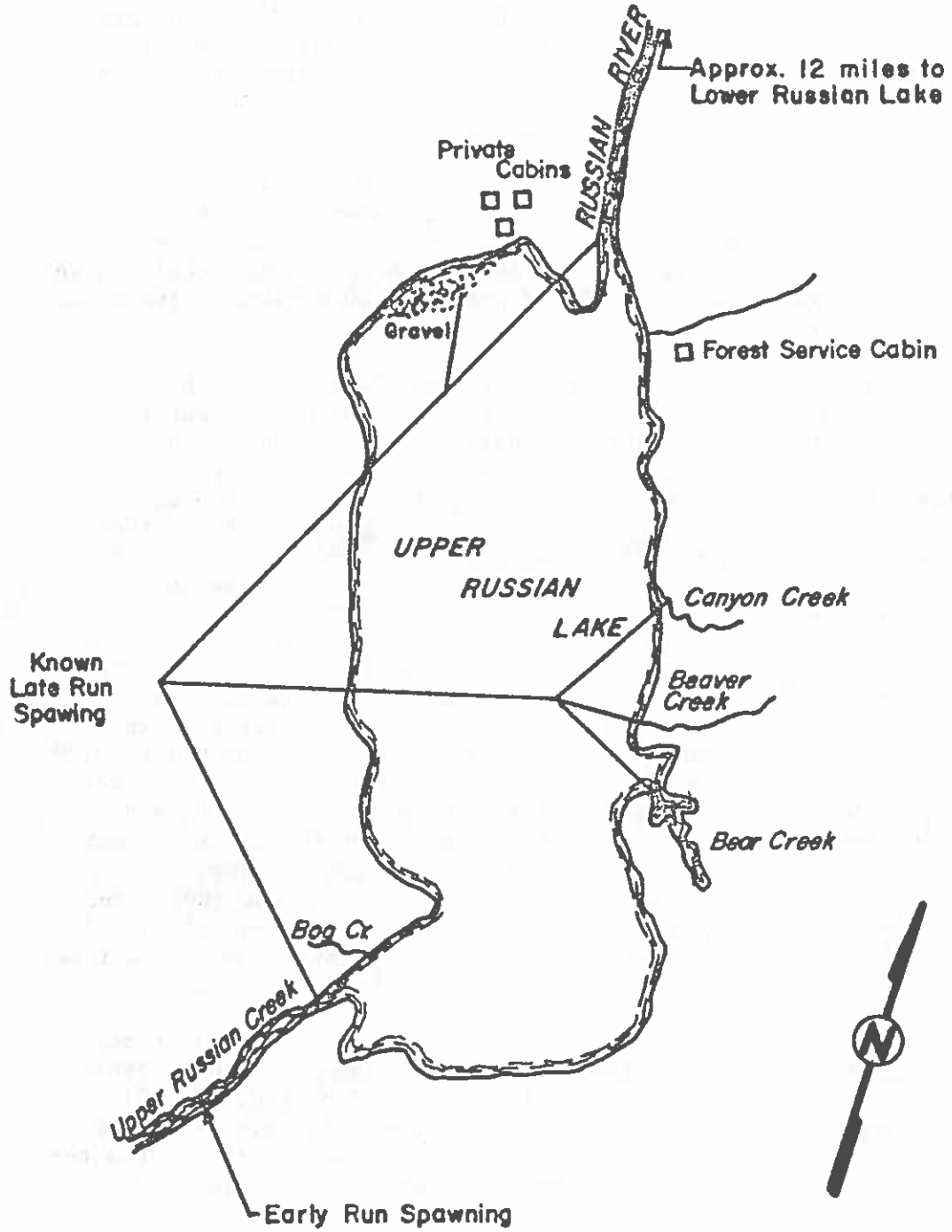


Figure 29. Schematic Diagram Upper Russian Lake.
Showing Sockeye Spawning Areas (not to scale) (Nelson, 1976).

The last factor, the quality and quantity of water flowing through the redd, is recognized as the most significant determinant to hatch success. The factors governing flow through the redds are in themselves very complex. Proper flow and, ultimately, oxygenation of eggs depend on the permeability of the gravel, the dissolved oxygen concentration of the water, and stream flow. If any of these elements are inadequate or absent, egg mortality will occur.

Stream flow is basic to egg hatching success. If eggs are deposited during high flow and then flow diminishes during egg incubation, spawning beds may be exposed and eggs contained therein will die. Although it seems unlikely that human activities could cause significant fluctuations in the Kenai system, dams or water diversions could significantly influence hatch success.

Permeability of the gravel is a critical factor to hatch success. Permeability is a measure of the ease with which water passes through the gravel and is a function of gravel size and compactness. Suffocation of eggs caused by siltation and the consequent loss of gravel permeability has been cited by Cooper,[52] Wickett,[48] White,[50] Hunter,[51] and Royce,[46] among others, to be the single most significant factor in egg mortality. White[50] has cited a direct relationship between percentage of egg hatch and amount of siltation over redds.

Dissolved oxygen concentration of the water passing through the redds is also a critical factor determining hatch success. Wickett[49] found that oxygen demand of pre-eyed chum salmon eggs was between 0.00013 and 0.0003 mg. per egg per hour at temperatures of 0.1 to 8.2° C. Chambers et al.[54] found that critically low levels of oxygen were 5.7 ppm for chinook (King) salmon, 1.9 ppm for silver salmon, and 1.4 ppm for sockeye salmon. Flowing water (typical of the Kenai system) usually contains very high oxygen levels (10-12 ppm),[36] but the addition of materials with high biochemical oxygen demand (BOD) (such as sewage treatment plant effluents, food-processing plant effluents, or effluents from fish hatcheries) could deplete oxygen concentrations in the Kenai system, especially during periods of ice cover.

Since salmon use their olfactory sense (sense of smell) to return to their place of birth (and thus a known spawning area), any foreign substances added to the system have the potential of adding sufficient olfactory "noise" to confuse the very sensitive olfactory receptors of migrating adult salmon. The introduction of "noise" to the stream results ultimately in reduced reproductive success.

The influence of human activities could already be significantly impacting the river ecosystem. WAPORA field studies in June 1977 noted the heavily silted condition of Slikok Creek downstream of a portion of the flood plain that is being cultivated. Several investigations have clearly demonstrated that siltation severely diminishes aquatic productivity. A review of sedimentation effects by Cordone and Kelly[55]

generally concludes that the biota of streams was seriously diminished, and it has been shown in this profile how siltation can severely reduce salmon production. The WAPORA survey noted a degraded and sparse fauna in the silted area of Slikok Creek compared to that of adjacent nonsilted areas.

WAPORA field studies also noted the absence of salmon activity in Cooper Creek, but superficially compared the creek to the Russian River in appearance. Cooper Creek was the only tributary surveyed in which no salmon juveniles were observed.

Commercial fishing in Cook Inlet is regulated by the Alaska Department of Fish and Game (ADF&G). Kenai River salmon stocks are exploited in the Central District of Cook Inlet through the use of drift nets and set nets (Figure 30). Drift nets harvest both migratory and milling stocks while set nets harvest migrating stocks.

The commercial fishing season generally opens the last week in June. Harvesting is permitted during two 12-hour periods weekly and most fishing activity ends by the first of October. Sockeye salmon are the primary harvest species as the season opens, but as the season ends, silver salmon dominate the catch.[40] Five species of salmon are harvested during the peak of the season. Table 11 shows records for the Central District.

Dates for opening and closing the season are an emotional issue. Sport fishermen cite overfishing by the commercial fishermen, who complain that fishing time is inadequate.

The timing of the fishing season is variable and is based on a comparison of current and previous (5-15 year) survey statistics. Early curtailment of the season may be prompted by low catches. Curtailment refers to a reduction in weekly fishing time.

Cook Inlet stocks consist of mixed species; however, during the 1977 season, it was possible to determine the percentage of Kenai River sockeye salmon harvested in the commercial fishery. Kenai and Kasilof stocks were dissimiliar in 1977.

Regulation of the commercial fishery is based primarily on sockeye salmon escapement data, and relative catch statistics, but obtaining such data is complicated. Aerial counts are confounded by the naturally turbid (from glacial flour) river, and counts made with sonar devices have proven, with but one exception, to be reliable.

Table 12 presents escapement data for 1968 through 1976. The tentative optimum escapement for late run fish is between 200,000 and 300,000.[56] Table 12 indicates that these levels were not met during

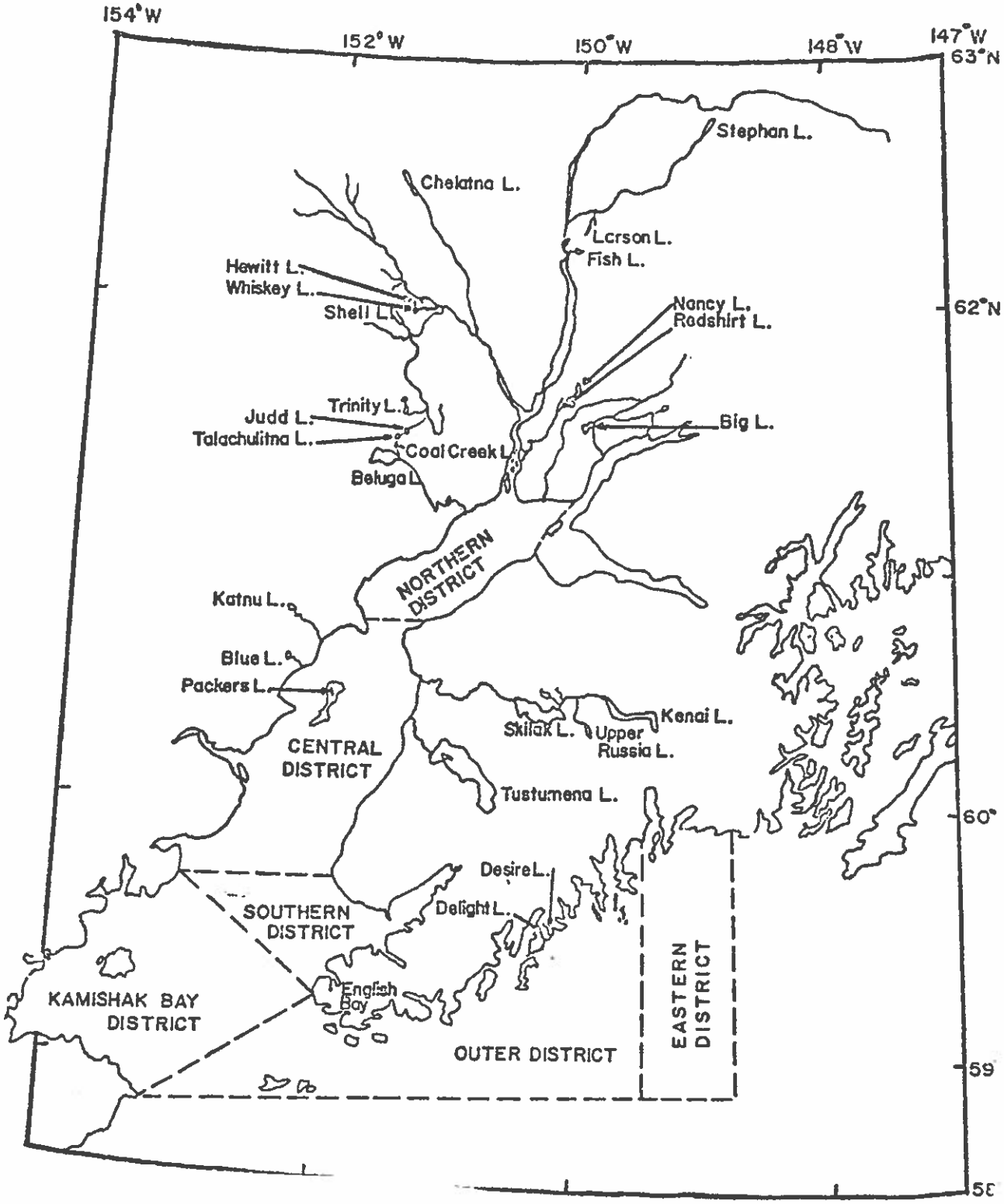


Figure 30. Commercial Fishing Districts of Cook Inlet.

Table 11. Commercial Salmon Catch, Central District, Cook Inlet. Data Are Presented as Number of Fish by Species for 1960-1976.*

Year	Species					Total (in millions)
	King	Sockeye	Silver	Pink	Chum	
1960	19,294	775,067	167,084	969,420	536,183	2.5
1961	11,982	1,084,929	76,803	23,252	288,525	1.5
1962	10,425	1,013,993	177,036	2,422,505	826,549	4.5
1963	10,191	833,470	133,600	21,496	343,333	1.3
1964	4,363	809,723	284,726	2,646,041	952,126	4.7
1965	9,441	1,380,775	131,717	19,049	299,538	1.8
1966	8,118	1,720,885	209,122	1,633,224	496,979	4.1
1967	7,675	1,261,997	133,875	23,769	258,453	1.7
1968	4,065	964,329	313,802	1,743,358	1,060,660	4.1
1969	9,494	654,189	80,527	25,802	258,019	1.3
1970	6,887	664,795	192,644	640,201	752,674	2.3
1971	10,167	595,770	78,542	27,201	310,426	1.0
1972	11,174	794,087	61,587	537,750	610,368	2.0
1973	5,024	624,411	80,469	188,934	636,722	1.5
1974	6,427	455,622	153,087	440,854	360,350	1.4
1975	4,661	619,292	194,321	245,406	921,009	2.0
1976**	10,220	1,574,507	178,933	1,110,299	406,227	3.3

* Source - ADF&G, Cook Inlet Catch Statistics (1960-1974). Totals of district catches may not agree with total Cook Inlet salmon catch reported by Int. N. Pacific Fish Commission

** Preliminary; through October 1976

Table 12. Comparison of sockeye salmon sonar counts, index area counts, alternate total escapement estimates, and alternate index area estimates, Kenai River, 1968-1977.

Year	Dates[1]	Sockeye Salmon[2] Sonar Counts (Y_1, X_2)	Index Area[2] Counts (X_1, Y_2)	Alternate Total[3] Escapement Estimates (Y'_1)	Alternate Index[4] Area Estimates (Y'_2)
1968	6/15 - 8/7	88,000	10,000	210,000	3,500
1969	6/15 - 8/8	53,000	2,800	82,000	1,600
1970	6/15 - 8/8	68,000	1,600	61,000	2,400
1971		____[5]	17,200	330,000	____
1972	6/15 - 8/8	335,000	15,000	300,000	17,000
1973	6/17 - 8/8	368,000	17,400	340,000	19,000
1974	6/23 - 8/6	161,000	5,200	120,000	7,500
1975	6/24 - 8/5	143,000	5,200	120,000	6,600
1976	6/16 - 8/20	381,000	18,000	350,000	20,000
1977	6/21 - 8/3	785,000[6]	44,000	800,000	42,000

1/ Inclusive of first and last days of operation.
2/ Rounded to nearest thousand fish.
3/ $Y'_1 = a + bx = 33,273 + 17.471X_1$ $r^2 = 0.953$ n=9 Y^1 rounded to two significant figures
4/ $Y'_2 = a + bx = -1312 + 0.055X_2$ $r^2 = 0.953$ n=9 Y^1 rounded to two significant figures
5/ Sonar counters malfunctioned.
6/ Preliminary data.

1974 and 1975, but that 1976 escapement was higher than previous years of record, presumably because of excellent escapement (1971). High 1977 and 1978 escapement is anticipated inasmuch as 1972 and 1973 counts were high. It is anticipated that 1979 and 1980 runs will be lower, but that 1981 runs will be high. The goal of the fisheries management program is to obtain sufficient salmon stocks of all species to ensure continued commercial fishing success without depleting the sport fishing stocks.

Sport fishing on the Kenai River has increased markedly in the recent past. This increase has been attributed to more sophisticated fishing techniques and greater access to the river through increased private ownership of boats. Five sections of the river, and their sport fishing use, have been postulated (Table 13).[40]

Table 13. Sport Fishing Characteristics: Five Sections of the Kenai River

Section	Length (miles)	Gradient (feet/mile)	Fishing Characteristics
Cook Inlet to Beaver Creek	9.7	1.55	Tidal area with little angling effort
Beaver Creek to Soldotna Bridge	11.3	3.54	Chief salmon angling area
Soldotna Bridge to Naptowne Rapids	19.4	5.41	Primary trout and char angling area
Naptowne Rapids to Skilak Lake Outlet	10.5	3.33	Primary trout and char angling area
Skilak Lake Inlet to Kenai Lake	17.3	13.93	Medium angler use area

The most angling effort was expended between Beaver Creek and the Soldotna Bridge where both bank and boat fishing is popular.

Hammarstrom[57] reports that, in the area below Skilak Lake, there were 80,500 man-days of fishing between June 9 and October 1, 1976. During the 1976 pink salmon run (even year) 21,400 fish were caught. Only 719 sokeye salmon, a species that cannot easily be caught with conventional tackle, were caught during 1976. The remaining 6,700 fish were rainbow trout and Dolly Varden char.

The Kenai River above Skilak Lake support an active trout and char, as well as a limited silver salmon, fishery.[58] The Russian River, famous for its sockeye fishery, enters the Kenai in this

section. That river is unique in that sockeye salmon can be caught on artificial lures, and, in 1976, the Russian River had 26,000 man-days of fishing during which 17,000 were caught.

Other tributaries to the Kenai receive some angling pressure, but less than 20,000 man-days were expended in 1976.[40] Predictions for 1977 for the entire Kenai system are for between 245,000 and 160,000 man-days of angling pressure. The Kenai system is currently the most heavily used sport fishery in Alaska.

WETLANDS BIOTA

Wetlands are prevalent throughout the Study Area. Both saline or coastal wetlands (those periodically inundated by the tides) and freshwater or inland wetlands (non-tidal) are present. Wetlands in the area have not been studied thoroughly. Few data are available. Therefore, general characteristics of these types of habitats will be presented, those susceptible to disruption from human activities will be discussed, and the results of field studies will be presented.

Wetlands serve to maintain water quality by retaining sediment and particulate materials, by processing organic substances, and by acting as sinks for nutrients. Alteration in flow through a wetland could impair these complex functions.

Wetlands reduce erosion by protecting areas from high-energy activities such as waves or wakes produced by motorboats. Wetlands may aid in flood protection, acting as buffers by retaining or detaining runoff.

Many wetlands provide valuable habitat for waterfowl, and other birds and mammals. Migratory waterfowl feed, rest, and may build nests in wetlands. Large game (e.g., moose, caribou) feed in these areas. These values in turn provide aesthetic and practical functions such as trapping or hunting. Wetlands may provide also spawning and nursery habitat for fish.

The most abundant plant in the coastal wetlands of the Study Area is the sedge Carex lyngbyei. This plant may serve as the main food of waterfowl during spring migrations. Dead plant material or detritus from these coastal wetlands may be carried to Lower Cook Inlet and used as food by marine organisms.

Plants characteristic of inland wetlands include black spruce, small shrubs, grasses and sedges, and various species of moss. Dead plant material from these areas serves as a food source for various macroinvertebrates. These organisms, in turn, serve as food sources for fish.

Because of their basic function in the ecosystem, and because they are a major determinant to the overall quality of navigable waters, the maintenance of wetlands is essential to overall ecosystem integrity.

During the course of the study, several wetland areas were visited by the Project Director. No quantitative data were collected during these visits. On 9 June 1977, the Project Director and Dr. Jack McCormick flew the Study Area at low altitude observing vegetation. During the following

five day period, Dr. McCormick observed visually several wetland areas within the Study Corridor. On 11-12 June 1977, Dr. McCormick visited ten separate wetland areas, collected plants from each site, and recorded observations at each site. Both saline and freshwater wetlands were visited.

Following are the results of those investigations. Species noted during the investigations are listed on Table 14. (Recent work completed by WAPORA, Inc., for the U.S. Army, Engineer District, Alaska, has resulted in a listing of plants that may be found in Alaskan wetlands. This list is included as Appendix F.)

Area 2

High fresh marsh landward of Kenai River tidal marsh

Location: South of Kenai River highway bridge at Kenai, Alaska, west of highway near upland border.

Description: Former spruce bog with standing trees. Numerous hummocks are present with dwarf birch, sprouting dwarf willow, and broomcrowberry. Sedges, cranberry, Labrador tea, and other small plants occur in the depressions between the hummocks. Sphagnum sp. and other mosses form a general ground cover over the entire area, including depressions and hummocks.

Species observed:

Betula nana	Dwarf birch
Salix stolonifera	Sprouting willow
Empetrum nigrum	Broom crowberry
Calamagrostis sp.	(young, sterile)
Carex limosa	Shore sedge

Area 3

High saline marsh section of Kenai River tidal marsh

Location: North of Kenai River highway bridge at Kenai, Alaska, on west side of highway opposite roadside rest area.

Description: Very dense stand of sedge is present. The dense stand resembles a lawn that has not been mowed for 2 or 3 weeks. In places, dead leaves of plants of previous years are sprawled in a cowlick pattern similar to East Coast Spartina patens (salthay) wetland. Extensive pannes are reddish in color. They are devoid largely of vegetation, but annual grass and glasswort seedlings were abundant and goosetongue was scattered.

Species observed:

Carex subspathea	Hoppner sedge
C. lyngbyei	Lyngbyei's sedge
Salicornia sp.	Glasswort (seedlings)
Puccinellia sp.	Grass seedlings
Plantago maritima ssp. juncoides	Goosetongue
Chrysanthemum arcticum	Arctic daisy
Potentilla anserina	Common silverweed (sterile, pinnate leaf)

Area 4

Intermediately low marsh section of Kenai River tidal marsh

Location: Same as Area 3, but the intermediate marsh occupies the banks of a tidal gut that flows through a culvert under the highway and the gently-sloping marsh surface within 20 to 40 feet of the channel banks.

Description: The intermediately low marsh section is divided into two zones on the basis of plant height. The average height of the Lyngbye sedge is 35.0 cm on the bank of the tidal gut and on the adjacent 10 to 15 foot wide band of the slightly sloped marsh surface. The slightly higher marsh surface within this section is occupied by a low growth form of the sedge, the average height of which is 25.7 cm. These growth forms mix in the transitional area between the two zones. Whereas Hoppner sedge is caespitose, and forms an even turf, Lyngbye sedge is not caespitose or stoloniferous, and the individuals are relatively widely and evenly spaced.

Species observed:

Carex lyngbyei	Lyngbye sedge
Potentilla anserina	Common silverweed (sterile, pinnate leaf)

Area 5

Low saline marsh in tidal gut

Location: North of Kenai River highway bridge at Kenai, Alaska, west of highway. The gut flows through a culvert under the highway near the north end of a roadside rest area.

Description: A tall stand of Lyngbye sedge is present in the tidal gut. The sedge forms hummocks that stand as much as 2 to 3 feet above the mineral substrate in the main channel. The channel is about 5 feet wide, and approximately 3 feet of this width is occupied by the sedge. The plants, from the base of the culm to the tip of the lowest bract (extended) are about 75 to 90 cm tall.

Species observed:

Carex lyngbyei	Lyngbye sedge

Area 6

Creekbank tidal marsh (saline to brackish)

Location: The area examined is located on the right bank (northwest) of Beaver Creek at its confluence with the Kenai River near the City of Kenai.

Description: The bank is convexly sloped from the streambed to a low scarp which marks the upland. The width of the bank, horizontally, is about 50 feet, and its total height is approximately 15 feet above the water line at the time of observation (near the low water slack, about 11:00 AM). The substrate is a gray clay composed of glacial flour.

Based on the growth of the sedge, it appears that 2 to 4 inches of clay had been deposited during the last (1976) growing season. The lower section of the bank, to about 5 feet above the water line, is barren. The next 1.5 feet (vertical) is occupied by a pure stand of swamp horsetail. Above this point, for a vertical distance of 0.5 to 1.0 feet, the horsetail is mixed in nearly equal proportion with Lyngbye sedge. The main marsh, from about 7.0 to 7.5 feet above the water line to 15 feet, is a nearly pure stand of Lyngbye sedge. Cinqurfoil and horsetail are scattered widely. The sedge is about 70 to 80 cm tall in the lower elevation section of the stand, and from 40 to 50 cm tall near the upland scarp.

Species observed:

Carex lyngbyei	Lyngbye sedge
Equisetum fluviatile	Swamp horsetail
Potentilla anserina	Silverweed

Area 7
Fringing marsh along freshwater stream

Location: Soldotna Creek, immediately north of Sterling Highway, east of the City of Soldotna, Alaska.

Description: The main stem of Soldotna Creek is about 10 feet wide and 3 to 6 feet deep immediately upstream from a culvert that extends through a highway embankment. The current is rapid. Another channel, with little evident flow, is approximately 75 feet to the east of the mainstem, and is separated from the mainstem by a marsh with scattered shrubs. The two channels meet near the culvert.

The west margin of the mainstem is covered by a sedge marsh (meadow). The substrate in this area is a very fine sand that is very tightly packed. Along the toe of the embankment slope for about 75 feet, to the east of the culvert, marsh cinquefoil, a decumbent, woody stemmed, vinelike plant, forms a loose mat over the water surface to a distance of about 50 to 60 feet from the bank. The water is about 2 feet deep under this mat. A moss (Aulacomnium sp.) covers the bottom in large areas under the mat, and numerous plants of arctic buttercup are rooted in the moss.

Along the east margin of the second channel, dwarf birch forms a low, dense cover. Sphagum sp. and other mosses grow under the dwarf birch and into the water beyond the shrub edge.

Sitka sedge (?) is the principal species in the sedge marsh. Horsetails grow in tha water at the edge of the channel in a shallow cove. Adjacent to the mainstem waterhemlock (a bulbous, pinnately-leaved plant) was scattered through the sedge marsh. Common marsetail grows on the mud in areas where the sedge cover is sparse. This plant has two forms

one that has short, rigid leaves from an ascending stem, and one that has long flaccid leaves from a decumbent stem. The latter form also occurs as a submerged plant along the shallow edge of Soldotna Creek. Marsh cinquefoil also was occasional in the sedge marsh, but generally was associated with old stump hummocks. A longleaved, grasslike plant was the most abundant submerged aquatic. It covered 10 to 20% of the channel bottom, at least near the highway.

Species observed:

Carex sitchensis	Sitka sedge
Cicuta sp	Waterhemlock
Unknown	"Water grass"
Equisetum fluviatile	Swamp horsetail
Hippuris vulgaris	Common marestail
Ranunculus hyberboreus	Arctic buttercup (also submerged moss)
Potentilla palustris	Marsh cinquefoil

Area 8
Valley-bottom lowland/quaking bog

Location: Section 8, to west of Robinson Loop Road, north-south segment, northeast of Whisper Lake and 4 miles west of Sterling, Alaska.

Description: Most of this wetland is a Sitka sedge meadow. Lyngbye sedge is scattered, especially near the pond edge. The north half, near the road, is a quaking bog. Shore sedge (?) grows on hummocks formed by dwarf birch and sprouting willow. Cranberry, Labrador tea, cloud berry, bog rosemary, roundspike sedge, and other plants occur on the hummocks in the mat of Sphagnum sp. that is diffused through the hummocks and between them. Haircap moss also forms thick cushions on the hummocks. Buckbean is conspicuous in a marginal open-water area immediately adjacent to the road embankment. Cottongrass occurs on the hummocks, but it is more abundant in saturated peaty material near the north edge of the wetland. The pond was sounded, and appeared to be 5 feet or more in depth near the road. (Viola langsdorfii was collected from the edge of the road in an upland site.)

Species observed:

Menyanthes trifoliata	Buckbean
Salix stolonifera	Sprouting willow
Ledum decumbens	Labrador tea
Vaccinium oxycoccus	Bog cranberry
Eriophorum scheuchzeri	White cottongrass
Polytrichum sp.	Haircap moss
Betula nana	Dwarf birch
Andromeda polifolia	Bog rosemary
Rubus chamaemorus	Cloudberry
Sphagnum sp.	Sphagnum moss
Potentilla palustris	Marsh cinquefoil
Carex lyngbyei	Lyngbye sedge
Carex sitchensis	Sitka sedge
Carex limosa	Shore sedge
Carex rotundata	Roundspike sedge

Area 9
Black spruce bog (Swanson River Road bog)

Location: In the southwest quadrant of the intersection of the east-west leg of Robinson Loop Road and the Swanson River Road, in Section 11, about 2 miles west of Sterling, Alaska.

Description: Dead or nearly dead black spruce, 25 to 30 feet tall are abundant, and 4 to 5 feet tall black spruce saplings also are abundant. The ground cover is composed of hummocks of dwarf shrubs, with a relatively continuous layer of sphagnum, with occasional haircap moss and other mosses. Labrador tea, hog cranberry, bog rosemary, cloudberry, bluejoint, cottongrass, and bog blueberry are abundant to frequent on the hummocks. Bigelow sedge forms free-standing hummocks in water to 2 feet deep. Bluejoint is the main vegetation near the road.

Species observed:

Vaccinium oxycoccus	Bog cranberry
Betula nana	Dwarf birch
Vaccinium uliginosum	Bog blueberry
Ledum decumbens	Labrador tea
Salix stolonifera	Sprouting willow
Rubus chamaemorus	Cloudberry
Polytrichum sp.	Haircap moss
Andromeda polifolia	Bog rosemary
Eriophorum scheutzeri	White cottongrass
Carex bigelowi	Bigelow sedge
Calamagrostis canadensis	Bluejoint

Area 10
Stream side wetland

Location: Kenai National Moose Range, Alaska, immediately west of Swanson River Road in Section 3, at outlet culvert from Silver Lake.

Description: A sedge meadow with deep pools is present at this site. Dead black spruce (burned) are prevalent near the margins adjacent to the road.

Horsetail is abundant and slender cottongrass was present in one colony of 40 to 50 plants, in water 3 feet or more in depth. Sitka sedge forms hummocks which have developed into a very unstable floating mat that would not support the investigator. Buckbean is relatively common in pools in water 2 to 3 feet or more in depth. Marsh cinquefoil and bog cottongrass are in shallow water and on sedge hummocks. Sphagnum also is in shallow water.

Species observed:

Menyanthes trifoliata	Buckbean
Eriophorum gracile	Slender cottongrass
Potentilla palustris	Marsh cinquefoil

Eriophorum brachyantherum	Bog cottongrass
Equisetum fluviatile	Swamp horsetail
Carex sitchensis	Sitka sedge

Area 11
Streamside marsh

Location: Unknown stream; 0.6 mile east of Beaver Loop Road on north side of Sterling Highway, City of Kenai (next to electric substation).

Description: Marsh marigold is abundant in the mudflat adjacent to the east side of the stream. Lyngbye sedge forms a small marsh on the west margin of the stream, and hummocks in the channel. The average height of plants on the bank is 39.5 cm. There are heavy deposits of iron oxide throughout the channel and in seepage from the banks.

Species observed:

Caltha palustris ssp. asarifolia	Marsh marigold
Carex lyngbyei	Lyngbye sedge

Table 14. Floristic components of the wetlands examined on 11-12 June 1977 by WAPORA, Inc.

	Saline tidal marsh										
	Low	Beaver	Interm.	High		Swanson Road	Robinson Loop	Moose Range	Soldotna Creek	Substation	
	5	6	4	3	2	9	8	10	7	11	
Betula nana					●	●	●				Dwarf birch
Salix stolonifera					●	●	●				Sprouting willow
Empetrum nigrum					●						Broom crowberry
Ledum decumbens						●	●				Labrador tea
Vaccinium oxycoccus						●	●				Bog cranberry
Andromeda polifolia						●	●				Bog rosemary
Rubus chamaemorus						●	●				Cloudberry
Vaccinium uliginosum						●					Bog blueberry
Picea mariana					D	●		D			Black spruce
Eriophorum gracile								●			Slender cottongrass
Calamagrostis canadensis					●	●					Bluejoint
Carex bigelowi							●				Bigelow sedge
Carex limosa					●		●				Shore sedge
Carex lyngbyei	●	●	●				●			●	Lyngbye sedge
Carex sitchensis							●	●	●		Sitka sedge
Carex subspathea				●							Hoppner sedge
Carex rotundata							●				Roundspike sedge
Eriophorum scheuchzeri						●	●				White cottongrass
Poa sp. (seedlings)				●							Bluegrass
Caltha palustris										●	Marsh marigold
Chrysanthemum arcticum				●							Arcticdaisy
Cicuta sp.									●		Waterhemlock
Equisetum fluviatile		●						●	●		Swamp horsetail
Hippuris vulgaris									●		Common marestail
Menyanthes trifoliata							●	●			Buckbean
Plantago maritima				●							Goosetongue
Potentilla anserina		●	●	●							Common silverweed
Ranunculus hyperboreus									●		Arctic buttercup
Salicornia sp.				●							Sal_wort
Eriophorum brachyantherum								●			Bogcottongrass
Eriophorum gracile								●			Slender cottongrass
Potentilla palustris							●	●	●		Marsh cinquefoil
Unknown									●		Watergrass
Aulacomnium sp. (moss)									●		
Polytrichum sp. (moss)						●	●				Haircap moss

TERRESTRIAL BIOTA

Vegetation

The Joint Federal-State Land Use Commission has recognized eight ecosystems along the Kenai River and its tributaries based on vegetation types. The following discussion and Figure 31 are an adaptation of their work with revisions from aerial photographs.

The photographs were taken during the summer of 1975 and 1976 as part of a joint program conducted by the Kenai Peninsula Borough, Alaska Division of Lands, and the Kenai National Moose Range, U.S. Fish and Wildlife Service.

The eight vegetation types were:

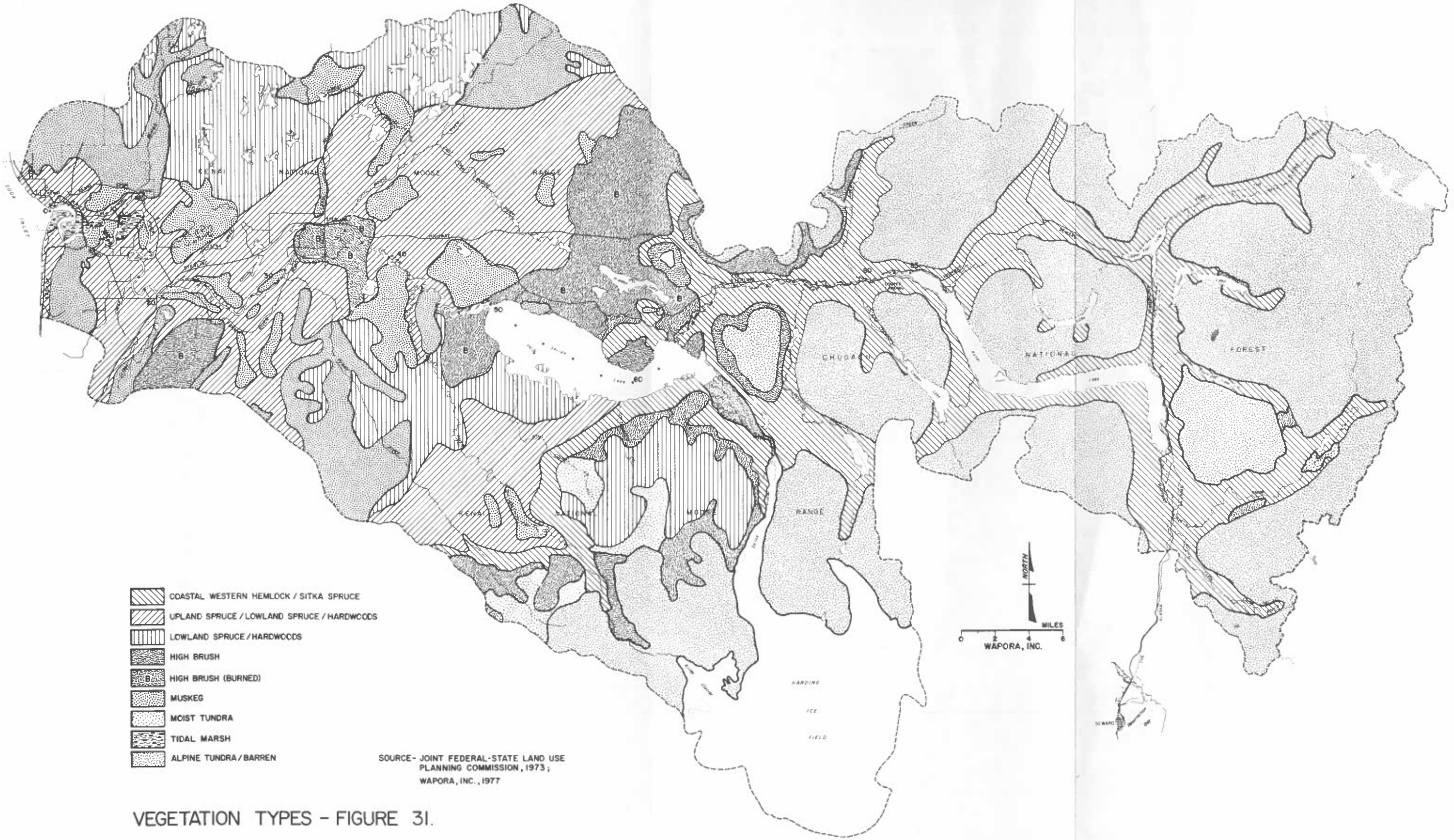
Coastal-western hemlock-Sitka spruce
Upland spruce-lowland spruce- hardwoods
Lowland spruce-hardwoods
High brush
High brush (burned)
Muskeg
Moist tundra
Alpine tundra and barren

Coastal western hemlock-Sitka spruce is an extension of the rain-belt forests of the Pacific Coast. Along the Kenai River upstream from Skilak Lake this general vegetation type changes from coastal to interior forest. Here white spruce, sitka spruce and mountain hemlock occur in association with aspen and white birch. Trees on the floor of valleys average 60 to 80 feet in height and up to 24 inches in diameter. Average spacing is 15 feet between trees. Trees on the valley slopes are smaller but occur closer together. Understory plants include blueberry, alder, juniper, willow, mosses, and ferns.

Upland spruce-lowland spruce-hardwoods forests are composed of moderately dense stands of white spruce, birch, aspen, and poplar. Some black spruce occurs on north facing slopes and poorly drained flat areas.

White spruce occurring on south facing slopes and well-drained soils will average 40 to 80 feet in height and up to 16 inches in diamater. Aspen and birch average 50 feet in height and mature in 60 to 80 years.

Birch trees are typically the first inhabitants of wetter slopes after a forest fire. The species establishes quickly and generally occurs in pure stands or interspersed with aspen. White,spruce, and sitka spruce and hemlock later grow in these stands. Mature birch in the



SOURCE- JOINT FEDERAL-STATE LAND USE PLANNING COMMISSION, 1973; WAPORA, INC., 1977

VEGETATION TYPES - FIGURE 31.

area are generally 60 to 80 feet tall and 8 to 9 inches in diameter, Birch typically colonizes the wetter slopes following burnoff.

Aspen will develop in upland areas on the driest, usually southern exposures after a fire. It will be replaced by white spruce and hemlock in all but the very driest sites. The trees mature in 60 to 80 years.

Undergrowth is composed of various moss and fern species except on moist slopes where alder and willow will occur. High and low bush cranberry, raspberry, and currant are typical understory plants.

Lowland spruce - hardwood is an open interior forest type consisting of evergreen and deciduous trees. In some areas pure stands of black spruce are present. Black spruce grow very slowly and will seldom exceed 8 inches in diameter or 50 feet in height. Black spruce is especially prevelant on north facing slopes and in poorly drained areas. It is often associated with muskeg and meadows.

More mesic areas will support a mixture of white and black spruce, birch, aspen, and poplar. In moist areas the understory consists of thick sphagnum mats or other mosses and ferns. Mesic areas will have an understory consisting of willow, dwarf birch, blueberry, Labrador tea, and various lichens, mosses, and ferns.

Large regions of intermixed upland spruce-broadleaf and lowland spruce-broadleaf are seen throughout the study area. These types can be separated only through a close examination of the vegetation.

High brush is divided into three separate subsystems, which include coastal alder thickets, flood plain thickets, and birch-alder-willow thickets.

Coastal alder thickets occur in areas between the beach and forest, between timberline and alpine tundra meadows, and in avalanche paths on mountainsides. Stands occur along the sea cliffs directly to the south of the City of Kenai. In the upland regions high brush will vary in successional stages between alder and grasses. In areas where grasses are dominant, bluejoint grass may be commercially important.

Floodplain thickets develop along newly exposed alluvial deposits. These areas are periodically flooded and support shrubs dominated by willows and alders, which are later replaced by cottonwood and poplar. The areas are important browse locations for moose. These thickets occur along the Kenai River floodplain and its tributaries.

Birch-alder-willow thickets typically occur near the timberline,

and are also found in burned regions. The stands, which may be quite dense, consist of birch, numerous alder species, several willow species, and several lower heath-type shrubs. They are important browse habitat for moose. These areas typify secondary succession patterns in areas of the Kenai Peninsula that have been burned or disturbed.

Muskegs are interspersed throughout the Study Area. They are found in wet basins but may also occur in depressions, flat areas, and gentle, poorly drained slopes. Small ponds with a peatlike bottom may support some aquatic vegetation. The vegetation of the area is dominated, however, by mosses such as Sphagnum sp. Smaller herbaceous plants such as cottongrass, crowberry, and several sedges, commonly occur. In small, drier hummocks, shrubs will replace sedges as the dominant plants. These muskegs, particularly when associated with shallow water, are favored feeding habitat for moose.

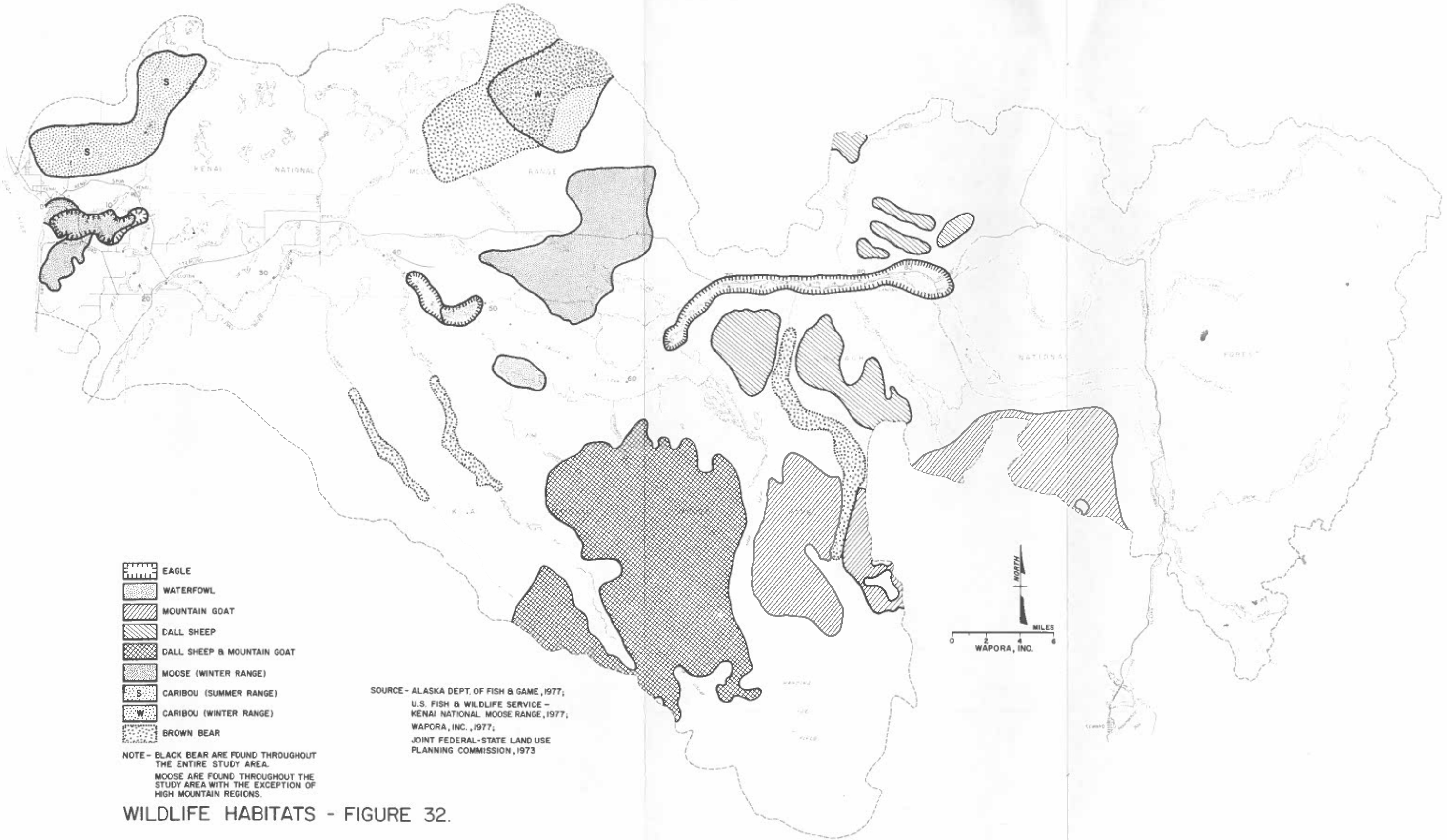
Moist tundra is found in only one small area south of King County Creek. This vegetation type is characterized by uniform mats of cottongrass and stands of dense lowlying shrubs. Other prevalent plants include Labrador tea, green alder, blueberry, rosebay, and mountain cranberry. Moist tundra usually occurs at elevations from 2,000 to 4,000 feet.

Alpine tundra and barren systems are found throughout the Kenai mountains, usually at elevations above 2,500 feet. They are characterized by barren rocks and rubble interspersed with low plant masses. Herbaceous and woody plants such as moss-campion, black oxytrope, resin birch, mountain heath, and rhododendron are often observed. Mosses and lichens are common. Alpine tundra is excellent habitat for Dall sheep and mountain goat.

Wildlife

The Kenai Peninsula is well known for the abundance and variety of wildlife it supports. The Kenai River, its tributaries, wetlands, and uplands provide the habitat types required to support diverse bird and mammal populations. Wildlife habitats are shown in Figure 32.

Bird populations are at their highest densities during spring migratory periods (late April through late May), when many species use the area for resting and feeding. Of particular interest are the tidal marshes and associated wetlands of Kenai, known as Kenai Flats. The area is unique in that it is usually the first suitable waterfowl habitat in Cook Inlet to become ice free. It is a favored resting and feeding site for several waterfowl, including snow geese, mallards, pintails, other puddle ducks (mostly widgeon), and cranes. Nesting of Canada geese and sandhill cranes has been observed in the flats.[60,61]



EAGLE
WATERFOWL
MOUNTAIN GOAT
DALL SHEEP
DALL SHEEP & MOUNTAIN GOAT
MOOSE (WINTER RANGE)
CARIBOU (SUMMER RANGE)
CARIBOU (WINTER RANGE)
BROWN BEAR

NOTE - BLACK BEAR ARE FOUND THROUGHOUT THE ENTIRE STUDY AREA.
MOOSE ARE FOUND THROUGHOUT THE STUDY AREA WITH THE EXCEPTION OF HIGH MOUNTAIN REGIONS.

SOURCE - ALASKA DEPT. OF FISH & GAME, 1977;
U.S. FISH & WILDLIFE SERVICE - KENAI NATIONAL MOOSE RANGE, 1977;
WAPORA, INC., 1977;
JOINT FEDERAL-STATE LAND USE PLANNING COMMISSION, 1973

WILDLIFE HABITATS - FIGURE 32.

The area provides favored wildlife vistas, especially during spring migratory periods when it is commonly visited by as many as 400 photographers and sightseers daily. The snow goose is the most popular bird.

Lyngbye's sedge (Carex lyngbyaei) is the primary waterfowl food. The birds feed on the succulent portions of the sedge.[61]

How intensely the flats are used by waterfowl depends on the rate at which the interior penninsula becomes ice free. Fewer waterfowl use the flats for shorter periods during mild springs.

Waterfowl densities are much lower in the fall than in spring. It is in the fall, however, that the area is open for waterfowl hunting. The flats are one of the few waterfowl hunting areas available to residents of Kasilof and Kenai. In 1969 the area received and is expected to continue to have an estimated 625 hunter-days.[62] The area is now zoned for industrial development by the City of Kenai and future conflicts could arise between resource agencies, concerned citizens, and the city over use of the area.

Waterfowl habitats, other than the flats, occur throughout the Study Area. Many lakes offer excellent habitat for several kinds of ducks, geese, and swans. Trumpeter swans are present in highest concentrations in the spring when as many as 75 to 100 birds have been observed on the Moose River.[61] Swans may also inhabit isolated parts of the mainstream Kenai River.

Waterfowl also concentrate in the backwater areas of Skilak Lake. Here, scaup, goldeneye, pintail, mallard, and widgeon have been observed.[63] Some limited waterfowl hunting occurs in this area during the fall. Because waterfowl are in low numbers, however, the section probably could not sustain increased hunting pressures.

Isleib and Kessel[64] include the southern half of the Kenai Peninsula in their Birds of the North Gulf Coast-Prince William Sound. Besides supplying a list of Kenai birds, this work describes the migration routes of many species that nest on the Kenai Peninsula. What appears to be the best known bird of the Kenai Peninsula is a year-round resident and important game species, the Alaskan spruce grouse. Ellison [65, 66, 67, 68] has investigated the food, movement patterns, methods of aging, and other population features of the Alaskan spruce grouse in studies spanning several years and mostly conducted on the Kenai Peninsula.

Several raptorial (hawks, owls, eagles, and falcons) species are present in varying densities in the area. Bald eagles inhabit the area adjacent to the mainstem of the river. The river provides food (fish), while adjacent floodplains (immediately below Skilak Lake and then the entire area above Skilak Lake) provide suitable nesting sites. Most nesting sites observed during this study were in the tops

of tall black cottonwood trees immediately adjacent to the mainstem of the river.

Other raptors, including great gray owl, osprey, rough-legged hawk, golden eagle, great horned owl, and American kestrel, may be observed at various times along the river. As a rule, all raptors depend upon secluded habitats that have few predators (including man), but that provide adequate food. Increased human activities will decrease the suitability of the area for use by raptorial species.

There are also several passerine species present throughout the area.

Table 15 lists birds of general interest in the Study Area.

Large mammals in the Study Area include moose, caribou, black and brown bear, mountain goat, Dall sheep, fox, coyote, and wolf. The most commonly observed of these is the Kenai moose, which can be seen at practically any time of the year along the river or along the Sterling Highway.

A 1941 Executive order established the Kenai National Moose Range. The Range was specifically established to protect the natural feeding and breeding habitat of the Kenai moose and other native wildlife.

Since the 1960's several studies have been conducted at the Kenai Moose Research Center, a cooperative project between the Alaska Department of Fish and Game and the U.S. Fish and Wildlife Service. Moose investigations conducted there include those on methods of censusing,[69] movement in winter,[70] and moose foods and nutrition.[71,72]

Moose populations in the western section of the Peninsula (from Tustumena Lake northward to Point Possession) reached a peak of approximately 9,000 animals in the late 1960's. Severe winters during 1971 through 1974, coupled with encroachment of prime habitat by undesirable vegetation types, caused reductions in the overall population.[63] (Much of the area was burned in 1947 and 1969 and vegetation typical of forest secondary succession is reestablishing.)

The severe winters resulted in 80-90% mortality rates in the moose calf population. Moose populations following those periods dropped from approximately 9,000 to 4,000 animals. Recent data seem to indicate that the population is expanding and may level off.[63] The increased browse potential of 1969 burn areas, coupled with tree-crushing activities conducted by Moose Range personnel, should enhance expansion of the moose population.[63] Because of the mild winter of 1976-1977, calving success is thought to be quite high.[60]

Preferred moose browse varies with area and season. Willow is the favored winter food. Areas south of Skilak Lake offer such habitat. Birch and aspen are also used and are found along both

Table 15. Birds of General Interest on or Adjacent to Kenai River

Common Name	Habitat and Status
Common Loon	Lakes
Arctic Loon	Lakes
Red-throated Loon	Mouth of River, nests in marsh areas
Red-necked Grebe	Lakes
Horned Grebe	Lakes and sloughs
Double-crested Cormorant	Nests on Skilak Lake
Whistling Swan	Migrant, river marsh
Trumpeter Swan	Visitor, river marsh
Lesser Canada Goose	Migrant, possible summer breeder
Black Brandt	Migrant
White-fronted Goose	Migrant, possible breeder
Snow Goose	Spring migrant in large numbers
Emperor Goose	Possible Occurrence
Mallard	Migrant and breeder
Pintail	Migrant and breeder
Green-winged Teal	Migrant, probable breeder
American Widgeon	Migrant, probable breeder
Gadwall	Migrant, probable breeder
Shoveler	Migrant, probable breeder
Harlequin Duck	Mated pairs observed on the River 8-10 June 1977
Greater Scaup	Migrant, may breed on lakes
Ring-necked Duck	Migrant, may breed on lakes
Lesser Scaup	Migrant, may breed on lakes
Canvasback	Migrant, may breed on lakes
Common Goldeneye	Spring occurrences, occasional winter resident
Barrow's Goldeneye	Spring migrant, may breed in area
Bufflehead	Spring migrant, may breed in area
Common Scoter	River mouth and lakes
White-winged Scoter	River mouth and lakes
Surf Scoter	River mouth and lakes
Red-breasted Merganser	Probable breeder
American Kestrel	Fall migrant
Marsh Hawk	Summer resident, hunts over river marsh
Goshawk	Breeds along river
Osprey	Breeds, lakes along river
Peregrine Falcon	Migrant, river and marshes
Bald Eagle	Resident, breeds along river
Golden Eagle	Nests along upper river area
Spruce Grouse	Resident
Willow Ptarmigan	Winter resident to lowlands along River
Sandhill Crane	Migrant, breeder in marshes
Semipalmated Plover	Summer breeder
Black-bellied Plover	Spring migrant
Golden Plover	Limited migrant
Common Snipe	Summer breeder
Whimbrel	Spring migrant
Spotted Sandpiper	Summer breeder
Greater Yellowlegs	Summer breeder

Table 15. continued

Common Name	Habitat and Status
Lesser Yellowlegs	Summer breeder
Pectoral Sandpiper	Migrant
Least Sandpiper	Migrant and breeder
Dunlin	Migrant
Long billed Dowitcher	Migrant
Short billed Dowitcher	Possible breeder
Western Sandpiper	Migrant
Hudsonian Godwit	Spring migrant, possible fall, may nest
Northern Phalarope	Summer breeder
Glaucous Gull	Rare visitor
Glaucous-winged Gull	Common spring, summer, fall
Herring Gull	Fairly common breeder on Skilak Lake
Mew Gull	Common summer breeder
Bonaparte's Gull	Summer breeder
Arctic Tern	Common summer breeder
Aleutian Tern	Possible occurrence
Parasitic Jaeger	Limited summer resident
Pomarine Jaeger	Present
Short-eared Owl	River marshes, limited
Great Horned Owl	Resident
Great Grey Owl	Rare, possible resident
Hawk Owl	Present
Boreal Owl	Possible in tall forests
Belted Kingfisher	Summer resident
Hairy Woodpecker	Wooded areas along river
Downy Woodpecker	Wooded areas along river
Olive-sided Flycatcher	Wooded areas along river
Traill's Flycatcher	Wooded areas along river
Least Flycatcher	Wooded areas along lower river
Violet-green Swallow	Wooded areas along river
Tree Swallow	Wooded areas along river
Bank Swallow	Uses banks on river for nest burrows
Cliff Swallow	Known to nest on local cannery building
Grey Jay	Permanent resident in woods
Magpie	Permanent resident in woods
Raven	Permanent resident
Black-capped Chickadee	Permanent resident in woods
Boreal Chickadee	Permanent resident in woods
Red-breasted Nuthatch	Possible in woods
Dipper	Small streams and river
Brown Creeper	In wooded areas
Robin	Common summer resident
Varied Thrush	Common in tall forest and mixed conifer
Hermit Thrush	Forests
Swainson's Thrush	Mixed woods, conifer, and deciduous
Grey-cheeked Thrush	Mixed woods, conifer, and deciduous
Golden-crowned Kinglet	Conifer
Ruby-crowned Kinglet	Conifer
Water Pipit	Tidal marshes
Bohemian Waxwing	In woods

sides of the river. Moose will browse in early spring on emergent plants along rivers, swamps, bogs, and muskegs, especially along the Moose River flats where plants have a higher mineral content than do plants of more mesic regions. No estimates are available on how heavily these areas are used.

Sport hunting success in the Study Area is difficult to determine. The area is divided into two major game management units: Units 7 and 15 (Figure 33). Unit 15 is divided into Unit 15A (north of the river) and 15B (south of the river). Table 16 shows hunting and trapping results from 1971 to the present. During 1975, 684 moose were taken in Units 7, 15A, and 15B.

Black and brown bear are prevalent throughout the area. Black bear are found in larger numbers than are brown bear. The largest concentrations are north of Sterling, where black bear range from Beaver Creek and the Swanson River east to within approximately 5 miles of the Kenai Mountains.

Black bear also inhabit higher elevations in the Round Mountain and Dike and Thurman Creeks area (2,000 to 3,500 feet); they occur on an unnamed mountain northeast of Tustumena Lake, and have occasionally been observed along the Kenai River between Jean Creek and the Russian River.

Black bear usually hibernate between November and April, but sightings have been reported during every winter month. In early spring after hibernation, black bear will move into lower wetland areas to feed on grasses, sedges, and horsetails. In early summer as plants mature, black bear will supplement their food source with a variety of berries (blueberry, lowbush cranberry, elderberry, and Arctic bearberry). They range great distances in search of food. Along the Kenai and its tributaries, black bear use salmon as a major food source. Black bear taken by hunting since 1973 are listed in Table 16.

Following a hibernation period similar to that of black bear, brown bear concentrate in late spring and early summer. Heaviest concentrations are observed along the Killey, Funny, and lower Kenai as shown in Figure 32. Food habits of the brown bear are similar to those of black bear. Brown bear fish in late summer and early fall in the lower reaches of the Kenai River between Soldotna and Kenai, where the primary species taken is pink salmon (Figure 32). Brown and black bear will occasionally prey on caribou or young moose. Brown bear harvested through sport hunting are listed in Table 16.

Johnson and LeRoux[73] have studied brown/grizzly bears near Island Lake north of Kenai, and at the mouth of Chickaloon River on the Kenai Peninsula. In an earlier study, Chatelain[74] examined bear-moose relationships on the Kenai Peninsula.

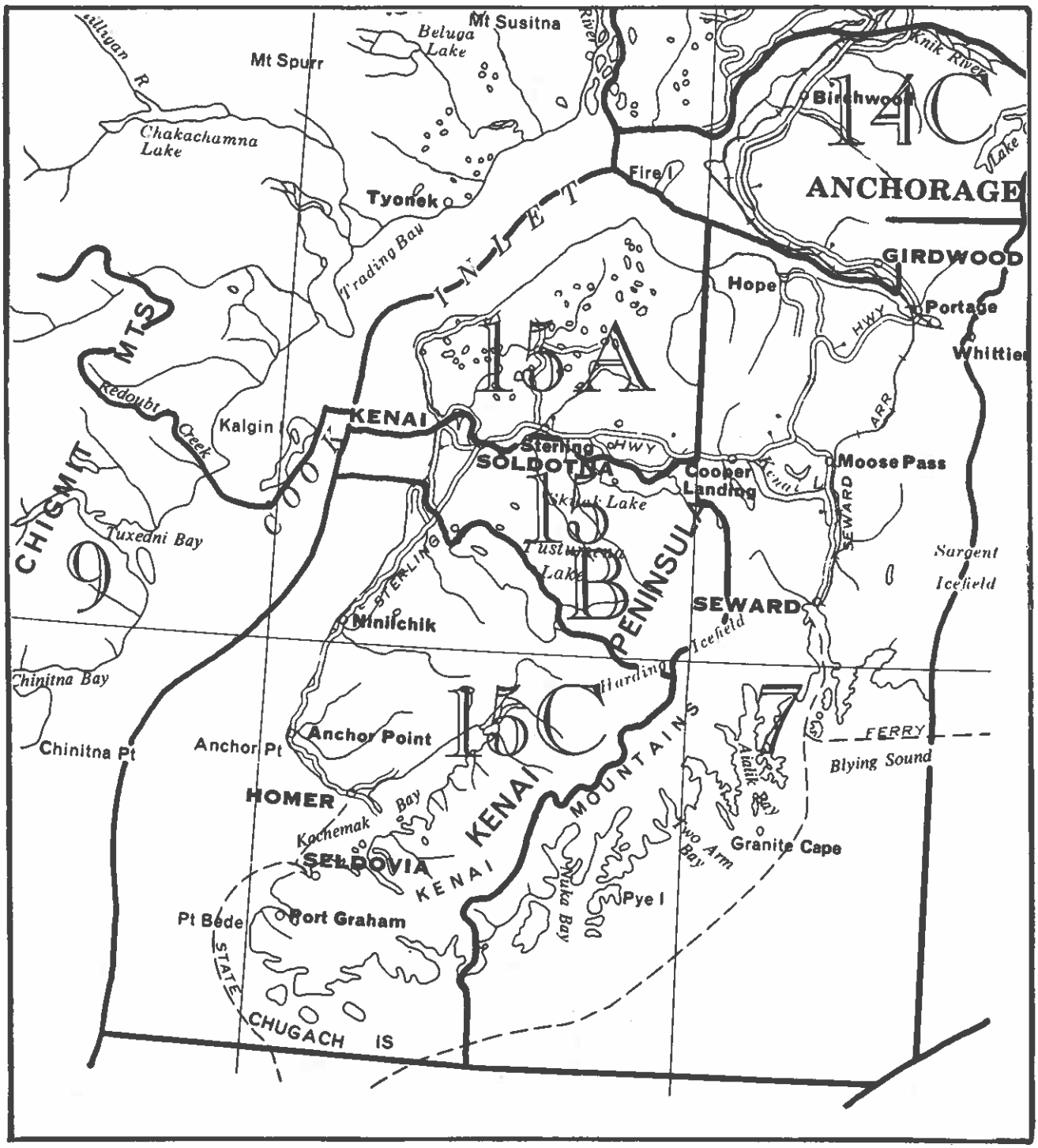


Figure 33. Game Management Units (after Alaska Department of Fish and Game, 1977).

Table 16. Game Animals Harvested by Various Methods, 1971-1975.

Type	1971-1972	1972-1973	1973-1974	1974-1975
Section:	Unit 7			
Moose	169	176	161	64
Black Bear	-	-	38	40
Brown/Grizzly Bear	0(1971)	1(1972)	2(1973)	-
Wolverine	23	24	12	19
Dall Sheep	9	18	26	18
Mountain Goat	-	127	166	64
Section:	Unit 15 (15a & b)			
Moose	853(15a)	339(15a)	270(15a)	620(15a & b)
Black Bear	-	-	55	46
Brown/Grizzly Bear	-	-	6(1973)	8(1974)
Wolverine	25	20	15	14
Dall Sheep	25	18	34	50
Mountain Goat	-	16(1972)	17	9

Source: Alaska Department of Fish and Game.

Caribou, prevalent in the area before fires in the late 1880's, were reintroduced north of the Kenai River in the mid-1960's. Their summer range is now in muskeg areas north of Kenai Airport.[60] Wintering areas are the Moose River Flats.[60,63]

The current population in this area varies between 65 and 80 caribou. The entire Kenai Peninsula herd was estimated at 397 in 1975.[60] Population data indicate that the herd is increasing.

The caribou prefer to feed during daylight hours, and they feed in a leapfrog manner. When the lead animal reaches a suitable location, the herd feeds in a counterclockwise direction. Principal browse of this caribou herd is thought to be sedges, as few lichens are available.[63] Wolves, black bear, and coyote are thought to prey on the herd, but the level of predation is not known.

Dall sheep are found along the mountains on both sides of the river. Heaviest concentrations occur south of the river and west of Skilak Glacier. Approximately 200 sheep inhabit the mountains northwest of the Killey River, while approximately 400 are known to occur on the mountainsides southwest of the Killey River.[63] The population is estimated in the Russian Mountain area at approximately 200 animals.[63] Round Mountain is estimated to support less than 30 sheep.[63] Other mountains in the area support varying sheep populations.

Dall sheep move primarily during summer months; movement is restricted during winter months to snow-free areas. Sheep move downslope in spring, when snowmelt begins, to feed on early emergent vegetation. As the snow retreats, sheep progress up-slope following the growing vegetation. As this movement begins, rams leave the herd and move to their summer grounds. They continue this segregation until late October and may range to high elevations and in rugged terrain.

Primary food of Dall sheep is grasses and forbes of the alpine tundra. The sheep will browse to some extent, primarily on dwarf willow. Scrub aspen is often used as resting habitat where the sheep can obtain cover while they continue to observe visually.

Mountain goats are found on various mountain peaks along the river. Usually they are seen on pinnacles, escapement lines, and other places inaccessible to man. Major goat concentrations lie south and west of Skilak Glacier north of Tustumena Lake. The mountain goat is diurnal. Movements made by the animal are governed by the breeding season, weather conditions, and food availability. If food is plentiful, goats may feed for several weeks in an area of 100 to 200 acres. They congregate in areas swept clear of snow in winter.

Other mammals in the area occur in varying densities. Density of the Red fox varies from moderate in the lower river sections below Sterling to low in the upper sections above Sterling. Mink are fairly

common throughout the area. There are dense populations of coyotes. Otter, once fairly common, are becoming scarce. Rausch and Pearson[75] include sampling sites from the Kenai Peninsula in their report on the wolverine in Alaska and the Yukon Territory. The wolverine is both an important terrestrial carnivore and a valuable furbearing mammal. Muskrat abundance is greatest in the slackwater of Skilak Lake, but they are fairly common in other sections of the river. There are long-tail and least weasels, red squirrel, and snowshoe hares in various densities throughout the area. There are an estimated 100 wolves in the peninsula,[60] but few in the immediate Study Area. Wolves are known to prey on caribou, but the extent of this predation is not known. Further information on mammal densities may be obtained from the Game Division, Alaska Department of Fish and Game, Soldotna, Alaska.

SUMMARY

The Kenai River watershed supports plants and animals that are diverse, abundant, and ecologically sensitive. The area is relatively undisturbed compared with many places in the lower 48 states. There are habitats that exist within the area of Corps of Engineers jurisdicition that must be protected against disruption so that the present ecological condition may be preserved or improved. Wetlands represent an ecosystem that is fragile but critical to the maintenance of water quality and wildlife populations. The Kenai River system currently supports an ecologically and economically important salmon population. Salmon require rigidly defined high quality environments for their reproductive activities. It is ironic that, while human demands on the area result largely because of the salmon, they pose the most significant threat to the salmon's existence. Except for the moose and Alaskan spruce grouse, relatively little is known about other important game species, and almost nothing about the biota that supports these game animals.

The findings of the Biological Profile lead to the following conculusions with regard to the Corps' permit authority:

General: Human activities that will degrade the wetlands or degrade the suitability of the Kenai River system as a salmon spawning and rearing area will be discouraged.

- Biological 1: Because wetlands are critical habitats for a variety of wildlife, and because they are important to the ecological integrity of the area, any activity that would alter them should be discouraged.

- Biological 2: Tributaries to the Kenai River are known, or believed to be important salmon spawning and nursery areas. Human activities in these areas are likely to cause siltation, alter or destroy habitat, change stream

flow, and degrade water quality. Because these impacts will severely degrade the suitability of the area for salmon spawning or for use as a nursery, activities in these areas should be discouraged.

- Biological 3: The mainstem of the Kenai River is known to be an important salmon migration, spawning, and nursery area. Activities along the river could alter stream flow, increase or change sedimentation rates or patterns, and degrade water quality. Development on the river should be conducted in a manner that minimizes or avoids such impacts.

CHAPTER 5

LAND AND WATER USE PROFILE

INTRODUCTION

Existing land and water uses along the Kenai River will affect not only the distribution of but also the amounts and types of economic activity in future years. Some of these activities involving the river will require a Corps of Engineers permit. Through an understanding of present land and water uses and trends, the Corps will be better prepared to respond to future permit requests.

In some instances the issuance or denial of specific permits may conflict with local land and water use patterns. When these patterns are identified and their cumulative impact is understood, the conflicts may be resolved.

In the following pages, land and water uses along the Kenai River are examined. Trends for future land and water uses also are discussed.

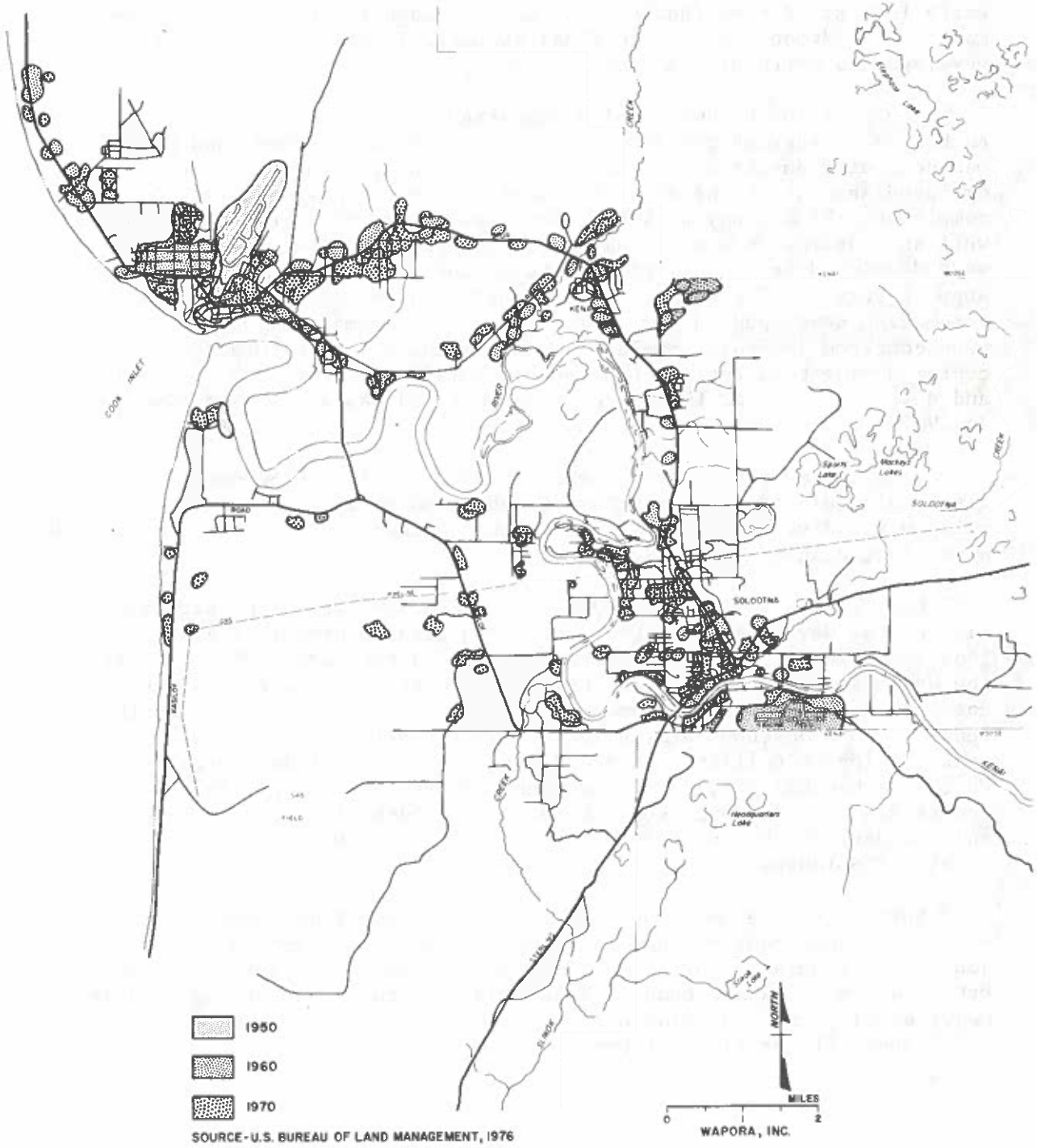
SETTLEMENT PATTERNS

Settlement took place in the Study Area in four time phases: pre-1950, 1950-1960, 1960-1970, and 1970 to the present. Settlement has been in direct response to economic stimuli such as trapping, fishing, mining, and oil production. Figure 34 shows developmental patterns for Kenai-Soldotna during the years 1950, 1960, and 1970.

Pre-1950 settlement began in the late 1700's as Russian trappers established what is now the city of Kenai. The fortified post established by the Russians represented an extension of territory. The Kenai River was used as access to inland trapping sites. After the purchase of Alaska by the United States in 1867, a U.S. Army fort was established in Kenai in 1869. The then Fort Kenay was abandoned in 1870. More settlers moved into the area, and a U.S. Census in 1880 reported 44 residents living in Kenai. The settlers built houses on the bluffs overlooking the river and Cook Inlet near old Fort Kenay. Fishing, hunting, trapping, and some mining were the primary occupations. The first canneries were established in 1884, providing seasonal employment for some of the residents.

With the discovery of gold in the Cook Inlet area in 1896, new people moved into the Kenai area, mainly from the Seattle area. A U.S. Post Office was opened in Kenai in 1899. The population of Kenai continued to grow; in 1920 it was estimated at 332, mostly residing in what is now the center of the city of Kenai.

The area was opened to homesteading in 1947, and, shortly after, four former Kenai area residents homesteaded what is now Soldotna. Naptowne (Sterling) also was homesteaded during this period. By 1950 the population of Kenai was 321 with 169 more residents in isolated homesteads along the Kenai Spur and Kalifonsky Beach Roads. There was evidence of core city in Kenai, with stores offering varied ser-



URBAN GROWTH (IN THE KENAI - SOLDOTNA AREA) FIGURE 34.

vices in the city. Two canneries, one located off Beaver Loop Road and another off Kalifonsky Beach Road, provided seasonal employment for local residents.

During 1950-1960, major changes occurred that accelerated the formerly slow-paced growth and settlement. Seward Station, a U.S. Army communications center was constructed north of Kenai in the early 1950's. A road (North Kenai Road) connecting the station (now known as Wildwood Station) to Kenai resulted in small residential developments north of the city.

The Sterling Highway, which connected the growing metropolis of Anchorage to various peninsula communities (Seward, Kenai, and Homer), was completed during this period. During its construction, the project employed several of the original Kenai Peninsula homesteaders. Once completed, the highway provided increased access to homesteaders as well as tourists, hunters, and sport fishermen. While homesteads were developed largely in areas outside the existing communities, support services for the expanding tourist and recreation industry were being developed in the communities. New commercial developments were centered in Kenai. Soldotna also expanded as a population center during this period, however, with major increases in population and development after the discovery of oil and gas at Swanson River in 1957.

With the advent of hydrocarbon development in the Swanson River field, oil-related infrastructure, roads, and residential areas developed rapidly. This boom environment continued for several years, with needs exceeding available services.

Development during 1960-1970 was related primarily to increased oil and gas development in Cook Inlet and Kenai Peninsula fields. In 1963 Standard Oil of California constructed a refinery at Nikiski off the North Kenai Road. Settlements in the North Kenai area grew accordingly. Increased settlement was most evident in Kenai and North Kenai, as hydrocarbon-related industrial activity increased (e.g., construction by Collier Carbon and Chemical Co., Phillips Petroleum Co., Marathon Oil Co., and Tesoro Petroleum Co.). Strip development occurred along the North Kenai Road because lateral roads were poor and residents wanted to live closer to support services (i.e., in Kenai and Soldotna).

During this period, isolated residential dwellings were constructed in Sterling, many of them for people employed in various oil-related jobs. The population of Cooper Landing increased for similar reasons, but to a lesser extent than in Kenai and Soldotna. In both communities major development was adjacent to the Sterling Highway, with little off-highway (lateral) development.

Since 1970, and especially since 1974, settlement in Kenai, Soldotna, and Sterling has proceeded rapidly. The most noticeable change has been from corridor development (i.e., along the Sterling Highway) to lateral development. The area has undergone rapid subdivision development with accompanying off-highway road networks. Development along the river began in the early 1970's and continues to the present. Increased tourism and recreational activities have contributed in large part to increased development in Sterling, and especially in Soldotna.

Kenai has not benefited from tourist and recreational activity to the same extent as Sterling and Soldotna, but has continued settlement as a slower pace. Settlement has not increased appreciably in Cooper Landing. Developed areas throughout the Study Area are shown in Figure 35.

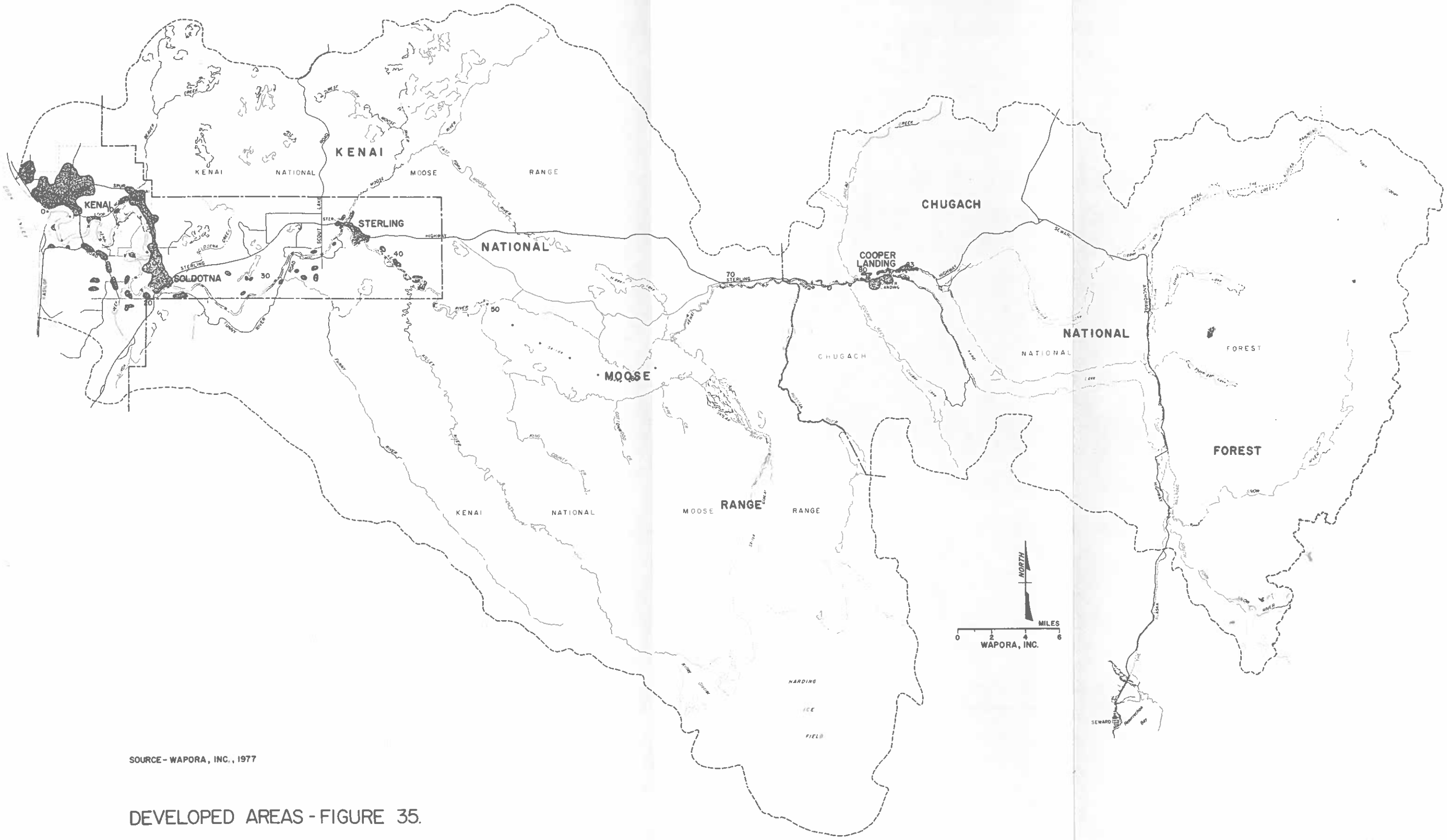
LAND USE

Within the Study Area, for purposes of this investigation defined as the Kenai River watershed downstream of the Sterling Highway bridge at Kenai Lake, three distinct ownership patterns are evident (Figure 2). Ownership is divided between private land (the Study Corridor between River Mile 0 to River Mile 25 and between River Mile 28 to River Mile 45) and federal land (from River Mile 45 upstream).

Exceptions to these general patterns are evident within both the corridor and federal land. Although it is beyond the scope of this project to present detailed data on ownership along the corridor, some city, borough, state, and federal holdings are known. Government holdings occupy only a small portion of river frontage in the corridor, however, as the majority of river frontage is owned by the private sector.

Lands in the Kenai National Moose Range (River Mile 25 to River Mile 28 and River Mile 45 to River Mile 73.6) are owned by the federal government and are administered through the U.S. Fish and Wildlife Service. There are, however, two private holdings in this section of the Moose Range: Caribou Island and a 5-acre tract south of Skilak Lake.[76] Approximately 4 years ago, the Kenai Native Association filed for lands in the slackwater area of Skilak Lake. This area, known as Steponka Village, was once a small village inhabited by the ancestors of present day Kenai Indians. If the Association is successful in its claim, the selected lands must be managed in accordance with U.S. Fish and Wildlife Service refuge standards. The Service also has the right of first refusal on the purchase of the land should the Kenai Native Association choose to sell.[77]

Within the Chugach National Forest, several parcels of land (shown in Figure 36) are held by private interests. In recent months,



SOURCE - WAPORA, INC., 1977

DEVELOPED AREAS - FIGURE 35.

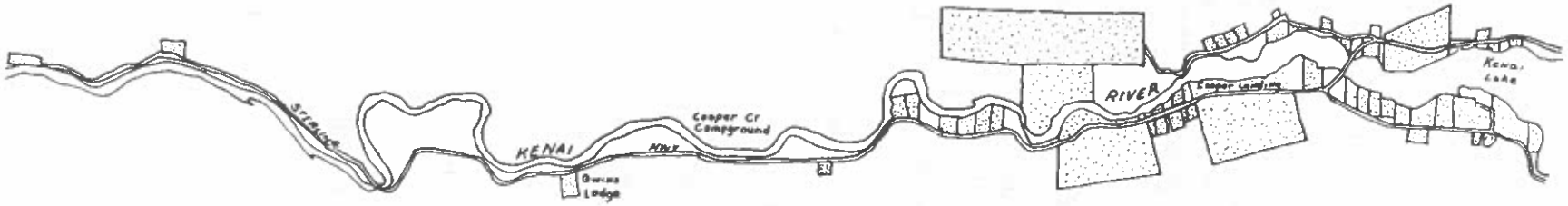


Figure 36. Private Holdings: Cooper Landing, Alaska (U.S. Forest Service, Chugach National Forest, 1977)

the village of Cooper Landing has filed with the state of Alaska under the Alaska Statehood Act for selection of 1,780 acres. Approximately 60% of this land is on the south side of the river, and the remaining 40% is to the north. Current estimates indicate transfer of the land should occur in early 1978.[77] Transferred land would become the property of the state of Alaska. The Kenai Peninsula Borough then could select up to 10% of this land for its purposes.

Studies completed in 1976 by the firm Mathematics Northwest, Inc., as part of an overall socioeconomic study of the Kenai-Soldotna area, described land distribution by commercial, industrial, residential, and public and semipublic building use categories.[78] The data (Tables 17 to 19) were compiled using aerial photographs for the years 1948, 1962, 1963, 1969, and 1974.

No data are known to be available for Sterling or Cooper Landing.

During 1950, most of the development in the Study Area was in the city of Kenai. Slightly more than half of this development was accounted for by the building of two fish canneries. Most of the rest took place laterally between the Kenai Spur Road and the Kenai River.

Between 1950 and 1960, total residential land increased almost sixfold. By mid-1960, Soldotna and the Standard Oil Refinery were established. Residential development increased along the Kenai Spur Road and North Kenai Road.

By about 1960, Kenai and Soldotna accounted for 72% of residential development in the analysis area. Because of a marked increase in industrial development in the North Kenai area, Kenai and Soldotna were affected in that they provided support services for this rapidly expanding industrial sector. Development in the residential service sector of North Kenai, however, did not increase appreciably.

Between about 1960 and 1970, total area development more than doubled. As in 1960, most residential growth was in the Kenai-Soldotna area, while industrial growth was centered in North Kenai. Although several mobile home parks were developed in the North Kenai area during this period (used primarily by seasonal construction workers), most of the permanent residential structures were erected in the Kenai-Soldotna area.

Table 20 shows that total per capita land use increased between 1950 and 1960 and decreased between 1960 and 1970. This decrease may be a result of overbuilding during the boom period (i.e., 1950-1960) leading to surpluses. This phenomenon appears to have occurred especially in the industrial sector, where per capita land use declined between 1950 and 1960 and again between 1960 and 1970.

Table 17. Land Use Distribution in Acres:
North Kenai, Kenai, Soldotna Area, Circa 1950, 1960, and 1970

Year and Analysis Area	Land Use				
	Residential	Commercial	Industrial	Public and Semi-public Buildings	Total
1950:					
Kenai	38.0	6.1	67.6	10.5	122.2
Soldotna	1.0	-	-	-	1.0
North Kenai	4.0	-	-	-	4.0
Kenai-Soldotna Interurban	-	-	-	-	-
Total Analysis Area	43.0	6.1	67.6	10.5	127.2
1960:					
Kenai	154.2	24.2	70.6	24.8	273.8
Soldotna	53.1	18.9	28.7	48.8	149.5
North Kenai	49.1	13.8	202.3	-	265.2
Kenai-Soldotna Interurban	33.3	-	12.3	-	45.6
Total Analysis Area	289.7	56.9	313.9	73.6	734.1
1970:					
Kenai	415.8	77.0	183.4	117.5	793.7
Soldotna	216.7	40.0	39.2	89.5	385.4
North Kenai	277.1	70.1	659.9	12.2	1,019.3
Kenai-Soldotna Interurban	99.2	0.8	46.9	7.6	154.5
Total Analysis Area	1,008.0	187.9	929.4	226.8	2,352.9

Table 18. Land Use Distribution, in Percent; North Kenai, Kenai, Soldotna Area, Circa 1950, 1960, and 1970

Year and Analysis Area	Land Use: Residential	Commercial	Industrial	Public and Semipublic Buildings	Total	Population Estimate	% Population Change
1950							
Kenai	88.4	100.0	100.0	100.0	96.1	321[a]	-
Soldotna	2.3	-	-	-	0.8	NA	-
North Kenai	9.3	-	-	-	3.1	NA	-
Kenai-Soldotna Interurban	-	-	-	-	-	NA	-
Total Analysis Area	100.0	100.0	100.0	100.0	100.0	498[a]	-
1960							
Kenai	53.2	42.5	22.5	33.7	37.3	788[a]	142.4
Soldotna	18.3	33.2	9.1	66.3	20.4	332[b]	NA
North Kenai	17.0	24.3	64.5	-	36.1	NA	NA
Kenai-Soldotna Interurban	11.5	-	3.9	-	6.2	NA	NA
Total Analysis Area	100.0	100.0	100.0	100.0	100.0	2,762[a]	454.6
1970							
Kenai	41.2	41.0	19.7	51.8	33.7	3,533[a]	354.1
Soldotna	21.5	21.3	4.2	39.5	16.4	1,202[b]	262.0
North Kenai	27.5	37.3	71.0	5.4	43.3	2,900[c]	NA
Kenai-Soldotna Interurban	9.8	0.4	5.1	3.3	6.6	2,122[c]	NA
Total Analysis Area	100.0	100.0	100.0	100.0	100.0	9,757[a]	283.4

[a]Tussing, Arlon, et al. (Editors), Alaska Fisheries Policy (Fairbanks, Institute for Social, Economic, and Governmental Research, University of Alaska, 1972), p.339.

[b]U.S. Bureau of the Census, U.S. Census of Population: 1970, Number of Inhabitants, Final Report, PC(1)A3, Alaska, Table 10.

[c]Estimated. Alaska Department of Labor, Alaska 1970 Census Atlas - Population by Enumeration District, pp. 31-32.

Table 19. Total Land Use in Acres: North Kenai, Kenai, Soldotna Area, Circa 1950, 1960, and 1970

Year	Land Use					Area Population Estimate
	Residential	Commercial	Industrial	Public and Semipublic Buildings	Total	
1950	43.0	6.1	67.6	10.5	127.2	498
1960	289.7	56.9	313.9	73.6	734.1	2,762
1970	1,008.8	187.9	929.4	226.8	2,352.9	9,757

Source: Prepared by Human Resources Planning Institute, Seattle, Washington, 1976.

Table 20. Per Capita Land Use Rates: North Kenai, Kenai, Soldotna Area, Circa 1950, 1960, and 1970

Year	Land Use				
	Residential	Commercial	Industrial	Public and Semipublic Buildings	Total
1950	0.086	0.012	0.136	0.021	0.255
1960	0.105	0.021	0.114	0.027	0.266
1970	0.103	0.019	0.095	0.023	0.241

Source: Prepared by Human Resources Planning Institute, Seattle, Washington, 1976.

UTILITIES

The city of Kenai began to develop its community water and sewer system in 1965, with federal funds from the Public Works Act of 1963, and local bonds of over $2 million. The system was extended in 1967, when the Federal Aviation Administration gave the airport to the city, and an additional bond issue was passed. In the late sixties, water and sewer connections are thought to have been mainly for new units; since 1970 the emphasis has been on connecting units formerly having wells or septic tanks. The city supplies water to approximately 3,500 residents (80% of the city's population) through two artesian wells. Current plans call for construction of a 3 million gallon reservoir to be completed by spring of 1978.[79]

The city sewer system currently serves 1,200 people, or 30% of the city residents. Discharge from the plant is to Cook Inlet. The plant, designed for peak flows of 0.5 mgd, is overloaded. Flows now average 0.7 to 0.8 mgd.[79] The city is now in Step I of a Section 201 facilities plan. During this stage, to be completed by August 1977, planning and preliminary engineering for enlarging treatment capacity will be conducted. Step II, which is expected to be completed by early 1978, will include the preparation of construction drawings and specifications. The final result of Section 201 work will be the construction of a larger capacity sewage treatment plant.[80]

The city of Soldotna provides water to approximately 1,200 city residents (60% of the population). Water is supplied by two wells capable of pumping 400 gpm and 450 gpm, respectively. The first well (400-gpm capacity) often pumps unwanted quantities of sand, as a result of earlier construction problems.[81] Additional water service is dictated largely through community needs. If an area is developed (i.e., subdivided) and the developing interest desires water service, the development usually is connected to the city system.

The Soldotna sewer system serves about 500 units. The city sewage treatment plant was originally designed for tertiary treatment. The system has never functioned properly, however, and the plant is overloaded. One of the major causes for this overloading is the local practice called water wasting (running water during the winter months to prevent pipe freeze-up). Discharge is to the Kenai River near Soldotna. Soldotna is now in Step I of a Section 201 facilities plan. Step II should be completed by January 1978.[81]

The remaining residents of the Study Area dispose of their sewage primarily through log cribs, although some septic tank systems or holding tanks are used. Several residents, especially in the Kenai Keys subdivision, use holding tanks. Wastewater is pumped from the tanks by private contractors, and transported either to the Soldotna or to the Kenai sewage treatment plant.

No studies have been conducted in the area to determine the amount of infiltration/inflow, if any.

While the amount of daily industrial wastes generated in Kenai and Soldotna, or in the Study Area is not great as a whole, seasonal wastes are produced by three canneries on the Kenai River. The U.S. Environmental Protection Agency allows a total discharge from the plants of 0.528 mgd.[82] All canneries are located in those sections of the river that are under tidal influence. Wastes are generated in summer and fall during fish-processing operations. Water and sewer service areas are shown in Figure 37.

The Kenai Peninsula Borough established an areawide solid waste disposal system, which includes the Study Area, in 1974. The landfill in Kenai serves the city of Kenai, North Kenai, and Soldotna.

The Chugach Electric Association generates electricity from its Beluga station near Tyonek. The Homer Electric Association, a Rural Electrification Administration cooperative, has distributed the electric power to Kenai, North Kenai, and Soldotna since 1971. Before that year, when it went into receivership, Consolidated Utilities, Incorporated, distributed the power under contract with the Kenai City Light System. In North Kenai, Tesoro and Collier Carbon generate their own electricity, relying on the Homer Electric Association for backup power only.

The Kenai Utility Service Corporation provides natural gas to most of the Kenai residents, while the Collier and Phillips refineries in North Kenai provide gas there, and to some residents in Kenai. Soldotna is served by Anchorage Natural Gas.

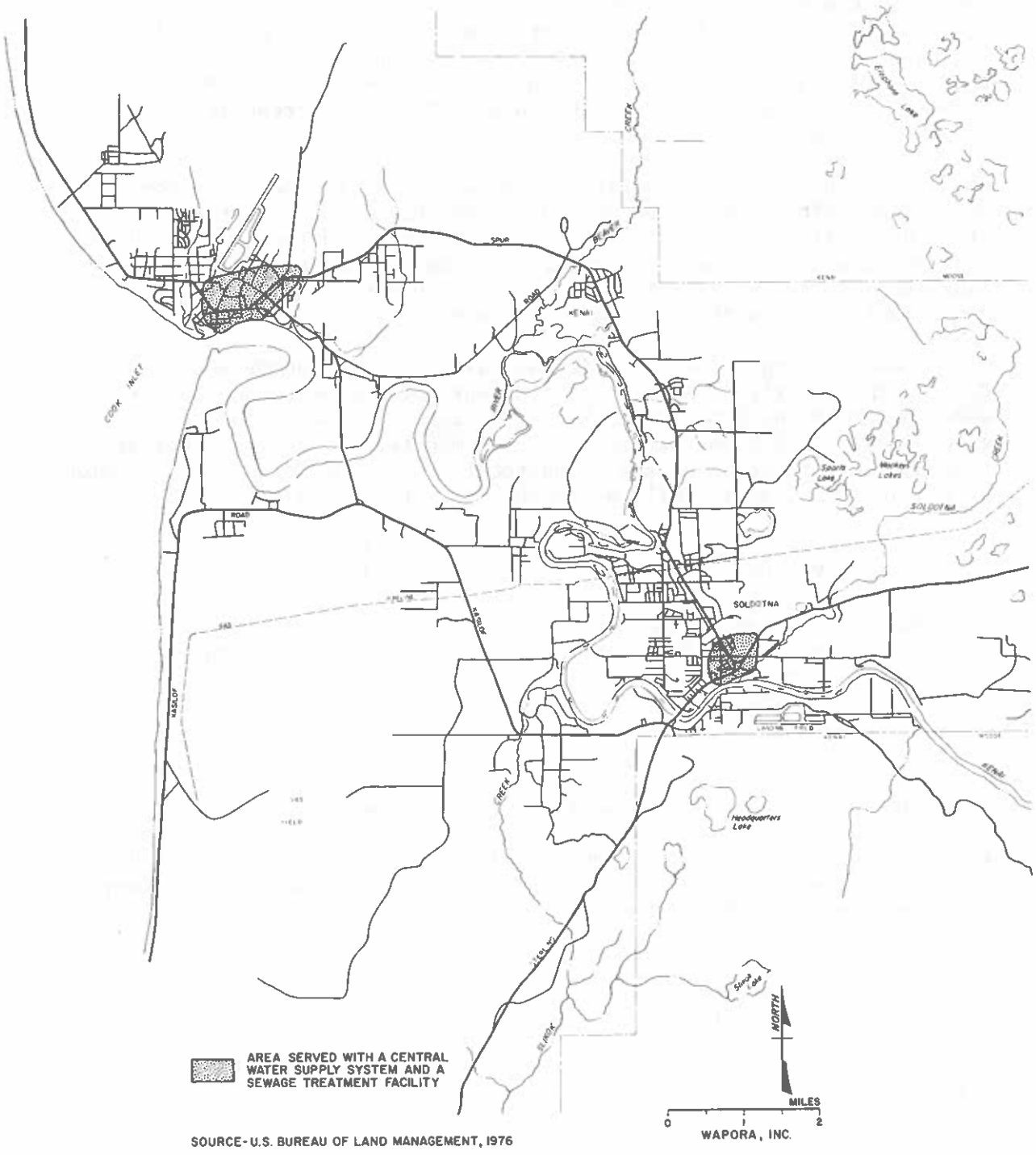
PLANNING AND ZONING

At present there is no comprehensive planning document for the Kenai Peninsula Borough, nor for the cities and communities along the Kenai. The only exception is a master plan for the airport at Kenai;[80] however, this document addresses only sections of the city that would be influenced directly by airport activities.

The cities of Kenai and Soldotna do have zoning ordinances. These ordinances originate in the individual cities subject to final approval by the Kenai Peninsula Borough Planning and Zoning Commission. There is no zoning in the unincorporated communities or outlying areas.

UNUSUAL OR UNIQUE AREAS

There are three parks along the river in the corridor section. The city of Soldotna campground is on the south side of the river at River Mile 20.5. This area is favored for fishing, camping, and picnicking. Another city of Soldotna park is at River Mile 22 on the north side of the river. This site has a public launch facility,



SOURCE- U.S. BUREAU OF LAND MANAGEMENT, 1976

WATER & SEWER SERVICE (IN THE KENAI - SOLDOTNA AREA) FIGURE 37.

as does Soldotna campground. It also is favored for camping, fishing, and other recreational uses. The Izaak Walton Wayside Park, named after the Anchorage-based Izaak Walton League, whose members were instrumental in acquiring the park, is at the confluence of the Moose River and the Kenai River. This park is maintained by the Alaska Department of Parks. It offers camping sites on fee terms, and is a favored fishing and picnicking site. Additional public access to the river is available at the Port of Kenai, Kenai National Moose Range (Skilak Lake sites), and the Chugach National Forest (near Cooper Landing).

The Congress is considering a recommendation to designate most of the land within the Kenai National Moose Range south of the Kenai River as a wilderness area. The area would be named the Kenai Wilderness Area, Andy Simmons Unit, after Mr. Simmons, who served the Moose Range for several years. The designation would not affect the current management policies for this part of the Moose Range.[63]

There is a national historic landmark, the Russian Orthodox Church, in the city of Kenai, located near Fort Kenay on the southwest corner of the city overlooking Cook Inlet. An archaeological site opposite the Moose River has been nominated for national historic status by the state of Alaska, Department of Natural Resources, Division of Parks.[83] A decision will be forthcoming on the nomination.

RIVER USE PRESENT AND FUTURE: POLICY ISSUES

The Kenai River (hereafter referred to as the river) serves a variety of commercial, municipal, residential, and recreational interests, and receives wastewater from these sources. Each use will be discussed separately.

Commercial Uses

There are canneries on the river. These canneries are all in the intertidal area of the river and rely on the river as a transportation corridor for incoming commercial fishing vessels. Fish processing wastes are discharged to the river. The commercial fishing fleet based on Kenai depends on the river for access to the rich fishery of Cook Inlet. Fleet boats are stored near the river.

Sand and gravel are obtained along the Kenai River, from river banks and flood plains.

Various business interests in the Study Area rely on river-related activities such as tourism, fishing, and other forms of recreation.

No known large-scale commercial developments, such as canneries, hydrocarbon-related industries, or power plants, are planned along the river.

Municipal Uses

The primary municipal use of the river is as a receiving water for residential wastewater from the city of Soldotna. Current sewerage studies and the resultant upgrading of sewage treatment facilities will improve the quality of municipally treated effluent now being discharged to the river.

Public boat ramps maintained by Kenai and Soldotna provide local residents and others with river access. One ramp is located at the Port of Kenai. Two boat ramps are located near Soldotna, one at the Soldotna campground on the south side of the river and one at the city of Soldotna Park on the north side of the river.

Future municipal river uses might include wastewater treatment facilities at Sterling and Cooper Landing, but it is now thought that it will be several years before they are constructed. More public boat facilities may be constructed in future years; however, their number and location are unknown.

Residential Uses

Urban

In the vicinity of Kenai and Soldotna, residential development has extended along the river as shown in Figure 34. Most of this area is included in the sewerage facilities planning currently underway and may be sewered. Additional residential development is expected to move away from the river. Treated sewage will be discharged to the river; however, it will not adversely affect water quality because the effluent will comply with state and federal standards. Thus, further direct impacts to the river from urban-oriented residential development are expected to be minimal.

As the urban areas grow, increased pressure on recreational resources will occur. These pressures are discussed in the section on Recreational Uses.

Rural

This discussion will consider only those structures serving as permanent residences. Seasonal dwellings will be discussed under Recreational Uses.

Several permanent residential structures have been erected adjacent to the river. Many of these homes have been built on the high bluffs overlooking the river; others are located in the floodplain.

Development on the bluff areas has, in some cases, increased erosion of the river banks and adds to the silt burden of the river.

Structures actually in the floodplain are, of course, vulnerable to flooding. (See Chapter 3 for a discussion of flooding characteristics of the river.) Many unimproved dirt access roads connect individual houses with major roads, adding to the runoff and erosion problems.

The permanent residences use on-lot sewage disposal systems, as described earlier. Wastewater from these systems reaches a wide range of treatment levels by the time it reaches the river, depending on the type of system used and its distance from the river. There are no plans for extending sewer service to these residences to date.

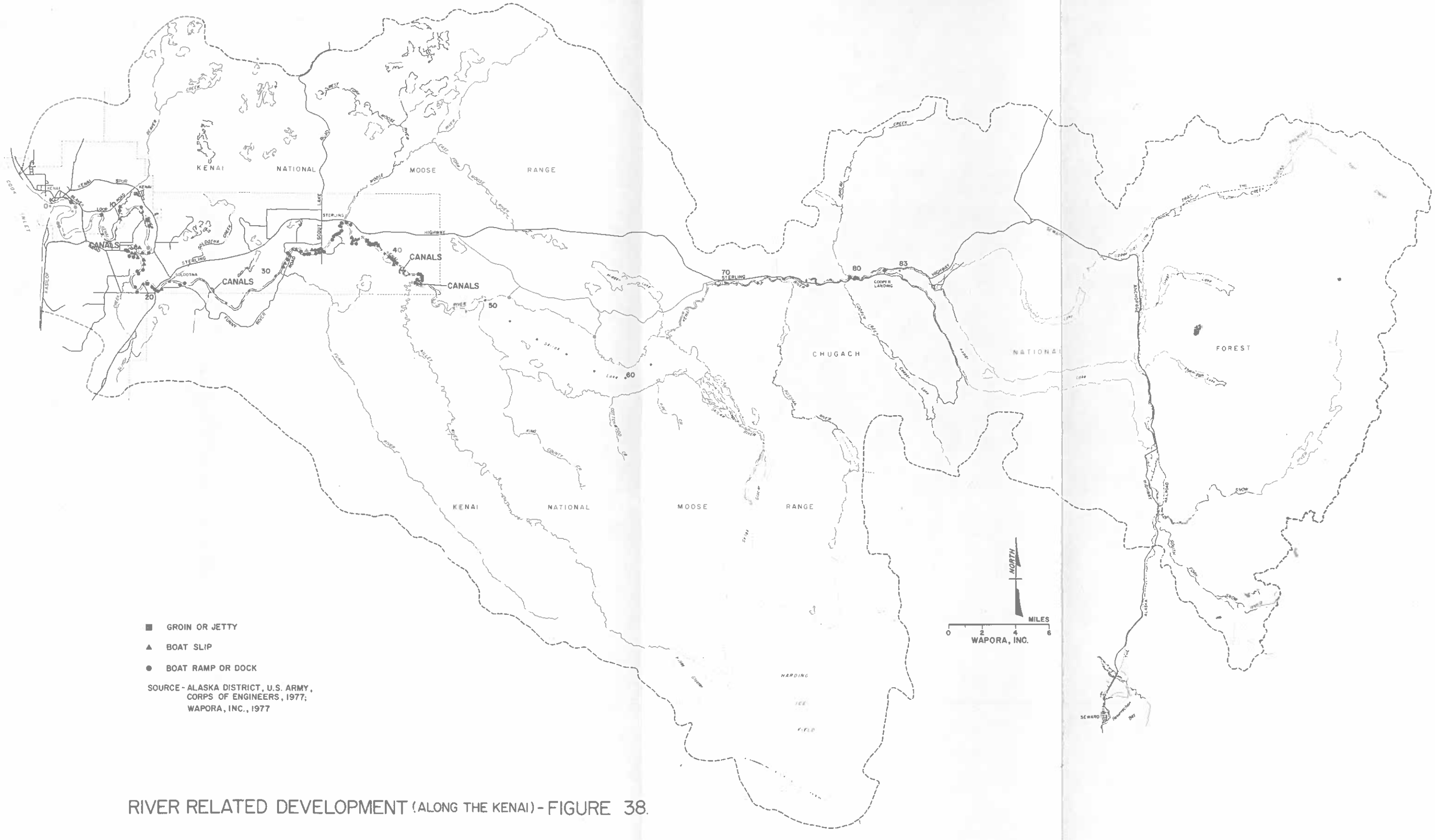
Development trends in the rural areas are similar to those seen throughout the country in fast-growing areas. Land is bought in large parcels by a developing interest, then subdivided into small parcels for homesites or campsites. River-front lots are at a premium, and lots with access to the river are most highly valued.

There are few public river access points, as discussed under Municipal Uses, and this situation has prompted local residents to construct their own piers, groins, jettys, canals, and other facilities. Developers also construct these types of structures on subdivided lots. (Examples are shown in Figure 38.) Most of these access facilities have been constructed in the Study Corridor, where 90 separate structures have been observed. Five have received a Corps of Engineers permit, and most have been constructed haphazardly. Flooding takes a heavy toll on these structures; consequently, maintenance is a continual problem. Recent flooding occurred during August 1977, causing an unknown amount of damage. Houses on canal systems were flooded to varying depths, as shown in Figure 39.

Recreational Uses

Recreational activities on the river and tributaries far outnumber commercial, municipal, and residential uses. The river is the center of recreational activity for the major population centers of south central Alaska. This level of activity is greatest during the summer. Anchorage accounts for a large share of the recreational users, as residents leave the city for various weekend activities. The Kenai River is often referred to as "Anchorage's Playground."

The river and adjacent lands are frequented by both organized tour groups and independent tourists. Summer activities include canoeing, camping, backpacking, hiking, picnicking, wildlife viewing, and photography. Waterfowl are hunted in the fall in the Kenai Flats, and to a lesser degree in the slackwater of Skilak Lake. Snowmobiling, trapping, cross-country skiing, and snowshoeing are popular winter activities.



■ GROIN OR JETTY

▲ BOAT SLIP

● BOAT RAMP OR DOCK

SOURCE - ALASKA DISTRICT, U.S. ARMY, CORPS OF ENGINEERS, 1977; WAPORA, INC., 1977

RIVER RELATED DEVELOPMENT (ALONG THE KENAI) - FIGURE 38.

Figure 39. Flooding of Kenai River at Kenai Keys During August 1977 (US Fish and Wildlife Service).

Although the foregoing contribute to overall recreation, the major recreational pursuit is sport fishing. The river and tributaries support the largest freshwater fishery in Alaska. The Alaska Department of Fish and Game estimates that anglers will spend 200,000 man-days in pursuit of salmon, trout, and char during the 1977 sport fishing season.[59] Anglers appear in virtually all sections of the river, except in areas of treacherous water. Boats of every size and shape are seen on the river. Riverboats with large horsepower engines equipped with jet units are favored, as this system permits rapid travel upstream.

There is some pleasure boating, but sport fishing is the major boat-related activity. Angling is more successful from a boat, as anglers float downstream trolling with fresh salmon eggs or artificial lures.

Increased boating pressure on the river has in part dictated the types of river-related developments that have taken place. The river is quite swift, some banks are very steep, and most of the low-lying areas with gentle sloping banks are saturated with water and soft. The problem for the boater, therefore, is one of access. There are now only seven public (nonfee) access ramps available. This lack has prompted individual landowners to construct private structures, as discussed under Residential Uses.

Uses

The demand for recreational activities involving the Kenai River is expected to increase with the expanding population of south central Alaska. With relatively easy access to the Kenai area given, and the excellent recreational opportunities offered by the river, this resource will be in greater demand in the future.

Increased demand will result in increased Corps of Engineers' permit requests, which are expected to be heaviest in the Study Corridor (Subareas I through IV).

SUMMARY

Existing land use in the Kenai River Area consists of residential and commercial dwellings centered in the communities of Kenai, Soldotna, Sterling, and Cooper Landing. There are isolated residential and recreational units in the floodplain. The Kenai River is used primarily as a recreational resource. Sport fishing is the major recreational activity. Areas suited for development lie outside the floodplain on adjacent uplands.

Requests for Corps permits are anticipated to be related primarily to river access, and they will arise primarily from property owners

within the Study Corridor. The number of permit requests from residents of Cooper Landing will increase after federally owned lands in the area are transferred to state and, ultimately, private ownership. Additional requests will come from those residents of the Study Area desiring to fill wetlands for construction purposes.

Based on the findings of the Land and Water Use Profile, the following general conclusions are made with regard to Corps permit authority:

- Land and Water Use 1: To alleviate and reduce possible flood hazards resulting from floodplain construction, permit requests for activities in the floodplain should plan flood proofing and erosion control measures.

- Land and Water Use 2: To reduce sewage disposal problems, permit requests for activities in the floodplain and adjacent wetlands should ordinarily be denied unless the applicant can demonstrate that sewage disposal systems will meet or exceed the criteria of the U.S. Environmental Protection Agency and the Alaska Department of Environmental Conservation.

- Land and Water Use 3: Permit requests for community public access facilities should be encouraged and will ordinarily be granted, assuming the facilities meet or exceed established design criteria.

CHAPTER 6

SOCIOECONOMIC PROFILE

INTRODUCTION

The Kenai River watershed (Study Area) is one of two major economic and social nuclei in the Kenai Peninsula. It is in the northwest part of the Peninsula, and its population is concentrated on the eastern shore of Cook Inlet. The other major nucleus--Homer-Seldovia--is also on the eastern shore of Cook Inlet in the southwest part of the Peninsula.

Kenai is the second oldest settlement in Alaska. It was founded in 1791 as a Russian fur-trading post. Its position at the mouth of the river gave access to the hinterland and to the outside world by way of Cook Inlet. It is the largest city in the Borough and developed as a trading and fishing center. Kenai is on the Sterling Highway linking Anchorage and Homer, and now has extensive economic ties with North Kenai, which grew in the sixties to become the focus of Alaskan oil and gas activity.

Soldotna is 21 miles upriver from Kenai. It was established in the late forties. It is strategically located where the river turns northwest and where Sterling Highway turns south to Homer. Soldotna grew as a result, especially, of its proximity to Alaska's first oil strike in 1957 at Swanson River.

Sterling is 10 miles east of Soldotna at the junction of the Moose and Kenai Rivers, and is on the Sterling Highway. The Post Office was established in 1954.

Cooper Landing, also on the Sterling Highway, was settled as the first convenient boat landing on the Kenai River east of Kenai Lake. It has had a Post Office since 1937. Cooper Landing also will take part in the general growth in the Peninsula resulting from the Lower Cook Inlet lease sale (October 1977).

In 1960, the export base of the Study Area consisted mainly of commercial fishing and federal (military) employment. By 1972, commercial fishing had become much less important relatively and absolutely, the Wildwood Army Base (established 1951-1952) had closed, and the economy was dominated by petroleum. The detailed analysis presented in this report therefore focuses on the events of the sixties, when the population of the study area rose probably at least fivefold, and on changes since 1970.

AREA COMPARISON

Selected Variables, 1970

The total population of the Study Area is not known, but is concentrated in the two cities (Kenai and Soldotna), in the three unincorporated places (North Kenai, Sterling, and Cooper Landing), and on the former Wildwood (Military) Reservation adjoining North Kenai. Table 21 shows that these settlements had a combined population of about 8,000 in 1970. Kenai and Soldotna are the largest cities in the Borough.

Tables 21 and 22 compare selected 1970 characteristics. Kenai city's ratio of employment to population was slightly higher than that of Kenai-Cook Inlet Census Division or the state in 1970. Its population is also highly mobile, but not so mobile as that of Kenai-Cook Inlet or the state as a whole. Only 13 percent of Kenai's population in 1970 resided in Alaska 5 years earlier; for Kenai-Cook Inlet and the state, the corresponding figures are even lower--11 and 6%, respectively. Median school years completed by those aged 25 years and older were 12.5 in 1970, similar to Kenai-Cook Inlet and the state.

The median age is lower in Kenai and Soldotna then in Kenai-Cook Inlet, the biggest cities, and the state. For all these jurisdictions, median age is significantly lower than in the United States as a whole, where it stood at 28.0 years in 1970. Kenai and Soldotna are predominantly white, somewhat more so than Kenai-Cook Inlet and Anchorage, and much more so than the state. The population distribution by sex does not differ measurably across the jurisdictions. The percentage of the population under 18 (the larger part) and over 65, generally regarded as dependents, is significantly higher than in the biggest cities and somewhat higher then in the state as a whole.

It is somewhat surprising that Kenai had a relatively high median family income (and a relatively low percentage of families below the poverty level) coupled with a relatively high civilian unemployment rate. The reasons may be several, but in the absence of time series data it is not easy to determine which are relevant. Possible reasons include higher earnings among those employed, more families having at least one relatively well-paid wage or salary earner or self-employed member, a higher proportion of military employees, independent sources of income (including support payments) among the unemployed or retirees, and the particular circumstances of 1970. Of these, the first is a priori the most plausible, because the manufacturing sector in the city of Kenai is influenced more by the higher paid chemicals and allied products and petroleum than is the area in Kenai-Cook Inlet, where the sector as a whole is influenced more by the lower paid food and kindred products subsector (e.g., fish).

Table 21. Selected Demographic and Economic Variables: State of Alaska, Three Biggest Cities, Kenai-Cook Inlet Census Division (K-CI), Kenai River Study Area, 1970

	State	Anchorage	Spenard	Fairbanks	K-CI	Study Area	Kenai	Soldotna	Sterling	Cooper Landing	North Kenai	Wildwood Reserv.
Population	302,173	48,171	18,065	14,859	14,250	8,046	3,533	1,202	30	31	2,500[1]	750
Employment	89,236	17,127	7,800	6,113	4,245		1,071					
Employment/ Population Ratio	0.295	0.356	0.432	0.411	0.298		0.303					
Percent Born Outside Alaska	68	68	70	66	79		84					
Percent Resident in Alaska in 1965	6	5	5	5	11		13					
Median School Years Completed[2]	12.4	12.6	12.5	12.6	12.4		12.5					
Percent of Civilian Labor Force	11.3/	8.6/	9.4/	8.8/	14.9/		17.3/					
Unemployed[3]	7.6	6.8	6.7	7.7	11.6		14.7					
Median Family Income	12,443	13,366	14,617	14,495	12,969		15,716					
Percent of Families With Income Less Than Poverty Level	9.3	5.3	5.5	5.5	7.1		4.5					

[1]1969 estimate
[2]25 years or older
[3]Males 16 years or older/females 16 years or older

Sources: U.S. Bureau of the Census, 1970 Census of Population. Kenai Peninsula Borough, Comprehensive Planning Program--Recommendations. Nov. 2, 1970

Table 22. Total Employed by Industrial Sector, 16 Years of Age and Older: State of Alaska, Three Biggest Cities, Kenai-Cook Inlet Census Division (K-CI), Kenai City, 1970

Industrial Sector	State		Anchorage		Spenard		Fairbanks		K-CI		Kenai City	
	Total	Percent	Total	Percent	Total	Percent	Total	Percent	Total	Percent	Total	Percent
Total Employment	89,236	100	17,127	100	7,800	100	6,113	100	4,245	100	1,071	100
Agriculture	1,792	2	56	1	32	-	17	-	127	3	n.av.	-
Mining	2,290	3	426	2	304	4	131	2	460	11	n.av.	-
Construction	8,385	0	1,616	0	802	10	739	12	399	9	87	8
Manufacturing	6,295	7	583	3	215	3	165	3	545	13	145	14
TCU	10,457	12	1,782	10	1,145	15	896	15	590	14	115	11
Trade	16,742	19	3,532	21	2,053	26	1,325	22	840	20	246	23
Finance, Insurance and Real Estate	3,262	4	1,119	7	354	5	293	5	119	3	255	24
Services	34,346	28	5,015	29	1,929	25	1,685	28	873	21		
Government	14,677	16	2,998	18	966	12	362	14	292	7	98	9
Other	-	-	-	-	-	-	-	-	-	-	125	12

n.av. = not available; percent columns may not add because of rounding
Source: U.S. Bureau of the Census. 1970 Census of Population.

Population and Employment, 1950-1976

Time series data are not available for the settlements of the Study Area for the variables shown in Tables 21 and 22. They are available, however, for two variables--population and employment--for Kenai city and for the other jurisdictions. Given the dominant role of Kenai city in the Kenai-Cook Inlet Census Division, trends in the division are mirrored in (or mirror) those in the city. Such data as are available are presented in Tables 23 (population) and 24 (total employment). The growth of the oil and natural gas sector is of central importance in explaining population and employment trends in the division and in Kenai city since 1960. Dates of discovery of oil and gas wells are shown in Table 25 and crude oil and gas production are shown in Table 26.

The most noticeable feature of the population trends shown in Table 23 is the 60% increase in the population of Kenai-Cook Inlet over the period 1967-1969. This growth was followed by a decline in total population (including military) over the period 1970-1973, with an increase since then that suggests a substantial jump from 1974 to 1975. Over the period 1960-1970, the population of Kenai-Cook Inlet more than doubled, while Kenai city grew still faster-- its population more then quadrupled over the same period. By contrast, the state grew by only one-third. The population level in the Study Area since 1970 is not known. Table 23 presents an estimate of 13,650 in 1976 for Kenai, North Kenai, and Soldotna combined. Kenai is estimated to have grown by 20%, and Soldotna by 70%, between 1970 and 1976. The two cities combined grew slightly faster (by 15%) over the period 1970-1975 than Kenai-Cook Inlet (13%). In summary, the general population trends over the whole period 1960-1976 are not very different for Kenai and Soldotna, on the one hand, and Kenai-Cook Inlet, on the other: a rapid increase in the sixties, a lag in the early seventies, and a marked upturn since 1973.

Employment and unemployment trends are shown in Table 24. The most noticeable feature is the rapid growth in Kenai-Cook Inlet over the period 1965-1968, when employment more than doubled. This growth was followed by absolute declines through 1971, and accelerating growth from 1972 on. Over the period 1960-1970 employment in Kenai-Cook Inlet almost tripled. The unemployment rate has changed little over the period 1960-1975. It declines in the short run when substantial increases in employment occur (for example, 1966-1967), and increases when jobs are lost (for example, 1969-1970), but has remained fairly steady overall, even though employment in Kenai-Cook Inlet has risen roughly fourfold over the period 1960-1975. The time-lag changes between population and employment data suggest that people looking for work come to the areas as word spreads that jobs are available, that not all of them get jobs, and that some stay even when the jobs they have end. This phenomenon is typical of a labor market characterized by fluctuation.

Table 23. Population Trends: State of Alaska, Kenai-Cook Inlet Census Division, Kenai Study Area, 1960-1976

Area	1976	1975	1974	1973	1972	1971	1970	1969	1968	1967	1966	1965	1960
State	382,000[1]	365,000[1]	341,000[2]	333,400[1]	325,000[2]	315,000[2]	304,000[2]	296,000[3]	285,000[3]	278,000[3]	271,000[3]	271,000[3]	226,000[4]
Kenai-Cook Inlet C.D.		16,059[1]		13,943[1]			14,250[1]						
		15,621[5]	13,962[5]	13,808[5]	13,830[5]	14,204[5]	14,250[5]						6,097[5]
(civilian only)					12,750[6]	12,540[6]	12,450[6]	11,460[6]	8,936[6]	7,128[6]	7,330[6]	6,681[6]	
Kenai Study Area	13,650[7]						8,046[8]						
Kenai City	4,261[7]	4,028[1]		3,509[1]			3,533[4]						778[9]
North Kenai								2,500[10]					
Soldotna	2,042[7]	1,420[1]		1,232[1]			1,202[4]	1,300[10]					332[9]
Sterling							30[4]						115[4]
Cooper Landing							31[4]						88[4]
Wildwood (Military) Reservation							750[4]						

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[1] U.S. Bureau of the Census. Current Population Report (CPR) P-25 No. 650 May, 1977.
[2] Ibid P-25 No. 640 November, 1976.
[3] Ibid P-25 No. 460 June, 1971.
[4] Ibid 1970 Census of Population
[5] Kenai Peninsula Borough. Overall Economic Development Program. 1976 Revised Document Draft Copy
[6] State of Alaska. Department of Labor. Estimates of Population 1961 to 1972.
[7] Kenai/North Kenai/Soldotna (i.e. excluding Sterling and Cooper Landing. Kenai Peninsula Borough. Profile of 5 Kenai Peninsula Towns 1977.
[8] Table I. Sum of 1970 figures plus 1969 estimate for North Kenai
[9] Incorporated after 1960. 1960 Census of Population
[10] Kenai Peninsula Borough. Comprehensive Planning Program. Recommendations. November 2, 1970.

Table 24. Civilian Employment: Kenai-Cook Inlet Census Division, Kenai and Soldotna, Various Dates

	1976	1975	1974	1973	1972	1971	1970	1969	1968	1967	1966	1965	1960
State	171,700[1]	162,300[1]	128,200[1]	110,600[1]	104,300[1]	97,800[1]	93,100[1] 89,236[2]	86,800[1]	79,900[1]	76,900[1]	73,100[1]	70,500[1]	57,157[3]
Kenai-Cook Inl.		6,118[4]	5,375[4]	4,831[4]	4,589[4] 5,027[5]	4,244[4] 4,594[5]	4,399[4] 4,745[5] 4,245[2]	5,509[5]	5,893[5]	4.926[5]	3,383[5]	2.510[5]	1,501[3]
Percent Labor Force Unemployed		13.4[4]	15.7[4]	16.0[4]	15.8[4]	17.3[4]	15.4[4]						
Percent Work Force Unemployed					16.0[5]	16.6[5]	17.1[5]	12.1[5]	9.9[5]	9.4[5]	13.6[5]	15.1[5]	
Percent Labor Force 14 yrs and older Unemployed							14.0[2]						14.6[3]
Kenai City	1,704[6]						1,071[2]						
Percent Labor Force 16 yrs and older Unemployed							16.5[2]						
Soldotna	817[6]												

Sources:

1 U.S. Department of Labor. Bureau of Labor Statistics. Employment and Earnings. Bulletin 1370-13. July, 1977. (nonagricultural employment)

2 1970 Census of Population

3 1960 Census of Population

4 State of Alaska Department of Labor. Alaska Labor Force Estimates by Industry and Area. 1970-1975.

5 Ibid. Alaska Work Force Estimates by Industry and Area. 1961-1972. (employment by place of work -- counts multiple jobholders more than once.)

6 Calculated by multiplying the estimates population (Table III) by o.4. The workforce/population estimate of 0.4 for 1976 is calculated by extrapolating the 1970-1975 trend for K-CI and appling to both cities. The trend is obtained from Alaska Labor Force Estimated by Industry and Area 1970-1975 (work force data) and from Table III (population.

Table 25. Petroleum and Gas Fields: Kenai-Cook Inlet Region

Field	Type	Location	Date of Discovery of Well
Swanson River	Oil and Gas	Onshore	August 1957
Kenai	Gas	Onshore	October 1959
West Fork	Gas	Onshore	September 1960
Falls Creek	Gas	Tidelands	May 1961
Sterling	Gas	Onshore	August 1961
West Foreland	Gas	Onshore	April 1962
Middle Ground Shoal	Oil	Offshore	June 1962
North Cook Inlet	Gas	Offshore	September 1962
Beluga River	Gas	Onshore	December 1962
North Middle Ground Shoal	Gas	Offshore	November 1964
Trading Bay	Oil	Offshore	June 1965
Birch Hill	Gas	Onshore	June 1965
Granite Point	Oil	Offshore	June 1965
McArthur River	Oil and Gas	Offshore	October 1965
Moquawkie	Gas	Onshore	November 1965
North Fork	Gas	Onshore	December 1965
Nicolai Creek	Gas	Onshore	May 1966
Ivan River	Gas	Onshore	October 1966
Beaver Creek	Gas	Onshore	February 1967
Albert Kaloa	Gas	Onshore	January 1968
Redoubt Shoal	Oil	Offshore	September 1968

Source: State of Alaska, Department of Natural Resources, Division of Oil and Gas, Statistical Report, 1973.

Table 26. Crude Oil and Gas Production: Kenai-Cook Inlet, 1959-1972

Year	Oil (1,000 bbl)	Gas ($ft^3 \times 10^6$)
1959	187	--
1960	578	137
1961	6,327	1,508
1962	10,259	3,556
1963	10,740	10,810
1964	11,054	11,865
1965	11,131	12,155
1966	14,365	41,218
1967	28,914	62,425
1968	66,143	99,849
1969	74,039	148,150
1970	82,414	216,620
1971	77,628	227,903
1972	72,638	222,789
1973	72,196	223,101
1974	70,098	228,528
1975	69,111	250,765
1976	62,404	264,762

Source: State of Alaska. Department of Natural Resources. Division of Oil and Gas. Statistical Reports, 1973 to 1976.

Figure 40 exhibits the close links between oil and gas activity, and trends in employment and population. Four phases in the activity have been distinguished, beginning with Alaska's first strike in 1957.

In the first phase, 1961-1964, the onshore Swanson River oil fields and the Kenai River gas field were developed. In the second phase, 1965-1968, offshore development and associated construction grew rapidly. In the third phase, 1969-1970, the area lost 1,300 workers in the mining and construction sectors, with the completion of the many development activities occurring in the second phase. By 1970, the temporary employment boom had passed, with continuing temporary employment being required only for the liquefied natural gas, the refinery, and three additional drilling platforms. In the fourth phase, 1970 and following, employment first declined from the peak of the temporary construction, and then turned up again, especially in 1974-1975, when it reached the peak attained in 1968.

Figure 40 shows these phases. As oil and gas production picked up, employment increased rapidly in the period 1965-1968, when it led the rise in the population. The increase in employment in the seventies is again leading a rise in the population level in Kenai-Cook Inlet.

Estimates for Kenai city for 1976 suggest that its employment level has more than tripled in the period 1970-1976. This increase is much faster than that in Kenai-Cook Inlet, where the employment level rose by 40% between 1970 and 1975. As a result, Kenai city may now account for as much as 50% of the employment in Kenai-Cook Inlet, compared with less than 25% in 1970.

Table 27 presents employment data showing trends in Kenai-Cook Inlet for 1970-1975, permitting a comparison between the employment structure of Kenai-Cook Inlet in 1975 and Kenai city in 1976.

The decline and subsequent increase in employment in Kenai-Cook Inlet over the period 1970-1975 reflect oil and gas activity. This relationship is borne out in that the sectors associated most directly with such activity--mining, construction, and transportation--lost and then tended to regain their 1970 percentage shares of total employment during the period. The mining sector in 1976 accounted for one-fifth of the civilian employment total. This is very high, and suggests an upturn in mining and construction related to the provision of increased infrastructure (housing, roads, hospitals, etc.) to meet the needs of the increased population. Both events have taken place.

Trends in Major Sectors

Petroleum and Natural Gas

The preceding section described four phases in the development of

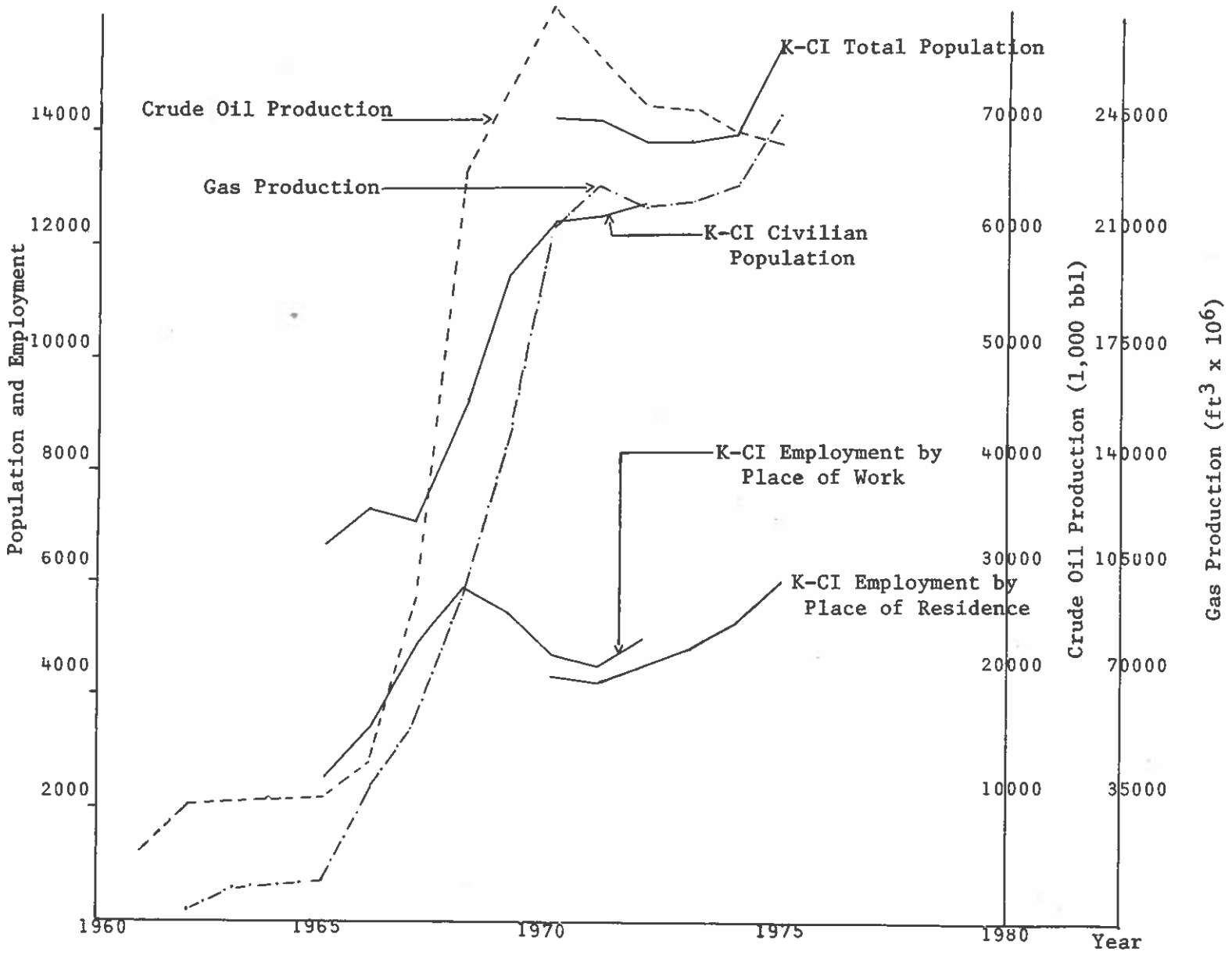


Figure 40. Trends in Population, Employment, and Oil and Gas Production: Kenai-Cook Inlet, 1965-1975.

Table 27. Civilian Employment by Sector, in Percent: Kenai-Cook Inlet, 1970-1975, Kenai and Soldotna, 1976

Sector	Kenai 1976	Soldotna 1976	Kenai-Cook Inlet Census Division[1] 1975		1974		1973		1972		1971		1970	
Agriculture, forestry & fisheries	4.2	4.9	n.av.	--	n.av.	--	n.av	--	n.av.	--	n.av.	--	n.av.	--
Mining	20.5	9.2	686	13.6	503	11.2	560	13.8	528	13.8	525	14.9	652	17.9
Contract Construction	14.0	14.8	548	10.9	442	9.9	343	8.5	433	11.3	398	11.3	354	9.7
Manufacturing	11.6	4.2	742	14.7	716	16.0	629	15.5	553	14.5	524	14.9	551	15.1
Transportation, Communications & Utilities	4.7	11.3	480	9.5	404	9.0	296	7.3	280	7.3	254	7.2	293	8.0
Wholesale & Retail Trade	10.7	16.2	754	14.9	627	14.0	507	12.5	502	13.1	466	13.2	507	13.9
Finance, Ins. & Real Estate + Misc.	1.9	3.5	186	3.7	179	4.0	171	4.2	134	3.5	140	4.0	194	5.3
Services	16.3	25.4	669	13.2	671	15.0	596	14.7	446	11.7	338	9.6	339	9.3
Government	16.3	9.9	990	19.6	945	21.0	947	23.3	946	24.8	873	24.8	750	20.6
Total	100.0	100.0	5050	100.0	4487	100.0	4049	100.0	3822	100.0	3518	100.0	3640	100.0

[1] These figures are work force estimates for nonagricultural wage and salary employees. They count multiple job holders more than once and exclude self-employed, unpaid and domestic workers.

Sources: Kenai Peninsula Borough. Profile of Five Kenai Peninsula Towns. 1977. State of Alaska Department of Labor. Alaska Labor Force Estimates by Industry and Area. 1970-75.

this sector and gave dates of well discoveries and data on production levels of crude oil and natural gas.

As a result of petroleum and natural gas activity, the Peninsula has experienced extensive development "in the form of oil and gas pipelines, marine terminals, refineries, and other processing facilities."[84] There are now 14 permanent drilling platforms in the Cook Inlet, some of which can drill as many as 48 wells. The development of the fields has involved 11 oil companies, including 6 majors. It has led to major onshore facilities in Nikisiki adjacent to the Study Area, including refineries, an ammonia urea manufacturing plant, and a natural gas liquefaction facility. A major LNG plant is planned for North Kenai, which would involve a temporary barge unloading facility south of the plant site for construction equipment, materials, and storage. The facility in turn could become a permanent harbor facility.

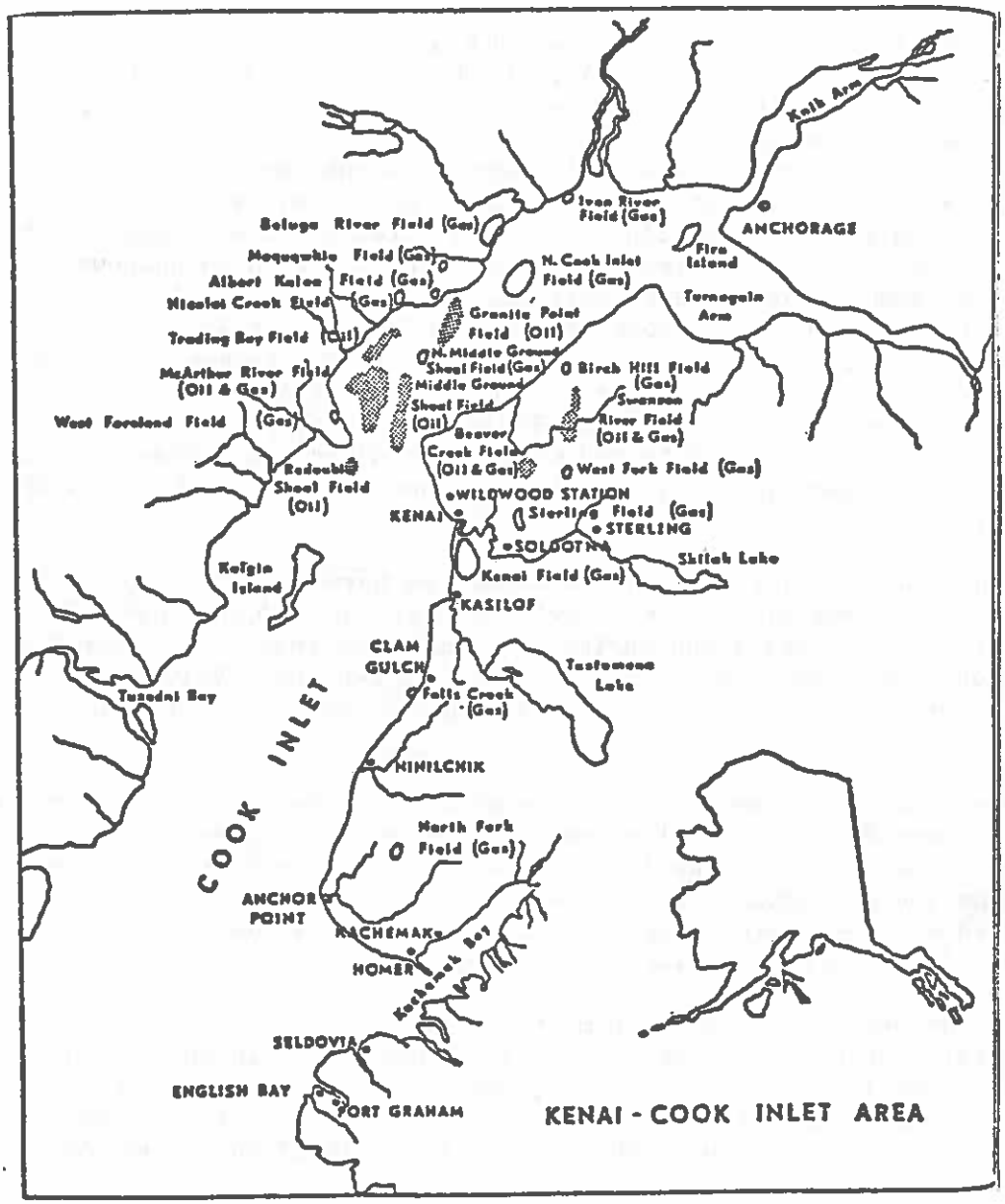
Current oil and gas production is confined to a relatively small area given known deposits (Figure 41). Future production is expected from the submerged lands of Lower Cook Inlet, where a federal lease-sale is expected in October 1977.

The Lower Cook Inlet sale is expected to affect the Study Area to a more limited extent than Homer-Seldovia, which is closer to the lease-sale area. It is expected that by 1983 the population of Kenai-Cook Inlet may increase by about 11,000 and employment by about 5,000 as a consequence of the lease-sale. By contrast, the 1975 population of Kenai-Cook Inlet is estimated at about 16,000, and civilian employment at about 6,000. Thus population is expected to rise by 70% and employment to double in the space of 6 years.

Coal and Metallic Minerals

The Study Area is underlain with coal and metallic minerals, while the surface contains alluvial deposits of sand and gravel. The coal resources are the Kenai coal field in the western half of the Peninsula, and the Beluga coal field west of Cook Inlet. A recent study indicates that the two fields are joined. The Kenai coal field is estimated to contain reserves of 318 million tons, and the Beluga coal field 2.25 billion tons, while Speculative Resources (to a depth of 10,000 feet) for the whole area are estimated at 1,700 billion tons. For comparison, the huge subbituminous and lignite reserves in eastern Montana are estimated at 153 billion tons.[85]

The extent to which the coal and metallic minerals resources may be developed is not now known, and depends on policy decisions at federal and state levels, since the coal underlies the Kenai National Moose Range, while the resources beneath Cook Inlet are considered to be controlled by the state. (Private land holdings are minimal.) The lack of both a transport system and a sufficiently large market has inhibited their development hitherto.



Source: Mathematical Sciences Northwest, Inc. and Human Resources Planning Institute, Inc. A Social and Economic Impact Study of Off-Shore Petroleum and Natural Gas Development in Alaska. Phase I Final Report Submitted to Department of the Interior, Bureau of Land Management. October 15, 1976. Seattle, WA.

Figure 41. Oil and Gas Fields: Current Production.

Commercial Fisheries

During 1975, the Study Area had 463 commercial fishing permit holders: Kenai, 309; Soldotna, 142; Sterling, 11; and Cooper Landing, 1. Salmon accounted for 73% of the permits, halibut for 12%, and herring, crabs, shrimp, clams, and bottomfish made up the rest. The value of the catch to Study Area fishermen is unknown. Using a weighted average of the Borough's value of catch for per permit holder for salmon and shellfish, the Study Area's value of catch for these species would have been about $6.5 million, with an unknown additional amount for halibut, herring, clams, and bottomfish.[a] Data on those employed in processing in the Study Area are not available. However, three of the Borough's largest volume processors (with cold storage facilities) are in Kenai, while other plants in Kenai-Cook Inlet are in Ninilchik, Homer, Seldovia, and Port Graham. The state and the recently formed Cook Inlet Aquaculture Association have programs underway to build, finance, and operate hatcheries and other fisheries.

Table 28 presents data on the fisheries harvest for the period 1954-1975 for Cook Inlet. It is evident that the industry has diversified, with crabs and shrimp increasing in importance relative to salmon, which have experienced a long-run decline. Value of catch exvessel has ranged from $10-18 million annually in recent years.

The number of commercial fishing-gear-and-license holders increased by about one-third between 1967 and 1975, with an increase in the number of resident and a decline in the number of nonresident fishermen. The increase exaggerates growth in the industry, because the extent to which registered gear is actively used has declined over the period, particularly with salmon gear.

It has been estimated that most of the sales of the Alaska commercial fishing sector are to the food-processing industry within the state, while "only 15 percent of the catch is estimated to be sold externally without being processed."[78] The processing sector in turn exports its product, while most of its local purchases are of labor and services.

The future of the fisheries resource and its role in the economy of the Study Area is unclear. It will be determined by factors internal and external to the industry.

Internally, overfishing, differential ease of entry for different fish resources, foreign competition, state regulation, and the recent adoption of a 200-mile fishing limit by the U.S. government are the major variables on the supply side.

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[a] Calculated from preliminary unpublished data of the Kenai Peninsula Borough Planning Department.

Table 28. Cook Inlet Commercial Fisheries Harvest.

Salmon (Number)

1954 thru 1975

YEAR	KINGS	REDS	COHOS	PINKS	CHUMS	TOTAL
1954[1/]	65,325	1,246,672	336,685	2,460,051	775,659	4,884,392
1955	46,499	1,064,128	180,452	1,286,008	317,053	2,894,140
1956	65,310	1,295,095	207,534	1,803,295	870,269	4,241,503
1957	42,767	670,629	127,199	306,841	1,207,920	2,355,356
1958	22,847	496,842	241,561	2,598,314	596,179	3,955,743
1959	32,783	634,313	112,664	137,255	411,157	1,328,172
1960[2/]	27,539	948,040	134,115	2,023,252	766,079	4,089,063
1961	19,778	1,185,079	119,397	337,394	405,221	2,066,869
1962	20,270	1,172,859	358,051	4,960,030	1,149,841	7,661,051
1963	17,632	958,101	203,876	234,052	525,537	1,939,198
1964	4,622	990,709	462,114	4,287,378	1,402,419	7,147,242
1965	9,751	1,426,352	154,363	139,561	344,052	2,074,079
1966	8,586	1,867,372	295,042	2,585,616	661,883	5,418,499
1967	8,035	1,409,107	180,455	407,717	382,282	2,387,596
1968	4,600	1,200,138	473,645	2,862,939	1,183,037	5,724,359
1969	12,462	815,050	101,575	235,866	331,058	1,496,011
1970	8,354	750,111	276,770	1,352,389	999,005	3,386,329
1971	19,838	658,537	105,197	428,495	475,631	1,687,698
1972	16,174	937,721	83,167	857,243	705,691	2,399,996
1973	5,347	699,277	106,104	633,498	783,080	2,227,306
1974	6,778	524,215	206,095	533,249	412,179	1,682,516
1975*	4,933	712,960	233,583	1,399,791	973,442	3,324,709

Shellfish (Pounds)

1951 thru 1975

YEAR	KING CRAB	TANNER CRAB	SHRIMP	DUNGENESS CRAB
1951	6,619	N	N	N
1952	2,900	O	O	O
1953	1,359,854		P	P
1954	1,275,852	P	I	I
1955	1,915,821	I	S	S
1956	2,129,035	S	H	H
1957	620,858	H	E	E
1958	752,990	E	R	R
1959	2,191,437	R	Y	Y
1960	4,287,432	Y	711,355	
1961	4,256,296		1,045,170	191,588
1962	6,851,621		532,291	460,725
1963	8,381,163		1,897,580	1,677,204
1964	6,772,392		601,410	421,452
1965	2,776,547		82,280	82,280
1966	3,900,163		309,359	127,977
1967	3,124,500		741,438	7,168
1968	4,009,453	165,147	26,748	481,764
1969	2,852,507	1,468,805	1,847,202	48,501
1970	3,852,802	1,333,889	5,817,633	208,577
1971	4,157,639	2,116,849	5,448,578	96,846
1972	4,693,329	4,095,144	5,552,584	38,930
1973	4,455,194	8,610,452	5,011,168	310,916
1974	4,601,800	7,660,900	5,748,900	721,200
1975	2,886,424	4,952,428	4,752,139	362,815

1/ 1954-59 data from Fish & Wildlife Service Statistical Digest #50

2/ 1960-72 Alaska Dept. Fish & Game IBM Salmon Report

Source: Kenai Peninsula Borough. Overall Economic Development Program. 1976. Revised Document. Draft Copy. Soldotna, AK.

Externally, a major unknown is the effect of LNG activity, which may affect both the availability of fish and the ability to fish. A recent report states:

> The availability of fish is affected by: oil spills, chronic low-level pollution; chemical dispersants; disturbance of the ocean bed and deterioration of surrounding waters by drilling and by pipeline excavation. The ability to fish is affected by competition for open ocean and harbor space (between oil and LNG tankers, supply and support boats on the one hand, and commercial fishing vessels on the other) and by destruction of fishing gear by greatly increased marine traffic, which is reported already in the Kachemak Bay area.[84] Some ten oil and LNG tankers per week may ply Cook Inlet during peak production 1983, from the proposed Lower Cook Inlet sale, with possibly 20 service boats for each of about 50 rigs at peak during exploration and development. No studies we know of have gone beyond a recital of bare facts such as these to a quantitative examination of the consequences for the fishing industry. Such an examination would properly be required of the companies by the applicants. At the other end of the scale is the impact of subsistence fishing as sport fishing increases with the consequent reduction in bag limits.[86]

Timber

Data are not available on the importance of timber in the economy of the Study Area. There is a small sawmill at Soldotna.

Timber on the peninsula is small, has a high incidence of decay, and has been affected by outbreaks of the spruce beetle, especially over the period 1969-1973. The wood is inadequate for veneer or lumber purposes but adequate for studs, some other dimensional products, cants, and for chips for pulp or for other fiber products. Cants are not exported from the Study Area, nor is there a pulp mill. The major timber export operations on the peninsula are located at Jakalof Bay near Seldovia (timber cutting for export and small mill for local use), Seward (lumber mill), and Tyonek (a recently completed chip mill complex), across the inlet and northwest of the Study Area. There are also five small sawmills on the peninsula outside the Study Area.

Competition from the Pacific Northwest is a major factor affecting trends in this sector in Alaska, where timber quality and transport systems are relatively poor, distances from stands to processing operations are relatively long, and where the local market (principally Anchorage and Fairbanks) is relatively limited. Alaska relies heavily on the Japanese market, which imports cants and chips and converts them to dimension lumber and other products for construc-

tion purposes. This export market has been static or declining for from 3 to 5 years. Until the export market improves and the domestic market grows, it is unlikely that the required investment in technical training of skilled operators, and in modern plant and equipment, will be undertaken. However, the new Tyonek chip mill complex indicates that opportunities are being sought and acted on. No analysis exists of the advantages or disadvantages of the Study Area compared with other places in the Borough for development of this sector.

Outdoor Recreation and Tourism

The number of tourists and outdoor recreationists visiting the Study Area annually is not known, nor are their expenditures therein. Between 1964 and 1967, however, wages from tourism in Alaska grew faster than the timber, mining, and food-processing sectors, and were exceeded only by growth in the oil and gas sector. Tourists increased over the period by 46%, their expenditures in that state by 69%, and wages from these expenditures by 65% (Table 29). By 1970, the number of tourists in Alaska was expected to increase from 86,700 in 1967 to 185,500 by 1975, to 233,700 by 1980, and to 600,600 by the year 2000 (Table 30). Such rates of growth, and associated expenditures and earnings, could make the tourism sector the single most important sector of economic activity in the state in the long run. The Borough and the Study Area will take part in such growth.

Most of the recreational opportunities in the Borough are provided by the Kenai National Moose Range (KNMR), by the Chugach National Forest, and by the two most developed state park areas--the Captain Cook and Silver King Wayside recreation areas. Tables 31, 32, and 33 indicate the extensive nature of the recreational opportunities offered, and their proximity to the Study Area. The KNMR occupies 2,700 square miles (the state of Delaware occupies 2,057 square miles) and has 50 camping sites (640 units); the Chugach occupies 1,900 square miles and 16 sites (360 units). City owned parks are shown in Table 34.

The major recreational activities are: sport fishing, sport hunting, and naturalistic activities. Data on the economic value of such activities are not comprehensive. Some indication of their importance, however, is provided by Tables 35 and 36 on the activities of sport fisherman and sport hunters combined. Data are not collected on sport fishing other than for salmon and clams. It is expected that such data would indicate effort and harvest at least as great as for salmon and clams combined. It is also expected that there are as many people who view and study wildlife as there are sport fishermen and hunters.

Two recent studies estimating the value of recreation would shed some light on these expenditures in the Borough.[87,88] The first[87] estimated that 350,000 people visited the Kenai Peninsula in 1973, spending half their time on the Kenai National Moose Range

Table 29. Economic Significance of Tourism in Alaska

	1964	1967	Increase 1967 Over 1964	% Change 1964-1967
Number of tourists	59,200	86,700	27,500	+46%
Tourist expenditures	$18,200,000	$29,000,000	$10,800,000	+69%
Primary nongovernment employees	1,100	1,650	550	+50%
Primary Wages	$ 6,600,000	$10,900,000	$ 4,300,000	+65%

Industry	1964	Estimated 1967 (Millions)	Increase 1967 Over 1964 Amount	Percent
Logging, lumbering and pulp	$19.8	$25.1	$ 5.3	27%
Food processing (a)	18.2	21.0	3.2	12
Oil and gas	8.5	18.7	10.2	120
Tourism	6.6	10.9	4.3	65
Metal and other mining	4.3	4.8	0.5	12

(a) Excludes income from self-employment resulting from fishing and related activities. If this were included, this category would be the largest, by far.

Source: Kenai Peninsula Borough. Comprehensive Planning Program. Recommendations. November 2, 1970. Soldotna.

Table 30. Expected Tourists: Alaska 1967-2000

Year	Number
1967 (Actual)	86,700
1975	185,500
1980	233,700
2000	600,600

Source: Kenai Peninsula Borough. Comprehensive Planning Program. Recommendations. November 2, 1970. Soldotna.

Table 31. Recreational Sites: Kenai National Moose Range

NAME	ACREAGE	CAMP UNITS	CAMPING LIMIT (# days)	PICNIC UNITS	TOILETS	DRINKING WATER	SHELTER	TRAILS	BOAT LAUNCH	CANOE TRAILS	FISHING	HUNTING	WINTER SPORTS	SWIMMING	PETS (on leash)	
NORTH OF SKILAK LAKE																
Sunken Island Lake (access site)	2	10	14		x	x			x		x				x	
Mosquito Lake (access site)	.1	3*	14					x			x				x	
Silver Lake (access site)	.1	3*	14					x			x				x	
Forest Lake (access site)	.1	2*	14					x			x				x	
Weed Lake Wayside	.1	3*	14												x	
Drake/Skookum Lakes (access site)	.1	3*	14					x			x				x	
Breeze Lake (access site)	.1	2*	14					x			x				x	
Dolly Varden Campground	5	15	14		x	x			x		x				x	
Rainbow Lake Campground	1	5	14		x	x			x		x				x	
Swanson River Landing (access site)	3	15	14		x	x					x				x	
Fish Lake (access site)	1	3	14		x						x				x	
Canoe Lake (access site-canoe trail)	1	25*	14		x					x	x				x	
Sucker Creek Wayside	.1	2*	14								x				x	
Merganser Lakes Wayside	.1	2*	14								x				x	
West Lake (access site)	.5	3*	14					x			x				x	
Portage Lake (access site)	.1	5*	14		x					x	x				x	
Paddle Lake (access site)	.2	25*	14		x					x	x				x	
Bottenintnin Lake (access site)	1	6	14		x	x					x				x	
Lower Skilak Lake Campground	5	30	14		x	x			x		x				x	
Engineer Lake (access site)	1	6	14		x	x		x			x				x	
Lower Ohmer Lake (access site)	.2	5	14		x						x				x	
Upper Skilak Lake Campground	5	15	14		x	x			x		x				x	
Upper Ohmer Lake (access site)	1	5	14		x						x				x	
Bear Mountain Trail (Trailhead)	.1	3*	14					x							x	
Skilak Lookout Trail (Trailhead)	.1	2*	14					x							x	
Hidden Creek Trail (Trailhead)	.1	3*	14					x			x				x	
Hidden Lake Campground	15	50	7		x	x			x		x				x	

* parking spaces - no designated camp areas

Table 31. Recreational Sites (continued)

NAME	ACREAGE	CAMP UNITS	CAMPING LIMIT (# days)	PICNIC UNITS	TOILETS	DRINKING WATER	SHELTER	TRAILS	BOAT LAUNCH	CANOE TRAILS	FISHING	HUNTING	WINTER SPORTS	SWIMMING	PETS (On leash)	
Kenai River Trail (2 sites) Trailhead	.1	8 *	14					x			x				x	
Jim's Landing Campground	5	15	14		x	x		x			x				x	
Jean Creek Wayside	.1	3 *	14								x				x	
Kenai-Russian River (access site)	3	200	7		x	x					x				x	
Kenai River Wayside	1	25 *	14								x				x	
Fuller Lakes Trail (Trailhead)	.1	3 *	14					x			x				x	
Jean Lake (access site)	1	3	14		x		x				x				x	
Skyline Trail (Trailhead)	.1	5 *	14					x							x	
Upper Jean Lake (access site)	.2	2	14								x				x	
Jean Lake Wayside	.1	6 *	14												x	
Mystery Creek Road (access site)	12 mi.	50 *	14									x			x	
Kelly Lake (access site)	2	6	14		x	x					x				x	
Petersen Lake (access site)	2	6	14		x	x					x				x	
Watson Lake (access site)	2	6	14		x	x					x				x	
Equmen Lake (Trailhead)	.1	5 *	14					x			x				x	
East Fork Moose River Wayside	.1	3 *	14								x				x	
Lily Lake Wayside	.1	3 *	14												x	
KNMR SOUTH OF SKILAK LAKE AND KENAI RIVER																
Funny River Horse Trail	.1	8 *						x				x				
Soldotna Ski Hill (Recreation Area)	10	25						x					x		x	
Tustumena Lake Campground	10	20	14		x	x			x		x				x	

* parking spaces - no designated camp areas

Source: Kenai Peninsula Borough. Overall Economic Development Program. 1976. Revised Document. Draft Copy. Soldotna, AK.

Table 32. Forest Service: Recreational Sites

LOCATION AND SITE	CAMP UNITS	CAMPING LIMIT (no. days)	PICNIC UNITS	TOILETS	DRINKING WATER	BOAT LAUNCH	FISHING	SEWAGE DUMP	PETS (on leash)
Bertha Creek Seward Highway	10	14		X	X		X		X
Granite Creek Seward Highway	18	14	3	X	X		X		X
Porcupine Hope Area	24	14	6	X	X		X		X
Coeur d'Alene Palmer Cr. Road		14	6	X			X		X
Tenderfoot Upper Summit Lake	27	14		X	X		X		X
Tern Lake Mile 38 Junction	25	14	3	X	X		X		X
Crescent Creek Sterling Highway	9	14		X	X		X		X
Quartz Creek Sterling Highway	26	14	10	X	X	X	X	X	X
Cooper Creek Sterling Highway	22	14	4	X	X		X		X
Trail River Mile 25 - Seward Hy	86	14		X	X		X		X
Ptarmigan Creek Mile 23 - Seward Hy	16	14	7	X	X		X		X
Primrose Landing Mile 18 - Seward Hy	10	14		X	X	X			X
Meadow Creek Across Kenai Lake		14	2	X			X		X
Ship's Creek Across Kenai Lake		14	2	X			X		X
Porcupine Island Across Kenai Lake		14	2	X			X		X
Russian River Mile 55 - Sterling Hy	86	14		X	X		X	X	X

Source: Kenai Peninsula Borough. Overall Economic Development Program. 1976. Revised Document. Draft Copy. Soldotna, AK.

Table 33. State Parks: Kenai Peninsula Borough

Park Name	ACREAGE	CAMP UNITS	CAMPING LIMIT	PICNIC UNITS	TOILETS	DRINKING WATER	SHELTER	TRAILS	BOAT LAUNCH	CANOEING	FISHING	SWIMMING	nearest community
Bernice Lake Wayside	7	11	15		X	X			X	X	X	X	Kenai
Kasilof River Wayside	47	10	15	5	X	X					X		Soldotna
Johnson Lake Wayside	56	20	15		X				X	X	X	X	Soldotna
Clam Gulch Picnic	36			20	X	X	X				X		Soldotna
Ninilchik Wayside	13	15	15		X								Ninilchik
Deep Creek Wayside	44			10	X				X	X	X		Ninilchik
Stariski Wayside	30	12	15		X	X	X						Anchor Point
Silver King Wayside	174	40	15		X	X		X			X		Anchor Point
Anchor River Wayside	57	7	15								X		Anchor Point
Kachemak Bay State Pk	119,970				UNDEVELOPED						X		Seldovia
Kachemak Bay Wilderness Pk	208,320				UNDEVELOPED						X		Seldovia
Captain Cook Recreation Area	3,620												Kenai
Discovery Campground		57	15		X	X							Kenai
Discovery Picnic Area				28	X	X							Kenai
Swanson River Canoe Landing					X					X	X		Kenai
Stormy Lake		10	15	40	X	X	X	X	X	X	X	X	Kenai
Bishop Creek		15	15		X	X		X					Kenai

Source: Kenai Peninsula Borough. Overall Economic Development Program. 1976. Revised Document. Draft Copy. Soldotna, AK.

Table 34. Kenai Peninsula Borough: City-owned Parks

LOCATION AND NAME OF PARK	ACREAGE	CAMP UNITS	CAMP LIMIT (#days)	PICNIC UNITS	TOILETS	DRINKING WATER	SHELTER	TRAILS	BOAT LAUNCH	CANOEING	FISHING	SWIMMING	PETS (on leash)
HOMER													
Homer City Hillside Campground	40	30	14	30	x	x	x						x
Homer Spit		1/			2/				x		x		
KENAI													
Birch Park	1				x			x					x
Kenai Municipal Park	2												x
Beaver Creek Park I	1/4	x		2				x					x
Beaver Creek Park II	1/4	x		2									x
Cunningham	2				x				x		x		x
SOLDOTNA													
Arc Lake	12	3/		9	x			x		x	x	x	x
Swiftwater Camper Park	60	18	7	2	x	x	x		x		x		x
Centennial Park	167	47	7	6	x	x	x	x	x		x		x
SEWARD													
Small Boat Harbor Campground		1	7	x	x	x			x		x		x
Forest Acres Campground		1	7	x	x	x							x
SELDOVIA													
Lot 1; block 29	47										x		

1/ camping allowed on city owned parcels
2/ restrooms with running water at end of Spit
3/ no overnight stays

Source: Kenai Peninsula Borough. Overall Economic Development Program. 1976. Revised Document. Draft Copy. Soldotna, AK.

Table 35. Sport Salmon Fishing Statistics: Kenai Peninsula Borough

	1972		1973		1974		1975	
	EFFORT	HARVEST	EFFORT	HARVEST	EFFORT	HARVEST	EFFORT	HARVEST
Resurrection Bay Silver Salmon	30,124	15,236	24,301	13,911	25,902	18,629	20,047	19,793
Russian River Red Salmon	24,665	21,667	30,590	15,670	21,120	14,940	16,510	9,790
Anchor River/Deep Creek/ Ninilchik Complex King Salmon	*13,500	490	24,100	770	21,000	990	19,600	850
Deep Creek Salt Water King Salmon	** 3,610	2,250	8,037	1,010	4,800	600	8,050	880
Kenai River All Species	***		***		***		47,915	23,460
TOTALS (excluding clams)	71,899	39,643	87,028	31,361	72,822	35,222	112,122	54,773
			RAZOR CLAMS					
East Side Cook Inlet	15,400	437,530	23,770	682,600	27,410	872,450	24,260	896,080

*These fisheries had reduced effort because of high water and turbidity as well as bad weather.
**This was basically the first year of Salt Water King fishery in the area. Exceptionally clear water was the main reason for the high success ratio.
***Counts for Kenai River not started prior to 1975.

Source: Kenai Peninsula Borough. Overall Economic Development Program. 1976. Revised Document. Draft Copy. Soldotna, AK.

Table 36. Kenai Peninsula Borough: Harvest and Hunters, Units 7 and 15, 1966 through 1975

Year	MOOSE		SHEEP		GOAT		CARIBOU		BLACK BEAR		BROWN BEAR	
	Number Hunters	Number Harvest	Number Hunters	Number Harvest	Number Hunters	Number Harvest	Number Hunters	Number Harvest	Number Hunters	Number Harvest	Number Hunters	Number Harvest
1966	--	1277	--	66	--	--	--	--	--	--	--	4
1967	1450	772	--	60	--	--	--	--	--	--	--	5
1968	1583	1059	--	104	--	--	--	--	--	--	--	11
1969	2436	953	401	73	--	--	--	--	--	--	--	8
1970	3205	995	312	67	--	--	--	--	--	--	--	6
1971	4393	1473	205	34	--	--	--	--	--	--	--	3
1972	3666	819	230	36	465	223	20*	6	--	--	--	3
1973	4204	929	311	59	645	244	250*	12	--	110	--	8
1974	3355	626	291	60	478	163	573*	44	--	107	--	8
1975	NA	NA	NA	NA	NA	NA	869*	87	--	147	--	5

-- No data
* Number of permits issued. A substantial number did not hunt.
NA Not yet available.

Source: Kenai Peninsula Borough. Overall Economic Development Program. 1976. Revised Document. Draft Copy. Soldotna, AK

(KNMR) and half elsewhere on the Peninsula. Using a rate of $15 per person, gross expenditure is estimated at $31.5 million, of which 35%, or approximately $11 million, is estimated to have been spent within the Borough. This initial expenditure induces successive rounds of spending, for which a multiplier of 1.4 is used, resulting in total expenditures from tourism of $15.4 million. This 1973 estimate of $15.4 million is just over 30% of the gross sales and services receipts in the Borough in 1972, which amounted to $50.4 million.

Of the $15.4 million, half is attributed to recreation on the KNMR. Of this $7.7 million, different proportions are attributed to the different kinds of recreation activities engaged on the KNMR, as shown in Table 37.

Expenditures in the Borough resulting from recreation activities are projected to increase from the $15.4 million of 1973 to $113.4 million in the year 2000. This projection assumes only that the number using the area for recreation increases (from 350,000 in 1973 to 2.6 million in the year 2000), while recreation-days and expenditures per recreation-day remain constant. It is further believed that recreation will in future contribute at least as much to gross sales and services receipts in the Borough as the 32.8% estimated for 1972-1973. The reasons cited for these projections include increased leisure time, increased per capita income, improved transportation, extensive nature of the recreation opportunities afforded by the Borough, and lack of recreation opportunities north of Anchorage as land development proceeds in that area. The significance of the last reason is seen in the fact that in 1972 Anchorage-area residents accounted for over 80% of those visiting the Peninsula for recreation.

The second study[88] provides some basis for comparison. It estimates that $52 million were spent in Alaska in 1973 by sport fishermen, and that 29% of the sport-fishing in man-days took place in the Kenai Peninsula (44% for the Peninsula, Cook Inlet, and the Lower Susitna River combined). It is then possible to estimate that $13.5 million occasioned by sport fishing were expended by sport fishermen in the Peninsula ($23 million in the Peninsula and Cook Inlet combined). Applying the same 35% Borough to Peninsula ratio used earlier, $4.7 million of the $13.5 million would have been spent in the Borough, which implies that about 43% (4.7/11.0) of the recreation-related expenditures in the Borough would have resulted from sport fishing, using the $11 million from the earlier study. This percentage compares with the 22% shown by Table 37 for KNMR. There may be several reasons for the discrepancy. One that appears plausible is that sport fishing accounts for a smaller proportion of recreation-days in the KNMR than it does in the Borough, because the KNMR offers a greater variety of recreational opportunities than the Borough. Other reasons include the two studies' data-gathering techniques, and the assumptions and estimates used in them to transform recreation-days into expenditures by geographical area.

Table 37. Percent of Recreational Expenditures by Type of Activity: Kenai National Moose Range, 1968

Type of Activity	Percent of Recreation Expenditures
Fishing	22.0
Hunting	18.0
Camping & picnicking	15.0
Scenic Driving	14.0
Wildlife observation & photography	12.0
Berrying	4.3
Hiking & horse use	4.3
Water sports	4.3
Canoeing	3.6
Winter sports	2.5
TOTAL	100.0

Source: Joint Federal-State Land Use Planning Commission. Review of Kenai National Moose Range. February 1974. Anchorage, AK.

Both studies, however, indicate the considerable importance of recreation activity in the Borough and, by implication, in the Study Area. Furthermore, it is clear from the expected growth of tourism in the state, and from the relatively undeveloped nature of the Kenai National Moose Range, the Chugach National Forest, and the larger state parks, that growth in this sector may well be substantial in the Borough. Such growth can be expected to affect especially the cities of Kenai and Soldotna, because of their central location, size (offering goods and services), accessibility (by road from Anchorage, by air, or by sea), and immediate proximity to the Kenai River.

KENAI AND SOLDOTNA: COMMUNITY CHARACTERISTICS, 1976

General

Between 1970 and 1976, the population of Kenai city rose from 3,533 to 4,261, for a gain of 70%. The 1976 estimates are of the nontransient population.

The number of employees in the two cities in 1976 is not estimated. The pattern of employment in the two cities in 1976 is given in Table 21. The biggest contrast between the two cities is that mining accounted in 1976 for about 20% of total employment in Kenai, and for about 10% in Soldotna. It is too early to say if these are substantial levels. A comparison of the sectoral distribution of employment in Kenai in 1970 (Table 22) and 1976 (Table 23) does not indicate increasing diversity in the economy of the city in this decade. About two-thirds of employed adults in the two cities work locally, and about 90% work within the Borough.

Housing

A relatively small percentage of the housing units consist of single-family homes (47% in Kenai, 56% in Soldotna). Mobile homes are numerous (22% of the units in Kenai, 28% in Soldotna). Apartments are of greater significance in Kenai (where they consitute 29% of total housing units) than in Soldotna (16%). Of the total units in Kenai, 60% are owner occupied. Apartments are usually rented. The mobile-home population may be more stable in Kenai than in Soldotna, because about 46% of the mobile-home owners in Kenai own the spaces on which their homes stand, while in Soldotna only 28% own the spaces. Average monthly housing payments (mortgage or rental) amount to $286 in Kenai and $282 in Soldotna. About 60% of the homes in both cities have city water; almost all the others rely on wells. Just over 60% of the units in both cities are serviced by city sewers; most of the rest have septic tanks. Gas is the principal home heating fuel in both cities (76% of the units in Kenai and 70% in Soldotna). In Kenai, the remaining units are served rather more by oil than by electricity, while in Soldotna almost all the remainder

are served by oil. Seventy-one percent of Kenai households and 66% in Soldotna have telephones.

By Census standards there appears to be some degree of overcrowding. Compared to the standard of 1.01 persons per census room, both cities have 1.7 persons. The extent of crowding may be exaggerated because the tendency in Alaska is to have a large, open living room rather than separate living, kitchen, and dining areas.

A vacancy rate of 5 to 6% (of the housing stock) indicates a flexible housing market. Both Kenai and Soldotna had low rates (3 and 2%), although housing starts were underway in both cities at the time of the 1976 survey, when Kenai had 1,308 and Soldotna 601 permanent units.

The external condition of homes is better in Kenai than in Soldotna. In Soldotna, 28% of the homes were in poor condition, or in average condition needing repair; in Kenai less than 1% were in poor condition while 23% were average, in need of repair. Kenai is a more contained community than Soldotna. Ninety-three percent of its homes are in a subdivision or otherwise near other homes; in Soldotna this is true of only 78%. In both cities, just over 60% of the homes are next to paved or graveled roads, the remainder relying on dirt roads for access.

Schools

Table 38 shows that there were nine schools in the Study Area in 1976; there were four in 1960. Each jurisdiction in the Study Area provides its own elementary school. Both Kenai and Soldotna have junior high schools. Students of the relevant age group from North Kenai attend the former, while those from Sterling and Cooper Landing attend the latter. The senior high school in Kenai caters to the relevant age group in the Study Area as a whole. Two things are evident when 1960 and 1970 data are compared: consolidation in Kenai and the provision of new schools in North Kenai and Soldotna. Five percent of the households in Kenai and Soldotna combined have children in schools other than the nine shown in Table 38. Almost all these children attend private schools operated by various churches.

Table 39 presents 1960-1974 data on average daily membership and number of personnel for Kenai Peninsula Borough. To the extent that the pattern in the Borough reflects (or is reflected in) the Study Area, two phenomena are strikingly evident: The rate of growth of population and employment is high in the Study Area; and the system responded rapidly by hiring teachers, as shown in the fact that the student to personnel ratio changed little over the period. Overcrowding existed at least temporarily; portable units were built in the North Kenai, Kenai, and Soldotna area over the period 1967-1972, while double-shift teaching occurred temporarily in some schools. The historic low of 14.3 in 1973-1974 suggests the existence of some slack.

Table 38. Study Area Schools: 1960 and 1970.

Type of School	Area					
1970	Total	North Kenai	Kenai	Soldotna	Sterling	Cooper Landing
Elementary	6	1	2	1	1	1
Junior High	2		1	1		
Senior High	1		1			
1960						
Elementary	3			1	1	1
All Grades	1		1			

Source: Mathematical Sciences Northwest, Inc. and Human Resources Planning Institute, Inc. A Social and Economic Impact Study of Off-Shore Petroleum and Natural Gas Development in Alaska. Phase I Final Report Submitted to Department of the Interior, Bureau of Land Management. October 15, 1976. Seattle, WA.

Table 39. Average Daily Membership and Personnel: Kenai Borough Schools, 1960-1974.

Year	ADM	Professional Personnel	Student/ Personnel Ratio
1960-1961	2255	123	18.3
1961-1962	2522	134	18.8
1962-1963	2744	146	18.8
1963-1964	2920	156	18.7
1964-1965	2842	160	17.8
1965-1966	2962	178	16.6
1966-1967	3109	181	17.2
1967-1968	3750	205	18.3
1968-1969	4525	236	19.2
1969-1970	4943	294	16.8
1970-1971	5032	299	16.8
1971-1972	4875	299	16.3
1972-1973	4716	265	17.8
1973-1974	4603	321	14.3

Source: State of Alaska, Department of Education, Annual Reports.

Protective Services

The Study Area has three fire departments, in North Kenai, Kenai, and Soldotna. The North Kenai Fire Department was established in 1970, the Kenai City Fire Department in 1960, and Soldotna Fire Department in 1962. The departments have shifted from all-volunteer to part-paid staff. The shift began when oil and gas offshore activity and construction activity onshore were at their peak in the Study Area.

Fire losses in North Kenai over the period 1970-1975 have been estimated at $1.2 million, mainly from major fires at a Shell Oil Company platform (1971 and 1972) and at Collier Carbon and Chemical (at Nikisiki in 1973).

Police protection was provided exclusively by Alaska State Troopers until 1969, when Kenai and Soldotna established their own forces. The state and local forces have close working relationships. Data on crime are not available for the Study Area, but only for a reporting district that includes the western half of the Kenai Peninsula, Cook Inlet, and its western shore (Tables 40 and 41). However, "the local troopers indicate that the preponderance of lawless activity occurred in the north--in and around Kenai and Soldotna." [78]

Health Services

The study area had no hospital until the 30-bed Central Peninsula General Hospital was built in Soldotna in 1970. In 1973 the hospital had 814 admissions, 3,137 patient-days, and 2,605 outpatient visits, with an occupancy rate of about 30%. It attracted physicians, whose number grew from two in 1969 to seven in 1973. By 1974, Kenai and Soldotna had nine physicians, five of them in General or Family Practice. In 1975, Kenai and Soldotna had two dentists each. In addition, the State Department of Health and Social Services provides screening, specialized clinics in outlying areas, and health education services. The State Division of Nursing staffs a public health clinic in Kenai. Some supplementary services are provided by charitable and special interest organizations.[78]

Welfare Programs

There are four main programs: aid to families with dependent children (AFDC), aid to the disabled (AD), old age assistance (OAA), and aid to the blind (AB). Table 42 presents 1960-1973 data on cases and payments under these four categories for the City of Kenai. AFDC preponderates, accounting for over 60% of cases and payments during 1970-1973, while AFDC and AD combined accounted for over 80%. For both, the pattern is a considerable increase since 1970, after a decade during which the number of cases and amounts paid were fairly stable. The total number of cases more than doubled in 1971 compared with 1970. This pattern appears to reflect the dramatic drop in

Table 40. Offenses Reported, Part I: Alaska State Troopers, 1968-1970

Class of Offense	1968	1969	1970
Homicide	3	2	1
Negligent Homicide	2	3	5
Forcible Rape	0	2	1
Armed Robbery	2	1	0
Assult	30	41	19
Burglary	80	96	55
Larcency - Over $50	90	71	36
- Under $50	42	53	19
Auto Theft	36	33	9
Total	285	305	145

Source: Alaska State Police Records

Table 41. Offenses Reported, Part II: Alaska State Troopers, 1968-1970

Class of Offense	1968	1969	1970
Forgery and counterfeiting	2	3	3
Embezzlement and fraud	10	9	17
Stolen property	0	0	1
Weapons	6	13	7
Prostitution and vice	1	0	0
Sex offenses	8	4	4
Offenses against family	3	8	1
Narcotic and drug	4	8	7
Liquor laws	58	25	19
Drunkenness	83	46	8
Disorderly conduct	19	8	15
Vagrancy	1	0	0
Gambling	3	0	0
Driving while intoxicated	96	39	63
Road and driving laws	--	7	8
Moving violations	38	17	24
Other	77	46	41
Total	409	203	218

Source: Alaska State Police Records

Table 42. City of Kenai: Welfare Cases and Payments, 1960-1973.

Year	Total		AFDC(1)		AD(2)		OAA(3)		AB(4)	
	cases	$	cases	$	cases	$	cases	$	cases	$
1960	12	1,263	4	607	-	-	6	456	2	200
1961	16	1,729	7	1,010	-	-	7	519	2	200
1962	15	1,516	9	1,133	-	-	4	222	2	161
1963	17	1,535	8	875	1	110	4	226	2	199
1964	16	1,585	8	1,060	0	0	6	343	2	182
1965	16	1,524	9	1,033	1	43	4	262	2	186
1966	17	1,746	8	1,060	1	53	2	132	3	296
1967	11	1,351	5	850	1	73	3	208	2	220
1968	13	1,611	7	1,060	2	288	3	144	1	119
1969	15	1,900	7	923	3	449	4	392	1	136
1970	21	4,056	11	2,658	3	506	5	515	2	377
1971	46	8,335	32	6,273	7	1,310	5	471	2	281
1972	57	9,608	34	6,119	14	2,382	8	925	1	82
1973	62	12,127	36	7,694	16	3,181	9	1,166	1	86

(1) Aid to Families with Dependent Children
(2) Aid to the Disabled
(3) Old Age Assistance
(4) Aid to the Blind

Source: State of Alaska. Department of Health and Social Services. Division of Family and Children Services. October Reports. Juneau, AK

employment in construction in the oil and gas sector in 1970. Corresponding data for the state (not presented) show no such pattern: its total cases rose by only 21% in 1971 as compared with 1970.

Attitudes

The attitudes of residents are presumed to affect the way in which their communities develop. The results of the extensive attitudes survey[89] are now summarized under four headings: general attitudes on growth, attitudes on the existing social infrastructure, and attitudes on types of industry and oil and gas development.

Growth

Both Kenai and Soldotna exhibit a distinct preference for a growing population of new residents, the next preference being (in descending order) a community the same size with present residents; a growing population of seasonal residents; a growing population of nonpermanent residents. The two cities differ in that a much greater percentage (59%) of the respondents in Soldotna than in Kenai (37%) preferred a larger community. Both cities exhibit a marked preference for new jobs that are long term (i.e., for more than 10 years), and that are added slowly.

Existing Infrastructure

Respondents were asked if they were very satisfied, satisfied, uncertain, dissatisfied, or very dissatisfied. The order of topics presented here follows roughly the order presented earlier in this section. The distribution of attitudes toward grocery and food services were bimodal: in both cities 84% of the respondents were satisfied or dissatisfied, although those satisfied outnumbered those dissatisfied, more so in Soldotna than in Kenai, where only 48% said they were dissatisfied. The school system did not rate highly: the satisfied respondents were the most numerous, but only 39% in Kenai and 44% in Soldotna were in that category. Protective services (police and fire) were rated fairly high in both cities: between 56 and 61% were satisfied, with from 18 to 26% uncertain. Hospital, medical, and ambulance services rated somewhat less well than protection services in both services: 46 to 54% were satisfied, and 13 to 36% uncertain. Utilities (except for road maintenance and telephone) rated the highest: the water, sewage, and garbage disposal services were adjudged satisfactory by from 60 to 78% of the residents of the two cities, while the electrical service was rated satisfactory by 75% in Kenai and 77% in Soldotna. Perceptions in Kenai and Soldotna were similar for road maintenance in winter and summer, and for parks and recreation. As with the grocery and food service, the distribution was bimodal: satisfied or dissatisfied accounted for the bulk of the responses, although somewhat more were satisfied than were dissatisfied. Summer road maintenance led 34% in Kenai and 33% in Soldotna to say they were dissatisfied (50% and 48%, respectively,

were satisfied). The telephone service received the lowest ratings: 75% in Kenai and 64% in Soldotna were either dissatisfied or very dissatisfied, with the latter (40%) outnumbering the former in Kenai. The most frequent response of the residents of both cities to the role of the two categories, community planning and community zoning was to say that they were uncertain (from 41 to 55%). The uncertainty was greater in Kenai than in Soldotna, where 27% were satisfied with zoning, and 31% with planning.

Impact of Growth on Social Infrastructure

Respondents were asked if they thought the impact would be that the categories of existing infrastructure would get much better, get somewhat better, stay the same, get somewhat worse, get much worse. The "don't know" response to all categories was slight, never more than 8%.

Grocery and food services, parks and recreation, and community zoning and planning were the only sectors expected to get much better, except for zoning and planning in Kenai, where respondents most frequently expected zoning (36%) and planning (33%) to stay the same. The distribution of responses to the impact of growth on the school system was bimodal in both cities: most respondents (55 to 58%) expected it to get somewhat worse or to get somewhat better, with the former predominating (30% in Kenai and 32% in Soldotna). Protection (fire, police) and health (hospital, medical, ambulance) services were for the most part expected to remain the same, although over 30% in both cities expected the police service to get somewhat worse, while about 30% in both cities expected the hospital-medical services to get somewhat better. The water and sewer, garbage, and electrical services were overwhelmingly expected in both cities to remain the same. Kenai residents expected maintenance (in both winter and summer) to remain the same; by contrast, Soldotna residents expected it to improve somewhat. The telephone system was expected in both cities to get somewhat worse or to get much worse.

Economic Activity/Oil and Gas Development (Table 42)

Respondents were asked which of 11 industries should be encouraged for the future of their cities: tourism, light manufacture, the lumber industry, the petrochemical industry, commercial fishing and processing, transport and storage, supply bases for offshore oil, education and research, deepwater port facilities, small boat harbor facilities, agriculture.

The percentage of respondents in both cities who would encourage these activities ranged from a high of 96% (Soldotna, education) to a high of 32% (Soldotna, lumber). Both cities had approximately the same ratings (in descending order of preference): education and research, fishing, agriculture, manufacturing, transport, tourism,

Table 43. Kenai and Soldotna; Attitudes Towards Economic Activities

Economic Activity	Percent who Would Encourage				Percent for whom Development is Most Desired: First Choice			
	Kenai	Rank	Soldotna	Rank	Kenai	Rank	Soldotna	Rank
Tourism	77.5	7	67.9	6	9.3	4	18.5	1
Light Manufacture	84.8	5	81.2	4	8.6	5	13.3	4
Lumber Industry	37.7	11	31.9	11	4.0	10	0.7	11
Petrochemical Industries	55.0	10	43.5	10	22.5	1	16.3	3
Commercial Fishing and Processing	92.1	3	87.7	2	11.9	3	9.6	6
Transport and Storage	81.3	6	71.7	5	4.0	9	3.0	10
Supply Bases for Offshore Oil	66.2	9	63.0	8	2.6	11	3.7	8
Education and Research	95.4	1	96.4	1	15.9	2	17.8	2
Deepwater Port	75.8	8	65.0	7	6.0	8	3.7	9
Small Boat Harbor	90.1	4	61.3	9	7.3	6	2.2	7
Agriculture	95.4	2	80.4	3	6.6	7	10.4	5

Source: Kenai Peninsula Borough, Profile of Five Kenai Peninsula Towns, 1977, Soldotna

deepwater port facilities, small boat harbor facilities, petrochemical industry, lumber industry, supply bases.

It is especially noteworthy that, with one exception, the more traditional industries were ranked high, while the newer industries ranked low. Agriculture ranked first (the greatest percentage of respondents would encourage it) in Kenai and fourth in Soldotna. Fishing ranked second in Soldotna and third in Kenai. Supply bases for offshore oil and petrochemicals ranked ninth and tenth, respectively, in both cities. The exception was lumber, a traditional industry, which ranked last in both cities.

One of these results is in sharp contrast to the responses given to an apparently similar question: Which of these types of development would you most like to see in _____? The first-choice results place the petrochemical industry first (the highest percentage of respondents choosing that industry) in Kenai and third in Soldotna. On the face of it, it appears that the petrochemical industry is ranked low for the future of the community but high for what people would like to see, which suggests that they see it as of some short run value for themselves, but as not beneficial in the long run for the community at-large. Other explanations are, of course, possible. This somewhat anomalous ranking is not discussed in the study. [89]

Only this sector has anomalous rankings in the responses to the two questions. Education (second in both cities) continues to rank high in the second question as in the first. Lumbering (tenth in Kenai, eleventh in Kenai, eighth in Soldotna) continues to rank low. The relative position of tourism has improved (to fourth in Kenai and first in Soldotna).

In response to other questions on oil and gas activity, 63% in Kenai and 55% in Soldotna thought regulatory powers should be used by the city and Borough to prevent the location of supply bases in the area (versus 28 and 31%, respectively, who did not think so). Both in Kenai and in Soldotna the overwhelming majority (74 and 84%, respectively) felt the city and Borough should have a strong role in determining the location and conditions under which onshore oil development facilities will be permitted. Pollution, population growth, and the effects on fishing were seen as the most adverse consequences expected.

Finances

Table 44 presents data on revenues and expenditures for the cities of Kenai and Soldotna for the year ended June 30, 1975. Kenai's general fund revenues totaled just over $1 million and its expenditures about $1.6 million, while Soldotna's revenues amounted to $665,000 and its expenditures to $597,000. Local tax revenues accounted for 72% of general fund revenues in Kenai, and for 79% in Soldotna. In both cities, the bulk of the local tax revenues consists of property

Table 44. Revenues and Expenditures: Kenai and Soldotna, Year Ended 30 June 1975

	Kenai	Soldotna
General Fund Revenue	1,015,136	655,326
1. Local Tax Revenue	732,943	519,441
a. Property	584,599	312,304 (1)
Real and Personal Property	572,872	307,983
Other	11,727	4,321
b. Nonproperty	148,344	137,387
Charges for Services	64,154	35,752
Penalties and fines	26,727	4,185
Permits, Licenses and Fees	14,072	12,757
Franchise	7,120	3,547
Rental of Equipment and Property	4,917	61,667
Other	31,354	19,479
2. Intergovernmental Tax Revenue	282,193	205,635
Revenue Sharing	184,289	94,131
Public Employee Program	0	69,750
Business License	56,298	24,812
Utilities	16,611	7,341
Liquor License	14,100	2,700
Fish	9,880	0
Other	1,015	6,901
General Fund Expenditure	1,716,017	550,513
City Council	32,283	16,627
Administration	209,724	63,192
Public Works	19,795	27,234
Police	186,661	86,745
Fire	250,823	56,248
Streets and Roads	161,554	45,462
Municipal Shop	89,653	76,562
Library	22,828	15,129
Department of Revenue	17,915	6,851
Inspection	48,223	1,078
Non-departmental	131,905	--
Recreation	5,078	9,839
Public Employee Program	0	73,078
Bonded Debt Retirement	503,631	21,514
Airport	0	12,388
Other	35,944	38,566
Less Reimbursements from Other Funds	131,586	--
Plus Transfers to Other Funds	--	46,764
Net Expenditures	1,584,431	597,277

(1) includes utility sales tax

Sources:

Mathematical Sciences Northwest, Inc. and Human Resources Planning Institute, Inc. A Social and Economic Impact Study of Off-Shore Petroleum and Natural Gas Development in Alaska. Phase I Final Report Submitted to Department of the Interior, Bureau of Land Management. Oct. 15, 1976. Seattle, WA.

Kenai Peninsula Borough. Overall Economic Development Program. 1976. Revised Document. Draft Copy. Soldotna, AK

Viva voce Ralph Kinney (Kenai) and Mrs. Wilkins (Soldotna)

taxes. Intergovernmental tax revenues consituted 28% of general fund revenues in Kenai, and 31% in Soldotna. Revenue-sharing monies accounted for about two-thirds of the intergovernmental revenues in Kenai, and for 46% in Soldotna.

Neither city has an income tax. Kenai's sales tax revenue was not earmarked for the general fund in 1975. It amounted to $208,400, and was used to retire debt. Soldotna instituted a sales tax in 1976, which yielded $110,819, in total revenues of $836,978.

The largest state aid program is that in support of local school districts. Since 1971, the state has paid a minimum of 90% of eligible expenditures by the local schools. The state's revenue-sharing program, which was begun in 1969, supports a variety of programs in the face of increased demands for services, and has enabled the local governments to levy property taxes at rates lower than they otherwise might have been.

The most noticeable difference in the expenditure patterns of the two cities in 1975 was the relatively much greater expenditure in Kenai on police and fire protection, and on streets and roads.

Table 45 presents data on property taxes and debt for the period 1965-1975 for Kenai and Soldotna. Although real and personal property are taxable, Kenai taxed only real property until 1971. In 1971, personal property was added to the tax base, and the millage consequently reduced. A marked increase occurred in Kenai's base and levies over the period 1968-1970, despite a constant rate (and a reduced rate in 1970). This increase reflects oil and gas development. The increase in the rate to 10.5 mills in 1973 followed a period of tax levies that had declined from the high of $358 million in 1970, and signifies that the demand for services had grown faster than the property base.

Soldotna levied property taxes for the first time in 1969, at a rate of 6 mills. This rate was maintained until 1972, when it was raised to 10 mills. It was raised again, to 14 mills, in 1973. With a fairly steadily increasing tax base throughout the period, Soldotna's levies rose by 250%. Again, the increase in the millage in the mid-seventies reflects a growth in service greater than the growth in the tax base.

The increase in the tax base in both cities in 1972 reflects the fact that the state permitted the cities to tax oil-producing properties in that year. The base will increase again in 1978, particularly when the 10-year-exempt period ends for industries that were the first of that type to locate in Alaska. In Kenai these industries include the first refinery, LNG, and petrochemical plants.

Kenai passed its first bond issue--for water and sewer systems--in 1965. Additional bond issues were floated in the early seventies.

Table 45. Taxes and Debt: Kenai and Soldotna, 1965-1975

Fiscal Year	Kenai						Soldotna					
	Property Tax Base ($ million)	Tax Rate (mills)	Property Tax Levies ($1,000)	Assessed Value ($ million)	G.O. Bonded Debt ($ million)	Debt as Percent of Assessed Value	Property Tax Base ($ million)	Tax Rate (mills)	Property Tax Levies ($1,000)	Assessed Value ($ million)	G.O. Bonded Debt ($ million)	Debt as Percent of Assessed Value
1965	10.0[1]	10[1]	99.7				-	-	-			
1966	9.0[1]	10[1]	90.2				-	-	-			
1967	12.4[1]	10[1]	124.1				-	-	-			
1968	18.3[1]	10[1]	182.9				12.4	6	74.4			
1969	29.6[1]	10[1]	296.0				13.6	6	81.4			
1970	44.8	8	358.1	47.0			14.9	6	89.3	14.7		
1971	44.7	7	313.1	48.5			15.1	6	90.4	16.5		
1972	46.8	7	327.7	49.4			17.6	10	176.2	18.1		
1973	46.8	10.5	491.1	49.4	5.41	11.0	18.4	14	257.0	19.7	0.13	0.07
1974				54.7	5.17	9.45				22.8	0.65	2.82
1975				60.7						30.9		

Source: Mathematical Sciences Northwest, Inc. and Human Resources Planning Institute, Inc. A Social and Economic Impact Study of Off-Shore Petroleum and Natural Gas Development in Alaska. Phase I Final Report Submitted to Department of the Interior, Bureau of Land Management. October 15, 1976. Seattle, WA.

Kenai Peninsula Borough. Overall Economic Development Program. 1976. Revised Document. Draft Copy. Soldotna, AK

(1) Real property only.

As a result, Kenai's debt to assessed value was above 10% in 1973. Above that figure, which is an indicator of financial health, additional bond issues become increasingly difficult to market. Soldotna's debt to value ratio is well below the figure.

SUMMARY

The hydrocarbon sector dominates the economy of the Study Area. It has been the major force underlying increases in population, employment, and economic activity. It is expected to continue to predominate, and to continue to be the major source of growth for the foreseeable future, largely because of the pending (October 1977) Lower Cook Inlet lease sale. In the long-run, the recreation-tourism sector is expected to grow, both absolutely and relatively. It may rank in importance with the hydrocarbon sector by the turn of the century, and is expected to constitute a significant source of economic growth in the Study Area between now and then.

The two sectors are linked in both a positive and a negative sense. Positively, the growth of population engendered by the hydrocarbon sector leads to increased recreation demand by local and nonlocal (for example, Anchorage) residents. Negatively, this growth can affect adversely the quality of the recreation experience and the natural resources on which it is based. For example, both general population growth and the movement of Anchorage residents into the Study Area in summer may affect adversely the quality of the Kenai River and the ability of the river to support salmon, which are one of the major natural resources of the area, and whose presence gives to the river its unique recreation character.

The following conclusions pertinent to the Corps' permit authority are drawn from the trends portrayed in the "Socioeconomic Profile":

- Socioeconomic 1: Population and economic growth and development in the area could adversely affect the river and related wetlands if all expected development requests are permitted.

- Socioeconomic 2: The demand for access to the river resulting from expected population and economic growth can be accommodated without adversely affecting the river and wetlends if permits are issued in amounts, types, and time phasing consonant with an overall land-use (including wetlands) plan.

- Socioeconomic 3: Expected activities resulting from the development of one natural resource may adversely affect the continued viability of other natural resources (e.g., salmon, moose, waterfowl) in the absence of a permit procedure tied to a comprehensive land-use plan. Without such a plan and permit procedure, the short-run development of the first

resource may permanently preclude the continuously renewable natural resources with consequent adverse effects on the long-run economy of the study area as recreation-tourism is inhibited.

CHAPTER 7

HISTORIC PROFILE

ARCHAEOLOGY

The history of the Kenai Peninsula may be divided into three periods: Native, Russian, and American. There is evidence suggesting that Eskimos were the first people to occupy the Kenai Peninsula. Exactly when they arrived is not known;[90] however, a culture was present 2000 years ago that displayed Eskimo characteristics.[91] That culture made use of riverine, marine, and inland resources in almost equal amounts.

Eskimos were replaced eventually by Tanaina Indians. Why and when Eskimo inhabitants in prehistoric times left the area is not known. It would appear, however, that the Cook Inlet area was one of unsettled ownership during the late 18th century.[91]

Archaeological investigations along the Kenai River have centered on one organized site location survey and three organized "digs."[83] The site location survey was conducted in 1960 as part of construction requirements of the Alaska Natural Gas and Kenai Pipeline Company pipelines.[92]

One of the digs is located near Soldotna on the homestead of Jim Porter. The second located on the Ciechanski homestead between Kenai and Soldotna. Tentative interpretations of data show the remains to be Tanaina Indian.[91] The final site, located opposite the confluence of the Moose River and Kenai River shows evidence of Eskimo habitation.[92]

It is felt that there are other archaeologically important sites along the Kenai River and its tributaries,[83] but their number and location is unknown.

CONTEMPORARY

Aside from its rich native heritage, the Kenai Peninsula by modern standards represents a fairly young settlement. Soldotna and Sterling, for example, were settled in 1947. Irrespective of its fairly young stature, the Study Area is steeped in a rich history of early, sometimes tyrannical, Russian influences coupled with later "boom" (e.g., gold, oil) influences. New residents to the area are constantly reminded of earlier settlers by such remnants as the Russian Orthodox Church and old Fort Kenay in the city of Kenai. Hikers and backpackers occasionally find old tools from previous residents.[94]

Following is a chronological listing of events that form a small part of the Russian and American history of the Study Area. Various authors contributed to this listing.[94,95,96]

24 July 1741:	Europeans sighting Kenai coast first recorded. Vitrus Bering and crew of the Russian ship St. Peter sight Kenai Peninsula but do not land because of adverse winds and tides.
1 August 1741:	Capt. Alexei Chirikov and crew of Russian ship St. Paul sight coast of Kenai Peninsula, but do not land because of dangerous appearance of coast.
1764:	Russian ships travel from Kanichatka to Kammandorski Islands and along the Aleutian chain to reach the Peninsula. Fur rush begins.
1774-1778:	Capt. James Cook explores the Peninsula. Meets natives at West Forelands who possess blue trade beads and iron knives indicating trade with Russians.
August 1791:	Lebedev hunters and traders under Grigor Konovalof establish Fort St. Nicholas (Kenai) on the Kaknu (Kenai) River.
1799:	Shelikhov company, after disposing of Grigor Konovalof, given complete control over the colonies by Russian government.
1834:	Alexander Baranov, Manager of Shelikhov company, reports gold upstream of Fort St. Nicholas near Funny River.
1836:	Smallpox reaches Kenai Peninsula.
1838-1840:	Disease rules the Kenai Peninsula.
1849:	Peter Doroskin digs for gold at the Russian River.
1867:	United States purchases Alaska for $7,200,000 from Russia. Purchase known as "Sewards Folly."
1869:	U.S. Army establishes Fort Kenai at site of Fort St. Nicholas with 104 men.
1870:	U.S. Army abandons Fort Kenay.
1880:	First U.S. Census reports 44 citizens at Kenai.
1882:	First canneries built on river.
1884:	Joseph Cooper discovers gold near Cooper Creek.
1896:	Word of Cook Inlet gold discoveries excites Seattle miners.
1899:	First Post Office established in Kenai.
1901:	Alaska Central Railroad Company formed.
1911:	Jack Brown and Keith McCullough survey Kenai forests.
1912:	Mt. Katmai erupts.
1915:	Nellie Neal Lawing ("Alaska Nellie") arrives in Seward.
1920:	Population of Kenai estimated to be 332.
1941:	Kenai National Moose Range established.
1947:	Area opened to homesteading. Four people homestead what is now Soldotna. Fires sweep Kenai Peninsula. Walt Pederson homesteads what is now Sterling (Naptowne).
1949:	Naptowne Post Office established. Soldotna Post Office established (Maxine Lee, Postmaster).

1949-1953: Homesteading closed. Residents work on Sterling Highway. Seward Station, a U.S. Army Communications Center, constructed.

1954: Naptowne renamed Sterling.

1957: Oil discovered at Swanson River.

1959: Alaska becomes a state.

1960: Soldotna becomes Fourth Class city.

1963: Kenai establishes home rule. Standard Oil builds refinery at Nikishka.

1964: Alaskan earthquake; minor damage to area; some uplift in Kenai Flats.

1967: Soldotna becomes First Class city.

1969: Lake on Skilak Glacier "dumps," causing severe damage downstream of Skilak Lake (especially in Sterling and Soldotna area).

SUMMARY

The Kenai River Study Area has a rich history. A culture, presumably Eskimo, was present 2,000 years ago. Eskimos were replaced by Tanaina Indians. Valuable archaeological sites are found along the river, and others may exist.

Modern-day residents of the Study Area relish its history. From the Historic Profile, the following conclusion relevant to Corps permit authority is evident:

- Historic 1: No permits should be granted that would endanger the integrity of valuable archaeological or historic sites.

CHAPTER 8

AESTHETIC PROFILE

INTRODUCTION

That the Kenai River Study Area offers many pleasing experiences is evidenced by the weekly influx of tourists and others who flock to the area to enjoy the truly individual benefits to be found. Mountain peaks capped with snow, the sound of fast flowing water, and seemingly endless acres of untouched vegetation capture the imagination and rekindle the dreams of would-be 20th-century adventurers.

In the following pages areas within the Study Area that have special meaning, value, and significance to residents and visitors will be discussed. The discussion will provide criteria related to permit activity that will promote and maintain the aesthetic attributes inherent to the Kenai River.

AESTHETIC LANDSCAPE ZONES

The landscape of the Study Area is composed of groupings of natural and cultural features. Three particular landscape zones are evident according to their unique character or visually cohesive patterns: 1) the Kenai River and associated tributaries, 2) the Kenai Lowlands, and 3) the mountains of the Kenai Range and Aleutian Range. Physiography and vegetation, as modified by settlement patterns, were considered principally in the delineation of these areas.

To arrive at the various zones one travels by boat, car, airplane, or on foot. Experiences vary with transportation mode.

Kenai River

The Kenai River is a beautiful natural amenity that provides scenic and recreational enjoyment for people living in the Kenai Peninsula as well as in all of south central Alaska. The Kenai River is swift flowing, interspersed with white water rapids and many boulders. The river originates at Kenai Lake and passes through several gentle meanders before cascading between mountainous gorges into Skilak Lake. The upper portion of the River is visible from Cooper Landing and from several points along the Sterling Highway. Areas of white water rapids add to the visual experience (Figure 42). Above Sterling, the Naptowne Rapids provide natural beauty as well as a navigational challenge to boaters. Near Sterling, groins and other structures related to river access detract from the attractiveness of the river (Figure 43). Evidence of human activities continues until the river enters Cook Inlet at Kenai.

The estuary and associated tidal marshes provide many aesthetic opportunities. During spring and fall, several species of waterfowl

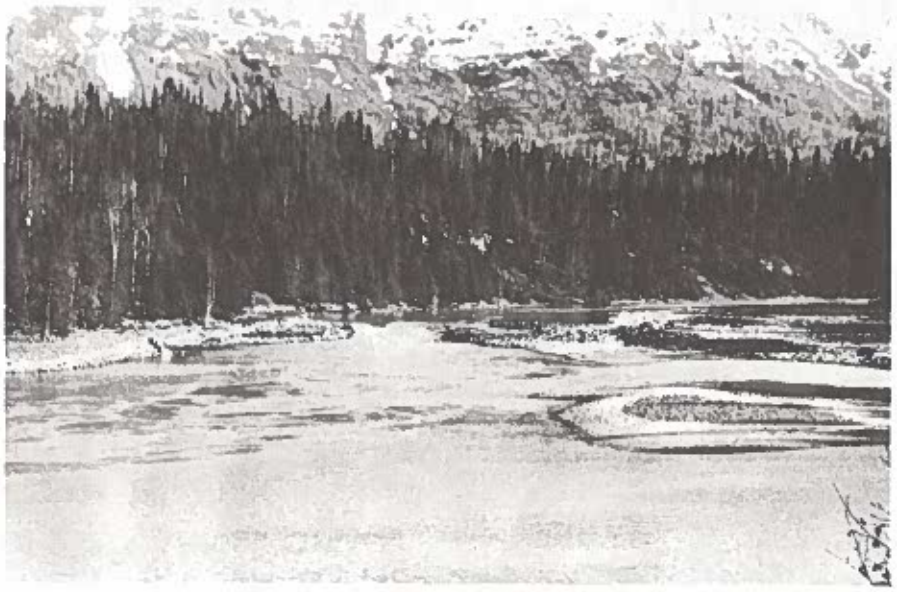

Figure 42. Kenai River Near Cooper Landing, May 1977
(WAPORA, Inc.)

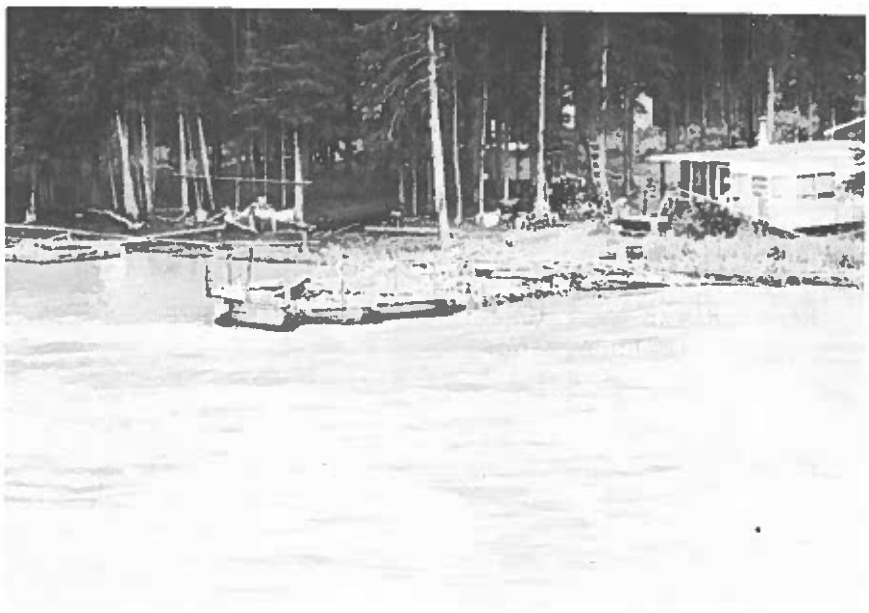

Figure 43. Groins on Kenai River Upstream of Kenai River-Moose River Confluence, August 1977 (WAPORA, Inc.)

use the area, where they are enjoyed by naturalists. Snow geese using the area in the spring signal an end to winter. Snow geese in the tidal flats of the estuary are pictured in Figure 44.

The twice daily change in the water level of the estuary is dramatic. In this section of the river the snow capped Kenai Mountains to the east and the mountains of the Aleutian Range to the west across Cook Inlet provide further scenic pleasure. Occasional oceangoing ships passing the area on their way to Nikiski or Anchorage contribute to the overall experience. Figure 45 shows part of the estuary.

Kenai Lowlands

The Kenai Lowlands are a relatively flat, broad expanse of land beginning at Cook Inlet and continuing eastward to the base of the Kenai mountains. The landscape is perceived as essentially flat, open, and vast. There are significant natural features other than the mountainous backdrop. In the absence of relief, residential, industrial, and transportation activities assume a greater visual prominence. As a result, this zone is relatively lacking in attractive or interesting character. From the air, it appears as a series of pothole lakes with associated wetlands interspersed among patches of conifers. Areas of burned timber scar the landscape as do earlier seismic trails. An occasional moose or bear breaks the monotony. The Kenai Lowlands are pictured in Figure 46.

Mountains

The Kenai Mountains are the most dramatic feature of the area. They are characterized by steep bluff slopes and incised ravines. The ravines show water falls during warmer months; in the winter they are ice covered and snow packed. The lower parts of the mountains are heavily vegetated; upper sections reveal exposed rock faces with no vegetation. Mountain goat and Dall sheep are observed in isolated groups, quietly feeding on exposed vegetation. Black and brown bear are seen feeding on the abundant berries or salmon along stream banks. Skilak Glacier, as observed from Skilak Lake, is perceived as a giant white mass. Nestled between the mountains, Cooper Landing retains the aura of a village of yesteryear. The Kenai Mountains near Cooper Landing are pictured in Figure 47.

SUMMARY

The Kenai River Study Area is attractive and exciting. Aesthetic opportunities are natural (e.g., marshes, mountains) and man ordered (e.g., Russian Orthodox Church and Fort Kenay). These opportunities must be retained because the lifestyle of the residents is oriented to them and because they influence the growth of tourism.

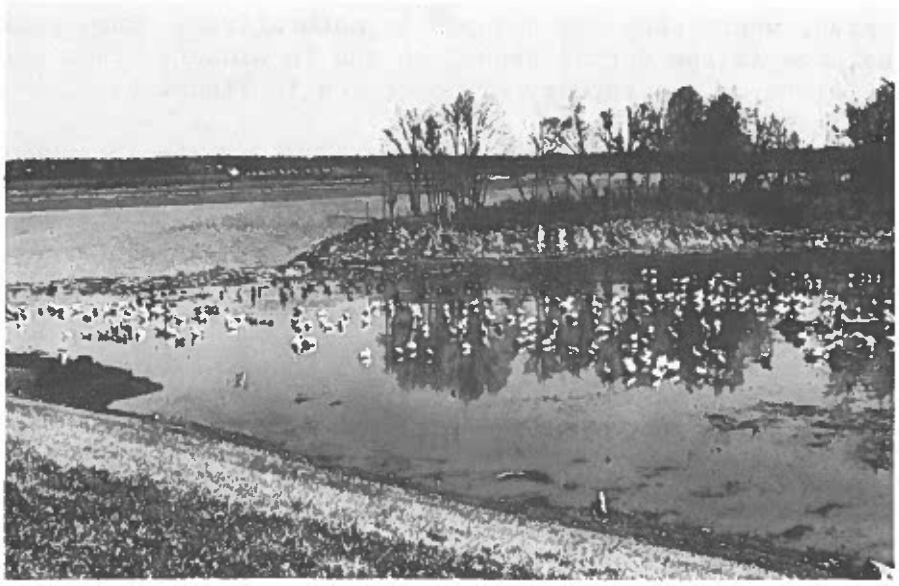

Figure 44. Snow Geese and Other Waterfowl in Kenai "Flats," May 1977 (WAPORA, Inc.)

Figure 45. Kenai River Estuary East of Kenai, Alaska, May 1977 (WAPORA, Inc.)

Figure 46. Kenai Lowlands May 1977 (WAPORA, Inc.)

Figure 47. Kenai River West of Cooper Landing, May 1977 (WAPORA, Inc.)

Some activities that would reduce the aesthetic opportunities of the Study Area are outside Corps jurisdiction. Others, such as construction in waterways or adjacent wetlands, are within the province of the Corps. Activities that would reduce the aesthetic quality and opportunities within the Study Area should be discouraged.

The findings of the Aesthetic Profile lead to the following conclusions with regard to Corps permit authority:

- Aesthetic 1: Activities in the floodplain that require removal of vegetation shall be discouraged unless the applicant ensures that revegetation will occur after construction.

- Aesthetic 2: Existing permitted activities will be maintained in a reasonable appearance. The use of car bodies, oil drums, or other unsightly material will not be permitted.

- Aesthetic 3: In areas of local, state, or national concern, structures or activities that diminish the aesthetic values will be discouraged. Before permit issuance, the applicant will be required to describe measures that will mitigate said effects.

CHAPTER 9

INSTITUTIONAL ANALYSIS

INTRODUCTION

Following is a summation of the plans, policies, and programs of several government agencies whose decisions have a direct effect on the permit authorities of the Corps of Engineers in the Kenai River Study Area. Several agencies are involved in the decision-making process. No single agency has the authority or the manpower to manage all aspects of the Kenai environment. Permit-related decisions, therefore, require close coordination between agencies.

The Corps of Engineers permit authorities and coordination policies are addressed in Chapter 1 and no further discussion is offered.

U.S. FISH AND WILDLIFE SERVICE

Under the provisions of the U.S. Fish and Wildlife Service Coordination Act, the Service must be consulted before a permit is issued by a federal agency for development activities in navigable waters. The Service investigates these activities with a view to the protection and conservation of fish and wildlife resources, and provides the lead agency (in the case of the Corps of Engineers) with recommendations regarding the issuance of the permit.

It is the main interest of the Service, in reviewing all permit applications submitted to the Corps of Engineers, to determine the impact of each application on the resident fish and wildlife, with a view to the conservation of wildlife resources by prevention or compensation of losses and damage caused by work or structures proposed in a permit application.

NATIONAL MARINE FISHERIES SERVICE

In accordance with Reorganization Plan No. 4 of 1970, certain functions under the Fish and Wildlife Coordination Act were transferred from the Department of the Interior to the Department of Commerce. These functions, which include the protection and enhancement of the anadromous fish resource and some offshore marine mammals, are performed by the National Marine Fisheries Service. The Service reviews any proposed federal action that might adversely affect these resources, including all permit applications considered by the Army Corps of Engineers. Comments concerning the application's possible impact on the anadromous fish resource are provided.

U.S. ENVIRONMENTAL PROTECTION AGENCY

The Environmental Protection Agency has the responsibility and authority to administer the Federal Water Pollution Control Act Amendments of 1972. Therefore, the Agency directly influences the permit decisions of the Corps of Engineers. Section 404 of the Federal Water Pollution Control Act authorizes the Corps to issue permits for discharge of dredged material into navigable waters, but the disposal sites must be in accordance with the Environmental Protection Agency's guidelines. The Agency can prohibit or restrict the use of a site if it is determined that the materials will have an unacceptable adverse effect on municipal water supplies, shellfish beds, fishery areas, wildlife areas, or recreational areas. The Agency also has permit authority over the discharge of pollutants into navigable waters.

In general, the Agency reviews all permit applications to determine that the possible impacts will be in compliance with federal water quality statutes, rules, and standards.

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Through state law, the Alaskan Department of Environmental Conservation has responsibility for developing regulations, issuing permits, reviewing plans, and providing assistance. To date, the Department has developed regulations for oil pollution control, wastewater disposal, water quality, pesticides, sold waste management, and air quality. The Department is currently developing regulations for safe drinking water and spill prevention and reporting for oil and other hazardous materials. All development is subject to the environmental constraints defined in these regulations.

Plan Review Requirements

For many proposed facilities, submission of engineering plans and specifications for review and approval by Department engineers and scientists is required by statute and regulation. This requirement ensures that the effects of potential new sources of pollution will be mitigated through the installation of equipment that will effectively protect the environment and meet state discharge, emission, and ambient standards.

Permits

Any development that involves water use, wastewater disposal, emissions into the atmosphere, disposal of solid waste, the use of broadcast chemicals and pesticides, the discharge of any material into the waters of the state, land clearing/land development, or resource harvesting, may require a permit from the Department. Permits enable the Department to work with new businesses and industries to ensure that they will be able to operate in compliance with Alaska's environmental standards.

ALASKA DEPARTMENT OF NATURAL RESOURCES

Alaska Water Use Act of 1966

The Alaska Water Use Act of 1966 (AS 46.15) establishes a water use permit and public notification system administered by the Alaska Department of Natural Resources. The Act deals specifically with the appropriation of water and thus may apply conditions, restrictions, and limitations on the construction and operation of works for an appropriation. The works may be a dam, diversion structure, or intake system in a waterbody. Conditions may be imposed to protect the rights of other appropriators and the public interest. In determining the public interest the law directs the Department to consider eight parameters, including the effects on fish and game, harm resulting to other persons from the proposed appropriation, and the effect on access to navigable or public waters (46.15.080). Stipulations are routinely placed on permits that require conformance to certain conditions; however, present staffing levels inhibit field assessment or enforcement.

Alaska Land Act of 1959

Under the Alaska Land Act of 1959 (AS 38.05), state land or lands defined as "all lands, or resources belonging to, or acquired by, the State" (AS 38.05.365(16)). Shorelands, submerged lands, tidelands, navigable waters, and public waters are further defined in the same section of the statute. Inasmuch as the state claims title to most of the stream and lake bottoms in the state, it follows that structures placed on the bed of the waterbody without the state's permission may be in trespass. Although the state does not have a comprehensive permitting or engineering program regarding modification of watercourses by placement of structures, statutes do provide a penalty if damage or trespass occurs on state land pursuant to AS 38.05.360.

> Waste or injury to land. A person who commits waste, or trespasses, or commits other injury upon state land, in addition to being civilly liable for damages caused upon conviction, is punishable by a fine of not more than $1,000.

KENAI PENINSULA BOROUGH

Land Use Planning and Regulation

The Kenai Peninsula Borough is responsible for all land use planning, as well as zoning and subdivision regulation throughout the Borough, even within cities. Currently, there is no officially adopted and followed comprehensive plan. Both the cities of Kenai and Soldotna having zoning ordinances and maps that have been adopted by

the Borough. The Borough has a subdivision regulation ordinance that applies areawide. The Borough does not currently have any building regulatory authority. The cities of Kenai and Soldotna do have a building code and a permit system.

Tax Assessment and Collection

The Borough is responsible for the assessment and collection of taxes areawide. The cities set their mill rate, but the Borough does all the property appraisal, tax billing, and tax collection.

Solid Waste Disposal

The Borough has assumed responsibility for the disposal of solid waste. Sanitary landfills are the method used.

ALASKA DEPARTMENT OF FISH AND GAME

The Anadromous Fish Act (AS 16.05.870) expresses the concern of the Alaska State Legislature for protecting the state's commercial, recreational, and subsistence stocks of anadromous fishes and their habitat. Fishes specifically covered under the statute are five species of Pacific salmon, Dolly Varden, rainbow trout (steelhead), Arctic char, sheefish, and whitefish. Section b of AS 16.05.870 requires that a person or agency desiring to use or modify the bed of an anadromous fisheries stream notify the Commissioner of the Alaska Department of Fish and Game of this intention and secure his written approval. The Alaska District Court has defined the bed of an anadromous fish waterway to be: "the land contained between a river's banks which is not covered by vegetation." Virtually all coastal waters in Alaska are designated important to spawning, rearing, or migration of anadromous fishes, and are so covered under the terms of the statute. The statute also covers perennial tributaries to known anadromous fish streams.

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APPENDICES

APPLICATION FOR A DEPARTMENT OF THE ARMY PERMIT

For use of this form, see EP 1145-2-1

The Department of the Army permit program is authorized by Section 10 of the River and Harbor Act of 1899, Section 404 of P. L. 92-500 and Section 103 of P. L. 92-532. These laws require permits authorizing structures and work in or affecting navigable waters of the United States, the discharge of dredged or fill material into waters of the United States, and the transportation of dredged material for the purpose of dumping it into ocean waters. Information provided in ENG Form 4345 will be used in evaluating the application for a permit. Information in the application is made a matter of public record through issuance of a public notice. Disclosure of the information requested is voluntary; however, the data requested are necessary in order to communicate with the applicant and to evaluate the permit application. If necessary information is not provided, the permit application cannot be processed nor can a permit be issued.

One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and checklist) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

1. Application number (To be assigned by Corps)	2. Date Day Mo. Yr.	3. For Corps use only.

4. Name and address of applicant. Telephone no. during business hours A/C ( ) _____ A/C ( ) _____	5. Name, address and title of authorized agent. Telephone no. during business hours A/C ( ) _____ A/C ( ) _____

6. Describe in detail the proposed activity, its purpose and intended use (private, public, commercial or other) including description of the type of structures, if any to be erected on fills, or pile or float-supported platforms, the type, composition and quantity of materials to be discharged or dumped and means of conveyance, and the source of discharge or fill material. If additional space is needed, use Block 14.

7. Names, addresses and telephone numbers of adjoining property owners, lessees, etc., whose property also adjoins the waterway.

8. Location where proposed activity exists or will occur.

Address:

_____
Street, road or other descriptive location

_____
In or near city or town

_____
County State Zip Code

Tax Assessors Description: (If known)

Map No. Subdiv. No. Lot No.

Sec. Twp. Rge.

9. Name of waterway at location of the activity.

ENG Form 4345, 1 OCT 77 Edition of 1 Apr 74 is obsolete.

10. Date activity is proposed to commence. _____

Date activity is expected to be completed _____

11. Is any portion of the activity for which authorization is sought now complete? ☐ YES ☐ NO
If answer is "Yes" give reasons in the remark section. Month and year the activity was completed _____. Indicate the existing work on the drawings.

12. List all approvals or certifications required by other federal, interstate, state or local agencies for any structures, construction, discharges, deposits or other activities described in this application.

Issuing Agency	Type Approval	Identification No.	Date of Application	Date of Approval

13. Has any agency denied approval for the activity described herein or for any activity directly related to the activity described herein?

☐ Yes ☐ No (If "Yes" explain in remarks)

14. Remarks (Checklist, Appendix H for additional information required for certain activities).

15. Application is hereby made for a permit or permits to authorize the activities described herein. I certify that I am familiar with the information contained in this application, and that to the best of my knowledge and belief such information is true, complete, and accurate. I further certify that I possess the authority to undertake the proposed activities.

_____
Signature of Applicant or Authorized Agent

The application must be signed by the applicant; however, it may be signed by a duly authorized agent (named in Item 5) if this form is accompanied by a statement by the applicant designating the agent and agreeing to furnish upon request, supplemental information in support of the application.

18 U. S. C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of The United States knowingly and willfully falsifies, conceals, or covers up by any trick, scheme, or device a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false fictitious or fraudulent statement or entry, shall be fined not more than $10,000 or imprisioned not more than five years, or both. Do not send a permit processing fee with this application. The appropriate fee will be assessed when a permit is issued.

GENERAL CONDITIONS

I. General Conditions:

a. That all activities identified and authorized herein shall be consistent with the terms and conditions of this permit; and that any activities not specifically identified and authorized herein shall constitute a violation of the terms and conditions of this permit which may result in the modification, suspension or revocation of this permit, in whole or in part, as set forth more specifically in General Conditions j or k hereto, and in the institution of such legal proceedings as the United States Government may consider appropriate, whether or not this permit has been previously modified, suspended or revoked in whole or in part.

b. That all activities authorized herein shall, if they involve a discharge or deposit into navigable waters or ocean waters, be at all times consistent with applicable water quality standards, effluent limitations and standards of performance, prohibitions, and pretreatment standards established pursuant to Sections 301, 302, 306 and 307 of the Federal Water Pollution Control Act of 1972 (P.L. 92-500; 86 Stat. 816), or pursuant to applicable State and local law.

c. That when the activity authorized herein involves a discharge or deposit of dredged or fill material into navigable waters, the authorized activity shall, if applicable water quality standards are revised or modified during the term of this permit, be modified, if necessary, to conform with such revised or modified water quality standards within 6 months of the effective date of any revision or modification of water quality standards, or as directed by an implementation plan contained in such revised or modified standards, or within such longer period of time as the District Engineer, in consultation with the Regional Administrator of the Environmental Protection Agency, may determine to be reasonable under the circumstances.

d. That the permittee agrees to make every reasonable effort to prosecute the work authorized herein in a manner so as to minimize any adverse impact of the work on fish, wildlife and natural environmental values.

e. That the permittee agrees to prosecute the work authorized herein in a manner so as to minimize any degradation of water quality.

f. That the permittee shall permit the District Engineer or his authorized representative(s) or designee(s) to make periodic inspections at any time deemed necessary in order to assure that the activity being performed under authority of this permit is in accordance with the terms and conditions prescribed herein.

g. That the permittee shall maintain the structure or work authorized herein in good condition and in accordance with the plans and drawings attached hereto.

h. That this permit does not convey any property rights, either in real estate or material, or any exclusive privileges; and that it does not authorize any injury to property or invasion of rights or any infringement of Federal, State, or local laws or regulations, nor does it obviate the requirement to obtain State or local assent required by law for the activity authorized herein.

i. That this permit does not authorize the interference with any existing or proposed Federal project and that the permittee shall not be entitled to compensation for damage or injury to the structures or work authorized herein which may be caused by or result from existing or future operations undertaken by the United States in the public interest.

j. That this permit may be summarily suspended, in whole or in part, upon a finding by the District Engineer that immediate suspension of the activity authorized herein would be in the general public interest. Such suspension shall be effective upon receipt by the permittee of a written notice thereof which shall indicate (1) the extent of the suspension, (2) the reasons for this action, and (3) any corrective or preventative measures to be taken by the permittee which are deemed necessary by the District Engineer to abate imminent hazards to the general public interest. The permittee shall take immediate action to comply with the provisions of this notice. Within ten days following receipt of this notice of suspension, the permittee may request a hearing in order to present information relevant to a decision as to whether his permit should be reinstated, modified or revoked. If a hearing is requested, it shall be conducted pursuant to procedures prescribed by the Chief of Engineers. After completion of the hearing, or within a reasonable time after issuance of the suspension notice to the permittee if no hearing is requested, the permit will either be reinstated, modified or revoked.

k. That this permit may be either modified, suspended or revoked in whole or in part if the Secretary of the Army or his authorized representative determines that there has been a violation of any of the terms or conditions of this permit or that such action would otherwise be in the public interest. Any such modification, suspension, or revocation shall become effective 30 days after receipt by the permittee of written notice of such action which shall specify the facts or conduct warranting same unless (1) within the 30-day period the permittee is able to satisfactorily demonstrate that (a) the alleged violation of the terms and the conditions of this permit did not, in fact, occur or (b) the alleged violation was accidental, and the permittee has been operating in compliance with the terms and conditions of the permit and is able to provide satisfactory assurances that future operations shall be in full compliance with the terms and conditions of this permit; or (2) within the aforesaid 30-day period, the permittee requests that a public hearing be held to present oral and written evidence concerning the proposed modification, suspension or revocation. The conduct of this hearing and the procedures for making a final decision either to modify, suspend or revoke this permit in whole or in part shall be pursuant to procedures prescribed by the Chief of Engineers.

l. That in issuing this permit, the Government has relied on the information and data which the permittee has provided in connection with his permit application. If, subsequent to the issuance of this permit, such information and data prove to be false, incomplete or inaccurate, this permit may be modified, suspended or revoked, in whole or in part, and/or the Government may, in addition, institute appropriate legal proceedings.

m. That any modification, suspension, or revocation of this permit shall not be the basis for any claim for damages against the United States.

n. That the permittee shall notify the District Engineer at what time the activity authorized herein will be commenced, as far in advance of the time of commencement as the District Engineer may specify, and of any suspension of work, if for a period of more than one week, resumption of work and its completion.

o. That if the activity authorized herein is not stated on or before _____ day of _____, 19_____, (one year from the date of issuance of this permit unless otherwise specified) and is not completed on or before _____ day of _____, 19_____, (three years from the date of issuance of this permit unless otherwise specified) this permit, if not previously revoked or specifically extended, shall automatically expire.

p. That no attempt shall be made by the permittee to prevent the full and free use by the public of all navigable waters at or adjacent to the activity authorized by this permit.

q. That if the display of lights and signals on any structure or work authorized herein is not otherwise provided for by law, such lights and signals as may be prescribed by the United States Coast Guard shall be installed and maintained by and at the expense of the permittee.

r. That this permit does not authorize or approve the construction of particular structures, the authorization or approval of which may require authorization by the Congress or other agencies of the Federal Government.

s. That if and when the permittee desires to abandon the activity authorized herein, unless such abandonment is part of a transfer procedure by which the permittee is transferring his interests herein to a third party pursuant to General Condition v hereof, he must restore the area to a condition satisfactory to the District Engineer.

t. That if the recording of this permit is possible under applicable State or local law, the permittee shall take such action as may be necessary to record this permit with the Register of Deeds or other appropriate official charged with the responsibility for maintaining records of title to and interests in real property.

u. That there shall be no unreasonable interference with navigation by the existence or use of the activity authorized herein.

v. That this permit may not be transferred to a third party without prior written notice to the District Engineer, either by the transferee's written agreement to comply with all terms and condition of this permit or by the transferee subscribing to this permit in the space provided below and thereby agreeing to comply with all terms and conditions of this permit. In addition, if the permittee transfers the interests authorized herein by conveyance of realty, the deed shall reference this permit and the terms and conditions specified herein and this permit shall be recorded along with the deed with the Register of Deeds or other appropriate official.

Title 33—Navigation and Navigable Waters

CHAPTER II—CORPS OF ENGINEERS, DEPARTMENT OF THE ARMY

Regulatory Programs of the Corps of Engineers

AGENCY: U.S. Army Corps of Engineers, DoD.

ACTION: Final rules.

SUMMARY: We are revising and reorganizing all regulations governing the permit programs of the Corps of Engineers. The new format is designed to make the policies and procedures more understandable to a person desiring to perform work in the waters of the United States. The Section 404 program (discharging dredged or fill material into the water) is being revised to clarify many terms and to provide for the issuance of nationwide permits. The new regulations should enable a person to get a quicker decision on his application. In the case of nationwide permits, no application at all is required.

EFFECTIVE DATE: July 19, 1977.

FOR FURTHER INFORMATION CONTACT:

Mr. Curtis Clark or Mr. Bernie Goode, Regulatory Functions Branch, phone: 202-693-5070 or Mr. William Hedeman, Chief Counsels Office, phone: 202-693-6169.

SUPPLEMENTARY INFORMATION: Because of the rapidly changing nature of the Corps' regulatory programs, we have prefaced this supplementary information with a historical background discussion.

HISTORICAL BACKGROUND

The Department of the Army, acting through the Corps of Engineers, is responsible for administering various Federal laws that regulate certain types of activities in specific waters in the United States and the oceans. The authorities for these regulatory programs are based primarily on various sections of the River and Harbor Act of 1899 (33 U.S.C. 401 et seq.), Section 404 of the Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. 1344) and Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413). Each of these laws will be discussed in further detail below.

THE RIVER AND HARBOR ACT OF 1899

Until recently, the regulatory programs of the Corps of Engineers were administered only pursuant to various sections in the River and Harbor Act of 1899. These include: Section 9 (33 U.S.C. 401); Section 10 (33 U.S.C. 403); Section 11 (33 U.S.C. 404); and Section 13 (33 U.S.C. 407).

Section 9 requires a permit from the Corps of Engineers to construct any dam or dike in a navigable water of the United States. The consent of Congress is also required if the navigable water is interstate, and the consent of the appropriate state legislature is required if the water is intrastate. Bridges and causeways constructed in navigable waters of the United States also require permits under Section 9, but the authority to issue these permits was transferred to the U.S. Coast Guard in 1966 when the Department of Transportation was created.

Section 10 identifies other types of structures or work in or affecting navigable waters of the United States that are prohibited unless permitted by the Corps of Engineers. However, unlike Section 9, the consent of Congress or a State legislature is not required. Section 10 requires permits from the Corps for structures in navigable waters such as piers, breakwaters, bulkheads, revetments, power transmission lines, and aids to navigation. It also requires permits for various types of work performed in navigable waters, including dredging and stream channelization, excavation and filling. In addition, any work that is performed outside the limits of a navigable water which affects its navigable capacity may also require a Section 10 permit.

The 1899 Act was enacted to protect navigation and the navigable capacity of the nation's waters. Section 11 focuses on this basic concern by allowing the Secretary of the Army to establish harbor lines landward of which piers, wharves, bulkheads, and other structures or work could be built or performed without a Corps permit. However, as will be noted below, these harborlines now serve only as guides to defining the offshore limits of these activities from the standpoint of their impact on navigation. They can no longer be relied upon as a substitute for the requirement to obtain a permit under the 1899 Act.

Violation of the provisions and requirements of Section 9, 10, or 11 of the 1899 Act can result in criminal prosecution. Section 12 specifies criminal fines that range between $500 and $2,500 per day of violation and/or imprisonment, either or both of which may be imposed upon conviction. In addition, Section 12 also provides for injunctive relief that may be sought by the United States to respond to violations of these Sections, including the restoration of the area to its original condition. See *U.S. v. Moretti*, 478 F. 2d 418 (5th Cir. 1975).

Until 1968, the Corps administered the 1899 Act regulatory program only to protect navigation and the navigable capacity of the nation's waters. The permit requirements of the Act were limited in their application to waters that were presently used as highways for the transportation of interstate or foreign commerce.

On December 18, 1968, the Department of the Army revised its policy with respect to the review of permit applications under Sections 9 and 10 of the 1899 Act. It published in the FEDERAL REGISTER a list of additional factors besides navigation that would be considered in the review of these applications. These included: fish and wildlife; conservation; pollution; aesthetics; ecology; and the general public interest. (33 CFR 209.120.)

The 1968 change in policy identified this new type of review as a "public interest review." It was adopted in response to a growing national concern for environmental values as they related to our nation's water resources and in response to related Federal legislation, such as the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.), that required the consideration of some of these concerns in Federal decision-making. Enactment of the National Environmental Policy Act on January 1, 1970 (42 U.S.C. 4331 et seq.) gave further support to this change in policy.

The "public interest review" received its first judicial test in the case of *Zabel v. Tabb*, 430 F. 2d 199 (15th Cir. 1970), cert. den. 401 U.S. 910 (1972) in which the Court upheld the denial by the Corps of a landfill permit for fish and wildlife reasons (and not reasons related to navigation). In reaching this decision, the Court reaffirmed the Department of the Army's position that it was "acting under a Congressional mandate to collaborate and consider all of these factors" when it reached that decision.

In further response to the adoption of this public interest review, the Department of the Army revised its harborline regulation (33 CFR 209.150) on May 27, 1970. This revision made it clear that permits were required for any work commenced landward of an established harborline after May 27, 1970, and that these permit applications would receive a full public interest review. Of course, navigation concerns in this public interest review will be guided, in large part, by the presence of established harborlines.

During 1972, the Corps of Engineers reviewed all judicial decisions in which the term "navigable waters of the United States" had been interpreted in order to identify all waters to which Sections 9 and 10 of the 1899 Act could be applied. This analysis was made in response to the Federal government's growing concern over the protection of the nation's water resources and the need to protect those resources through the full mandate of available Federal laws.

On September 9, 1972, the Corps of Engineers published an administrative definition of the term "navigable waters of the United States" in the FEDERAL REGISTER (subsequently codified as 33 CFR 209.260). This definition was intended for use in the Corps' administration of Sections 9 and 10 of the 1899 Act, and included the following: (1) all waters presently used to transport interstate or foreign commerce (see *Daniel Ball v. United States*, 77 U.S. 557 (1871)); (2) all waters used in the past to transport interstate of foreign commerce (see *Economy Light and Power Company v. United States*, 256 U.S. 113 (1921)); all waters susceptible to use in their ordinary condition or by reasonable improvement to transport interstate or foreign commerce (see *United States v. Appalachian Electric Power Co.*, 311 U.S. 377 (1940)); and all waters subject to the ebb and flow of the tide (see *United States v. Moretti, supra*). The landward limit of this jurisdiction for freshwater was established as the ordinary high water mark and the shore-

ward limit for tidal water was established as the mean high water mark (mean higher high water mark on the West Coast).

On April 4, 1974, the Corps of Engineers published final revisions to its permit regulation (33 CFR 209.120) (Proposed revisions were published for interim guidance on May 10, 1973). These revisions were made for the following reasons:

a. To incorporate new permit programs established under Section 404 of the FWPCA and Section 103 of the MPRSA (discussed in more detail below);

b. To incorporate the requirements of new Federal legislation related to the review of the Federal permit applications, including: other sections of the FWPCA and the MPRSA; the National Environmental Policy Act of 1969, and the Coastal Zone Management Act of 1972, as amended (16 U.S.C. 1451 et seq.).

c. To adopt additional factors of concern in the public interest review, in response to this related legislation, including, in addition to those previously announced, the following: economics, historic values, flood damage prevention, land use classification, recreation, water supply, and water quality.

d. To adopt criteria that would also be considered in the evaluation of each permit application including the desirability of using appropriate alternatives; the extent and permanence of the beneficial and/or detrimental effects of the proposed activity; and the cumulative effect of the activity when considered in relation to other activities in the same general area;

e. To adopt a wetlands policy that would protect wetlands within the Corps jurisdiction from unnecessary destruction; and

f. To implement procedures that insured compliance with these new statutory and policy review requirements.

As previously noted, regulations have been published throughout the past years to implement Sections 9, 10, 11, and 13 of the 1899 Act. These regulations have all been included in Part 209 of Title 33 of the Code of Federal Regulations as follows:

a. 209.120. Permits for Activities in Navigable Waters and Ocean Waters.
b. 209.125. Dams and Dikes Across Waterways.
c. 209.131. Permits for Discharges of Deposits into Navigable Waters.
d. 209.150. Harbor Lines.
e. 209.260. Definition of Navigable Waters of the United States.

THE REFUSE ACT PERMIT PROGRAM

On April 7, 1971 the Corps of Engineers implemented the first nationwide program to regulate the discharge of pollutants into the nation's awters. Authority for this permit program was based on Section 13 of the River and Harbor Act of 1899 (33 U.S.C. 407), commonly referred to as "The Refuse Act", which prohibits the discharge of "refuse matter" into navigable waters of the United States or their tributaries, or onto the banks of such waters if the "refuse matter" is likely to be washed into a navigable water. Regulations to implement this permit program were published in 33 CFR 209.131. On December 24, 1971, the permit program was enjoined by the District Court for the District of Columbia in the case of *Kalur v. Resor*, 335 F. Supp. 1, (D.D.C. 1971).

The Refuse Act permit program remained suspended until October 18, 1972, when Congress enacted the FWPCA. Section 402 of the FWPCA established the National Pollutant Discharge Elimination System program, which subsumed the Refuse Act permit program. Section 402(a)(5) provides that no permits may be issued under Section 13 of the 1899 Act for discharges into waters of the United States after 18 October 1972. However, the Refuse Act prohibitions can only be lifted by the issuance of an NPDES permit, and the Refuse Act remains a viable Federal enforcement mechanism for the discharge of pollutants into these waters without such a permit.

SECTION 404 OF THE FWPCA

On October 18, 1972, Congress enacted the Federal Water Pollution Control Act Amendments of 1972 with the announced purpose of restoring and maintaining the chemical, physical, and biological integrity of the Nation's waters. The FWPCA established a number of goals, requirements, prohibitions, and programs to achieve this purpose, and addressed the problems of water pollution by using many different approaches. The Amendments provide Federal financial assistance for major research and demonstration projects and the construction of publicly owned waste treatment works. They also provide programs to deal with various sources and types of pollution, including toxic, oil, and hazardous substances. Section 208 of the Act provides for the development and implementation of areawide waste treatment management planning processes to control all sources of pollution.

Section 301 of the FWPCA prohibits the discharge of pollutants from discernible conveyances (defined as "point sources") into "navigable waters", (defined in the FWPCA as "the waters of the United States, including the territorial seas"), unless the discharge is in compliance with Section 402 or 404 of the Act. As noted above, Section 402 establishes the National Pollutant Discharge Elimination System to regulate industrial and municipal point source discharges of pollutants into the Nation's waters. The NPDES permit program is administered by the Administrator of the Environmental Protection Agency, and provides an opportunity for the Administrator to transfer this responsibility to those States that have the authority and capability to assume responsibility for the administration of the NPDES program.

Section 404 of the FWPCA establishes a permit program, administered by the Secretary of the Army, acting through the Chief of Engineers, to regulate the discharge, into the waters of the United States, of dredged material and of those pollutants that comprise fill material. Applications for Section 404 permits are evaluated by using guidelines developed by the Administrator of EPA, in conjunction with the Secretary of the Army (See 40 CFR 230). The Chief of Engineers can make a decision to issue a permit that is inconsistent with those guidelines if the interests of navigation require. Section 404(c) gives the Administrator, EPA, further authority, subject to certain procedures, to restrict or prohibit the discharge of any dredged or fill material that may cause an unacceptable adverse effect on municipal water supplies, shellfish beds and fishery areas (including spawning and breeding areas), wildlife, or recreational areas.

Violation of the prohibition specified in Section 301 of the FWPCA against discharging pollutants into the waters of the United States without a required permit under Section 402 or 404, or permit conditions, or of other requirements of the FWPCA, can result in civil fines of not more than $10,000 per day of violation, criminal fines of up to $50,000 per day of violation, imprisonment, and/or injunctive relief, including restoration of the area to its original condition. The exact provisions for Federal enforcement of the FWPCA are established in Section 309. (33 U.S.C. 1319).

As part of the revisions to its April 3, 1974 permit regulation, the Department of the Army published regulations to implement the Section 404 permit program. These regulations limited the Section 404 permit program to the same waters that were being regulated under the River and Harbor Act of 1899: waters that are subject to the ebb and flow of the tide shoreward to their mean high water mark (mean higher water mark on the West Coast) and/or waters that are presently used, were used in the past, or are susceptible to use to transport interstate or foreign commerce.

The Natural Resources Defense Council and the National Wildlife Federation challenged this limitation on the jurisdiction of Section 404 as being inconsistent with the intent of Congress to regulate "all waters of the United States," as expressed in the FWPCA's definition of "navigable waters." Concern was expressed over the need to regulate the entire aquatic system, including all of the wetlands that are part of it, rather than only those aquatic areas that are arbitrarily distinguished by the presence of an ordinary or mean high water mark. (A major portion of the coastal wetlands are above the mean high water mark and were outside the permit review requirements of Section 404 by this interpretation.) Concern was expressed over the need to regulate the many tributary streams that feed into the tidal and commercially navigable waters (all of which were subject to regulation under the Refuse Act and NPDES programs) since the destruction and/or degradation of the physical, chemical, and biological integrity of each of these waters is threatened by the unregulated discharge of dredged or fill material. And concern was expressed for the many

other waters, including lakes, isolated wetlands, and potholes whose degradation, destruction, and disappearance continues to increase at alarming rates.

On March 27, 1975, the District Court for the District of Columbia ordered the revocation and rescission of that part of the Department of the Army's regulation "which limits the permit (Section 404) jurisdiction of the Corps by definition or otherwise to other than the waters of the United States." The Court further ordered publication of proposed regulations within 15 days (later amended to 40 days) which clearly recognized the full regulatory mandate of the FWPCA with respect to Section 404, and final regulations within 30 days of the date of the order (later amended to 80 days). *NRDC* v. *Callaway*, 392 F. Supp. 685 (D.D.C. 1975).

Responding to this court order, the Corps published four alternative proposed regulations in the FEDERAL REGISTER for comment on May 6, 1975. Over 4,500 comments were received in response to these proposed regulations. Many of these comments assisted the Corps in developing an administrative definition of "navigable waters" that was consistent with the intent and objectives of the FWPCA and also in developing a program that was responsive to many of the concerns raised by the comments.

On July 25, 1975, the Corps of Engineers published an interim final regulation in the FEDERAL REGISTER. The interim final regulation essentially melded revisions to the Section 404 program into the previously published April 3, 1974 regulation. It included administrative definitions of "navigable waters", "dredged material", and "fill material", and procedural mechanisms to avoid unnecessary duplicative review in those states that have permit programs similar to Section 404.

The interim final regulation administratively defined the term "navigable waters" to include: coastal waters, wetlands, mudflats, swamps, and similar areas; freshwater lakes, rivers, and streams that are used, were used in the past, or are susceptible to use to transport interstate commerce, including all tributaries to these waters; interstate waters; certain specified intrastate waters, the pollution of which would affect interstate commerce; and freshwater wetlands, including marshes, shallows, swamps, and similar areas that are contiguous or adjacent to the above described lakes, rivers, and streams, and that are periodically inundated and normally characterized by the prevalence of vegetation that requires saturated soil conditions for growth and reproduction.

The regulation also specified that permits would not be required for discharges beyond the "headwaters" of a river or stream unless the interests of water quality required assertion of jurisdiction above the headwaters. "Headwaters" was defined as "the point on the stream above which the flow is normally less than 5 cubic feet per second * * *."

Any material that is excavated or dredged from a water of the United States and reintroduced into a water of the United States is considered to be the "discharge of dredged material" for purposes of Section 404.

"Fill material" was defined to include the following activities: the creation of fastlands, elevations of land beneath waters of the United States, or impoundments; the building of any structure or impoundment requiring rock, sand, dirt, or other pollutants for its construction; site-development fills; causeway or road-fills; dams and dikes; artificial islands; property protection and/or reclamation devices such as riprap, groins, and breakwaters; beach nourishment; levees; and backfill for various structures and utility lines.

The regulation also identified certain types of activities that were excluded from the program because they do not involve the discharge of dredged or fill material into water. Plowing, seeding, cultivating, and harvesting for the production of food, fiber, and forest products were included in this list of excluded activities. Also excluded from the program was material placed for maintenance and emergency reconstruction of existing fills.

The July 25 regulation adopted a phase-in schedule to implement the permit requirements of Section 404 for discharges in the above defined waters, and also included authority for District Engineers to issue general permits for those discharges that cause only a minor individual and cumulative impact to the environment. Phase I began immediately upon publication of the regulation, and included all waters subject to the ebb and flow of the tide and/or waters that are, were, or are susceptible to use for commercial navigation purposes (waters already being regulated by the Corps) plus all adjacent wetlands to these waters (thus eliminating the artificial ordinary high water and mean high water mark distinctions). Phase II became effective on September 1, 1976 (originally scheduled for July 1, 1976, but postponed for 60 days by Presidential action), and included primary tributaries to the Phase I waters and lakes greater than five acres in surface area, plus wetlands adjacent to these waters. Phase III, requiring permits for discharges of dredged or fill material into all waters of the United States, became effective on July 1, 1977. Discharges that occur in a particular waterbody before a scheduled phase-in date are permitted by the regulation, subject to six specified conditions. Also permitted by the regulation are certain minor discharges, again subject to the same conditions.

Various policies and procedures were also included in this regulation to allow joint review and processing of applications for Section 404 permits in those states with programs similar to Section 404.

On September 5, 1975, EPA published interim final guidelines to be used in the evaluation of proposed discharges of dredged or fill material. These interim guidelines are published in 40 CFR Part 230.

A number of courts have had occasion to consider whether particular waters, including wetlands, are "waters of the United States" within the scope of the FWPCA. The first case to address whether wetlands beyond the mean high water mark of traditional navigable waters of the United States were subject to the FWPCA was *United States* vs. *Holland*, 373, F. Supp. 665 (M.D. Fla., 1974) in which the Court held:

> The court is of the opinion that the mean high waterline is no limit to Federal authority under the FWPCA. While the line remains a valid demarcation for other purposes, it has no rational connection to the aquatic ecosystems which the FWPCA is intended to protect. Congress has wisely determined that Federal authority over water pollution properly rests on the commerce clause and not on past interpretations of an act designed to protect navigation. And the Commerce clause gives Congress ample authority to reach activities above the mean high water line that pollute the waters of the United States.

Other Courts have pursued the same theme, and often use the Holland rationale to support their position. These include the following: *United States* v. *Ashland Oil and Transportation Co.*, 504 F2d 1317 (6th Cir. 1974), involving discharges of oil into a tertiary tributary to a navigable water of the United States; *United States* v. *P.F.Z. Properties, Inc.*, 393 F. Supp. 1370, 1381 (D.D.C. 1975) and *Leslie Salt* v. *Froehlke*, 403 F. Supp. 1292, 1296–1297 (N.D. Cal. 1974)—each involving discharges of dredged or fill material into navigable waters of the United States; *Conservation Council of North Carolina* v. *Costanzo*, 398 F. Supp. 653, 673 (E.D. N.C. 1975); *United States* v. *Smith*, 7 ERC 1936, 1938–1939 (E.D. Va., 1975); *United States* v. *Golden Acres, Inc.*, No. 76–0023–CIV–4, slip opinion p. 5–6 (E.D. N.C., Jan. 13, 1977); *United States* v. *Riverside Bayview Homes, Inc.*, Civil Action No. 77–76041 (E.D. Mich., Feb. 24, 1977)—all involving discharges into wetlands adjacent to navigable waters of the United States or a primary tributary thereof in which the wetland area is located above the mean high tide line or ordinary high water mark but is still periodically inundated and covered with aquatic vegetation; and *United States* v. *Byrd and Elder*, ERC 1275 (N.D. Ind., August 13, 1976) involving the discharge of fill material into a natural freshwater lake.

SECTION 103 OF THE MARINE PROTECTION, RESEARCH AND SANCTUARIES ACT OF 1972

Five days after enactment of the FWPCA, Congress enacted the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413). This Act, commonly referred to as the "Ocean Dumping Act", has many provisions that resemble the approach taken by the FWPCA to regulate activities that can pollute or otherwise adversely affect the ocean waters.

Section 102 of the Act vests authority in the Administrator, EPA, to issue permits, after notice and opportunity for public hearing, for the transportation from the United States of material that is intended to be dumped in ocean waters. "Material" is defined in the Act to include most liquid, solid, or suspended solid substances. Before issuing a permit,

the Administrator is required to determine that the proposed dumping will not unreasonably degrade or endanger human health, welfare or amenities, or the marine environment, ecological systems or economic potentialities. The Act also requires him to establish ocean dumping criteria to be used in making this evaluation.

Section 103 of the Ocean Dumping Act is similar to Section 404 of the FWPCA in that it creates a separate permit program to be administered by the Secretary of the Army, acting through the Chief of Engineers, to regulate the ocean dumping of dredged material. The Act requires the Corps of Engineers to make the same evaluation that is required of the Administrator for the ocean dumping of other materials, and to make this evaluation, by using the ocean dumping criteria developed by the Administrator. The Act also requires the Corps of Engineers to utilize ocean dumping sites that have been designated by the Administrator, EPA, to the maximum extent feasible.

If the EPA criteria prohibit ocean dumping, the Act requires the Corps of Engineers to make an independent determination as to the need for the proposed dumping based upon an evaluation of the potential affect that would occur to navigation, economic and industrial development, and foreign and domestic commerce of the United States if a permit were denied. An independent determination as to other proposed methods of disposal of dredged materials and appropriate locations for ocean dumping must also be made by the Corps of Engineers in the review of applications for ocean dumping.

No permit may be issued to dump dredged material in the oceans if the dumping does not comply with the EPA criteria unless the Secretary of the Army seeks a waiver of the criteria from the Administrator after certifying that there is no economically feasible method or site available other than the proposed dump site under consideration. The Act requires the Administrator to grant this waiver unless he finds that the proposed dumping will result in an unacceptable adverse impact on municipal water supplies, shellfish beds, wildlife, fisheries, or recreational areas.

The EPA criteria for evaluating the ocean dumping of all material, including dredged material, are published in 40 CFR Parts 220–228. These criteria were revised by EPA, and the revisions are published in the FEDERAL REGISTER dated 11 January 1977 (42 FR 2462).

Violation of any provision or requirement of the Ocean Dumping Act can result in criminal or civil penalties of not more than $50,000 per day of violation, imprisonment, and legal actions to enjoin imminent or continuing violations of the Act.

REVISIONS TO REGULATIONS

The Corps of Engineers published its July 25, 1975 regulation as an interim final regulation, and provided a comment period of 90 days in which interested members of the public could comment further on the regulation before it was finalized. Today, we are finalizing that regulation. We wish to take this opportunity to thank again those 2,000 individuals, government officials, special interest groups, and companies who responded to this opportunity for additional comment. Many of you will find that your suggestions have been developed in the revisions to our regulation.

In addition to the 2,000 comments received on the interim final regulation, the Corps of Engineers held four nationwide public hearings on the Section 404 program and 243 information meetings that have assisted us in these revisions.

We now have almost two years of experience in administering the Section 404 program as revised by the July 25, 1975 regulation, and over three years of experience in the administration of our other permit programs since publication of the April 3, 1974 regulation. This experience has revealed some problem areas that require correction. Our District and Division offices have raised these concerns with us, and we have attempted to respond to these problems in revisions to the regulation.

One of the primary criticisms of the existing regulation was its length, organization and wordiness. We have responded to this concern by deleting redundant paragraphs, rewording sentences, and completely reorganizing the regulations. This includes a new format that incorporates related regulations into an orderly sequence.

Today, we are rescinding the following regulations:

a. 33 CFR 209.120, "Permits for Activities in Navigable Waters or Ocean Waters";
b. 33 CFR 209.125, "Dams and Dikes Across Waterways";
c. 33 CFR 209.131, "Permits for Discharges or Deposits into Navigable Waters";
d. 33 CFR 209.133, "Public Hearings";
e. 33 CFR 209.150, "Harbor Lines"; and
f. 33 CFR 209.260, "Definition of Navigable Waters of the United States."

We are also, today, publishing the following new regulations, each of which generally corresponds with one of the above cited regulations that is being rescinded. All regulations that pertain completely to the permit programs of the Corps of Engineers, are being published in a new series of Title 33 of the Code of Federal Regulations, and will be included in Parts 320 to 340. This new series is organized as follows:

a. Part 320, "General Regulatory Policies";
b. Part 321, "Permits for Dams and Dikes in Navigable Waters of the United States" (Section 9 of the River and Harbor Act of 1899);
c. Part 322, "Permits for Structures or Work in or Affecting Navigable Waters of the United States" (Section 10 of the River and Harbor Act of 1899);
d. Part 323, "Permits for Discharges of Dredged or Fill Material into Waters of the United States" (Section 404 of the FWPCA);
e. Part 324, "Permits for Ocean Dumping of Dredged Material" (Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972);
f. Part 325, "Processing of Department of the Army Permits";
g. Part 326, "Enforcement";
h. Part 327, "Public Hearings";
i. Part 328, "Harbor Lines";
j. Part 329, "Definition of Navigable Waters of the United States";
k. Parts 330–339 (Reserved).

The following is an explanation of each new part of this regulation, including the reasons for significant changes that have been made. We will also respond to significant comments that were made in response to various provisions in this regulation.

PART 320

This Part describes the general and related statutory authorities that are used by the Corps of Engineers in administering the various permit programs to regulate activities in waters of the United States and the oceans. The part also describes the general policies that are used by the Corps in the review of each permit application, including: (1) The public interest review described above; and (2) policies on wetlands; fish and wildlife; water quality; historic, scenic, and recreational values; effects on limits of the territorial sea; interference with adjacent properties or Federal projects; and requirements for other Federal, State, or local permits or certifications. This part generally corresponds to the provisions in paragraphs (a), (b), (c), (f), and (g) (1), (3), (4), (5), (6), (10) and (18) of rescinded § 209.120.

We have added descriptions of each of the following Federal statutes to the list of "related legislation" in § 320.3 of this Part, since each of these laws is involved with or related to the review of applications for Federal permits. These include: The Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.); The Deepwater Port Act of 1974 (33 U.S.C. 1501 et seq.); The Marine Mammal Protection Act of 1972 (16 U.S.C. 1361 et seq.); Section 7(a) of the Wild and Scenic Rivers Act (16 U.S.C. 1278 et seq.); and Section (f) of the Land and Water Conservation Fund Act of 1965 (16 U.S.C. 460*l*–4 et seq.).

In § 320.4(a), we have added three additional items to the list of factors that comprise our public interest review: Energy needs, safety, and food requirements.

Several modifications have been made to our wetlands policy in § 320.4(b). We identified those wetlands "whose destruction or alteration would affect detrimentally the natural drainage characteristics, sedimentation patterns, salinity distribution, flushing characteristics, current patterns or environmental characteristics," as one of the types of wetlands that is important to the public interest. (Previously this valuable wetlands function was only recognized if the wetlands that perform it were located next to the wetlands described in the first two subsections.) We also added to the list of functions those wetlands which through natural water filtration processes, serve to purify water. Finally, we have attempted to clarify our guidance on determining whether a particular wetlands

alteration is "necessary". The change now requires the District Engineer to consider whether the proposed activity "is primarily dependent on being located in or in close proximity to the aquatic environment and whether feasible alternative sites are available." Applicants are required to provide sufficient information to make this evaluation. We believe that this change more closely corresponds to the wetlands policy in the Section 404 Guidelines (40 CFR 230.5(b)(8)).

At the request of the Department of the Interior, we have added sites acquired under the Recreational Demonstrations Projects Act of 1942 (PL 77-594) to the types of sites for which the policy in § 320.4(e) on historic, scenic, and recreational values is applicable.

Clarifying language has been added to our policy in § 320.4(j) on other permits or certifications required for the same activity to ensure that it is applicable to all Federal, State and/or local permits or certifications. Under this policy, we will process permit applications concurrently (and in many cases we plan to do this jointly) with other required applications for Federal, State and/or local permits or certifications. If another required permit or certification is denied, we will not issue a permit.

To ensure that this policy cannot be used as a mechanism to delay decision-making on our permit application processing and decision-making, however, we also have modified it to allow the District Engineer to process a permit application to conclusion if the responsible government agency fails to take any definitive action to issue or deny its permit or certification within three months of our public notice.

We have added two new general policies to the review of all applications for permits. Section 320.4(k) includes a policy on the safety of impoundment structures that requires the District Engineer to condition permits for these types of structures to require the permittee to operate and maintain the structure properly to ensure public safety. This policy is not applicable, however, to impoundment structures for which an adequate safety inspection program is required or which are under the control of another Federal agency. Section 320.4(l) includes a policy on the review of permit applications in floodplains as required by the May 24, 1977 Executive Order 11988.

PART 321

This part describes the special policies and procedures that are followed in the review of applications for dams or dikes to be located in a navigable water of the United States. As noted above, this review is made under Section 9 of the River and Harbor Act of 1899 (33 U.S.C. 401). The general policies described in Part 320 and the general procedures described in Part 325 are also applicable to the review of these applications.

Part 321 replaces 33 CFR 209.125, which has been rescinded. We have defined the terms "navigable waters of the United States", "dam", and "dike" in this part to specify the types of waters to which Section 9 is applicable, and the type of structures that will require Section 9 permits. We anticipate that our administrative definitions of "dam" and "dike" in Section 321.2 will assist in distinguishing these types of structures from those that would otherwise be regulated under Section 10 of the River and Harbor Act of 1899.

In all other respects, the language in Part 321 resembles that in rescinded § 209.125.

PART 322

This part prescribes the special policies and procedures to be followed by the Corps in the evaluation of applications for structures or work in or affecting navigable waters of the United States pursuant to Section 10 of the River and Harbor Act of 1899. The general policies specified in Part 320.4 and the general procedures specified in Part 325 also are applicable to this evaluation. Furthermore, some of the activities that fall under this Part will also require permits under Section 404 of the FWPCA and Section 103 of the Ocean Dumping Act.

This Part corresponds to those sections of rescinded 33 CFR 209.120 that incorporated the Section 10 program. These include paragraphs (d)(1), (e)(1) and (4), and (g)(2)(7), (8), (9), (11), (13), (14), (15) and (16).

We have adopted administrative definitions of the terms "structure" and "work" to identify the types of activities that will require Section 10 permits (Sec. 322.2).

The 1975 regulation administratively "grandfathered" certain types of activities performed in navigable waters of the United States (see rescinded 33 CFR 209.120(g)(12)(vii)) and exempted others altogether from the need to obtain Section 10 permits (see rescinded 33 CFR 209.120(e)(1)). This latter category included the placement of aids to navigation by the U.S. Coast Guard and structures placed in artificial canals, the connection of which previously was authorized by a Section 10 permit.

Today, instead of again exempting or grandfathering these activities, we are permitting them through the issuance of nationwide permits that are incorporated into this regulation. We have also included other small structures in these nationwide permits that are often placed in navigable waters and have only a de minimus impact on the environment. We are issuing nationwide permits for these activities because we feel that this administrative device is preferable to those affected by it, and is a better administrative approach than relying on a "grandfathering" or "exemption" provision to satisfy the requirements of the 1899 Act.

The following activities are subject to these nationwide permits (see § 322.4):

1. The placement of aids to navigation by the U.S. Coast Guard;

2. Structures constructed in artificial canals within principally residential developments where the connection of the canal to a navigable water already has received a Section 10 permit;

3. Repair, rehabilitation, or replacement of any previously authorized, currently serviceable structure, or of any currently serviceable structure constructed prior to the requirement for a Seciton 10 permit (no deviation from original plans is authorized);

4. Marine life harvesting devices, such as pound nets, crab pots, eel pots, and lobster traps;

5. Staff and tidal gages, water recording devices, water quality testing and improvement devices, and similar scientific structures;

6. Survey activities including core sampling; and

7. Structures of work completed before December 18, 1968 (the date on which we adopted our public interest review) or in navigable waters over which the District Engineer has not asserted jurisdiction.

The nationwide permit imposes conditions on each of these structures, primarily to protect navigation.

Besides the nationwide permit, three other types of authorizations are used to issue Section 10 permits. These are:

1. Letters of permission—an individual permit issued following the abbreviated review procedures outlined in § 325.5(b);

2. Individual permits—permits issued following a case-by-case analysis of an application; and

3. General permits—permits issued for future minor work or structures in a particular region of the country that will have only minimal individual and cumulative impact on the environment.

We have included definitions of each of these terms in the regulation (§ 322.2). A person needing a Section 10 permit should first check to see whether the proposed project has already been permitted by a general permit or in this Part through a nationwide permit.

In all other respects, this regulation remains basically the same as published in 1975.

PART 323

This Part prescribes the special policies and procedures to be followed by the Corps in the evaluation of applications for permits to discharge dredged or fill material into the waters of the United States pursuant to Section 404 of the FWPCA. Again, as we have noted in Parts 321 and 322, the general policies specified in Part 320 and the general procedures specified in Part 325 also would be applicable to this evaluation. Furthermore, some of the activities that fall under Section 404 will also require permits under Sections 9 and 10 of the River and Harbor Act of 1899 (Parts 321 and 322).

This Part corresponds to those sections of the rescinded 33 CFR 209.120 that incorporated the Section 404 program. These include: paragraphs (d)(2), (4), (5), (6), (7) and (8) and (g)(17).

Section 404 provides that the Corps of Engineers may issue permits, after notice and opportunity for public hearing, for "discharges of dredged or fill material into navigable waters". The majority of comments received on the July 25, 1975 interim final regulation were in response to our definitions of terms "navigable waters", "dredged material", and "fill material".

The legislative history of the term "navigable waters" specified that it "be given the broadest constitutional interpretation unencumbered by agency determinations which have been made or may be made for administrative purposes." (H.R. Report No. 92–1465 at 144; A Legislative History of the FWPCA at p. 327). Article 1, Section 8 of the Constitution gives the Federal Government the authority "to regulate commerce with foreign Nations, and among the several states." We have interpreted the guidance contained in this legislative history to be consistent with the Federal Government's broad constitutional power to regulate activities that affect interstate commerce as interpreted by the Supreme Court on several occasions. *Perez* v. *United States*, 402 U.S. 146 (1970); *Katzenbach* v. *McClung*, 379 U.S. 294 (1974); *Heart of Atlanta Motel, Inc.* v. *United States*, 379 U.S. 241 (1964); and *Wickard* v. *Filburn*, 317 U.S. 111 (1942).

Water pollution is one such activity, for as the Court stated in *U.S.* v. *Holland*, supra., "Congress has wisely determined that Federal authority over water pollution properly rests on the commerce clause. And the commerce clause gives Congress ample authority to reach activities * * * that pollute the waters of the United States." (See also the cases cited above on defining "waters of the United States" which affirmed the constitutionality of Congress' broad assertion of jurisdiction.)

We followed this basic premise in the development of our administrative definition of "navigable waters" for the July 25, 1975 regulation, and we have followed it again in our efforts to clarify that definition in this regulation.

Our definition of "navigable waters" in the 1975 regulation included the following:

(1) Coastal waters that are navigable waters of the United States subject to the ebb and flow of the tide, shoreward to their mean high water mark (mean higher high water mark on the Pacific coast);

(2) All coastal wetlands, mudflats, swamps, and similar areas that are contiguous or adjacent to other navigable waters. "Coastal wetlands" includes marshes and shallows and means those areas periodically inundated by saline or brackish waters and that are normally characterized by the prevalence of salt or brackish water vegetation capable of growth and reproduction;

(3) Rivers, lakes, streams, and artificial water bodies that are navigable waters of the United States up to their headwaters and landward to their ordinary high water mark;

(4) All artificially created channels and canals used for recreational or other navigational purposes that are connected to other navigable waters, landward to their ordinary high water mark;

(5) All tributaries of navigable waters of the United States up to their headwaters and landward to their ordinary high water mark;

(6) Interstate waters landward to their ordinary high water mark and up to their headwaters;

(7) Intrastate lakes, rivers and streams landward to their ordinary high water mark and up to their headwaters that are utilized:

(a) By interstate travelers for water-related recreational purposes;

(b) For the removal of fish that are sold in interstate commerce;

(c) For industrial purposes by industries in interstate commerce; or

(d) In the production of agricultural commodities sold or transported in interstate commerce;

(8) Freshwater wetlands, including marshes, shallows, swamps, and similar areas that are contiguous or adjacent to other navigable waters and that support freshwater vegetation. "Freshwater wetlands" means those areas that are periodically inundated and that are normally characterized by the prevalence of vegetation that requires saturated soil conditions for growth and reproduction; and

(9) Those other waters which the District Engineer determines necessitate regulation for the protection of water quality as expressed in the guidelines (40 CFR 230). For example, in the case of intermittent rivers, streams, tributaries, and perched wetlands that are not contiguous or adjacent to navigable waters identified in paragraphs (a)–(h), a decision on jurisdiction shall be made by the District Engineer.

Many suggested that we change the nomenclature of the term "navigable waters" and refer to our jurisdiction under Section 404 as "waters of the United States." This is the definition given to that term in Section 502(7) of the FWPCA. We have adopted this suggestion and feel that it will assist in distinguishing between the Section 404 program and the types of waters that are subject to the permit programs administered under Sections 9 and 10 of the 1899 Act.

We have consolidated the 1975 list of waters in our new definition to include four basic categories. We believe that this consolidation will assist in clarifying those waters that are subject to the Section 404 program.

CATEGORY 1

Coastal and inland waters, lakes, rivers, and streams that are navigable waters of the United States, including adjacent wetlands.—This category corresponds to those waters identified in sections (1), (2), (3), and (8) of the old definition. Through consolidation, we believe that many of the ambiguities raised in the old definition will be clarified.

The Federal government's authority to regulate all activities in or affecting navigable waters of the United States has always been recognized. As we have noted above, waters that fall within this category are also regulated under the River and Harbor Act of 1899. They include natural and artifical waters that are subject to the ebb and flow of the tide and/or that are used, were used in the past, or are susceptible to use to transport interstate or foreign commerce.

CATEGORY 2

Tributaries to navigable waters of the United States, including adjacent wetlands.—This category corresponds to sections (4), (5), (8), and (9) of the old definition.

The Federal government's authority to regulate activities on the rivers and streams that feed into navigable waters of the United States also has been historically recognized. As we noted in our historical background discussion, Section 10 of the River and Harbor Act of 1899 can be used to regulate activities outside the jurisdictional limits of navigable waters of the United States if those activities affect the navigable capacity of those waters. Section 13 of the 1899 Act also prohibits the dumping of any refuse matter into any tributary of a navigable water of the United States, or onto the banks of such waters where the material is likely to be washed into the water.

More recently, courts have recognized that the FWPCA is applicable to tributaries of navigable waters. In *U.S.* v. *Ashland Oil, supra*, the Court stated:

Pollution control of navigable streams can only be exercised by controlling pollution of their tributaries.

We have adopted the suggestion of many commenters that we incorporate into our definition (and not in the Preamble as we did in 1975) the statement that nontidal drainage and irrigation ditches that feed into navigable waters will not be considered "waters of the United States" under this definition. To the extent that these activities cause water quality problems, they will be handled under other programs of the FWPCA, including Sections 208 and 402 .

CATEGORY 3

Interstate waters and their tributaries, including adjacent wetlands.—This category corresponds to those waters listed in sections (6) and (8) of the old definition.

The affects of water pollution in one state can adversely affect the quality of the waters in another, particularly if the waters involved are interstate. Prior to the FWPCA Amendments of 1972, most federal statutes pertaining to water quality were limited to interstate waters. We have, therefore, included this third category consistent with the Federal government's traditional role to protect these waters from the standpoint of water quality and the obvious effects on interstate commerce that will occur through pollution of interstate waters and their tributaries.

CATEGORY 4

All other waters of the United States not identified in Categories 1–3, such as isolated lakes and wetlands, intermittent streams, prairie potholes, and other waters that are not part of a tributary system to interstate waters or to navigable waters of the United States, the degradation or destruction of which could affect interstate commerce.—This category corresponds to sections (7), (8), and (9) of the old definition.

Waters that fall within categories 1, 2, and 3 are obvious candidates for inclusion as waters to be protected under the Federal government's broad powers to regulate interstate commerce. Other waters are also used in a manner that makes them part of a chain or connection to the production, movement, and/or use of interstate commerce even though they are not interstate waters or part of a

tributary system to navigable waters of the United States. The condition or quality of water in these other bodies of water will have an effect on interstate commerce.

The 1975 definition identified certain of these waters. These included waters used:

(1) By interstate travelers for water-related recreational purposes;
(2) For the removal of fish that are sold in interstate commerce;
(3) For industrial purposes by industries in interstate commerce; and
(4) In the production of agricultural commodities sold or transported in interstate commerce.

We recognized, however, that this list was not all inclusive, as some waters may be involved as links to interstate commerce in a manner that is not readily established by the listing of a broad category. The 1975 regulation, therefore, gave the District Engineer authority to assert jurisdiction over "other waters", such as intermittent rivers, streams, tributaries and perched wetlands, to protect water quality. Implicit in this assertion of jurisdiction over these other waters was the requirement that some connection to interstate commerce be established, even though that requirement was not clearly expressed in the 1975 definition.

We received many comments and criticisms concerning the waters covered in sections (7) and (9) of the 1975 definition, particularly with respect to uncertainty over the types of waters covered by section 9, and as to whether section 404 permits are required to discharge dredged or fill material into these latter waters.

We have responded to these comments by noting in the definition of these waters that they are the type, the degradation or destruction of which could affect interstate commerce. We have also incorporated an explanatory footnote at the end of this category which further explains this connection to interstate commerce.

We are responding to the concern of uncertainty over the need to obtain a permit in these waters by issuing today a nationwide permit for discharges into most of these waters. We believe that if the common sense conditions, guidelines and management practices provided in these nationwide permits are followed, the concern for water quality, as it affects the production, movement and/or use for interstate commerce, ordinarily will be satisfied with respect to these discharges.

Wetlands. Prior to enactment of the FWPCA, the mean tide line (mean higher tide line on the West Coast) was used to delineate the shoreward extent of jurisdiction over the regulation of most activities in tidal waters under the 1899 Act as well as for mapping, delineation of property boundaries, and other related purposes. In freshwater lakes, rivers and streams that are navigable waters of the United States, the landward limit of jurisdiction has been traditionally established at the ordinary high water mark.

The regulation of activities that cause water pollution cannot rely on these artificial lines, however, but must focus on all waters that together form the entire aquatic system. Water moves in hydrologic cycles, and the pollution of this part of the aquatic system, regardless of whether it is above or below an ordinary high water mark, or mean high tide line, will affect the water quality of the other waters within that aquatic system.

For this reason, the landward limit of Federal jurisdiction under Section 404 must include any adjacent wetlands that form the border of or are in reasonable proximity to other waters of the United States, as these wetlands are part of this aquatic system.

The July 25, 1975 regulation identifies "coastal" and "freshwater" wetlands contiguous or adjacent to other waters of the United States as separate categories of waters for inclusion in our overall definition of the term "waters of the United States." Many comments and suggestions were received on these terms.

Both "coastal" and "freshwater" wetlands as used in the July 25, 1975 regulation require that the area in question be "periodically inundated" by either saline, brackish or freshwater and "normally characterized by the prevalence of" salt or brackish water vegetation or vegetation that requires saturated soil conditions for growth and reproduction. Some felt that the criteria for delineating a wetland should not require both "periodic inundation" and the "prevalence of" vegetation, as either condition should suffice from the standpoint of protecting the entire aquatic system. Others raised concern over the vagueness of terms such as "perodically inundated", "normally", and "prevalence", and the lack of any definition for the terms "contiguous" or "adjacent".

In response to these comments, and with the assistance of the Departments of Interior and Agriculture and the Environmental Protection Agency, we have adopted the following definition of "wetlands":

> Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

This definition is intended to eliminate several problems and achieve certain results. The reference to "periodic inundation" has been eliminated. Many interpreted that term as requiring inundation over a record period of years. Our intent under Section 404 is to regulate discharges of dredged or fill material into the aquatic system as it exists, and not as it may have existed over a record period of time. The new definition is designed to achieve this intent. It pertains to an existing wetland and requires that the area be inundated or saturated by water at a frequency and duration sufficient to support aquatic vegetation. This inundation or saturation may be caused by either surface water, ground water, or a combination of both.

The use of the word "normally" in the old definition generated a great deal of confusion. The term was included in the definitions to respond to those situations in which an individual would attempt to eliminate the permit review requirements of Section 404 by destroying the aquatic vegetation, and to those areas that are not aquatic but experience an abnormal presence of aquatic vegetation. Several such instances of destruction of aquatic vegetation in order to eliminate Section 404 jurisdiction actually have occurred. However, even if this destruction occurs, the area still remains as part of the overall aquatic system intended to be protected by the Section 404 program. Conversely, the abnormal presence of aquatic vegetation in a non-aquatic area would not be sufficient to include that area within the Section 404 program.

We have responded to the concern for the vagueness of the term "normally" by replacing it with the phrase "* * * and that under normal circumstances to support * * *" We do not intend, by this clarification, to assert jurisdiction over those areas that once were wetlands and part of an aquatic system, but which, in the past, have been transformed into dry land for various purposes.

Concerns were also expressed over the types and amount of vegetation that would be required to establish a "wetland" under this definition. We have again used the term "prevalence" to distinguish from those areas that have only occasional aquatic vegetation interspersed with upland or dry land vegetation.

At the same time, we have changed our description of the vegetation involved by focusing on vegetation "typically adapted for life in saturated soil conditions." The old definition of "freshwater wetlands" provided a technical "loophole" by describing the vegetation as that which requires saturated soil conditions for growth and reproduction, thereby excluding many forms of truly aquatic vegetation that are prevalent in an inundated or saturated area, but that do not require saturated soil from a biological standpoint for their growth and reproduction. We intend to publish shortly vegetation guides to indicate the types of vegetation intended to be included in this definition, and to rely on the assistance of biologists, scientists and other technical experts from other Federal and State agencies to assist in delineating those wetland areas intended to be incuuded in this definition.

Several comments questioned the need for separate definitions of salt and brackish water wetlands (e.g. coastal wetlands) and freshwater wetlands. Others questioned whether salt and brackish water wetlands in nontidal waters and freshwater wetlands contiguous or adjacent to coastal wetlands were intended to be included in the definition, since these wetlands are part of the aquatic system. Still others ques-

tioned whether these definitions were also applicable to isolated wetlands that are not contiguous or adjacent to coastal waters and freshwater lakes, rivers, and streams, but which still contribute to interstate commerce.

The old definition was intended to include all fresh, brackish and salt water wetlands contiguous or adjacent to coastal waters and freshwater lakes, rivers, streams and other waters included in the definition of "waters of the United States." It was also intended to be used to identify isolated wetlands. We agree, however, that this intent was not clearly expressed. To remedy this situation, we have adopted one definition of wetlands. This definition will be applicable to those wetlands adjacent to coastal waters and freshwaters that are identified in the definition of "waters of the United States," and also to those isolated wetlands that are not adjacent to any lake, river, stream, or other coastal or freshwater. (See the discussion, above, on waters in Category 4.)

We have also responded to the concerns raised over the absence of any definition of the terms "adjacent" or "contiguous" as those terms relate to the location of wetlands. Since "contiguous" is only a subpart of the term "adjacent," we have eliminated the term "contiguous." At the same time, we have defined the term "adjacent" to mean "bordering, contiguous, or neighboring." The term would include wetlands that directly connect to other waters of the United States, or that are in reasonable proximity to these waters but physically separated from them by man-made dikes or barriers, natural river berms, beach dunes, and similar obstructions.

Finally, to respond to those who expressed concern that our definition of "wetlands" may be interpreted as extending to abnormal situations including non-aquatic areas that have aquatic vegetation, we have listed swamps, bogs, and marshes at the end of this definition to further clarify our intent to include only truly aquatic areas.

"High tide line." Many aquatic areas along the coast are located above the mean or mean higher high tide lines but do not fit within the definition of "wetlands" discussed above. These include sandflats, mudflats, and similar areas, that, while not covered with vegetation, are inundated with sufficient frequency and regularity to be included as part of the aquatic resource. While these areas are identified in our previous definition of waters of the United States, some commenters suggested the need for more definitive guidance in delineating the shoreward limit of jurisdiction in coastal areas when these circumstances exist. We have, therefore, adopted the term "high tide line" to delineate these areas. "High tide line" has been defined as "a line or mark left upon tide flats, beaches, or along shore objects that indicates the intersection of the land with the water's surface at the maximum height reached by a rising tide." The term is intended to include areas covered by spring high tides and other high tides that occur with periodic frequency, but does not include those areas that are covered by tidal water as a result of storm surges, hurricanes, or other intense storms.

Ordinary high water mark: A number of comments criticized the definition of "ordinary high water mark" adopted for purposes of delineating the landward limit of jurisdiction in freshwaters (absent adjacent wetlands). The comments indicated that other methods to define the ordinary high water mark have already been refined to a point of reasonable reliability based on the hydrologic movement of freshwaters, and that a second methodology under Section 404 would be administratively cumbersome. In addition, other concerns were expressed over the manner in which a "25% inundation" factor could be determined.

Responding to these comments, we have returned to our definition of "ordinary high water mark" used in the administration of our 1899 Act permit program. We believe that in waters where no wetlands are present, this definition will include those areas that are part of the aquatic system along these freshwater lakes, rivers and streams, as this mark is intended to include those areas where water will be present with predictable regularity.

Headwaters: The July 25, 1975 regulation established a cutoff point, referred to as the headwaters, for each river and stream identified as a water of the United States. "Headwaters" was defined as "the point on the stream beyond which the flow of the waterbody is normally less than five cubic feet per second." Waters above the "headwaters" cutoff point were also included as "waters of the United States," but only if the District Engineer determined that regulation of these waters was necessary to protect water quality.

Many comments and criticisms were received concerning the vagueness of our definition of "headwaters" and the legality of excluding waters in rivers and streams above the headwaters from the definition of waters of the United States. We have responded to these concerns and criticisms by: (1) Including the entire length of rivers and streams in our definition of waters of the United States; (2) utilizing the "headwaters" concept to establish the point on the stream below which an individual or general permit will be required to discharge dredged or fill material (discharges above headwaters are being permitted through the issuance today of a nationwide permit which is discussed in greater detail below); and (3) redefining the term "headwaters."

We have adopted the recommendations of a number of commenters and have redefined the term "headwaters" as the point on a freshwater (nontidal) stream above which the average annual flow is less than five cubic feet per second. Since precision is not required in establishing the headwater point, the definition allows the District Engineer to use approximate means to compute it. The drainage area that will contribute an average annual flow of five cubic feet per second can be estimated by approximating the proportion of the average annual precipitation that is expected to find its way into the stream. Having the area that will produce this flow, the "headwater" point can be approximated from drainage area maps.

However, we also recognized that streams with highly irregular flows, such as occur in the western portion of the country, could be dry at the "headwater" point for most of the year and still average on a yearly basis a flow of five cubic feet per second because of high volume, flash flood type flows which greatly distort the average. We therefore added an option for the District Engineer, after notifying the Regional Administrator of EPA, to establish the headwater based on the median rather than the average flow. A median flow of five cubic feet per second means that 50% of the time the flow is greater than five cubic feet per second and 50% of the time the flow is less than this value. This approach more realistically represents normal base flows of such streams.

We emphasize that the "headwaters" concept used in this new regulation is the point on the stream above which individual or general permits ordinarily will not be required. It is not to be construed as the point beyond which a stream ceases to be a water of the United States under Section 404 or the programs to regulate industrial and municipal discharges and oil and hazardous substances under other sections of the FWPCA. We also refer you to the discussion below on the nationwide permits that are being issued today for various discharges of dredged or fill material, including those that occur above the headwater. We believe that the common sense conditions and management practices reflected in these nationwide permits will, if followed, avoid potential water quality problems for most of these discharges.

Lakes: The 1975 regulation defined "lakes" as "natural bodies of standing water greater than five acres in surface area and all bodies of standing water created by the impounding of waters of the United States."

A number of comments and criticisms were received concerning this definition. Some felt that the size limitation on natural lakes was too small, while others felt it was not small enough. Others questioned the legality of imposing any size limitation on natural lakes, since a lake less than five acres in size is just as much a "water of the United States" as one that is more than five acres in size.

Many raised questions about the manner and time for measurement of the five surface acres because of the seasonal fluctuations in water content exhibited by most lakes. Others suggested that we add to the list of artificial open bodies of water that are not included in the definition of lakes. (The 1975 definition excludes stock watering ponds and settling basins that are not created by impounding a river or stream.)

We have responded to these comments and criticisms in several ways. First, we have established definitions for two new terms: "natural lake" and "impoundment." We believe that these two sepa-

rate definitions will assist in alleviating the confusion expressed over the broad definition of "lake" as cited in the 1975 regulation.

At the suggestion of EPA, we have defined "natural lake" as "a natural depression fed by one or more streams and from which a stream may flow, that occurs due to the widening or natural blockage of a river or stream, or that occurs in an isolated natural depression that is not part of a surface river or stream." We believe that this definition reflects the three types of situations in which a natural lake may exist.

We have defined the term "impoundment" as a "standing body of open water created by artificially blocking or restricting the flow of a river, stream, or tidal area." Responding to several suggestions, we have clarified what is not included in the term "impoundment" by stating that it does not include artificial lakes or ponds created by excavating and/or diking dry land to collect and retain water for such purposes as stock watering, irrigation, settling basins, cooling, or rice growing.

Unlike the 1975 definition, no size limitation has been placed on the definitions of "natural lake" or "impoundment". Instead, we are permitting, today, through the issuance of nationwide permits, discharges of dredged or fill material into natural lakes, including their adjacent wetlands, that are less than 10 acres in surface area and that are either fed or drained by a river or stream above the headwaters, or isolated and not a part of a tributary system to navigable waters of the United States or interstate waters. (Discharges into natural lakes below the headwaters and isolated natural lakes greater than ten acres will require individual or general permits to satisfy the requirements of Section 301 of the FWPCA.) We are also issuing today a nationwide permit for discharges of dredged or fill material into non-tidal rivers, streams and their impoundments including adjacent wetlands that are located above the headwaters. (Again, discharges into impoundments below the headwaters of a river or stream will require an individual or general permit.) We refer you to our discussion of nationwide permits, below, for further details on this action.

We believe that the inclusion of adjacent wetlands as part of the 10 acre measurement of those natural lakes that are included in this definition will alleviate many concerns raised over how and when this measurement must occur. Since our definition of "wetlands" requires aquatic vegetation, we anticipate that the lake's measurement normally can be made on the basis of the presence of this vegetation, which generally remains fixed throughout the year, even if the water levels in the lake fluctuate.

Dredged and Fill Material. The 1975 regulation provided definitions for "dredged material", "discharge of dredged material", "fill material", and "discharge of fill material". Several comments and two years of experience have revealed the need to make certain changes to these definitions.

To respond to many misunderstandings over activities that require Section 404 permits, the 1975 regulation stated, in the definitions of "dredged material" and "fill material" that "material resulting from normal farming, silviculture, and ranching activities, such as plowing, cultivating, seeding, and harvesting for the production of food, fiber, and forest products" was not included. We intended, by this statement, to make it clear that activities such as plowing, seeding, harvesting, cultivating and any other activity by any industry that do not involve discharges of dredged or fill material cannot be included in the program. However, many interpreted this language as an exclusion of all practices by the farming and forestry industry including those that do involve discharges of dredged or fill material into water. The FWPCA does not allow us to make such an exemption or exclusion for any industry. (See *NRDC vs. Train*, 366 F. Supp. 1393 (D.D.C., 1975).) We have, however, clarified our intent by stating at the end of our definitions of "discharge of dredged material" and "discharge of fill material" that plowing, seeding, cultivating and harvesting for the production of food, fiber, and forest products are not included in the Section 404 program.

The 1975 definition of "fill material" also excluded "material placed for the purpose of maintenance, including emergency reconstruction of recently damaged parts, of currently serviceable structures such as dikes, dams, levees, groins, riprap, breakwaters, causeways, and bridge abutments or approaches, and transportation structures." Since maintenance and emergency reconstruction of these types of fill often involve discharges into water, we do not have authority to exclude these activities from the permit requirements of the FWPCA. We have, therefore, eliminated this exclusion from our definition of "fill material". At the same time, we are issuing, today, a nationwide permit for discharges of dredged or fill material that involve maintenance and emergency reconstruction of existing fills. The nationwide permit contains basic common sense conditions and management practices which, if followed, will achieve the objectives of the FWPCA. Of course, if the maintenance or emergency reconstruction does not involve a discharge in water, no permit is required.

During the two years of experience with the Section 404 program, several industrial and municipal discharges of solid waste materials have been brought to our attention which technically fit within our definition of "fill material" but which were intended to be regulated under the NPDES program. These include the disposal of waste materials such as sludge, garbage, trash, and debris in water. In some cases involving the disposal of these types of material in water, the final result may be a landfill even though the primary purpose of the discharge is waste disposal.

The Corps and the Environmental Protection Agency feel that the initial decision relating to this type of discharge should be through the NPDES program. We have, therefore, modified our definition of fill material to exclude those pollutants that are discharged into water primarily to dispose of waste. We will process Section 404 permits for these types of activities to the extent that a levee or other type of containment structure must be placed in the water as part of the overall disposal plan. We will not, however, take any final action on the Section 404 permit application until a decision on the NPDES permit has been made (See 33 CFR 230.4(j)).

Individual, general, and nationwide permits: As we did in the regulation on our Section 10 program, we have included definitions of "individual", "general" and "nationwide" permits to distinguish between the three types of authorizations that will be used to satisfy the requirements of the FWPCA.

If a discharge requires an individual permit, an application must be made to the District Engineers following the procedures specified in 33 CFR Part 325 and the discharge cannot begin until and unless the permit is issued.

Before applying for an individual permit, however, a person needing a Section 404 permit should check to see whether the proposed discharge has already been permitted by a general permit, or a nationwide permit published in this regulation. District Engineers are issuing general permits for particular regions of the country that cover a wide variety of discharges that cause only minimal individual and cumulative adverse environmental impact. Nationwide permits apply throughout the country, and cover many types of minor activities. If a general or nationwide permit already covers your discharge, you should not have to get an individual permit to satisfy the requirements of the FWPCA.

Nationwide Permits

On May 16, 1977 we published proposed nationwide permits in the FEDERAL REGISTER to authorize discharges of dredged or fill material into certain waters of the United States and also certain specific categories of discharges. We received 163 letters commenting on these nationwide permits, the majority of which supported the concept but suggested additions, modifications and/or deletions to the activities covered and the conditions imposed.

Today, we are issuing nationwide permits for discharges into most of the Category 4 waters, discussed above, (isolated natural lakes larger than 10 acres are not included) and for certain specific categories of discharges into other waters. These nationwide permits are being incorporated into § 323.4.

We wish to take this opportunity to express our appreciation to everyone who commented on these nationwide permits. The following is a discussion of the sub-

stantive changes that were made as a result of your comments.

Management practices. The Environmental Protection Agency expressed concern over the potential for adverse cumulative effects that may be caused by some of the discharges that are subject to the nationwide permit. To minimize these potential effects, EPA suggested that we identify certain basic common sense management practices that should be followed, to the maximum extent possible, to minimize these potential adverse effects on the aquatic environment. We have adopted this suggestion. These management practices pertain to all discharges subject to these nationwide permits and are listed in § 323.4(b). We anticipate that compliance with these practices will avoid the potential for cumulative adverse water quality impacts that may be caused by these discharges.

We intend to remain aware of potential cumulative impacts that may occur on a regional basis as a result of these nationwide permits. If adverse cumulative impacts are anticipated from any of the discharges subject to these nationwide permits, we intend to take appropriate administrative action including the exercise of authority expressed in § 323.4–4 to require individual or general permits for these activities.

Discharges prior to effective dates of phasing (§ *323.4–1*). The 1975 regulation authorized discharges of dredged or fill material that occurred before a particular phasing date. We have republished this authorization by including it in this nationwide permit. The conditions remain the same as were published in 1975.

Discharges into certain waters of the United States (§ *323.4–2*). Many commenters expressed confusion over the types of waters that were covered by this nationwide permit, specifically with reference to those that are described in § 323.4–2(a)(4) as "non-tidal waters of the United States that are not part of a surface tributary system to interstate waters or navigable waters of the United States." We intended by this description to include those waters identified in "Category 4," above with the exception of isolated lakes larger than 10 acres. Thus, discharges of dredged or fill material into most of the "Category 4" waters are subject to this nationwide permit.

Numerous letters questioned whether wetlands adjacent to these "Category 4" waters were included as part of this nationwide permit. Discharges into these adjacent wetlands are included. Several environmental groups expressed concern over expanding the size limitations for natural lakes including prairie potholes to 10 acres, which they viewed as an apparent expansion from the present 5 acre lake "exclusion" contained in the Corps' 1975 regulations. As we have already indicated in our discussion on lakes above, the 5 acre standard, measured by surface area, was difficult to determine since, in many regions, the surface area of small lakes is subject to extreme seasonal variation. However, we have found that in most cases, the wetlands adjacent to these small natural lakes are more easily delineated and are relatively stable despite fluctuations in water levels. In order to simplify the identification of natural lakes described in § 323.4–2(a) (2) and (3) we adopted a standard for surface area measurement by including adjacent wetlands. Since these surrounding wetland areas are now included in the measurement, we increased the size limitation for lakes from 5 acres to 10 acres. Again, we emphasize that this size limitation is only used for determining whether an individual or general permit in lieu of this nationwide permit, is required.

We share the concern of the environmental groups that prairie potholes and many other isolated lakes are disappearing. The safeguards contained in the new management practices section of this permit, as well as the authority vested in the District Engineers to process individual or general permits where the concerns of the aquatic environment (as expressed in the EPA Guidelines) so require, will, we believe, adequately protect the broad range of water quality concerns and the public interest in "prairie potholes, small lakes, and other waters described by this section." Moreover, § 323.4–4 provides another safeguard through which EPA can bring concerns for water quality as expressed in the Section 404(b) Guidelines to the attention of the District Engineer.

Several commenters indicated that the third condition of this nationwide permit, dealing with erosion, was vague and overly broad. The condition has been changed to make our intent clear: the fill must be maintained in a manner to prevent erosion and other non-point sources of pollution.

EPA recommended that we include a condition that the discharge would not destroy members of a threatened or endangered species. We concur and this change has been made in this nationwide permit, as well as in the nationwide permit that authorizes discharges for certain types of activities. (See §§ 323.4–2(b)(1) and 323.4–3(b)(3).) We cannot agree to requests from industries to delete this condition altogether since Section (7) of the Endangered Species Act requires the Corps to protect threatened and endangered species in all waters subject to its regulatory jurisdiction.

We received a great number of comments from Resource Districts in opposition to the exception in our nationwide permits (§ 323.4–2(c)) for dams located above the headwaters which would be greater than 25 feet in height or 50 acre feet in impoundment capacity. As was pointed out, this exception would automatically require an individual permit for many dams above the headwaters which, in most cases, were exempt from individual permit requirements by the 1975 regulation. We are excluding this exception since we feel that our original reason for including it will now be satisfied by inclusion of the new management practices, discussed above. The deletion of § 323.4–2(3) means that any dam located above the headwater of a stream will be authorized by the nationwide permit unless the District Engineer applies his discretionary authority under § 323.4–4.

Specific categories of discharges. Comments on the types of activities and proposed conditions included in this portion of the nationwide permit ranged from environmental groups, who favored greater restrictions on permitted activities, to industry groups who proposed additional categories to be permitted to cover their particular activities. We feel that we have struck a reasonable balance between these concerns and requests through the addition of the management practices, discussed above. At the same time, we are committed to reviewing other classes and categories of discharges of dredged or fill material that may be, in the future, candidates for nationwide permits.

Utility lines (§ *323.4–3(a)(1)*). This section has been amended to clarify that any excess material beyond that needed to restore the bottom contour to its preconstruction status must be removed to an upland disposal area. Such a requirement was envisioned in the proposed permit, but not clearly expressed. At the suggestion of EPA, we have explicitly stated this requirement to insure compliance and avoid misunderstanding.

Numerous commenters suggested further clarification on what was intended by the use of the term "utility line." We have defined the term to include any pipe or pipeline for the transportation of any gaseous, liquid, liquifiable, or slurry substance, and any cable, line, or wire for the transmission of energy, telephone, radio, or television communication.

Despite several suggestions for pre-notification requirements and fill length and volume restrictions, we do not believe that these conditions are necessary. We feel, instead, that upland disposal of excess material and compliance with the management practices will limit any sedimentation or disruption of water flow in streams as a result of these activities.

Bank stabilization (§ *323.4–3(a)(2)*). We have modified this category of discharge to make it clear that only *necessary* bank stabilization for erosion prevention is being permitted. While some suggested that we include a pre-notification requirement, we do not feel that this is necessary.

Minor road crossing fills (§ *323.4–3(a)(3)*). This category of activity generated more specific comment than any other of the proposed nationwide permits. We have made certain changes to respond to these comments.

At the request of many commenters, we have removed the 30 day advance notification requirement for discharges between 100 and 200 cubic yards in quantity. We believe that this is impractical to administer and that the basic intent for the notification has been offset by the inclusion of management practices.

Our proposed nationwide permit provided that a crossing must be culverted or bridged to prevent the restriction of normal flow. In response to comments by

EPA and environmental groups "normal" has been changed to "expected high flows." This change will provide more effective drainage and reduce erosion during expected flood stage levels.

Forest industry commenters were almost unanimous in their calls for deleting the 100 to 200 cubic yard reporting requirement (see above) and increasing both the 200 cubic yard fill limit and the 50 foot wetland width limitation. They indicated that many minor road crossings with little or no direct or cumulative environmental impact would not qualify under our proposed permit. Their main source of concern was the 50 foot limit on wetlands adjacent to the waterbody to be crossed. In reviewing the comments it became apparent that confining road crossing activities in adjacent wetlands to 50 feet on either side of the ordinary high water mark of the waterbody would result in excluding many small roadfills from this nationwide permit. On the other hand, others applauded our 50 foot limit and urged a reduction in the allowable level of fill. After carefully considering all comments on this permit we decided that the allowable wetland width to be crossed could be increased from 50 to 100 feet on either side of the stream as long as this allowance was applicable to non-tidal streams. In tidal waters, where adjacent wetlands are more dependent on frequent tidal flushing, and therefore circulation impairments from road fills are more damaging, we concluded that even the 50 foot wetland fill needed to be controlled through an individual or general permit. We, therefore, divided the road fill permit into tidal and non-tidal waters. For non-tidal waterbodies, we increased the adjacent wetland width from 50 to 100 feet. For tidal water crossings (Section 323.4–3(a)(4)) we included only the fill placed incidental to the construction of the bridge itself. Any approach fills or causeways associated with the crossings of tidal waters will require an individual or general Section 404 permit if located in waters of the United States.

One commenter expressed concern that no restriction had been placed on the total amount of fill above the ordinary high water mark, since this could lead to erosion on steep slopes between the ordinary high water mark and the road surface. The letter also feared that without a total fill limit, vast amounts of wetlands could be filled at right angles to the waterbody for roads or turn around areas. We share this commenter's concerns. However, we believe that adherence to the management practices suggested by EPA will minimize erosion and other non-profit sources of pollution. As for his second concern, it must be noted that § 323.4–3(a)(3) only permits minor road crossings and attendant features. It does not authorize general road building in wetlands above the ordinary high water mark. We will construe attendant features narrowly. Major activities appurtenant to the road crossing will not be permitted by this section. These require an individual or general permit issued pursuant to procedures in 33 CFR Part 325.

Many commenters expressed confusion over the 100/200 cubic yard measurement as it pertains to these roadfills. We intended to use that measurement to define the size of the crossing, and to use the ordinary high water mark to determine that size. Thus, up to 200 cubic yards of material can be discharged below the plane of ordinary high water of a waterbody under this nationwide permit, and additional cubic yards of material can be discharged into the 100 foot strip of adjacent wetlands, as necessary, to construct the road provided the conditions to protect those wetlands are satisfied. We have expressed this intent by including a definition of "minor road fill" in the nationwide permit.

Repair, rehabilitation and replacement of existing fills (§323.4–3(a)(4)). As we have previously indicated, the 1975 regulations excluded material placed for maintenance and emergency reconstruction of fills from the definition of "fill material." We have added this previously excluded activity to the list of those that are being permitted today by this nationwide permit.

EPA, Conservation Commissions, and environmental groups noted that the condition in subparagraph (f) that the discharge not disrupt the migration of indigenous aquatic life was not sufficient to safeguard the passage of nonmigratory aquatic life. The final nationwide permit condition reflects this concern by changing "migration" to "movement."

Subparagraph (6) has been amended to clarify its intent to control erosion and other non-points sources of pollution. This subparagraph is consistent with changes made in § 323.4–2(b)(3).

A new condition has been added at the request of the Department of the Interior to exclude components of National and State wild and scenic river systems (established pursuant to the Wild and Scenic Rivers Act) from the nationwide permit programs (§§ 323.4–2(b)(4) and 323.4–3(b)(7)).

Discretionary authority to require individual or general permits (§ 323.4–4). Comments received from industry groups suggested that this section was superfluous since by definition any activity performed in accordance with the conditions in §§ 323.4–2 or 323.4–3 would have minimum adverse water quality impact and would not trigger EPA Guideline concerns. On the other hand other commenters suggested more stringent controls over erosion, water quality, chemical use, restoration of abandoned projects and wildlife protection. In order to make our regulatory program work, we are relying on decentralization and our flexibility to respond to local conditions. Moreover, if we overburden this nationwide permit with specific conditions, its intent and usefulness is reduced. On the other hand, we realize that local conditions may be such that special restrictions are required for activities otherwise acceptable in most areas and certain waters of the United States otherwise covered by a nationwide permit require special restrictions. We believe the most efficient means to do this is to grant our District Engineers the authority to require individual or general permits, as needed, to respond to these local conditions. To this end we invite the help of private groups, citizens, and Federal and State agencies to help our District Engineers respond to these localized concerns.

All Federal agencies that commented expressed support for the concept of nationwide permits, as did 81% of the public comment letters. We believe these new nationwide permits represent a major step forward in reducing unnecessary reviews and delay associated with regulation of minor discharges of dredged or fill material into waters of the United States.

An environmental assessment and a Findings of Fact have been prepared for these nationwide permits as well as for the Section 10 nationwide permits and are available for review in the Office, Chief of Engineers, Forrestal Building, Room 5F–036, Washington, D.C. 20314.

PART 324

This Part prescribes the special policies and procedures that will be used to evaluate applications for permits to transport dredged material for purposes of dumping in ocean waters pursuant to Section 103 of the Ocean Dumping Act. These policies and procedures must also be read in conjunction with the applicable general policies of Part 320 and general procedures of 325. If you need a permit to dump dredged material in the oceans, you should also refer to Part 322 since a permit will be required under Section 10 of the 1899 Act to dredge in navigable waters of the United States.

Part 324 corresponds to Sections (d)(3), (e)(3), and (g)(17) of rescinded 33 CFR 209.120.

We have adopted the definitions of "oceans waters", "dredged material", and "transport" as used by the Ocean Dumping Act.

In accordance with recent revisions to EPA criteria for the evaluation of the ocean dumping of dredged material, we have included requirements for additional specific information that must be included as part of a public notice for a proposed ocean dumping of dregded material. We have also specifically included the requirement that District Engineers consider the availability of land based alternatives during the evaluation of applications for ocean dumping permits. (See also § 320.4(a)(2)).

Procedures have also been included in this Part for those cases in which EPA objects to the proposed dumping of dregded material in ocean waters as being inconsistent with the EPA criteria. (See § 324.4(c)–(e)).

PART 325

This Part describes the procedures for processing all applications for Department of the Army permits, and for modi-

fying or revoking permits that have been issued. It corresponds to and supersedes paragraphs (h) through (s) of rescinded 33 CFR 209.120. The following is a summary of the major changes:

The material was reorganized for clarity. For example, public notice and environment impact statement (EIS) procedures, which were discussed in a number of different places in the rescinded regulation, were consolidated into single paragraphs.

The EIS procedures were revised to allow for a public hearing at completion of the draft EIS rather than the proposed final EIS; to require a public notice of the final EIS filing; and to provide for transmittal of the District Engineer's report to higher authority for decision, if required, after completion of the 30 day comment period on the final EIS (§ 325.4).

Permit file documentation requirements have been clarified. The District Engineer must prepare an impact assessment document (either an environmental assessment or an EIS) for each application and a decision document (either a Findings of Fact or, if the case is sent forward for decision, his report on the application) (§ 325.2(a)).

District Engineers have been delegated expanded authority to deny permits, including those which he determines are not in the public interest. (Their previous denial authority was limited to navigational conflicts and denial of a related state or local certification or authorization.) District Engineers have also been given the authority to issue most permits found to be in the public interest over unresolved objections of another Federal agency if that agency indicates that it does not desire to refer the application to a higher level of authority for review. (§ 325.8(b)).

Litigation potential and objection from a member of Congress have been deleted as reasons for automatically having to refer an application to the Chief of Engineers for decision. (§ 325.8(d)).

Procedures relating to the Coastal Zone Management Act have been made compatible with new regulations of the National Oceanic and Atmospheric Administration to be published as 15 CFR 930 (§ 325.2(b)(2)).

PART 326

This Part prescribes the policies and procedures that will be used by the Corps in the enforcement of the requirements of the River and Harbor Act of 1899, the FWPCA, and the Ocean Dumping Act. The Part corresponds to rescinded 33 CFR 209.120(g)(12), and is generally a restatement of the provisions in that rescinded section.

We have made several additions and clarifications to this enforcement regulation. On August 22, 1975, the Chief of Engineers delegated authority to District Engineers to refer certain types of cases involving unauthorized activities directly to the local U.S. Attorney. This delegation included the following types of cases: (1) All unauthorized structures or work falling exclusively within the scope of Section 10 of the 1899 Act for which a criminal fine or penalty under Section 12 of that Act is considered appropriate; (2) all civil actions involving small unauthorized structures, such as piers, which require restoration or modification by judicial order because efforts to secure voluntary compliance have failed; (3) all violations of Section 301 of the FWPCA involving unauthorized discharges of dredged or fill material into waters of the United States, unless the case involves a substantial question of law or fact, or a request for substantial restoration; and (4) all cases for which a temporary restraining order and/or preliminary injunction is appropriate following non-compliance with a cease and desist order issued by the District Engineer.

We have restated this delegation of authority in this regulation, as well as certain basic policy guidance (also previously included in the August, 1975 delegation) for use by the District Engineer in determining whether civil and/or criminal action is appropriate. We have also incorporated the policies and procedures expressed in a Memorandum, dated June 1, 1976, entitled "EPA Enforcement Policy for Noncompliance with Section 404 of the FWPCA", which was signed by the Assistant Administrator for Enforcement of EPA and concurred in by the Assistant Attorney General and the Chief Counsel of the Corps of Engineers.

Authority to refer certain types of cases directly to the local U.S. Attorney has not been delegated to the District Engineer either because of the extreme seriousness of the case or because the law on the particular type of case has not developed to the point to which Departmental level attention is no longer required.

We intend to propose revisions to this regulation in the near future that will provide further policy and procedural guidance and that will incorporate other enforcement authorities.

PART 327

This Part prescribes the policies and procedures to be followed by the Corps in the conduct of public hearings. A public hearing may become necessary in the evaluation of an application for a Department of the Army permit. The Part restates the policies and procedures that were prescribed in rescinded 33 CFR 209.133.

PART 328

This Part prescribes the policies and procedures used in the establishment of harborlines pursuant to Section 11 of the River and Harbor Act of 1899 (33 U.S.C. 404). As previously indicated, harborlines are only used as guidance to the District Engineer concerning the impact that a particular activity may have on navigation. Activities occurring landward of established harborlines must still have permits under Sections 9 or 10 of the 1899 Act, and may also require permits under Section 404 of the FWPCA and Section 103 of the Ocean Dumping Act. This part restates the policies and procedures expressed in rescinded 33 CFR 209.150.

PART 329

This Part corresponds to rescinded 33 CFR 209.260 and provides the administrative definition of the term "navigable waters of the United States" as used throughout Parts 320–325.

Two changes have been made to this regulation. First, pursuant to the decision of *United States* v. *Stoeco Homes, Inc.*, 498 F.2d 597, (3rd Cir., 1974), *cert. den.*; 420 U.S. 927 (1975), we have included artificial waters subject to tidal action within our administrative definition of navigable waters of the United States. Second, we have delegated authority to Division Engineers to make determinations of navigability. (Previously, this authority existed with the Chief of Engineers.) Accordingly, 33 CFR 209.120, 209.125, 209.131, 209.133, 209.150 and 209.260 are revoked and reserved and 33 CFR 320 through 329 are added as set forth below.

NOTE.—The Department of the Army has determined that this document does not contain a major proposal requiring preparation of an Inflation Impact Statement under Executive Order 11821 and OMB Circular A-107.

(33 U.S.C. 401; 33 U.S.C. 403; 33 U.S.C. 1344; 33 U.S.C. 1413.)

Dated: July 13, 1977.

DRAKE WILSON,
Brigadier General, USA,
Deputy Director of Civil Works.

Chapter II of 33 CFR is amended as follows:

PART 209—ADMINISTRATIVE PROCEDURES

§§ 209.120, 209.125, 209.131, 209.133, 209.150, and 209.260 [Reserved]

1. The above sections are revoked and reserved.

2. The following parts 320 through 329 are added:

PART 320—GENERAL REGULATORY POLICIES

Sec.
320.1 Purpose and scope.
320.2 Authorities to issue permits.
320.3 Related legislation.
320.4 General policies for evaluating permit applications.

AUTHORITY: 33 U.S.C. 401 et seq.; 33 U.S.C. 1344; 33 U.S.C. 1413.

§ 320.1 Purpose and scope.

(a) *Types of activities regulated.* This regulation and the regulations that follow (33 CFR 321–329) prescribe the statutory authorities, and general and special policies and procedures applicable to the review of applications for Department of the Army permits for various types of activities that occur in waters of the United States or the oceans. This part identifies the various Federal statutes that require Department of the Army permits before these activities can be lawfully undertaken; the related Federal legislation applicable to the review of each activity that requires a Department of the Army permit; and the general policies that are applicable

to the review of all activities that require Department of the Army permits. Parts 321–324 address the various types of activities that require Department of the Army permits, including special policies and procedures applicable to those activities, as follows:

(1) Dams or dikes in navigable waters of the United States (Part 321);

(2) All other structures or work including excavation, dredging, and/or disposal activities, in navigable waters of the United States (Part 322);

(3) All activities that alter or modify the course, condition, location, or capacity of a navigable water of the United States (Part 322);

(4) Construction of fixed structures and artificial islands on the outer continental shelf (Part 322);

(5) All discharges of dredged or fill material into the waters of the United States (Part 323); and

(6) All activities involving the transportation of dredged material for the purpose of dumping it in ocean waters (Part 324).

(b) *Forms of authorization.* Department of the Army permits for the above described activities are issued under various forms of authorization. These include individual permits; letters of permission that are issued following a review of an individual application for a Department of the Army permit; general permits that authorize the performance of a category or categories of activities in a specific geographical region after it is determined that these activities will cause only a minimal individual and cumulative adverse environmental impact; and nationwide permits that authorize the performance of certain specified activities throughout the Nation. The nationwide permits are found in 33 CFR 322.4 and 323.4. If an activity is covered by a general or nationwide permit, an application for a Department of the Army permit does not have to be made. In such cases, a person must only comply with the conditions contained in the general or nationwide permit to satisfy the requirements of law.

(c) *General instructions.* The procedures for processing all letters of permission, individual permits, and general permits are contained in 33 CFR 325. However, before reviewing those procedures, a person desiring to perform any activity that requires a Department of the Army permit is advised to review the general and special policies that relate to the particular activity as outlined in this Part 320 and Parts 321 through 324. The terms "navigable waters of the United States" and "waters of the United States" are used frequently throughout these regulations, and it is important that the reader understand the difference from the outset. "Navigable waters of the United States" are defined in 33 CFR 329. These are the traditional waters where permits are required for work or structures pursuant to sections 9 and 10 of the River and Harbor Act of 1899. "Waters of the United States" are defined in 33 CFR 323.2(a). These waters include more than navigable waters of the United States and are the waters where permits are required for the discharge of dredged or fill material pursuant to section 404 of the Federal Water Pollution Control Act Amendments of 1972.

§ 320.2 Authorities to issue permits.

(a) Section 9 of the River and Harbor Act approved March 3, 1899 (30 Stat. 1151; 33 USC 401) (hereinafter referred to as Section 9) prohibits the construction of any dam or dike across any navigable water of the United States in the absence of Congressional consent and approval of the plans by the Chief of Engineers and the Secretary of the Army. Where the navigable portions of the waterbody lie wholly within the limits of a single State, the structure may be built under authority of the legislature of that State, if the location and plans or any modification thereof, are approved by the Chief of Engineers and by the Secretary of the Army. The instrument of authorization is designated a permit. Section 9 also pertains to bridges and causeways but the authority of the Secretary of the Army and Chief of Engineers with respect to bridges and causeways was transferred to the Secretary of Transportation under the Department of Transportation Act of October 15, 1966 (80 Stat. 941, 49 USC 1155g (6)(A)). See also 33 CFR Part 321. A Department of the Army authorization is required for the discharge of dredged or fill material into waters of the United States associated with bridges and causeways pursuant to Section 404 of the Federal Water Pollution Control Act Amendments of 1972 (33 USC 1344). See CFR Part 323.

(b) Section 10 of the River and Harbor Act approved March 3, 1899 (30 Stat. 1151; 33 USC 403) (hereinafter referred to as Section 10) prohibits the unauthorized obstruction or alteration of any navigable water of the United States. The construction of any structure in or over any navigable water of the United States, the excavation from or depositing of material in such waters, or the accomplishment of any other work affecting the course, location, condition, or capacity of such waters is unlawful unless the work has been recommended by the Chief of Engineers and authorized by the Secretary of the Army. The instrument of authorization is designated a permit, general permit, or letter of permission. The authority of the Secretary of the Army to prevent obstructions to navigation in the navigable waters of the United States was extended to artificial islands and fixed structures located on the outer continental shelf by Section 4(f) of the Outer Continental Shelf Lands Act of 1953 (67 Stat. 463; 43 U.S.C. 1333(f)). See also 33 CFR Part 322.

(c) Section 11 of the River and Harbor Act approved March 3, 1899 (30 Stat. 1151; 33 U.S.C. 404) authorizes the Secretary of the Army to establish harbor lines channelward of which no piers, wharves, bulkheads or other works may be extended or deposits made without approval of the Secretary of the Army. By policy stated in 33 CFR 328, effective May 27, 1970, harbor lines are guidelines only for defining the offshore limits of structures and fills insofar as they impact on navigation interests. Permits for work shoreward of those lines must be obtained in accordance with Section 10 and, if applicable, Section 404.

(d) Section 13 of the River and Harbor Act approved March 3, 1899 (30 Stat. 1152; 33 U.S.C. 407) provides that the Secretary of the Army, whenever the Chief of Engineers determines that anchorage and navigation will not be injured thereby, may permit the discharge of refuse into navigable waters. In the absence of a permit, such discharge of refuse is prohibited. While the prohibition of this section, known as the Refuse Act, is still in effect, the permit authority of the Secretary of the Army has been superseded by the permit authority provided the Administrator, Environmental Protection Agency, and the States under Sections 402 and 405 of the Federal Water Pollution Control Act Amendments of 1972 (PL 92–500, 86 Stat. 816, 33 U.S.C. 1342 and 1345). See 40 CFR Parts 124 and 125.

(e) Section 14 of the River and Harbor Act approved March 3, 1899 (30 Stat. 1152; 33 U.S.C. 408) provides that the Secretary of the Army on the recommendation of the Chief of Engineers may grant permission for the temporary occupation or use of any sea wall, bulkhead, jetty, dike, levee, wharf, pier, or other work built by the United States. This permission will be granted by an appropriate real estate instrument in accordance with existing real estate regulations.

(f) Section 1 of the River and Harbor Act of June 13, 1902 (32 Stat. 371; 33 U.S.C. 565) allows any persons or corporations desiring to improve any navigable river at their own expense and risk to do so upon the approval of the plans and specifications by the Secretary of the Army and the Chief of Engineers. Improvements constructed under this authority, which are primarily in Federal project areas, remain subject to the control and supervision of the Secretary of the Army and the Chief of Engineers.

(g) Section 404 of the Federal Water Pollution Control Act Amendments of 1972 (PL 92–500, 86 Stat. 816, 33 U.S.C. 1344) (hereinafter referred to as Section 404) authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits, after notice and opportunity for public hearings, for the discharge of dredged or fill material into the waters of the United States at specified disposal sites. See 33 CFR 323. The selection and use of disposal sites will be in accordance with guidelines developed by the Administrator of the Environmental Protection Agency (EPA) in conjunction with the Secretary of the Army, published in 40 CFR Part 230. If these guidelines prohibit the selection or use of a disposal site, the Chief of Engineers may consider the economic impact on navigation of such a prohibition in reaching his decision. Furthermore, the

Administrator can prohibit or restrict the use of any defined area as a disposal site whenever he determines, after notice and opportunity for public hearings and after consultation with the Secretary of the Army, that the discharge of such materials into such areas will have an unacceptable adverse effect on municipal water supplies, shellfish beds and fishery areas, wildlife, or recreational areas.

(h) Section 103 of the Marine Protection, Research and Sancturaries Act of 1972, as amended (PL 92-532, 86 Stat. 1052, 33 U.S.C. 1413) (hereinafter referred to as Section 103) authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits, after notice and opportunity for public hearings, for the transportation of dredged material for the purpose of dumping it in ocean waters where it is determined that the dumping will not unreasonably degrade or endanger human health, welfare, or amenities, or the marine environment, ecological system, or economic potentialities. The selection of disposal sites will be in accordance with criteria, developed by the Administrator of the EPA in consultation with the Secretary of the Army, published in 40 CFR Parts 220-229. However, similar to the EPA Administrator's limiting authority cited in subparagraph (g), above, the Administrator can prevent the issuance of a permit under this authority if he finds that the dumping of the material will result in an unacceptable adverse impact on municipal water supplies, shellfish beds, wildlife, fisheries or recreational areas. See also 33 CFR Part 324.

§ 320.3 Related legislation.

(a) Section 401 of the Federal Water Pollution Control Act Amendments of 1972 (PL 92-500; 86 Stat. 816, 33 U.S.C. 1341) requires any non-Federal applicant for a Federal license or permit to conduct any activity that may result in a discharge of a pollutant into waters of the United States to obtain a certification from the State in which the discharge originates or will originate, or, if appropriate, from the interstate water pollution control agency having jurisdiction over the affected waters at the point where the discharge originates or will originate, that the discharge will comply with the applicable effluent limitations and water quality standards. A certification obtained for the construction of any facility must also pertain to the subsequent operation of the facility.

(b) Section 307(c) of the Coastal Zone Management Act of 1972, as amended (PL 94-370, 90 Stat. 1013, 16 U.S.C. 1456(c)) requires Federal agencies conducting activities, including development projects, directly affecting a State's coastal zone, to comply, to the maximum extent practicable, with an approved State coastal zone management program. It also requires any non-Federal applicant for a Federal license or permit to conduct an activity affecting land or water uses in the State's coastal zone to furnish a certification that the proposed activity will comply with the State's coastal zone management program. Generally, no permit will be issued until the State has concurred with the non-Federal applicant's certification. This provision becomes effective upon approval by the Secretary of Commerce of the State's coastal zone management program. See also 15 CFR Part 930.

(c) Section 302 of the Marine Protection, Research and Sanctuaries Act of 1972, as amended, (PL 92-532, 86 Stat. 1052, 16 U.S.C. 1432) authorizes the Secretary of Commerce, after consultation with other interested Federal agencies and with the approval of the President, to designate as marine sanctuaries those areas of the ocean waters or of the Great Lakes and their connecting waters or of other coastal waters which he determines necessary for the purpose of preserving or restoring such areas for their conservation, recreational, ecological, or aesthetic values. After designating such an area, the Secretary of Commerce shall issue regulations to control any activities within the area. Activities in the sanctuary authorized under other authorities are valid only if the Secretary of Commerce certifies that the activities are consistent with the purposes of Title III of the Act and can be carried out within the regulations for the sanctuary.

(d) The National Environmental Policy Act of 1969 (42 U.S.C. 4321-4347) declares the national policy to encourage a productive and enjoyable harmony between man and his environment. Section 102 of that Act directs that "to the fullest extent possible: (1) The policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with the policies set forth in this Act, and (2) all agencies of the Federal Government shall * * * insure that presently unquantified environmental amenities and values may be given appropriate consideration in decision making along with economic and technical considerations * * *". See also 33 CFR Part 325 and 33 CFR 209.410.

(e) The Fish and Wildlife Act of 1956 (16 U.S.C. 742a, et seq.), the Migratory Marine Game-Fish Act (16 U.S.C. 760c-760g) and the Fish and Wildlife Coordination Act (16 U.S.C. 661-666c) and other acts express the concern of Congress with the quality of the aquatic environment as it affects the conservation, improvement and enjoyment of fish and wildlife resources. Reorganization Plan No. 4 of 1970 transferred certain functions, including certain fish and wildlife-water resources coordination responsibilities, from the Secretary of the Interior to the Secretary of Commerce. Under the Fish and Wildlife Coordination Act and Reorganization Plan No. 4, any Federal agency that proposes to control or modify any body of water must first consult with the United States Fish and Wildlife Service, the National Marine Fisheries Service, as appropriate, and with the head of the appropriate State agency exercising administration over the wildlife resources of the affected State.

(f) The Federal Power Act of 1920 (41 Stat. 1063; 16 U.S.C. 791a et seq.), as amended, authorizes the Federal Power Commission (FPC) to issue licenses for the construction, operation and maintenance of dams, water conduits, reservoirs, power houses, transmission lines, and other physical structures of a power project. However, where such structures will affect the navigable capacity of any navigable waters of the United States (as defined in 16 U.S.C. 796), the plans for the dam or other physical structures affecting navigation must be approved by the Chief of Engineers and the Secretary of the Army. In such cases, the interests of navigation should normally be protected by a recommendation to the FPC for the inclusion of appropriate provisions in the FPC license rather than the issuance of a separate Department of the Army permit under 33 U.S.C. 401 et seq. As to any other activities in navigable waters not constituting construction, operation and maintenance of physical structures licensed by the FPC under the Federal Power Act of 1920, as amended, the provisions of 33 U.S.C. 401 et seq. remain fully applicable. In all cases involving the discharge of dredged or fill material into waters of the United States or the transportation of dredged material for the purpose of dumping in ocean waters, Section 404 or Section 103 will be applicable.

(g) The National Historic Preservation Act of 1966 (80 Stat. 915, 16 U.S.C. 470) created the Advisory Council on Historic Preservation to advise the President and Congress on matters involving historic preservation. In performing its function the Council is authorized to review and comment upon activities licensed by the Federal Government which will have an effect upon properties listed in the National Register of Historic Places, or eligible for listing. The concern of Congress for the preservation of significant historical sites is also expressed in the Preservation of Historical and Archeological Data Act of 1974 (16 U.S.C. 469 et seq.), which amends the Act of June 27, 1960. By this Act, whenever a Federal construction project or Federally licensed project, activity or program alters any terrain such that significant historical or acheological data is threatened, the Secretary of the Interior may take action necessary to recover and preserve the data prior to the commencement of the project. See also 33 CFR Part 305.

(h) The Interstate Land Sales Full Disclosure Act (15 USC 1701 et seq.) prohibits any developer or agent from selling or leasing any lot in a subdivision (as defined in 15 USC 1701(3)) unless the purchaser is furnished in advance a printed property report containing information which the Secretary of Housing and Urban Development may, by rules or regulations, require for the protection of purchasers. In the event the lot in question is part of a project that requires Department of the Army authorization, the Property Report is required by Housing and Urban Development regulation to state whether or not

a permit has been applied for, issued, or denied by the Corps of Engineers for the development under Section 10 or Section 404. The Property Report is also required to state whether or not any enforcement action has been taken as a consequence of non-application for or denial of such permit.

(i) The Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.) declares the intention of the Congress to conserve threatened and endangered species and the ecosystems on which those species depend. The Act provides that Federal agencies must utilize their authorities in furtherance of its purposes by carrying out programs for the conservation of endangered or threatened species, and by taking such action necessary to insure that any action authorized by that Agency will not jeopardize the continued existence of such endangered or threatened species or result in the destruction or modification of habitat of such species which is determined by the Secretaries of Interior or Commerce, as appropriate, to be critical. See also 50 CFR Part 17.

(j) The Deepwater Port Act of 1974 (33 U.S.C. 1501 et seq.) prohibits the ownership, construction, or operation of a deepwater port beyond the territorial seas without a license issued by the Secretary of Transportation. The Secretary of Transportation may issue such a license to an applicant if he determines, among other things, that the construction and operation of the deepwater port is in the national interest and consistent with national security and other national policy goals and objectives. An application for a deepwater port license constitutes an application for all Federal authorizations required for the ownership, construction, and operation of a deepwater port, including applications for Section 10, Section 404 and Section 103 permits which must also be issued by the Department of the Army pursuant to the authorities listed in § 320.2. The Secretary of Transportation must obtain the views and recommendations of all Federal agencies having jurisdiction over any aspect of the deepwater port construction and operation prior to issuing a license.

(k) The Marine Mammal Protection Act of 1972 (16 U.S.C. 1361 et seq.) expresses the intent of Congress that marine mammals be protected and encouraged to develop in order to maintain the health and stability of the marine ecosystem. The Act imposes a perpetual moratorium on the harassment, hunting, capturing, or killing of marine mammals and on the importation of marine mammals and marine mammal products without a permit from either the Secretary of the Interior or the Secretary of Commerce, depending upon the species of marine mammal involved. Such permits may be issued only for purposes of scientific research and for public display if the purpose is consistent with the policies of the Act. The appropriate Secretary is also empowered in certain restricted circumstances to waive the requirements of the Act.

(l) Section 7(a) of the Wild and Scenic Rivers Act (82 Stat. 906, 16 U.S.C. 1278 et seq.) provides that no department or agency of the United States shall assist by loan, grant, license, or otherwise in the construction of any water resources project that would have a direct and adverse effect on the values for which such river was established, as determined by the Secretary charged with its administration. No department or agency of the United States shall recommend authorizing of any water resources project that would have a direct and adverse effect on the values for which such river was established, as determined by the Secretary charged with its administration, or request appropriations to begin construction of any such project, whether heretofore or hereafter authorized, without advising the Secretary of the Interior or the Secretary of Agriculture, as the case may be, in writing of its intention so to do at least sixty days in advance, and without specifically reporting to the Congress in writing at the time it makes its recommendation or request in what respect construction of such project would be in conflict with the purposes of this Act and would affect the component and the values to be protected by it under this Act.

(m) Section 6(f) of the Land and Water Conservation Fund Act of 1965 (78 Stat. 897, 16 USC 460 *l*–4, *et seq.*) provides that no property acquired or developed with assistance from the Land and Water Conservation Fund shall, without the approval of the Secretary of the Interior, be converted to other than public outdoor recreation uses. The Secretary shall approve such conversion only if he finds it to be in accord with the then existing comprehensive statewide outdoor recreation plan and only upon such conditions as he deems necessary to assure the substitution of other recreation properties of at least equal fair market value and of reasonably equivalent usefulness and location.

§ 320.4 General policies for evaluating permit applications.

The following policies shall be applicable to the review of all applications for Department of the Army permits. Additional policies specifically applicable to certain types of activities are identified in Parts 321–324 of this chapter.

(a) *Public interest review.* (1) The decision whether to issue a permit will be based on an evaluation of the probable impact of the proposed activity and its intended use on the public interest. Evaluation of the probable impact which the proposed activity may have on the public interest requires a careful weighing of all those factors which become relevant in each particular case. The benefit which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. The decision whether to authorize a proposal, and if so, the conditions under which it will be allowed to occur, are therefore determined by the outcome of the general balancing process (e.g., see 33 CFR 209.400, Guidelines for Assessment of Economic, Social and Environmental Effects of Civil Works Projects). That decision should reflect the national concern for both protection and utilization of important resources. All factors which may be relevant to the proposal must be considered; among those are conservation, economics, aesthetics, general environmental concerns, historic values, fish and wildlife values, flood damage prevention, land use, navigation, recreation, water supply, water quality, energy needs, safety, food production, and, in general, the needs and welfare of the people. No. permit will be granted unless its issuance is found to be in the public interest.

(2) The following general criteria will be considered in the evaluation of every application:

(i) the relative extent of the public and private need for the proposed structure or work;

(ii) the desirability of using appropriate alternative locations and methods to accomplish the objective of the proposed structure or work;

(iii) the extent and permanence of the beneficial and/or detrimental effects which the proposed structure or work may have on the public and private uses to which the area is suited; and

(iv) the probable impact of each proposal in relation to the cumulative effect created by other existing and anticipated structures or work in the general area.

(b) *Effect on wetlands.* (1) Wetlands are vital areas that constitute a productive and valuable public resource, the unnecessary alteration or destruction of which should be discouraged as contrary to the public interest.

(2) Wetlands considered to perform functions important to the public interest include:

(i) Wetlands which serve important natural biological functions, including food chain production, general habitat, and nesting, spawning, rearing and resting sites for aquatic or land species;

(ii) Wetlands set aside for study of the aquatic environment or as sanctuaries or refuges;

(iii) Wetlands the destruction or alteration of which would affect detrimentally natural drainage characteristics, sedimentation patterns, salinity distribution, flushing characteristics, current patterns, or other environmental characteristics;

(iv) Wetlands which are significant in shielding other areas from wave action, erosion, or storm damage. Such wetlands are often associated with barrier beaches, islands, reefs and bars;

(v) Wetlands which serve as valuable storage areas for storm and flood waters;

(vi) Wetlands which are prime natural recharge areas. Prime recharge areas are locations where surface and ground water are directly interconnected; and

(vii) Wetlands through natural water filtration processes serve to purify water.

(3) Although a particular alteration of wetlands may constitute a minor change,

the cumulative effect of numerous such piecemeal changes often results in a major impairment of the wetland resources. Thus, the particular wetland site for which an application is made will be evaluated with the recognition that it is part of a complete and interrelated wetland area. In addition, the District Engineer may undertake reviews of particular wetland areas in consultation with the appropriate Regional Director of the Fish and Wildlife Service, the Regional Director of the National Marine Fisheries Service of the National Oceanic and Atmospheric Administration, the Regional Administrator of the Environmental Protection Agency, the local representative of the Soil Conservation Service of the Department of Agriculture, and the head of the appropriate State agency to assess the cumulative effect of activities in such areas.

(4) No permit will be granted to work in wetlands identified as important by subparagraph (2), above, unless the District Engineer concludes, on the basis of the analysis required in paragraph (a), above, that the benefits of the proposed alteration outweigh the damage to the wetlands resource and the proposed alteration is necessary to realize those benefits. In evaluating whether a particular alteration is necessary, the District Engineer shall consider whether the proposed activity is primarily dependent on being located in, or in close proximity to the aquatic environment and whether feasible alternative sites are available. The applicant must provide sufficient information on the need to locate the proposed activity in the wetland and must provide data on the basis of which the availability of feasible alternative sites can be evaluated.

(5) In addition to the policies expressed in this subpart the Congressional policy expressed in the Estuary Protection Act, PL 90-454, and State regulatory laws or programs for classification and protection of wetlands will be given great weight.

(c) *Fish and wildlife.* In accordance with the Fish and Wildlife Coordination Act (§ 320.3(e) above) Corps of Engineers officials will consult with the Regional Director, U.S. Fish and Wildlife Service, the Regional Director, National Marine Fisheries Service, and the head of the agency responsible for fish and wildlife for the State in which the work is to be performed, with a view to the conservation of wildlife resources by prevention of their direct and indirect loss and damage due to the activity proposed in a permit application. They will give great weight to these views on fish and wildlife considerations in evaluating the application. The applicant will be urged to modify his proposal to eliminate or mitigate any damage to such resources, and in appropriate cases the permit may be conditioned to accomplish this purpose.

(d) *Water quality.* Applications for permits for activities which may affect the quality of a water of the United States will be evaluated for compliance with applicable effluent limitations, water quality standards, and management practices during the construction, operation, and maintenance of the proposed activity. Certification of compliance with applicable effluent limitations and water quality standards required under provisions of Section 401 of the Federal Water Pollution Control Act will be considered conclusive with respect to water quality considerations unless the Regional Administrator, Environmental Protection Agency (EPA), advises of other water quality aspects to be taken into consideration. Any permit issued may be conditioned to implement water quality protection measures.

(e) *Historic, scenic, and recreational values.* (1) Applications for permits covered by this regulation may involve areas which possess recognized historic, cultural, scenic, conservation, recreational or similar values. Full evaluation of the general public interest requires that due consideration be given to the effect which the proposed structure or activity may have on the enhancement, preservation, or development of such values. Recognition of those values is often reflected by State, regional, or local land use classifications, or by similar Federal controls or policies. In both cases, action on permit applications should, insofar as possible, be consistent with, and avoid adverse effect on, the values or purposes for which those classifications, controls, or policies were established.

(2) Specific application of the policy in subparagraph (1) above, applies to:

(i) Rivers named in Section 3 of the Wild and Scenic Rivers Act (82 Stat. 906, 16 U.S.C. 1273 et seq.); those proposed for inclusion as provided by Sections 4 and 5 of the Act, or by later legislation; and wild, scenic, and recreational rivers established by State and local entities;

(ii) Historic, cultural, or archeological sites or practices as provided in the National Historic Preservation Act of 1966 (83 Stat. 852, 42 U.S.C. 4321 et seq.) (see also Executive Order 11593, May 13, 1971, and Statutes there cited). Particular attention should be directed toward any district, site, building, structure, or object listed or eligible for listing in the National Register of Historic Places;

(iii) Sites included in or determined eligible for listing in the National Registry of Natural Landmarks which are published periodically in the FEDERAL REGISTER;

(iv) Sites acquired or developed with the assistance of the Land and Water Conservation Fund (78 Stat. 897, 16 U.S.C. 460, 1-4, et seq.) or the Recreational Demonstrations Projects Act of 1942 (PL 77-594, 56 Stat. 326) and other public parks and recreation areas; and

(v) Any other areas named in Acts of Congress or Presidential Proclamations as National Rivers, National Wilderness Areas, National Seashores, National Recreation Areas, National Lakeshores, National Parks, National Monuments, and such areas as may be established under Federal law for similar and related purposes, such as estuarine and marine sanctuaries.

(f) *Effect on limits of the territorial sea.* Structures or work affecting coastal waters may modify the coast line or base line from which the three mile belt is measured for purposes of the Submerged Lands Act and International Law. Generally, the coast line or base line is the line of ordinary low water on the mainland; however, there are exceptions where there are islands or lowtide elevations offshore. (The Submerged Lands Act, 67 Stat. 29, U.S. Code Section 1301(c), and United States vs. California, 381 U.S. 139 (1965), 382 U.S. 448 (1966).) All applications for structures or work affecting coastal waters will therefore be reviewed specifically to determine whether the coast line or base line might be altered. If it is determined that such a change might occur, coordination with the Attorney General and the Solicitor of the Department of the Interior is required before final action is taken. The District Engineer will submit a description of the proposed work and a copy of the plans to the Solicitor, Department of the Interior, Washington, D.C. 20240, and request his comments concerning the effects of the proposed work on the outer continental rights of the United States. These comments will be included in the file of the application. After completion of standard processing procedures, the file will be forwarded to the Chief of Engineers. The decision on the application will be made by the Secretary of the Army after coordination with the Attorney General.

(g) *Interference with adjacent properties or water resource projects.* Authorization of work or structures by the Department of the Army does not convey a property right, nor authorize any injury to property or invasion of other rights.

(1) Because a landowner has the general right to protect his property from erosion, applications to erect protective structures will usually receive favorable consideration. However, if the protective structure may cause damage to the property of others, the District Engineer will so advise the applicant and inform him of possible alternative methods of protecting his property. Such advice will be given in terms of general guidance only so as not to compete with private engineering firms nor require undue use of government resources. A significant probability of resulting damage to nearby properties can be a basis for denial of an application.

(2) A landowner's general right of access to navigable waters of the United States is subject to the similar rights of access held by nearby landowners and to the general public's right of navigation on the water surface. Proposals which create undue interference with access to, or use of, navigable waters will generally not receive favorable consideration.

(3) Where it is found that the work for which a permit is desired is in navigable waters of the United States (see 33 CFR Part 329) and may interfere with an authorized Federal project, the applicant should be apprised in writing

of the fact and of the possibility that a Federal project which may be constructed in the vicinity of the proposed work might necessitate its removal or reconstruction. The applicant should also be informed that the United States will in no case be liable for any damage or injury to the structures or work authorized by Sections 9 or 10 of the River and Harbor Act of 1899 (see 33 CFR Parts 321 and 322) which may be caused by or result from future operations undertaken by the Government for the conservation or improvement of navigation, or for other purposes, and no claims or right to compensation will accrue from any such damage.

(4) Proposed activities which are in the area of a Federal project which exists or is under construction will be evaluated to insure that they are compatible with the purposes of the project.

(h) *Activities affecting coastal zones.* Applications for Department of the Army permits for activities affecting the coastal zones of those States having a coastal zone management program approved by the Secretary of Commerce will be evaluated with respect to compliance with that program. No permit will be issued to a non-Federal applicant until certification has been provided that the proposed activity complies with the coastal zone management program and the appropriate State agency has concurred with the certification or has waived its right to do so. However, a permit may be issued to a non-Federal applicant if the Secretary of Commerce, on his own initiative or upon appeal by the applicant, finds that the proposed activity is consistent with the objectives of the Coastal Zone Management Act of 1972 or is otherwise necessary in the interest of national security. Federal agency applicants for Department of the Army permits are responsible for complying with the Coastal Zone Management Act's directives for assuring that their activities directly affecting the coastal zone are consistent, to the maximum extent practicable, with approved State coastal zone management programs.

(i) *Activities in marine sanctuaries.* Applications for Department of the Army authorization for activities in a marine sanctuary established by the Secretary of Commerce under authority of Section 302 of the Marine Protection, Research and Sanctuaries Act of 1972, as amended, will be evaluated for impact on the marine sanctuary. No permit will be issued until the applicant provides a certification from the Secretary of Commerce that the proposed activity is consistent with the purposes of Title III of the Marine Protection, Research and Sanctuaries Act of 1972, as amended, and can be carried out within the regulations promulgated by the Secretary of Commerce to control activities within the marine sanctuary. Authorizations so issued will contain such special conditions as may be required by the Secretary of Commerce in connection with his certification.

(j) *Other Federal, state, or local requirements.* (1) Processing of an application for a Department of the Army permit normally will proceed concurrently with the processing of other required Federal, State, and/or local authorizations or certification. Where the required Federal State and/or local certification and/or authorization has been denied, the application for a Department of the Army permit will be denied without prejudice to the right of the applicant to reinstate processing of his application if subsequent approval is received from the appropriate Federal, State and/or local agency. Even if official certification and/or authorization is not required by State or Federal law, but a State, regional, or local agency having jurisdiction or interest over the particular activity comments on the application, due consideration shall be given to those official views as a reflection of local factors of the public interest.

(2) Where officially adopted State, regional, or local land-use classifications, determinations, or policies are applicable to the land or water areas under consideration, they shall be presumed to reflect local factors of the public interest and shall be considered in addition with the other national factors of the public interest identified in § 320.4(a).

(3) A proposed activity may result in conflicting comments from several agencies within the same State. While many States have designated a single State agency or individual to provide a single and coordinated State position regarding pending permit applications, where a State has not so designated a single source, District Engineers will elicit from the Governor an expression of his views and desires concerning the application or, in the alternative, an expression from the Governor as to which State agency represents the official State position in this particular case.

(4) In the absence of overriding national factors of the public interest that may be revealed during the processing of the permit application, a permit will generally be issued following receipt of a favorable State determination provided the concerns, policies, goals, and requirements as expressed in 33 CFR Parts 320-324, and the following statutes have been followed and considered: The National Environmental Policy Act; the Fish and Wildlife Coordination Act; the Historical and Archaeological Preservation Act; the National Historic Preservation Act; the Endangered Species Act; the Coastal Zone Management Act; the Marine Protection, Research and Sanctuaries Act of 1972, as amended; and the Federal Water Pollution Control Act (see § 320.3, above).

(5) If the responsible Federal, State, and/or local agency fails to take definitive action to grant or deny required authorizations or to furnish comments as provided in subparagraph (3) above, within three months of the issuance of the public notice, the District Engineer shall process the application to a conclusion.

(6) Permits will not be issued where certification or authorization of the proposed work is required by Federal, State and/or local law and that certification or authorization has been denied.

(7) The District Engineer may, in those States with ongoing permit programs for activities regulated by Department of the Army permits, enter into an agreement with the States to jointly process and evaluate Department of the Army and State permit applications. This may include the issuance of joint public notices; the conduct of joint public hearings, if held; and the joint review and analysis of information and comments developed in response to the public notice, public hearing, the environmental assessment and the environmental impact statement (if necessary), the Fish and Wildlife Coordination Act, the Historical and Archaeological Preservation Act, the National Historic Preservation Act, the Endangered Species Act, the Coastal Zone Management Act, the Marine Protection, Research and Sanctuaries Act of 1972, as amended, and the Federal Water Pollution Control Act. In such cases, applications for Department of the Army permits may be processed concurrently with the processing of the State permit to an independent conclusion and decision by the District Engineer and appropriate State agency.

(k) *Safety of impoundment structures.* Unless an adequate inspection program is required by another Federal licensing agency or will be performed by another Federal agency, the District Engineer will condition permits for impoundment structures to require that the permittee operate and maintain the structure properly to insure public safety. The District Engineer may condition such permits to require periodic inspections and to indicate that failure to accomplish actions to assure the public safety will be considered cause to revoke the permit.

(l) *Floodplains.* Executive Order 11988, dated May 24, 1977, requires each Federal agency, in its conduct of Federal programs that affect land use including the regulation of water resources, to take action to reduce the risk of flood loss; to minimize the impact of floods on human safety, health and welfare; and to restore and preserve the natural and beneficial values served by floodplains. In evaluating whether activities located in a floodplain that require Department of the Army permits are in the public interest, available alternatives to avoid adverse effects from and incompatible development in floodplains shall be considered.

PART 321—PERMITS FOR DAMS AND DIKES IN NAVIGABLE WATERS OF THE UNITED STATES

Sec.
321.1 General.
321.2 Definitions.
321.3 Special policies and procedures.

AUTHORITY: 33 U.S.C. 401.

§ 321.1 General.

This regulation prescribes, in addition to the general policies of 33 CFR 320.4 and procedures of 33 CFR Part 325, those special policies, practices, and procedures to be followed by the Corps of En-

gineers in connection with the review of applications for Department of Army permits to authorize the construction of a dike or dam in a navigable water of the United States pursuant to Section 9 of the River and Harbor Act of 1899 (33 U.S.C. 401). See 33 CFR 320.2(a). Dams and dikes in navigable waters of the United States also require Department of the Army permits under Section 404 of the Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. 1344). Applicants for Department of the Army permits under this Part should also refer to 33 CFR Part 323 to satisfy the requirements of Section 404.

§ 321.2 Definitions.

For the purpose of this regulation, the following terms are defined:

(a) The term "navigable waters of the United States" means those waters of the United States that are subject to the ebb and flow of the tide shoreward to the mean high water mark (mean higher high water mark on the Pacific coast), and/or are presently used, or have been used in the past, or may be susceptible to use to transport interstate or foreign commerce. See 33 CFR Part 329 for a more complete definition of this term.

(b) The term "dam" means an impoundment structure that completely spans a navigable water of the United States and that may obstruct interstate waterborne commerce.

(c) The term "dike" means an embankment, low dividing wall, or other protective barrier that completely spans a navigable water of the United States and that may obstruct interstate waterborne commerce.

§ 21.3 Special policies and procedures.

The following additional special policies and procedures shall be applicable to the evaluation of permit applications under this regulation:

(a) The Secretary of the Army will decide whether Department of the Army authorization for a dam or dike in a navigable water of the United States will be issued, since this authority has not been delegated to the Chief of Engineers. The conditions to be imposed in any instrument of authorization will be recommended by the District Engineer when he forwards his report to the Secretary of the Army, through the Chief of Engineers, pursuant to 33 CFR 325.11.

(b) A Department of the Army application under Section 9 will not be processed until the approval of the United States Congress has been obtained if the navigable water of the United States is an interstate waterbody, or until the approval of the appropriate State legislature has been obtained if the navigable water of the United States is solely within the boundaries of one State.

PART 322—PERMITS FOR STRUCTURES OR WORK IN OR AFFECTING NAVIGABLE WATERS OF THE UNITED STATES

Sec.
322.1 General.
322.2 Definitions.
322.3 Activities requiring permits.
322.4 Structures and work permitted by this regulation.
322.5 Special policies and procedures.
Appendix A.—U.S. Coast Guard/Chief of Engineers Memorandum of Agreement.
Appendix B.—Delegation of Authority.

AUTHORITY: 33 U.S. 403.

§ 322.1 General.

This regulation prescribes, in addition to the general policies of 33 CFR 320.4 and procedures of 33 CFR Part 325 those special policies, practices and procedures to be followed by the Corps of Engineers in connection with the review of applications for Department of Army permits to authorize structures or work in or affecting navigable waters of the United States pursuant to Section 10 of the River and Harbor Act of 1899 (33 U.S.C. 403), (hereinafter referred to as Section 10). See 33 CFR 320.2(b). Certain structures or work in or affecting navigable waters of the United States are also regulated under other authorities of the Department of the Army. These include discharges of dredged or fill material into waters of the United States, including the territorial seas, pursuant to Section 404 of the Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. 1344; see 33 CFR Part 323) and the transportation of dreged material by vessel for purposes of dumping in ocean waters, including the territorial seas, pursuant to Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972, as amended (33 U.S.C. 1413; see 33 CFR Part 324). A Department of the Army permit will also be required under these additional authorities if they are applicable to structures or work in or affecting navigable waters of the United States. Applicants for Department of the Army permits under this part should refer to the other cited authorities and implementing regulations for these additional permit requirements to determine whether they also are applicable to their proposed activities.

§ 322.2 Definitions.

For the purpose of this regulation, the following terms are defined:

(a) The term "navigable waters of the United States" means those waters of the United States that are subject to the ebb and flow of the tide shoreward to the mean high water mark (mean higher high water mark on the Pacific coast), and/or are presently used, or have been used in the past, or may be susceptible to use to transport interstate or foreign commerce. See 33 CFR Part 329 for a more complete definition of this term.

(b) The term "structure" shall include, without limitation, any pier, wharf, dolphin, weir, boom, breakwater, bulkhead, revetment, jetty, permanent mooring structure, power transmission lines, permanently moored floating vessels, piling, aids to navigation, or any other permanent or semi-permanent obstacle or obstruction.

(c) The term "work" shall include, without limitation, any dredging or disposal of dredged material, excavation, filling, or other modification of a navigable water of the United States.

(d) The term "letter of permission" means an individual permit issued in accordance with the abbreviated procedures of 33 CFR 325.5(b).

(e) The term "individual permit" means a Department of the Army authorization that is issued following a case-by-case evaluation of a specific structure or work in accordance with the procedures of this regulation and 33 CFR Part 325 and a determination that the proposed structure or work is in the public interest pursuant to 33 CFR Part 320.

(f) The term "general permit" means a Department of the Army authorization that is issued for a category or categories of structures or work in a specified region of the country, when those structures or work are substantially similar in nature and cause only minimal individual and cumulative adverse environmental impact. A general permit is issued following an evaluation of the proposed category of activities that it will authorize in accordance with the procedures of this regulation (322.5(b)), 33 CFR Part 325, and a determination that the proposed discharges will be in the public interest pursuant to 33 CFR Part 320.

(g) The term "nationwide permit" means a Department of the Army authorization that has been issued by this regulation in § 322.4 to permit certain structures or work in or affecting navigable waters of the United States throughout the Nation.

§ 322.3 Activities requiring permits.

(a) *General.* Department of the Army permits are required under Section 10 for all structures or work in or affecting navigable waters of the United States except for bridges and causeways (see Appendix A) and structures or work licensed under the Federal Power Act of 1920. Activities that were commenced or completed shoreward of established Federal harbor lines before May 27, 1970 (see 33 CFR Part 328) also do not require Section 10 permits; however, if those activities involve the discharge of dredged or fill material into waters of the United States after October 18, 1972, a Section 404 permit is required (see 33 CFR Part 323).

(1) Structures or work are in the navigable waters of the United States if they are within limits defined in 33 CFR Part 329. Structures or work outside these limits are subject to the provisions of law cited in paragraph (a) above, if these structures or work affect the course, location, or condition of the waterbody in such a manner as to impact on the navigable capacity of the waterbody. For purposes of a Section 10 permit, a tunnel or other structure under or over a navigable water of the United States is considered to have an impact on the navigable capacity of the waterbody.

(2) Pursuant to Section 154 of the Water Resource Development Act of 1976 (PL 94-587), Department of the Army permits will not be required under Section 10 to construct wharves and piers in any waterbody, located entirely within one State, that is a navigable water of

the United States solely on the basis of its historical use to transport interstate commerce. Section 154 applies only to the construction of a single pier or wharf and not to marinas. Furthermore, Section 154 is not applicable to any pier or wharf that would cause an unacceptable impact on navigation.

(b) *Outer continental shelf.* Department of the Army permits will also be required for the construction of artificial islands and fixed structures on the outer continental shelf pursuant to Section 4(f) of the Outer Continental Shelf Lands Act (see 33 CFR 320.2(b)).

(c) *Activities of Federal agencies.* Except as specifically provided in this subparagraph, activities of the type described in (a) and (b), above, done by or on behalf of any Federal agency, other than any work or structures in or affecting navigable waters of the United States that are part of the Civil Works activities of the Corps of Engineers, are subject to the authorization procedures of this regulation. Agreement for construction or engineering services performed for other agencies by the Corps of Engineers does not constitute authorization under this regulation. Division and District Engineers will therefore advise Federal agencies accordingly, and cooperate to the fullest extent in expediting the processing of their applications.

(1) Congress has delegated to the Secretary of the Army and the Chief of Engineers in Section 10 the duty to authorize or prohibit certain work or structures in navigable waters of the United States. The general legislation by which Federal agencies are empowered to act generally is not considered to be sufficient authorization by Congress to satisfy the purposes of Section 10. If an agency asserts that it has Congressional authorization meeting the test of Section 10 or would otherwise be exempt from the provisions of Section 10, the legislative history and/or provisions of the Act should clearly demonstrate that Congress was approving the exact location and plans from which Congress could have considered the effect on navigable waters of the United States or that Congress intended to exempt that agency from the requirements of Section 10. Very often such legislation reserves final approval of plans or construction for the Chief of Engineers. In such cases evaluation and authorization under this regulation are limited by the intent of the statutory language involved.

(2) The policy provisions set out in 33 CFR 320.4(j) relating to State or local certifications and/or authorizations, do not apply to work or structures undertaken by Federal agencies, except where compliance with non-Federal authorization is required by Federal law or Executive policy.

§ 322.4 Structures and work permitted by this regulation.

The following structures or work are hereby permitted for purposes of Section 10 and do not require separate Department of the Army permits:

(a) The placement of aids to navigation by the U.S. Coast Guard; see § 322.5 (e), below;

(b) Structures constructed in artificial canals within principally residential developments where the connection of the canal to a navigable water of the United States has been previously authorized; See § 322.5(g), below;

(c) The repair, rehabilitation, or replacement of any previously authorized, currently serviceable, structure or of any currently serviceable structure constructed prior to the requirement for authorization; provided such repair, rehabilitation, or replacement does not result in a deviation from the plans of the original structure, and further provided that the structure to be maintained has not been put to uses differing from uses specified for it in any permit authorizing its original construction;

(d) Marine life harvesting devices such as pound nets, crab traps, eel pots, lobster traps, provided there is no inteference with navigation;

(e) Staff gages, tide gages, water recording devices, water quality testing and improvement devices, and similar scientific structures provided there is no interference with navigation;

(f) Survey activities including core sampling; and

(g) Structures or work completed before 18 December 1968 or in waterbodies over which the District Engineer has not asserted jurisdiction provided there is no interference with navigation.

§ 322.5 Special policies.

The Secretary of the Army has delegated to the Chief of Engineers the authority to issue or deny Section 10 permits. (See Appendix B). The following additional special policies and procedures shall also be applicable to the evaluation of permit applications under this regulation.

(a) *General.* Department of the Army permits will be required for structures or work in or affecting navigable waters of the United States. Certain structures or work specified in § 322.4 are permitted by this regulation. If a structure or work is not permitted by this regulation, an individual or general Section 10 permit will be required.

(b) *General Permits.* The District Engineer may, after compliance with the other procedures of 33 CFR Part 325, issue general permits for certain clearly described categories of structures or work, requiring Department of the Army permits. After a general permit has been issued, individual activities falling within those categories will not require individual permit processing by the procedures of 33 CFR Part 325 unless the District Engineer determines, on a case-by-case basis, that the public interest requires such individual review.

(1) District Engineers will include only those activities that are substantially similar in nature, that cause only minimal adverse environmental impact when performed separately, and that will have only a minimal adverse cumulative effect on the environment as categories which are candidates for general permits.

(2) In addition to the conditions prescribed in Appendix C of 33 CFR Part 325, any general permit issued by the District Engineer shall prescribe the following conditions:

(i) The maximum quantity of material that may be discharged and the maximum area that may be modified by structures or work that are authorized for a single or incidental operation (if applicable);

(ii) A description of the category or categories of activities included in the general permit; and

(iii) The type of water(s) into which the activity may occur.

(3) The District Engineer may require reporting procedures.

(4) A general permit may be revoked if it is determined that the cumulative effects of the activities authorized by it will have an adverse impact on the public interest provided the procedures of 33 CFR 325.7 are followed. Following revocation, application for any future activities in areas covered by the general permit shall be processed as applications for individual permits.

(c) *Non-Federal dredging for navigation.*—(1) The benefits which an authorized Federal navigation project are intended to produce will often require similar and related operations by non-Federal agencies (e.g., dredging an access channel to dock and berthing facilities or deepening such a channel to correspond to the Federal project depth). These non-Federal activities will be considered by Corps of Engineers officials in planning the construction and maintenance of Federal navigation projects and, to the maximum practical extent, will be coordinated with interested Federal, State, regional and local agencies and the general public simultaneously with the associated Federal projects. Non-Federal activities which are not so coordinated will be individually evaluated in accordance with this regulation. In evaluating the public interest in connection with applications for permits for such coordinated operations, equal treatment will, therefore, be accorded to the fullest extent possible to both Federal and non-Federal operations. Furthermore, permits for non-Federal dredging operations will contain conditions requiring the permittee to comply with the same practices or requirements utilized in connection with related Federal dredging operations with respect to such matters as turbidity, water quality, containment of material, nature and location of approved spoil disposal areas (non-Federal use of Federal contained, disposal areas will be in accordance with laws authorizing such areas and regulations governing their use), extent and period of dredging, and other factors relating to protection of environmental and ecological values.

(2) A permit for the dredging of a channel, slip, or other such project for navigation will also authorize the periodic maintenance dredging of the

project. Authority for maintenance dredging will be subject to revalidation at regular intervals to be specified in the permit. Revalidation will be in accordance with the procedures prescribed in 33 CFR 325.6. The permit, however, will require the permittee to give advance notice to the District Engineer each time maintenance dredging is to be performed. Where the maintenance dredging involves the discharge of dredged material into waters of the United States or the transportation of dredged material for the purpose of dumping in the ocean waters, the procedures in 33 CFR Parts 323 and 324 respectively shall also be followed.

(d) *Structures for small boats.* As a matter of policy, in the absence of overriding public interest, favorable consideration will generally be given to applications from riparian owners for permits for piers, boat docks, moorings, platforms and similar structures for small boats. Particular attention will be given to the location and general design of such structures to prevent possible obstructions to navigation with respect to both the public's use of the waterway and the neighboring proprietors' access to the waterway. Obstructions can result from both the existence of the structure, particularly in conjunction with other similar facilities in the immediate vicinity, and from its inability to withstand wave action or other forces which can be expected. District Engineers will inform applicants of the hazards involved and encourage safety in location, design and operation. Corps of Engineers officials will also encourage cooperative or group use facilities in lieu of individual proprietor use facilities.

(1) Letters transmitting permits for structures for small boats will, where applicable, include the following language: "Notice is hereby given that a possibility exists that the structure permitted may be subject to damage by wave wash from passing vessels. Your attention is invited to special condition _____ of the permit." The appropriate designation of the permit condition placing responsibility on the permittee and not on the United States for integrity of the structure and safety of boats moored thereto will be inserted.

(2) Floating structures for small recreational boats or other recreational purposes in lakes controlled by the Corps of Engineers under a Resources Manager are normally subject to permit authorities cited in § 322.3, above, when those waters are regarded as navigable waters of the United States. However, such structures will not be authorized under this regulation but will be regulated under applicable regulations of the Chief of Engineers published in 36 CFR 327.19 if the land surrounding those lakes is under complete Federal ownership. District Engineers will delineate those portions of the navigable waters of the United States where this provision is applicable and post notices of this designation in the vicinity of the lake Resources Manager's office.

(e) *Aids to navigation.* The placing of fixed and floating aids to navigation in a navigable water of the United States is within the purview of Section 10 of the River and Harbor Act of 1899. Furthermore, these aids are of particular interest to the U.S. Coast Guard because of their control of marking, lighting and standardization of such navigation aids. Applications for permits for installation of aids to navigation will, therefore, be coordinated with the appropriate District Commander, U.S. Coast Guard, and permits for such aids will include a condition to the effect that the permittee will conform to the requirements of the Coast Guard for marking, lighting, etc. Since most fixed and floating aids to navigation will not ordinarily significantly affect environmental values, the usual form of authorization to be used will be a letter of permission (See 33 CFR 325.1(b)).

(f) *Outer continental shelf.* Artificial islands and fixed structures located on the outer continental shelf are subject to the standard permit procedures of this regulation. Where the islands or structures are to be constructed on lands which are under mineral lease from the Bureau of Land Management, Department of the Interior, that agency, in cooperation with other Federal agencies, fully evaluates the potential effect of the leasing program on the total environment. Accordingly, the decision whether to issue a permit on lands which are under mineral lease from the Department of the Interior will be limited to an evaluation of the impact of the proposed work on navigation and national security. The public notice will so identify the criteria.

(g) *Canals and other artificial waterways connected to navigable waters of the United States.* (1) A canal or similar artificial waterway is subject to the regulatory authorities discussed in § 322.3, above, if it constitutes a navigable water of the United States, or if it is connected to navigable waters of the United States in a manner which affects their course, condition, or capacity. In all cases the connection to navigable waters of the United States requires a permit. Where the canal itself constitutes a navigable water of the United States, evaluation of the permit application and further exercise of regulatory authority will be in accordance with the standard procedures of this regulation. For all other canals the exercise of regulatory authority is restricted to those activities which affect the course, condition, or capacity of the navigable waters of the United States. Examples of the latter may include the length and depth of the canal; the currents, circulation, quality and turbidity of its waters, especially as they affect fish and wildlife values; and modifications or extensions of its configuration.

(2) The proponent of canal work should submit his application for a permit, including a proposed plan of the entire development, and the location and description of anticipated docks, piers and other similar structures which will be placed in the canal, to the District Engineer before commencing any form of work. If the connection to navigable waters of the United States has already been made without a permit, the District Engineer will proceed in accordance with 33 CFR Part 326. Where a canal connection is planned, an application for a Section 10 permit should be made at the earliest stage of planning. Where the canal construction has already begun, the District Engineer will, in writing, advise the proponent of the need for a permit to connect the canals to navigable waters of the United States. He will also ask the proponent if he intends to make such a connection and will request the immediate submission of the plans and permit application if it is so intended. The District Engineer will also advise the proponent that any work is done at the risk that, if a permit is required, it may not be issued, and and that the existence of partially completed excavation work will not be allowed to weigh favorably in evaluation of the permit application.

(h) *Facilities at the borders of the United States.* (1) The construction, operation, maintenance, or connection of facilities at the borders of the United States are subject to Executive control and must be authorized by the President, Secretary of State, or other delegated official.

(2) Applications for permits for the construction, operation, maintenance, or connection at the borders of the United States of facilities for the transmission of electric energy between the United States and a foreign country, or for the exportation or importation of natural gas to or from a foreign country, must be made to the Federal Power Commission. (Executive Order 10485, September 3, 1953, 16 U.S.C. 824(a)(e), 15 U.S.C. 717(b), and 18 CFR Parts 32 and 153).

(3) Applications for the landing or operation of submarine cables must be made to the Federal Communications Commission. (Executive Order 10530, May 10, 1954, 47 U.S.C. 34 to 39, and 47 CFR 1.766).

(4) The Secretary of State is to receive applications for permits for the construction, connection, operation, or maintenance, at the borders of the United States, of pipelines, conveyor belts, and similar facilities for the exportation or importation of petroleum products, coals, minerals, or other products to or from a foreign country; facilities for the exportation or importation of water or sewage to or from a foreign country; and monorails, aerial cable cars, aerial tramways and similar facilities for the transportation of persons or things, or both, to or from a foreign country. (Executive Order 11423, August 16, 1968.)

(5) A Department of the Army permit under Section 10 of the River and Harbor Act of 1899 is also required for all of the above facilities which affect the navigable waters of the United States, but in each case in which a permit has

been issued as provided above, the decision whether to issue the Department of the Army permit will be based primarily on factors of navigation, since the basic existence and operation of the facility will have been examined and permitted as provided by the Executive orders. Furthermore, in those cases where the construction, maintenance, or operation at the above facilities involves the discharge of dredged or fill material in waters of the United States or the transportation of dredged material for the purpose of dumping it into ocean waters, appropriate Department of the Army authorizations under Section 404 of the Federal Water Pollution Control Act or under Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972, as amended, are also required (See 33 CFR Parts 323, 324).

(i) *Power transmission lines.* (1) Permits under Section 10 of the River and Harbor Act of 1899 are required for power transmission lines crossing navigable waters of the United States unless those lines are part of a water power project subject to the regulatory authorities of the Federal Power Commission under the Federal Water Power Act of 1920. If an application is received for a permit for lines which are part of a water power project, the applicant will be instructed to submit his application to the Federal Power Commission. If the lines are not part of a water power project, the application will be processed in accordance with the procedures prescribed in this regulation.

(2) The following minimum clearances are required for aerial electric power transmission lines crossing navigable waters of the United States. These clearances are related to the clearances over the navigable channel provided by existing fixed bridges, or the clearances which would be required by the U.S. Coast Guard for new fixed bridges, in the vicinity of the proposed power line crossing. The clearances are based on the low point of the line under conditions which produce the greatest sag, taking into consideration temperature, load, wind, length or span, and type of supports as outlined in the National Electrical Safety Code.

Minimum additional clearance above clearance required for bridges

Nominal system voltage kilovolt:	*Feet* [1]
115 and below	20
138	22
161	24
230	26
350	30
500	35
700	42
750 to 765	45

[1] Above clearance required for bridges.

(3) Clearances for communication lines, stream gaging cables, ferry cables, and other aerial crossings are usually required to be a minimum of ten feet above clearances required for bridges. Greater clearances will be required if the public interest so indicates.

(j) *Seaplane operations.* (1) Structures in navigable waters of the United States associated with seaplane operations require Department of the Army permits, but close coordination with the Federal Aviation Administration (FAA), Department of Transportation, is required on such applications.

(2) The FAA must be notified by an applicant whenever he proposes to establish or operate a seaplane base. The FAA will study the proposal and advise the applicant, District Engineer, and other interested parties as to the effects of the proposal on the use of airspace. The District Engineer will therefore refer any objections regarding the effect of the proposal on the use of airspace to the FAA, and give due consideration to their recommendations when evaluating the general public interest.

(3) If the seaplane base will serve air carriers licensed by the Civil Aeronautics Board, the applicant must receive an airport operating certificate from the FAA. That certificate reflects determination and conditions relating to the installation operation, and maintenance of adequate air navigation facilities and safety equipment. Accordingly, the District Engineer may, in evaluating the general public interest, consider such matters to have been primarily evaluated by the FAA.

(k) *Foreign Trade Zones.* The Foreign Trade Zones Act (48 Stat. 998–1003, 19 U.S.C. 81a to 81u, as amended) authorizes the establishment of foreign-trade zones in or adjacent to United States ports of entry under terms of a grant and regulations prescribed by the Foreign-Trade Zones Board. Pertinent regulations are published in 15 CFR Part 400. The Secretary of the Army is a member of the Board, and construction of a zone is under the supervision of the District Engineer. Laws governing the navigable waters of the United States remain applicable to foreign-trade zones, including the general requirements of this regulation. Evaluation by a District Engineer of a permit application may give recognition to the consideration by the Board of the general economic effects of the zone on local and foreign commerce, general location of wharves and facilities, and other factors pertinent to construction, operation, and maintenance of the zone.

APPENDIX A—U.S COAST GUARD/CHIEF OF ENGINEERS, MEMORANDUM OF AGREEMENT

1. PURPOSE AND AUTHORITY

A. The Department of Transportation Act, the Act of October 15, 1966, P.L. 89–670, transferred to and vested in the Secretary of Transportation certain functions, powers and duties previously vested in the Secretary of the Army and the Chief of Engineers. By delegation of authority from the Secretary of Transportation (49 CFR 1.46(c)) the Commandant, U.S. Coast Guard, has been authorized to exercise certain of these functions, powers and duties relating to bridges and causeways conferred by:

(1) The following provision of law relating generally to drawbridge operating regulations: Section 5 of the Act of August 18, 1894, as amended (28 Stat. 362; 33 U.S.C. 499);

(2) The following law relating generally to obstructive bridges: The Act of June 21, 1940, as amended (The Truman-Hobbs Act) (54 Stat. 497; 33 U.S.C. 511 et seq.);

(3) The following laws and provisions of law to the extent that they relate generally to the location and clearances of bridges and causeways in the navigable waters of the United States:

(a) Section 9 of the Act of March 3, 1899, as amended (30 Stat. 1151; 33 U.S.C. 401);

(b) The Act of March 23, 1906, as amended (34 Stat. 84; 33 U.S.C. 491 et seq.); and

(c) The General Bridge Act of 1946, as amended (60 Stat. 847; 33 U.S.C. 525 et seq.) except Sections 502(c) and 503.

B. The Secretary of the Army and The Chief of Engineers continue to be vested with broad and important authorities and responsibilities with respect to navigable waters of the United States, including, but not limited to, jurisdiction over excavation and filling, design flood flows and construction of certain structures in such waters, and the prosecution of waterway improvement projects.

C. The purposes of this agreement are:

(1) To recognize the common and mutual interest of the Chief and Engineers and the Commandant, U.S. Coast Guard, in the orderly and efficient administration of their respective responsibilities under certain Federal statutes to regulate certain activities in navigable waters of the United States;

(2) To clarify the areas of jurisdiction and the responsibilities of the Corps of Engineers and the Coast Guard with respect to:

(a) The alteration of bridges,

(1) In connection with Corps of Engineers waterway improvement projects, and

(2) Under the Truman-Hobbs Act;

(b) The construction, operation and maintenance of bridges and causeways as distinguished from other types of structures over or in navigable waters of the United States;

(c) The closure of waterways and the restriction of passage through or under bridges in connection with their construction, operation, maintenance and removal; and

(d) The selection of an appropriate design flood flow for flood hazard analysis of any proposed water opening.

(3) To provide for coordination and consultation on projects and activities in or affecting the navigable waters of the United States.

In furtherance of the above purposes the undersigned do agree upon the definitions, policies and procedures set forth below.

2. ALTERATION OF BRIDGES IN OR ACROSS NAVIGABLE WATERS WITHIN CORPS OF ENGINEERS PROJECTS

A. The Chief of Engineers agrees to advise and consult with the Commandant on navigation projects contemplated by the Corps of Engineers which require the alteration of bridges across the waterways involved in such projects. The Chief of Engineers also agrees to include in such project proposals the costs of alterations, exclusive of betterments, of all bridges within the limits of the designated project which after consultation with the Commandant he determines to require alteration to meet the needs of existing and prospective navigation. Under this concept the federal costs would be furnished under the project.

B. The Commandant of the Coast Guard agrees to undertake all actions and assumes all responsibilities essential to the determination of navigational requirements for horizontal and vertical clearances of bridges across navigable waters necessary in connection with any navigation project by the Chief of Engineers. Further, the Commandant agrees to conduct all public proceedings necessary thereto and establish guide clearance criteria where needed for the project objectives.

3. ALTERATION OF BRIDGES UNDER THE TRUMAN-HOBBS ACT

The Commandant of the Coast Guard acknowledges and affirms the responsibility of the Coast Guard, under the Truman-Hobbs Act, to program and fund for the alteration of bridges which, as distinct from project related alterations described in paragraph 2 herein, become unreasonable obstructions to navigation as a result of factors or changes in the character of navigation and this agreement shall in no way affect, impair or modify the powers or duties conferred by that Act.

4. APPROVAL, ALTERATION AND REMOVAL OF OTHER BRIDGES AND CAUSEWAYS

A. *General Definitions.* For purposes of this Agreement and the administration of the statutes cited in 1.A.(3) above, a "bridge" is any structure over, on or in the navigable waters of the United States which (1) is used for the passage or conveyance of persons, vehicles, commodities and other physical matter and (2) is constructed in such a manner that either the horizontal or vertical clearance, or both, may affect the passage of vessels or boats through or under the structure. This definition includes, but is not limited to, highway bridges, railroad bridges, foot bridges, aqueducts, aerial tramways and conveyors, overhead pipelines and similar structures of like function together with their approaches, fenders, pier protection systems, appurtenances and foundations. This definition does not include aerial power transmission lines, tunnels, submerged pipelines and cables, dams, dikes, dredging and filling in, wharves, piers, breakwaters, bulkheads, jetties and similar structures and works (except as they may be integral features of a bridge and used in its construction, maintenance, operation or removal; or except when they are affixed to the bridge and will have an effect on the clearances provided by the bridge) over which jurisdiction remains with the Department of the Army and the Corps of Engineers under Sections 9 and 10 of the Act of March 3, 1899, as amended (33 U.S.C. 401 and 403). A "causeway" is a raised road across water or marshy land, with the water or marshy land on both sides of the road, and which is constructed in or affects navigation, navigable waters and design flood flows.

B. *Combined Structures and Appurtenances.* For purposes of the Acts cited in 1.A.(3) above, a structure serving more than one purpose and having characteristics of either a bridge or causeway, as defined in 4.A., and some other structure, shall be considered as a bridge or causeway when the structure in its entirety, including its appurtenances and incidental features, has or retains the predominant characteristics and purpose of a bridge or causeway. A structure shall not be considered a bridge or causeway when its primary and predominant characteristics and purpose are other than those set forth above and it meets the general definitions above only in a narrow technical sense as a result of incidental features. This interpretation is intended to minimize the number of instances which will require an applicant for a single project to secure a permit or series of permits from both the Department of Transportation and the Department of the Army for each separate feature or detail of the project when it serves, incidentally to its primary purpose, more than one purpose and has features of either a bridge or causeway and features of some other structure. However, if parts of the project are separable and can be fairly and reasonably characterized or classified in an engineering sense as separate structures, each such structure will be so treated and considered for approval by the agency having jurisdiction thereover.

C. *Alteration of the Character of Bridges and Causeways.* The jurisdiction of the Secretary of Transportation and the Coast Guard over bridges and causeways includes authority to approve the removal of such structures when the owners thereof desire to discontinue their use. If the owner of a bridge or causeway discontinues its use and wishes to remove or alter any part thereof in such a manner that it will lose its character as a bridge or causeway, the Coast Guard will normally require removal of the structure from the waterway in its entirety. However, if the owner of a bridge or a causeway wishes to retain it in whole or in part for use other than for operation and maintenance as a bridge or causeway, the proposed structure will be considered as coming within the jurisdiction of the Corps of Engineers. The Coast Guard will refer requests for such uses to the Corps of Engineers for consideration. The Corps of Engineers agrees to advise the Commandant of the receipt of an application for approval of the conversion of a bridge or causeway to another structure and to provide opportunity for comment thereon. If the Corps of Engineers approves the conversion of a bridge or causeway to another structure, no residual jurisdiction over the structure will remain with the Coast Guard. However, if the Corps of Engineers does not approve the proposed conversion, then the structure remains a bridge subject to the jurisdiction of the Coast Guard.

5. CLOSURE OF WATERWAYS AND RESTRICTION OF PASSAGE THROUGH OR UNDER BRIDGES

Under the statutes cited in Section 1 of this Memorandum of Agreement, the Commandant must approve the clearances to be made available for navigation through or under bridges. It is understood that this duty and authority extends to and may be exercised in connection with the construction, alteration, operation, maintenance and removal of bridges, and includes the power to authorize the temporary restriction of passage through or under a bridge by use of falsework, piling, floating equipment, closure of draws, or any works or activities which temporary reduce the navigation clearances and design flood flows, including closure of any or all spans of the bridge. Moreover, under the Ports and Waterways Safety Act of 1972, Public Law 92-340, 86 Stat. 424, the Commandant exercises broad powers in waterways to control vessel traffic in areas he determines to be especially hazardous and to establish safety zones or other measures for limited controls or conditional access and activity when necessary to prevent damage to or the destruction or loss of, any vessel, bridge, or other structure on or in the navigable waters of the United States. Accordingly, in the event that work in connection with the construction, alteration or repair of a bridge or causeway is of such a nature that for the protection of life and property navigation through or in the vicinity of the bridge or causeway must be temporarily prohibited, the Coast Guard may close that part of the affected waterway while such work is being performed. However, it is also clear that the Secretary of the Army and the Chief of Engineers have the authority, under Section 4 of the Act of August 18, 1894, as amended, (33 U.S.C. 1) to prescribe rules for the use, administration and navigation of the navigable waters of the United States. In recognition of that authority, and pursuant to Section 102(c) of the Ports and Waterways Safety Act, the Coast Guard will consult with the Corps of Engineers when any significant restriction of passage through or under a bridge is contemplated to be authorized or a waterway is to be temporarily closed.

6. COORDINATION AND COOPERATION PROCEDURES

A. District Commanders, Coast Guard Districts, shall send notices of applications for permits for bridge or causeway construction, modification, or removal to the Corps of Engineers Divisions and Districts in which the bridge or causeway is located.

B. District Engineers, Corps of Engineers, shall send notices of applications for permits for other structures or dredge and fill work to local Coast Guard District Commanders.

C. In cases where proposed structures or modifications of structures do not clearly fall within one of the classifications set forth in paragraph 4.A. above, the application will be forwarded with recommendations of the reviewing officers through channels to the Chief of Engineers and the Commandant of the Coast Guard who shall, after mutual consultation, attempt to resolve the questions.

D. If the above procedures fail to produce agreement, the application will be forwarded to the Secretary of the Army and Secretary of Transportation for their determination.

E. The Chief of Engineers and the Commandant, Coast Guard pledge themselves to mutual cooperation and consultation in making available timely information and data, seeking uniformity and consistency among field offices, and providing timely and adequate review of all matters arising in connection with the administration of their responsibilities governed by the Acts cited herein.

Dated: March 21, 1973.

C. R. BENDER.

Dated: April 18, 1973.

F. J. CLARKE.

APPENDIX B—DELEGATION OF AUTHORITY TO ISSUE OR DENY PERMITS FOR CONSTRUCTION OR OTHER WORK AFFECTING NAVIGABLE WATERS OF THE UNITED STATES

MAY 24, 1971.

Pursuant to the authority vested in me by the Act of March 3, 1899, c.425, Sections 10 and 14, 30 Stat. 1151, 1152, 33 U.S.C. Sections 403 and 408, and the Act of June 13, 1902, c.1079, Section 1, 32 Stat. 371, 33 U.S.C. Section 565, I hereby authorize the Chief of Engineers and his authorized representatives to issue or deny permits for construction or other work affecting navigable waters of the United States. Except in cases involving applications for permits for artificial islands or fixed structures on Outer Continental Shelf lands under mineral lease from the Department of the Interior, the Chief of Engineers shall, in exercising such authority, evaluate the impact of the proposed work on the public interest. In cases involving applications for permits for artificial islands or fixed structures on Outer Continental Shelf lands under mineral lease from the Department of the Interior, the Chief of Engineers shall, in exercising such authority, evaluate the impact of the proposed work on navigation and national security. The permits so granted may be made subject to such special conditions as the Chief of Engineers or his authorized representatives may consider necessary in order to effect the purposes of the above Acts.

The Chief of Engineers and his authorized representatives shall exercise the authority hereby delegated subject to such conditions as I or my authorized representative may from time to time impose.

STANLEY R. RESOR,
Secretary of the Army.

PART 323—PERMITS FOR DISCHARGES OF DREDGED OR FILL MATERIAL INTO WATERS OF THE UNITED STATES

Sec.

AUTHORITY: 33 U.S.C. 1344.

§ 323.1 General.

This regulation prescribes, in addition to the general policies of 33 CFR 320.4 and procedures of 33 CFR Part 325, those special policies, practices, and procedures to be followed by the Corps of Engineers in connection with the review of applications for Department of the Army permits to authorize the discharge of dredged or fill material into waters of the United States pursuant to Section 404 of the Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. 1344) (hereinafter referred to as Section 404). See 33 CFR 320.2(g). Certain discharges of dredged or fill material into waters of the United States are also regulated under other authorities of the Department of the Army. These include dams and dikes in navigable waters of the United States pursuant to Section 9 of the River and Harbor Act of 1899 (33 U.S.C. 401; see 33 CFR 321) and structures or work in or affecting navigable waters of the United States pursuant to Section 10 of the River and Harbor Act of 1899 (33 U.S.C. 403; see 33 CFR 322). A Department of the Army permit will also be required under these additional authorities if they are applicable to activities involving discharges of dredged or fill material into waters of the United States. Applicants for Department of the Army permits under this Part should refer to the other cited authorities and implementing regulations for these additional permit requirements to determine whether they also are applicable to their proposed activities.

§ 323.2 Definitions.

For the purpose of this regulation, the following terms are defined:

(a) The term "waters of the United States" means: [1]

(1) The territorial seas with respect to the discharge of fill material. (The transportation of dredged material by vessel for the purpose of dumping in the oceans, including the territorial seas, at an ocean dump site approved under 40 CFR 228 is regulated by Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972, as amended (33 USC 1413). See 33 CFR 324. Discharges of dredged or fill material into the territorial seas are regulated by Section 404.);

(2) Coastal and inland waters, lakes, rivers, and streams that are navigable waters of the United States, including adjacent wetlands;

(3) Tributaries to navigable waters of the United States, including adjacent wetlands (manmade nontidal drainage and irrigation ditches excavated on dry land are not considered waters of the United States under this definition).

(4) Interstate waters and their tributaries, including adjacent wetlands; and

(5) All other waters of the United States not identified in paragraphs (1)–(4) above, such as isolated wetlands and lakes, intermittent streams, prairie potholes, and other waters that are not part of a tributary system to interstate waters or to navigable waters of the United States, the degradation or destruction of which could affect interstate commerce.[2]

The landward limit of jurisdiction in tidal waters, in the absence of adjacent wetlands, shall be the high tide line and the landward limit of jurisdiction an all other waters, in the absence of adjacent wetlands, shall be the ordinary high water mark.

(b) The term "navigable waters of the United States" means those waters of the United States that are subject to the ebb and flow of the tide shoreward to the mean high water mark (mean higher high water mark on the Pacific coast) and/or are presently used, or have been used in the past, or may be susceptible to use to transport interstate or foreign commerce. (See 33 CFR 329 for a more complete definition of this term.)

(c) The term "wetlands" means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.

(d) The term "adjacent" means bordering, contiguous, or neighboring. Wetlands separated from other waters of the United States by man-made dikes or barriers, natural river berms, beach dunes and the like are "adjacent wetlands."

(e) The term "natural lake" means a standing body of open water that occurs in a natural depression fed by one or more streams and from which a stream may flow, that occurs due to the widening or natural blockage of a river or stream, or that occurs in an isolated natural depression that is not a part of a surface river or stream

(f) The term "impoundment" means a standing body of open water created by artificially blocking or restricting the flow of a river, stream, or tidal area. As used in this regulation, the term does not include artificial lakes or ponds created by excavating and/or diking dry land to collect and retain water for such purposes as stock watering, irrigation, settling basins. cooling, or rice growing.

(g) The term "ordinary high water mark" means the line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank; shelving; changes in the character of soil; destruction of terrestrial vegetation; the presence of litter and debris; or other appropriate means that consider the characteristics of the surrounding areas.

(h) The term "high tide line" means a line or mark left upon tide flats, beaches, or along shore objects that indicates the intersection of the land with the water's surface at the maximum height reached by a rising tide. The mark may be determined by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gages, or other suitable means that delineate the general height reached by a rising tide. The term includes spring high tides and other high tides that occur with periodic frequency, but does not include storm surges in which there is a departure from the normal or predicted reach of the tide due to the piling up of water against a coast

[1] The terminology used by the FWPCA is "navigable waters" which is defined in Section 502(7) of the Act as "waters of the United States including the territorial seas." For purposes of clarity, and to avoid confusion with other Corps of Engineers regulatory programs, the term "waters of the United States" is used throughout this regulation.

[2] In defining the jurisdiction of the FWPCA as the "waters of the United States," Congress, in the legislative history to the Act, specified that the term "be given the broadest constitutional interpretation unencumbered by agency determinations which would have been made or may be made for administrative purposes." The waters listed in paragraphs (a)(1)–4 fall within this mandate as discharges into those waterbodies may seriously affect water quality, navigation, and other Federal interests; however, it is also recognized that the Federal government would have the right to regulate the waters of the United States identified in paragraph (a)(5) under this broad Congressional mandate to fulfill the objective of the Act: "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters" (Section 101(a)). Paragraph (a)(5) incorporates all other waters of the United States that could be regulated under the Federal government's Constitutional powers to regulate and protect interstate commerce, including those for which the connection to interstate commerce may not be readily obvious or where the location or size of the waterbody generally may not require regulation through individual or general permits to achieve the objective of the Act. Discharges of dredged or fill material into waters of the United States identified in paragraphs (a)(1)–(4) will generally require individual or general permits unless those discharges occur beyond the headwaters of a river or stream or in natural lakes less than 10 acres in surface area. Discharges into these latter waters and into most of the waters identified in paragraph (a)(5) will be permitted by this regulation, subject to the provisions listed in paragraph 323.4–2(b) unless the District Engineer develops information, on a case-by-case basis, that the concerns for the aquatic environment as expressed in the EPA Guidelines (40 CFR 230) require regulation through an individual or general permit. (See 323.4–4).

by strong winds such as those accompanying a hurricane or other intense storm.

(i) The term "headwaters" means the point on a non-tidal stream above which the average annual flow is less than five cubic feet per second.[2] The District Engineer may estimate this point from available data by using the mean annual area precipitation, area drainage basin maps, and the average runoff coefficient, or by similar means.

(j) The term "primary tributaries" means the main stems of tributaries directly connecting to navigable waters of the United States up to their headwaters, and does not include any additional tributaries extending off of the main stems of these tributaries.

(k) The term "dredged material" means material that is excavated or dredged from waters of the United States.

(l) The term "discharge of dredged material" means any addition of dredged material into the waters of the United States. The term includes, without limitation, the addition of dredged material to a specified disposal site located in waters of the United States and the runoff or overflow from a contained land or water disposal area. Discharges of pollutants into waters of the United States resulting from the onshore subsequent processing of dredged material that is extracted for any commercial use (other than fill) are not included within this term and are subject to Section 402 of the Federal Water Pollution Control Act even though the extraction and deposit of such material may require a permit from the Corps of Engineers. The term does not include plowing, cultivating, seeding and harvesting for the production of food, fiber, and forest products.

(m) The term "fill material" means any material used for the primary purpose of replacing an aquatic area with dry land or of changing the bottom elevation of a waterbody. The term does not include any pollutant discharged into the water primarily to dispose of waste, as that activity is regulated under Section 402 of the Federal Water Pollution Control Act Amendments of 1972.

(n) The term "discharge of fill material" means the addition of fill material into waters of the United States. The term generally includes, without limitation, the following activities: Placement of fill that is necessary to the construction of any structure in a water of the United States; the building of any structure or impoundment requiring rock, sand, dirt, or other material for its construction; site-development fills for recreational, industrial, commercial, residential, and other uses; causeways or road fills; dams and dikes; artificial islands; property protection and/or reclamation devices such as riprap, groins, seawalls, breakwaters, and revetments; beach nourishment; levees; fill for structures such as sewage treatment facilities, intake and outfall pipes associated with power plants and subaqueous utility lines; and artificial reefs. The term does not include plowing, cultivating, seeding and harvesting for the production of food, fiber, and forest products.

(o) The term "individual permit" means a Department of the Army authorization that is issued following a case-by-case evaluation of a specific project involving the proposed discharge(s) in accordance with the procedures of this regulation and 33 CFR 325 and a determination that the proposed discharge is in the public interest pursuant to 33 CFR Part 320.

(p) The term "general permit" means a Department of the Army authorization that is issued for a category or categories of discharges of dredged or fill material that are substantially similar in nature and that cause only minimal individual and cumulative adverse environmental impact. A general permit is issued following an evaluation of the proposed category of discharges in accordance with the procedures of this regulation (§ 323.3(c)), 33 CFR Part 325, and a determination that the proposed discharges will be in the public interest pursuant to 33 CFR Part 320.

(q) The term "nationwide permit" means a Department of the Army authorization that has been issued by this regulation in § 323.4 to permit certain discharges of dredged or fill material into waters of the United States throughout the Nation.

§ 323.3 Discharges requiring permits.

(a) *General.* Department of the Army permits will be required for the discharge of dredged or fill material into waters of the United States. Certain discharges specified in §§ 323.4–1, 323.4–2 and 323.4–3 are permitted by this regulation. If a discharge of dredged or fill material is not permitted by this regulation, an individual or general Section 404 permit will be required for the discharge of dredged or fill material into waters of the United States in accordance with the following phased schedule:

(1) Before July 25, 1975, discharges into navigable waters of the United States.

(2) After July 25, 1975, discharges into navigable waters of the United States and adjacent wetlands.

(3) After September 1, 1976, discharges into navigable waters of the United States and their primary tributaries, including adjacent wetlands, and into natural lakes, greater than 5 acres in surface area. (See also § 323.4–2 for discharges that are permitted by this regulation.)

(4) After July 1, 1977, discharges into all waters of the United States. (See also § 323.4–2 for discharges that are permitted by this regulation.)

(b) *Individual permits.* Unless permitted by this regulation (§§ 323.4–1, 323.4–2 and 323.4–3) or authorized by general permits (§ 323.3(c)), the discharge of dredged or fill material into waters of the United States will require an individual Department of the Army permit issued in accordance with the policies in § 320.4 and procedures in 33 CFR Part 325.

(c) *General permits.* The District Engineer may, after compliance with the other procedures of 33 CFR Part 325, issue general permits for certain clearly described categories of structures or work, including discharges of dredged or fill material, requiring Department of the Army permits. After a general permit has been issued, individual activities falling within those categories will not require individual permit processing by the procedures of 33 CFR Part 325 unless the District Engineer determines, on a case-by-case basis, that the public interest requires individual review.

(1) District Engineers will include only those activities that are substantially similar in nature, that cause only minimal adverse environmental impact when performed separately, and that will have only a minimal adverse cumulative effect on the environment as categories which are candidates for general permits.

(2) The District Engineer shall include appropriate conditions as specified in Appendix C of 33 CFR Part 325 in each general permit and shall prescribe the following additional conditions:

(i) The maximum quantity of material that may be discharged and the maximum area that may be modified by a single or incidental operation (if applicable);

(ii) A description of the category or categories of activities included in the general permit; and

(iii) The type of water(s) into which the activity may occur.

(3) The District Engineer may require reporting procedures.

(4) A general permit may be revoked if it is determined that the effects of the activities authorized by it will have an adverse impact on the public interest provided the procedures of 33 CFR 325.7 are followed. Following revocation, applications for future activities in areas covered by the general permit shall be processed as applications for individual permits.

(d) *Activities of Federal agencies.* (1) Discharges of dredged or fill material into waters of the United States done by or on behalf of any Federal agency, or instrumentality other than the Corps of Engineers, are subject to the authorization procedures of this regulation. Agreement for construction or engineering services performed for other agencies by the Corps of Engineers does not constitute authorization under the regulation. Division and District Engineers will therefore advice Federal agencies and instrumentalities accordingly and cooperate to the fullest extent in the expeditious processing of their applications.

(2) The policy provisions set out in 33 CFR 320.4(j), relating to State or local authorizations, do not apply to discharges of dredged or fill material into

[2] For streams that are dry during long periods of the year, District Engineers, after notifying the Regional Administrator of EPA, may establish the headwater point as that point on the stream where a flow of five cubic feet per second is equaled or exceeded 50 percent of the time. The District Engineer shall notify the Regional Administrator of his determination of these headwater points.

waters of the United States undertaken by Federal agencies, except where compliance with non-Federal authorization is required by Federal law or Executive policy. Federal agencies are required to comply with the appropriate State, interstate and local water-quality standards and effluent limitations as are applicable by law that are adopted in accordance with or effective under the provisions of the Federal Water Pollution Control Act, as amended; in the design, construction, management, operation, and maintenance of their respective facilities. (See Executive Order No. 11752, dated 17 Dec. 73). They are not required, however, to provide certification of compliance with effluent limitations and water-quality standards from State or interstate water pollution control agencies in connection with activities involving discharges into waters of the United States.

(e) *Activities licensed under the Federal Power Act of 1920.* Any part of a structure or work licensed by the Federal Power Commission that involves the discharge of dredged or fill material into waters of the United States shall require a Department of the Army authorization under this regulation.

§ 323.4 Discharges permitted by this regulation.

(a) *General.* Discharges of dredged or fill material specified in §§ 323.4–1, 323.4–2 and 323.4–3, below, are hereby permitted for purposes of Section 404 without further processing under this regulation (individual applications are not needed), except as provided in § 323.4–4 below. Permits may, however, be required under Section 10 of the River and Harbor Act of 1899 (see 33 CFR 322). Sections 323.4–1, 323.4–2, and 323.4–3 do not obviate the requirement to obtain State or local assent required by law for the activities permitted therein.

(b) *Management practices.* In addition to the conditions specified in §§ 323.4–2(b) and 323.4–3(b), the following management practices should be followed, to the maximum extent practicable, in the discharge of dredged or fill material permitted by §§ 323.4–2 and 324.4–3 to minimize the adverse effects of these discharges on the aquatic environment:

(1) Discharges of dredged or fill material into waters of the United States should be avoided or minimized through the use of other practical alternatives;

(2) Discharges in spawning areas during spawning seasons should be avoided;

(3) Discharges should not restrict or impede the movement of aquatic species indigenous to the waters or the passage of normal or expected high flows or cause the relocation of the waters (unless the primary purpose of the fill is to impound waters);

(4) If the discharge creates an impoundment water, adverse impacts on the aquatic system caused by the accelerated passage of water and/or the restriction of its flow, should by minimized;

(5) Discharges in wetlands areas should be avoided;

(6) Heavy equipment working in wetlands should be placed on mats;

(7) Discharges into breeding and nesting areas for migratory waterfowl should be avoided; and

(8) All temporary fills should be removed in their entirety.

§ 323.4–1 Discharges prior to effective dates of phasing.

(a) Discharges of dredged or fill material in waters of the United States that occur before the phase-in dates specified in § 323.3(a)(2)–(4) above are hereby permitted for purposes of Section 404, provided the conditions in paragraph (c) below are met.

(b) Discharges of dredged or fill material of less than 500 cubic yards into waters other than navigable waters of the United States (see 33 CFR 329) that are part of an activity that was commenced before July 25, 1975, that were completed by January 25, 1976, and that involve a single and complete project and not a number of projects associated with a complete development plan are hereby permitted for purposes of Section 404, provided the conditions in paragraph (c) below are met. The term "commenced" as used herein shall be satisfied if there has been, before July 25, 1975, some discharge of dredged or fill material as a part of the above activity or an entering into of a written contractual obligation to have the dredged or fill material discharged at a designated disposal site by a contractor.

(c) For the purposes of Section 404, the following conditions must have been satisfied for the discharges occurring before the dates specified in paragraph (a) and (b) above:

(1) That the discharge was not located in the proximity of a public water intake;

(2) That the discharge did not contain unacceptable levels of pathogenic organisms in areas used for recreation involving physical contact with the water;

(3) That the discharge did not occur in areas of concentrated shellfish production; and

(4) That the discharge did not destroy or endanger the critical habitat or a threatened or endangered species, as identified under the Endangered Species Act.

§ 323.4–2 Discharges into certain waters of the United States.

(a) Discharges of dredged or fill material into the following waters of the United States are hereby permitted for purposes of Section 404, provided the conditions in paragraph (b) below are met:

(1) Non-tidal rivers, streams and their impoundments including adjacent wetlands that are located above the headwaters;

(2) Natural lakes, including their adjacent wetlands, that are less than 10 acres in surface area and that are fed or drained by a river or stream above the headwaters. In the absence of adjacent wetlands, the surface area of a lake shall be determined at the ordinary high water mark;

(3) Natural lakes, including their adjacent wetlands, that are less than 10 acres in surface area and that are isolated and not a part of a surface river or stream. In the absence of adjacent wetlands, the surface area of a lake shall be determined at the ordinary high water mark; and

(4) Other non-tidal waters of the United States other than isolated lakes larger than 10 acres (see (3) above) that are not part of a surface tributary system to interstate waters or navigable waters of the United States (see § 323.2 (a)(5)).

(b) For purposes of Section 404, the following conditions must be satisfied for any discharge of dredged or fill material in waters described in paragraph (a), above:

(1) That the discharge will not destroy a threatened or endangered species as identified under the Endangered Species Act, or endanger the critical habitat of such species;

(2) That the discharge will consist of suitable material free from toxic pollutants in other than trace quantities;

(3) That the fill created by the discharge will be properly maintained to prevent erosion and other non-point sources of pollution; and

(4) That the discharge will not occur in a component of the National Wild and Scenic Rivers System or in a component of a State wild and scenic river system.

§ 323.4–3 Specific categories of discharges.

(a) The following discharges of dredged or fill material into waters of the United States are hereby permitted for purposes of Section 404, provided the conditions specified in this paragraph and paragraph (b) below are met:

(1) Dredged or fill material placed as backfill or bedding for utility line crossings provided there is no change in preconstruction bottom contours (excess material must be removed to an upland disposal area). A "utility line" is defined as any pipe or pipeline for the transportation of any gaseous, liquid, liquifiable, or slurry substance, for any purpose, and any cable, line, or wire for the transmission for any purpose of electrical energy, telephone and telegraph messages, and radio and television communication. (The utility line will require a Section 10 permit if in navigable waters of the United States. See 33 CFR Part 322.);

(2) Material discharged for bank stabilization, provided that the bank stabilization activity is less than 500 feet in length, is necessary for erosion prevention, and is limited to less than an average of one cubic yard per running foot along the bank, provided further that no material for bank stabilization is placed in any wetland area, and provided further that no material is placed in any locality or in any manner so as to impair surface water flow into or out of any wetland area. (This activity will require a Section 10 permit if in navigable waters of the United States. See 33 CFR part 322.);

(3) Minor road crossing fills including all attendant features both temporary and permanent that are part of a single and complete crossing of a nontidal waterbody, provided that the crossing is culverted or bridged to prevent the restriction of expected high flows and provided further that discharges into any wetlands adjacent to the waterbody do not extend beyond 100 feet on either side of the ordinary high water mark of that waterbody. A "minor road crossing fill" is defined as a crossing that involves the discharge of less than 200 cubic yards of fill material below the plane of ordinary high water. The crossing will require a permit from the US Coast Guard if located in navigable waters of the United States (see 33 USC 401);

(4) Fill placed incidental to the construction of bridges across tidal waters including cofferdams, abutments, foundation seals, piers, and temporary construction and access fills. Approach fills and causeways are not included in this permit and will require an individual or general Section 404 permit if located in waters of the United States; these fills as well as the bridge itself will also require a permit from the U.S. Coast Guard; and

(5) The repair, rehabilitation or replacement of any previously authorized, currently serviceable fill, or of any currently serviceable fill discharged prior to the requirement for authorization; provided such repair, rehabilitation or replacement does not result in a deviation from the specifications of the original work, and further provided that the fill to be maintained has not been put to uses differing from uses specified for it in any permit authorizing its original construction.

(b) For the purposes of Section 404, the following conditions must be satisfied prior to any discharge of dredged or fill material associated with the activities described above:

(1) That the discharge will not be located in the proximity of a public water supply intake;

(2) That the discharge will not occur in areas of concentrated shellfish production;

(3) That the discharge will not destroy a threatened or endangered species as identified under the Endangered Species Act, or endanger the critical habitat of such species;

(4) That the discharge will not disrupt the movement of those species of aquatic life indigenous to the waterbody;

(5) That the discharge will consist of suitable material free from toxic pollutants in other than trace quantities;

(6) That the fill created by the discharge will be properly maintained to prevent erosion and other non-point sources of pollution; and

(7) That the discharge will not occur in a component of the National Wild and Scenic River System or in a component of a State wild and scenic river system.

§ 323.4–4 Discretionary authority to require individual or general permits.

Notwithstanding the provisions of §§ 323.4–1, 323.4–2 and 323.4–3, above, the procedures of this regulation and 33 CFR Part 325, including those pertaining to individual and general permits, shall apply to any discharge(s) of dredged or fill material if the District Engineer determines that the concerns of the aquatic environment, as expressed in the guidelines (see 40 CFR Part 230) indicate the need for such action because of individual and/or cumulative adverse impacts to the affected waters. In such cases, he shall take such steps as are necessary to notify persons who would be affected by such action. If the Regional Administrator, EPA, advises the District Engineer that the concerns for the aquatic environment as expressed in the Section 404(b) Guidelines require assertion of jurisdiction under § 323.4–4, and the District Engineer and Division Engineer disagree, the Office of the Chief of Engineers (DAEN–CWO–N and DAEN–CCH) shall be notified for further coordination and resolution with the Administrator.

§ 323.5 Special policies and procedures.

The Secretary of the Army has delegated to the Chief of Engineers the authority to issue or deny Section 404 permits. (See Appendix A.) The following additional special procedures shall also be applicable to the evaluation of permit applications under this regulation:

(a) *EPA Guidelines.* Applications for permits for the discharge of dredged or fill material into waters of the United States will be reviewed in accordance with guidelines promulgated by the Administrator, EPA, under authority of Section 404(b) of the Federal Water Pollution Control Act. (See 40 CFR Part 230.) If the EPA guidelines alone prohibit the designation of a proposed disposal site, the economic impact on navigation and anchorage of the failure to authorize the use of the proposed disposal site will also be considered in evaluating whether or not the proposed discharge is in the public interest.

(b) *Coordination with EPA.* Prior to actual issuance of permits for the discharge of dredged or fill material in waters of the United States, Corps of Engineers officials will advise appropriate Regional Administrators, EPA, of the intent to issue permits to which EPA has objected, recommended conditions, or for which significant changes are proposed. If the Regional Administrator advises, within fifteen days of the advice of the intent to issue, that he objects to the issuance of the permits, the case will be forwarded to the Chief of Engineers in accordance with 33 CFR 325.11 for further coordination with the Administrator, EPA, and decision. The report forwarding the case will contain an analysis of the economic impact on navigation and anchorage that would occur by failing to authorize the use of a proposed disposal site, and whether there are other economically feasible methods or sites available other than those to which the Regional Administrator objects.

Appendix A.—Deletion of Authority To Issue or Deny Permits for the Discharge of Dredged or Fill Material Into Navigable Waters

March 12, 1973.

Pursuant to the authority vested in me by Section 404 of the Federal Water Pollution Control Act Amendments of 1972, 86 Stat. 816, P.L. 92–500, I hereby authorize the Chief of Engineers and his authorized representatives to issue or deny permits, after notice and opportunity for public hearings, for the discharge of dredged or filled material into navigable waters at specified disposal sites. The Chief of Engineers shall, in exercising such authority, evaluate the impact of the proposed discharge on the public interest. All permits issued shall specify a disposal site for the discharge of the dredged or fill material through the application of guidelines developed by the Administrator of the Environmental Protection Agency and myself. In those cases where these guidelines would prohibit the specification of a disposal site, the Chief of Engineers, in his evaluation of whether the proposed discharge is in the public interest, is authorized also to consider the economic impact on navigation and anchorage which would occur by failing to authorize the use of a proposed disposal site. The permits so granted may be made subject to such special conditions as the Chief of Engineers or his authorized representatives may consider necessary in order to effect the purposes of the above Act, other pertinent laws and any applicable memoranda of understanding between the Secretary of the Army and heads of other governmental agencies.

The Chief of Engineers and his authorized representative shall exercise the authority hereby delegated subject to such conditions as I or my authorized representative may from time to time impose.

Kenneth E. Belieu,
Acting Secretary of the Army.

PART 324—PERMITS FOR OCEAN DUMPING OF DREDGED MATERIAL

Sec.
324.1 General.
324.2 Definitions.
324.3 Activities requiring permits.
324.4 Special procedures.
Appendix A.—Delegation of authority.

Authority: 33 U.S.C. 1413.

§ 324.1 General.

This regulation prescribes in addition to the general policies of 33 CFR 320.4 and procedures of 33 CFR Part 325, those special policies, practices and procedures to be followed by the Corps of Engineers in connection with the review of applications for Department of the Army permits to authorize the transportation of dredged material by vessel for the purpose of dumping it in ocean waters at dumping sites designated under 40 CFR Part 228 pursuant to Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972, as amended (33 USC 1413) (hereinafter referred to as Section 103). See 33 CFR 320.2(h). Activities involving the transportation of dredged material for the purpose of dumping in the ocean waters also require Department of the Army permits under Section

10 of the River and Harbor Act of 1899 (33 USC 403) for the dredging in navigable waters of the United States. Applicants for Department of the Army permits under this Part should also refer to 33 CFR Part 322 to satisfy the requirements of Section 10.

§ 324.2 Definitions.

For the purpose of this regulation, the following terms are defined:

(a) The term "ocean waters" means those waters of the open seas lying seaward of the base line from which the territorial sea is measured, as provided for in the Convention on the Territorial Sea and the Contiguous Zone (15 UST 1606; TIAS 5639).

(b) The term "dredged material" means any material excavated or dredged from navigable waters of the United States or ocean waters.

(c) The term "transport" or "transportation" refers to the carriage and related handling of dredged material by a vessel.

§ 324.3 Activities requiring permits.

(a) *General.* Department of the Army permits are required for the transportation of dredged material for the purpose of dumping it in ocean waters.

(b) *Activities of Federal agencies.* (1) The transportation of dredged material for the purpose of dumping in ocean waters done by or on behalf of any Federal agency other than the activities of the Corps of Engineers are subject to the procedures of this regulation. Agreement for construction or engineering services performed for other agencies by the Corps of Engineers does not constitute authorization under the regulation. Division and District Engineers will therefore advise Federal agencies accordingly and cooperate to the fullest extent in the expeditious processing of their applications. The activities of the Corps of Engineers that involve the transportation of dredged material for dumping in ocean waters are regulated by 33 CFR 209.145.

(2) The policy provisions set out in 33 CFR 320.4(j) relating to State or local authorizations do not apply to work or structures undertaken by Federal agencies, except where compliance with non-Federal authorization is required by Federal law or Executive policy. Federal agencies are required to comply with the substantive State, interstate, and local water-quality standards and effluent limitations as are applicable by law that are adopted in accordance with or effective under the provisions of the Marine Protection, Research and Sanctuaries Act of 1972, as amended, and related laws in the design, construction, management, operation, and maintenance of their respective facilities. (See Executive Order No. 11752, dated 17 Dec 73.) They are not required, however, to obtain and provide certification of compliance with effluent limitations and water-quantity standards from State or interstate water pollution control agencies in connection with activities involving discharges into ocean waters.

§ 324.4 Special procedures.

The Secretary of the Army has delegated to the Chief of Engineers the authority to issue or deny Section 103 permits. (See Appendix A.) The following additional procedures shall also be applicable under this regulation.

(a) *Public notice.* For all applications for Section 103 permits, the District Engineer will issue a public notice which shall contain, in addition to the information specified in 33 CFR 325.3, the following information:

(1) The location of the proposed disposal site and its physical boundaries;

(2) A statement as to whether the site has been designated for use by the Administrator, EPA, pursuant to Section 102(c) of the Act;

(3) If the proposed disposal site has not been designated by the Administrator, EPA a description of the characteristics of the proposed disposal site and an explanation as to why no previously designated disposal site is feasible;

(4) A brief description of known dredged material discharges at the proposed disposal site;

(5) Existence and documented effects of other authorized dumpings that have been made in the dumping area (e.g., heavy metal background reading and organic carbon content);

(6) An estimate of the length of time during which disposal will continue at the proposed site;

(7) Characteristics and composition of the dredged material; and

(8) A statement concerning a preliminary determination of the need for and/or availability of an environmental impact statement.

(b) *Evaluation.* Applications for permits for the transportation of dredged material for the purpose of dumping it in ocean waters will be evaluated to determine whether the proposed dumping will unreasonably degrade or endanger human health, welfare, or amenities, or the marine environment, ecological systems or economic potentialities. In making this evaluation, criteria established by the Administrator, EPA, pursuant to Section 102 of the Marine Protection Research and Sanctuaries Act of 1972, as amended, shall be applied including an evaluation of the need for the ocean dumping and including the availability of alternatives to ocean dumping. Where ocean dumping is determined to be necessary, the District Engineer will, to the extent feasible, specify disposal sites using the recommendations of the Administrator pursuant to Section 102(c) of the Act. See 40 CFR Parts 220 to 229.

(c) *EPA review.* If the Regional Administrator, EPA, advises the District Engineer that the proposed dumping will comply with the criteria the District Engineer shall complete his evaluation of the Section 103 application under this regulation and 33 CFR Parts 320 and 325. If, however, the Regional Administrator advises the District Engineer that the proposed dumping will not comply with the Criteria, the District Engineer will proceed as follows.

(1) The District Engineer shall determine whether there is an economically feasible alternative method or site available other than the proposed ocean disposal site. If there are other feasible alternative methods or sites available, the District Engineer shall evaluate them in accordance with 33 CFR Parts 320, 322, 323, 325 and this regulation, as appropriate.

(2) If the District Engineer makes a determination that there is no economically feasible alternative method or site available, he shall so advise the Regional Administrator of his intent to issue the permit setting forth his reasons for such determination.

(d) *EPA objection.* If the Regional Administrator advises, within 15 days of the notice of the intent to issue, that he still objects to the issuance of the permit, the case will be forwarded to the Chief of Engineers, for further coordination with the Administrator, EPA, and decision. The report forwarding the case will contain, in addition to the analysis required by 33 CFR 325.11, an analysis of whether there are other economically feasible methods or sites available to dispose of the dredged material.

(e) *Chief of Engineers review.* The Chief of Engineers shall evaluate the permit application and make a decision to deny the permit or recommend its issuance. If the decision of the Chief of Engineers is that ocean dumping at the proposed disposal site is required because of the unavailability of economically feasible alternatives, he shall so certify and request that the Secretary of the Army seek a waiver from the Administrator, EPA, of the Criteria or of the critical site designation in accordance with 40 CFR 225.4.

APPENDIX A—DELEGATION OF AUTHORITY TO ISSUE OR DENY PERMITS FOR THE TRANSPORTATION OF DREDGED MATERIAL FOR THE PURPOSE OF DUMPING IT INTO OCEAN WATERS

MARCH 12, 1973.

Pursuant to the authority vested in me by Section 103 of the Marine Protection, Research, and Sanctuaries Act of 1972, 86 Stat. 1052, Pub. L. 92-532, I hereby authorize the Chief of Engineers and his authorized representatives to issue or deny permits, after notice and opportunity for public hearings, for the transportation of dredged material for the purpose of dumping it in ocean waters. The Chief of Engineers and his authorized representatives shall, in exercising such authority, evaluate the impact of the proposed dumping on the public interest. No permit shall be issued unless a determination is made that the proposed dumping will not unreasonably degrade or endanger human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities. In making this determination, those criteria for ocean dumping established by the Administrator of the Environmental Protection Agency pursuant to Section 102 (a) of the above Act which relate to the effects of the proposed dumping shall be applied. In addition, based upon an evaluation of the potential effect which a permit denial will have on navigation, economic and industrial development, and foreign and domestic commerce of the United States, the Chief of Engineers or his authorized representatives, in evaluating the permit appli-

cation, shall make an independent determination as to the need for the dumping, other possible methods of disposal, and appropriate locations for the dumping. In considering appropriate disposal sites, recommended sites designated by the Administrator of the Environmental Protection Agency pursuant to Section 102(c) of the above Act will be utilized to the extent feasible. Prior to issuing any permit, the Chief of Engineers or his authorized representatives shall first notify the Administrator of the Environmental Protection Agency or his authorized representative of his intention to do so. In any case in which the Administrator or his authorized representative disagrees with the determination of the Chief of Engineers or his authorized representative as to compliance with the criteria established pursuant to Section 102(a) of the above Act relating to the effects of the dumping or with the restrictions established pursuant to Section 102(c) of the above Act relating to critical areas, the determination of the Administrator or his authorized representative shall prevail. If, in any such case, the Chief of Engineers or his Director of Civil Works finds that, in the disposition of dredged material, there is no economically feasible method or site available other than a dumping site the utilization of which would result in noncompliance with such criteria or restrictions, he shall so certify and request that I seek a waiver from the Administrator of the Environmental Protection Agency of the specific requirements involved. Unless the Administrator of the Environmental Protection Agency grants a waiver, the Chief of Engineers or his authorized representatives shall not issue a permit which does not comply with such criteria and restrictions. The permits so granted may be made subject to such special conditions as the Chief of Engineers or his authorized representatives may consider necessary in order to effect the purposes of the above Act, other pertinent laws, and any applicable memoranda of understanding between the Secretary of the Army and the heads of other governmental agencies.

The Chief of Engineers and his authorized representative shall exercise the authority hereby delegated subject to such conditions as I or my authorized representative may from time to time impose.

KENNETH E. BELIEU,
Acting Secrtary of the Army.

PART 325—PROCESSING OF DEPARTMENT OF THE ARMY PERMITS

Sec.

AUTHORITY: 33 U.S.C. 401 et seq.: 33 U.S.C. 1344; 33 U.S.C. 1413.

§ 325.1 Applications for permits.

(a) *General.* The processing procedures of this regulation (Part 325) apply to any form of Department of the Army permit. Special procedures and additional information are contained in Parts 320 through 324. This Part is arranged in the basic timing sequence used by the Corps of Engineers in processing Department of the Army permits.

(b) *Application form.* Any person proposing to undertake any activity requiring Department of the Army authorization as specified in 33 CFR 321–324 must apply for a permit to the District Engineer in charge of the District where the proposed activity is to be performed. Applications for permits must be prepared in accordance with instructions in Engineer Pamphlet 1145–2–1, "A Guide for Applicants," utilizing the prescribed application form (ENG Form 4345). The form and pamphlet may be obtained from the District Engineer having jurisdiction over the waterway in which the proposed activity will be located. Local variations of the application form for purposes of facilitating coordination with State and local agencies may be used.

(c) *Content of application.* (1) Generally, the application must include a complete description of the proposed activity including necessary drawings, sketches or plans; the location, purpose and intended use of the proposed activity; scheduling of the activity; the names and addresses of adjoining property owners; the location and dimensions of adjacent structures; and the approvals required by other Federal, interstate, State or local agencies for the work, including all approvals received or denials already made.

(2) If the activity involves dredging in waters of the United States, the application must include a description of the type, composition and quantity of the material to be dredged, the method of dredging, and the site and plans for disposal of the dredged material.

(3) If the activity includes the discharge of dredged or fill material in the waters of the United States or the transportation of dredged material for the purpose of dumping it in ocean waters, the application must include the source of the material; a description of the type, composition and quantity of the material; the method of transportation and disposal of the material; and the location of the disposal site. (See Part 324 for additional information requirements on ocean dumping applications.) Certification under Section 401 of the Federal Water Pollution Control Act is required for such discharges into waters of the United States.

(4) If the activity includes the construction of a fill or pile or float-supported platform, the project description must include the use and specific structures to be erected on the fill or platform.

(d) *Additional information.* In addition to the information indicated in subparagraph (c), above, the applicant will be required to furnish such additional information as the District Engineer may deem necessary to assist him in his evaluation of the application. Such additional information may include environmental data and information on alternate methods and sites, as may be necessary for the preparation of the Environmental Assessment or Environmental Impact Statement (see § 325.4).

(e) *Signature of application.* The application must be signed by the person who desires to undertake the proposed activity; however, the application may be signed by a duly authorized agent if accompanied by a statement by that person designating the agent and agreeing to furnish, upon request, supplemental information in support of the application. In either case, the signature of the applicant will be understood to be an affirmation that he possesses the authority to undertake the activity proposed in his application, except where the lands are under the control of the Corps of Engineers, in which cases the District Engineer will coordinate the transfer of the real estate and the permit action. When the application is submitted by an agent, the application may include the activity of more than one owner provided the character of the activity of each owner is similar and in the same general area.

(f) *Fees.* Fees are required for permit applications under Section 404 of the Federal Water Pollution Control Act Amendments of 1972, Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972, as amended, and Sections 9 and 10 of the River and Harbor Act of 1899. A fee of $100.00 will be charged when the planned or ultimate purpose of the project is commercial or industrial in nature and is in support of operations that charge for the production, distribution or sale of goods or services. A $10.00 fee will be charged for permit applications when the work is non-commercial in nature and provides personal benefits that have no connection with a commercial enterprise. The final decision as to basis for fee (commercial vs. non-commercial) shall be solely the responsibility of the District Engineer. No fee will be charged if the applicant withdraws his application at any time prior to issuance of the permit and/or if his application is denied. Collection of the fee will be deferred until the applicant is notified by the District Engineer that a public interest review has been completed and that the proposed activity has been determined to be in the public interest. Upon receipt of this notification the applicant will forward a check or money order to the District Engineer, made payable to the Treasurer of the United States. The permit will then be issued upon receipt of the application fee. Multiple fees are not to be charged if more than one law is applicable. Any modification significant enough to require a permit will also require a fee. No fee will be assessed when a permit is transferred from one property owner to another. No fees will be charged for time extensions or general permits. Agencies or instrumentalities of Federal, State or local governments will not be required to pay any fee in connection with the applications for permits. This fee structure will be reviewed from time to time.

§ 325.2 Processing of applications.

(a) *Standard procedures.* (1) When an application for a permit is received, the District Engineer shall immediately assign it a number for identification, acknowledge receipt thereof, and advise the applicant of the number assigned to it. He shall review the application for completeness, and obtain from the applicant any additional information he deems necessary for further processing.

(2) When all required information has been provided, the District Engineer will issue a public notice as described in § 325.3, below, unless specifically exempted by other provisions of this regulation.

(3) The District Engineer shall consider all comments received in response to the public notice (see § 325.3) in his subsequent actions on the permit application. Receipt of the comments will be acknowledged and they will be made a part of the official file on the application. Comments received as form letters or petitions may be acknowledged as a group to the person or organization responsible for the form letter or petition. If comments relate to matters within the special expertise of another Federal agency, the District Engineer may seek the advice of that agency. The applicant must be given the opportunity to furnish the District Engineer his proposed resolution or rebuttal to all objections from Government agencies and other substantive adverse comments before final decision will be made on the application.

(4) The District Engineer shall prepare an Environmental Assessment on all applications. The Environmental Assessment shall be dated, signed, and placed in the record and shall include the expected environmental impacts of the proposal. Where the District Engineer has delegated authority to sign permits for and in his behalf, he may similarly delegate the signing of the Environmental Assessment. In those cases requiring an Environmental Impact Statement (EIS), the draft EIS may serve as the Environmental Assessment. Where an EIS is not prepared, the Environmental Assessment will include a statement that the decision on the application is not a major Federal action significantly affecting the quality of the human environment.

(5) The District Engineer shall also evaluate the proposed application to determine the need for a public hearing pursuant to 33 CFR Part 327.

(6) After all above actions have been completed, the District Engineer will determine in accordance with the record and applicable regulations whether or not the permit should be issued. He shall prepare a Findings of Fact on all applications to support his determination. The Findings of Fact shall include the District Engineer's views on the probable effect of the proposed work on the public interest including conformity with the guidelines published for the discharge of dredged or fill material in waters of the United States (40 CFR Part 230) or with the criteria for dumping of dredged material in ocean waters (40 CFR Parts 220 to 229), if applicable, and the conclusions of the District Engineer. The Findings of Fact shall be dated, signed, and included in the record prior to final action on the application. Where the District Engineer has delegated authority to sign permits for and in his behalf, he may similarly delegate the signing of the Findings of Fact. If a permit is warranted, the District Engineer will determine the conditions and duration which should be incorporated into the permit. In accordance with the authorities specified in § 325.8, the District Engineer will take final action or forward the application with all pertinent comments, records, and studies, including the final Environmental Impact Statement, if prepared, through channels to the official authorized to make the final decision. The report forwarding the application for decision will be in the format prescribed in § 325.11. Notice that the application has been forwarded to higher headquarters will be furnished the applicant and to any Federal agency expressing an interest in the application. Such notice shall not divulge the District Engineer's recommendations. In those cases where the application is forwarded for decision in the format prescribed in § 325.11, the report will serve as the Findings of Fact.

(7) If the final decision is to deny the permit, the applicant will be advised in writing of the reason for denial. If the final decision is to issue the permit, the issuing official will forward two copies of the draft permit to the applicant for signature accepting the conditions of the permit. The applicant will return both signed copies to the issuing official who then signs and dates the permit. The permit is not valid until signed by the issuing official. Final action on the permit application is the signature on the letter notifying the applicant of the denial of his application or signature of the issuing official on the authorizing document.

(8) The District Engineer will publish monthly a list of permits issued or denied during the previous month. The list will identify each action by public notice number, name of applicant, and brief description of activity involved. This list will be distributed to all persons who received any of the public notices listed.

(9) If the applicant fails to respond within 45 days to any request or inquiry of the District Engineer, the District Engineer may advise the applicant by certified letter that his application will be considered as having been withdrawn unless the applicant responds thereto within thirty days of the date of the letter.

(b) *Procedures for particular types of permit situations.* (1) If the District Engineer determines that water quality certification for the proposed activity is necessary under the provisions of the Federal Water Pollution Control Act, he shall so notify the applicant and obtain from him either the appropriate certification or a copy of his application for such certification. The District Engineer may issue the public notice of the application jointly with the certifying agency if arrangements for such joint notices have been approved by the Division Engineer. When the activity may affect the waters of another State, a copy of the certification will be forwarded to the Regional Administrator of EPA who shall determine if the proposed activity may affect the quality of the waters of any State or States other than the State in which the work is to be performed. If he needs supplemental information in order to make this determination, the Regional Administrator may request it from the District Engineer who shall obtain it from the applicant and forward it to the Regional Administrator. The Regional Administrator shall, within thirty days of receipt of the application, certification and supplemental information, notify the affected State, the District Engineer, and the applicant in the event such a second State may be affected. The second State then has sixty days to advise the District Engineer that it objects to the issuance of the permit on the basis of the effect on the quality of its waters and to request a hearing. No authorization will be granted until required certification has been obtained or has been waived. Waiver is deemed to occur if the certifying agency fails or refuses to act on a request for certification within a reasonable period of time after receipt of such request. The request for certification must be made in accordance with the regulations of the certifying agency. In determining whether or not a waiver period has commenced, the District Engineer will verify that the certifying agency has received a valid request for certification. Three months shall generally be considered to be a reasonable period of time. If, however, special circumstances identified by the District Engineer require that action on an application be taken within a more limited period of time, the District Engineer shall determine a reasonable lesser period of time, advise the certifying agency of the need for action by a particular date and that, if certification is not received by that date, it will be considered that the requirement for certification has been waived. Similarly if it appears that circumstances may reasonably require a period of time longer than three months, the District Engineer may afford the certifying agency up to one year to provide the required certification before determining that a waiver has occurred. District Engineers shall check with the certifying agency at the end of the allotted period of time before determining that a waiver has occurred.

(2) If the proposed activity is to be undertaken in a State operating under a coastal zone management program approved by the Secretary of Commerce pursuant to the Coastal Zone Management Act (see 33 CFR 320.3(b)), the District Engineer shall proceed as follows:

(i) If the applicant is a Federal agency, and the application involves a Federal activity in or affecting the coastal zone or a Federal development project in the coastal zone, the District Engineer shall forward a copy of the public notice to

the agency of the State responsible for reviewing the consistency of Federal activities. The Federal agency applicant shall be responsible for complying with the Coastal Zone Management Act's directives for ensuring that Federal agency activities are undertaken in a manner which is consistent, to the maximum extent practicable, with approved coastal zone management programs. (See 15 CFR Part 930.) If the State coastal zone agency objects to the proposed Federal activity on the basis of its inconsistency with the State's approved coastal zone management program, the District Engineer shall not make a final decision on the application until the disagreeing parties have had an opportunity to utilize the procedures specified by the Coastal Zone Management Act for resolving such disagreements.

(ii) If the applicant is not a Federal agency and the application involves an activity affecting the coastal zone, the District Engineer shall obtain from the applicant a certification that his proposed activity complies with and will be conducted in a manner that is consistent with the approved State coastal zone management program. Upon receipt of the certification, the District Engineer will forward a copy of the public notice (which will include the applicant's certification statement) to the State coastal zone agency and request its concurrence or objection. The District Engineer can issue the public notice of the application jointly with the State agency if arrangements for such joint notices have been approved by the Division Engineer. If the State agency objects to the certification or issues a decision indicating that the proposed activity requires further review, the District Engineer shall not issue the permit until the State concurs with the certification statement or the Secretary of Commerce determines that the proposed activity is consistent with the purposes of the Coastal Zone Management Act or is necessary in the interest of national security. If the State agency fails to concur or object to a certification statement within six months of the State agency's receipt of the certification statement, State agency concurrence with the certification statement shall be conclusively presumed.

(3) If the proposed activity involves any property listed or eligible for listing in the National Register of Historic Places (which is published in its entirety in the FEDERAL REGISTER annually in February with addenda published each month), the District Engineer will proceed in accordance with 33 CFR Part 305.

(4) If the proposed activity consists of the dredging of an access channel and/or berthing facility associated with an authorized Federal navigation project, the activity will be included in the planning and coordination of the construction or maintenance of the Federal project to the maximum extent feasible. Separate notice, hearing, and Environmental Impact Statement will not be required for activities so included and coordinated; and the public notice issued by the District Engineer for these Federal and associated non-Federal activities will be the notice of intent to issue permits for those included non-Federal dredging activities. The decision whether to issue or deny such a permit will be consistent with the decision on the Federal project unless special considerations applicable to the proposed activity are identified. (See § 322.5(a).)

(5) Copies of permits will be furnished to other agencies in appropriate cases as follows:

(i) If the activity involves the construction of structures or artificial islands on the outer continental shelf, to the Director, Defense Mapping Agency, Hydrographic Center, Washington, D.C. 20390: Attention, Code N512 and to the Director, National Ocean Survey, NOAA, Department of Commerce, Rockville, Maryland 20852.

(ii) If the activity involves the construction of structures to enhance fish propagation (fish havens) along the coasts of the United States, to Defense Mapping Agency, Hydrographic Center and National Ocean Survey as in (i), above, and to the Director, Office of Marine Recreational Fisheries, National Marine Fisheries Service, Washington, D.C. 20235.

(iii) If the activity involves the erection of an aerial transmission line across a navigable water of the United States, to the Director, National Ocean Survey, NOAA, Department of Commerce, Rockville, Maryland 20852, reference C322.

(iv) If the activity is listed in subparagraphs (i), (ii), or (iii), above, or involves the transportation of dredged material for the purpose of dumping it in ocean waters, to the appropriate District Commander, U.S. Coast Guard.

(c) *Emergency procedures.* An "emergency" is a situation which would result in an unacceptable hazard to life or severe loss of property if corrective action requiring a permit is not undertaken within a time period less than the normal time needed to process the application under required procedures. In such cases the District Engineer will explain the circumstance and recommend special procedures in writing to the Chief of Engineers, ATTN: DAEN-CWO-N. The Chief of Engineers, upon consultation with the Secretary of the Army or his authorized representative, will instruct the District Engineer as to further processing of the application.

(d) *Timing of processing of applications.* In view of the extensive coordination with other agencies and the public and the study of all aspects of proposed activities required by the above procedures, applicants must allow adequate time for the processing of their applications. The District Engineer will be guided by the following time limits for the indicated steps in processing permit applications:

(1) Public notice should be issued within fifteen days of receipt of all required information from the applicant, unless joint notice with State agencies is to be used.

(2) The receipt of comments as a result of the public notice should not extend beyond thirty days from the date of the notice. However, if unusual circumstances warrant, the District Engineer may extend the comment period up to a maximum of seventy-five days.

(3) The District Engineer should either send notice of denial to the applicant, or issue the draft permit to the applicant for acceptance and signature, or forward the application to higher headquarters within thirty days of one of the following whichever is latest: Closing of the public notice comment period with no objections received; receipt of notice of withdrawal of objections; completion of coordination following receipt of applicant's rebuttal of objections; closing of the record of a public hearing; or expiration of the waiting period following the filing of the final Environmental Impact Statement with CEQ.

§ 325.3 Public notice.

(a) *General.* The Public notice is the primary method of advising all interested parties of the proposed activity for which a permit is sought and of soliciting comments and information necessary to evaluate the probable impact on the public interest. The notice must, therefore, include sufficient information to give a clear understanding of the nature of the activity to generate meaningful comments. The notice should include the following items of information:

(1) Applicable statutory authority or authorities;

(2) The name and address of the applicant;

(3) The location of the proposed activity;

(4) A brief description of the proposed activity, its purpose and intended use, including a description of the type of structures, if any, to be erected on fills, or pile or float-supported platforms, and a description of the type, composition and quantity of materials, to be discharged or dumped and means of conveyance. See also 33 CFR 324 for additional information required on ocean dumping public notices;

(5) A plan and elevation drawing showing the general and specific site location and character of all proposed activities, including the size relationship of the proposed structures to the size of the impacted waterway and depth of water in the area;

(6) If the proposed activity would occur in the territorial seas or ocean waters, a description of the activity's relationship to the baseline from which the territorial sea is measured;

(7) A list of other government authorizations obtained or requested, including required certifications relative to water quality, coastal zone management, or marine sanctuaries;

(8) A statement concerning a preliminary determination of the need for and/or availability of an Environmental Impact Statement;

(9) Any other available information which may assist interested parties in evaluating the likely impact of the proposed activity, if any, on factors affecting the public interest, including environmental values; and

(10) A reasonable period of time, normally thirty days but not less than fifteen days from date of mailing, within which interested parties may express their views concerning the permit application.

(b) *Evaluation factors.* A paragraph describing the various factors on which decisions are based during evaluation of a permit application shall be included in every public notice.

(1) Except as provided in paragraph (b)(4) below, the following will be included:

The decision whether to issue a permit will be based on an evaluation of the probable impact of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefit which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered; among those are conservation, economics, aesthetics, general environmental concerns, historic values, fish and wildlife values, flood damage prevention, land use, navigation, recreation, water supply, water quality, energy needs, safety, food production and, in general, the needs and welfare of the people.

(2) If the activity involves the discharge of dredged or fill material into the waters of the United States or the transportation of dredged material for the purpose of dumping it in ocean waters, the public notice shall also indicate that the evaluation of the impact of the activity on the public interest will include application of the guidelines promulgated by the Administrator, EPA, under authority of Section 404(b) of the Federal Water Pollution Control Act (40 CFR Part 230) or of the criteria established under authority of Section 102(a) of the Marine Protection, Research and Sanctuaries Act of 1972, as amended (40 CFR Parts 220 to 228), as appropriate. See also 33 CFR Part 324.

(3) If the activity includes the discharge of dredged or fill material in the waters of the United States or the transportation of dredged material for the purpose of dumping it in ocean waters, the following statement will also be included in the public notice:

Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held to consider this application. Requests for public hearings shall state, with particularity, the reasons for holding a public hearing.

(4) In cases involving construction of fixed structures or artificial islands on Outer Continental Shelf lands which are under mineral lease from the Department of the Interior, the notice will contain the following statement: "The decision as to whether a permit will be issued will be based on an evaluation of the impact of the proposed work on navigation and national security."

(c) *Distribution of public notices.* (1) Public notices will be distributed for posting in post offices or other appropriate public places in the vicinity of the site of the proposed work and will be sent to the applicant, to appropriate city and county officials, to adjoining property owners, to appropriate State agencies, to concerned Federal agencies, to local, regional and national shipping and other concerned business and conservation organizations, to appropriate River Basin Commissions, and to any other interested party. If in the judgment of the District Engineer the proposal may result in substantial public interest, the public notice (without drawings) may be published for five consecutive days in the local newspaper, and the applicant shall reimburse the District Engineer for the costs of publication. Copies of public notices will be sent to all parties who have specifically requested copies of public notices, to the U.S. Senators and Representatives for the area where the work is to be performed, the Field Representatvie of the Secretary of the Interior, the Regional Director of the Fish and Wildlife Service, the Regional Director of the National Park Service, the Regional Administrator of the Environmental Protection Agency (EPA), the Regional Director of the National Marine Fisheries Service of the National Oceanic and Atmospheric Administration (NOAA), the head of the State agency responsible for fish and wildlife resources, and the District Commander, U.S. Coast Guard.

(2) In addition to the general distribution of public notices cited above, notices will be sent to other addresses in appropriate cases as follows:

(i) If the activity involves structures or dredging along the shores of the sea or Great Lakes, to the Coastal Engineering Research Center, Washington, D.C. 20016.

(ii) If the activity involves construction of fixed structures or artificial islands on the Outer Continental Shelf or in the territorial seas, to the Deputy Assistant Secretary of Defense (Installations and Housing), Washington, D.C. 20310; the Director, Defense Mapping Agency, Hydrographic Center, Washington, D.C. 20390, Attention, Code N512; and the Director, National Ocean Survey, NOAA, Department of Commerce, Rockville, Maryland 20852.

(iii) If the activity involves the construction of structures to enhance fish propagation along the Atlantic, Pacific, and Gulf coasts, to the Director, Office of Marine Recreational Fisheries, National Marine Fisheries Service, Washington, D.C. 20235.

(iv) If the activity involves the construction of structures which may affect aircraft operations or for purposes associated with seaplane operations, to the Regional Director of the Federal Aviation Administration.

(v) If the activity is in connection with a foreign-trade zone, to the Executive Secretary, Foreign-Trade Zones Board, Department of Commerce, Washington, D.C. 20230 and to the appropriate District Director of Customs as Resident Representative, Foreign-Trade Zones Board.

(3) It is presumed that all interested parties and agencies will wish to respond to public notices; therefore, a lack of response will be interpreted as meaning that there is no objection to the application. A copy of the public notice with the list of the addressees to whom the notice was sent will be included in the record. If a question develops with respect to an activity for which another agency has responsibility and that other agency has not responded to the public notice, the District Engineer may request their comments. Whenever a response to a public notice has been received from a member of Congress, either in behalf of a constituent or himself, the District Engineer will inform the member of Congress of the final decision.

(d) *General permit notices (RCS: DAEN–CWO–52).* For purposes of performing a nationwide analysis of the effectiveness of the general permit program, Division offices will submit "Public Notices on General Permits" reports (RCS: DAEN–CWO–52) by COB on the 15th day, following the end of each quarter, to HQDA (DAEN–CWO–N) Washington, D.C. 20314. Said reports will be in the form of a letter listing the public notices published during the previous month to announce proposals or to finalize issuances of general permits; copies of the public notices are to be made inclosures to the reports. Negative reports will be submitted if no general permit actions have taken place in the Division during the reporting period.

§ 325.4 Environmental impact statements.

(a) *General.* Section 102(2)(c) of the National Environmental Policy Act of 1969 (NEPA) requires all Federal agencies, with respect to major Federal actions significantly affecting the quality of the human environment, to submit to the President's Council on Environmental Quality a detailed statement on:

(1) The environmental impact of the proposed actions.

(2) Any adverse environmental effects which cannot be avoided should the proposal be implemented.

(3) Alternatives to the proposed action.

(4) The relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity.

(5) Any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented. The District Engineer must determine whether such an Environmental Impact Statement (EIS) is required in connection with each permit application.

(b) *EIS procedures.* In addition to the procedures required by 33 CFR 209.410 (ER 1105–2–507), the following special procedures apply to the processing of permits involving the preparation of an EIS.

(1) The District Engineer, at the earliest practicable time prior to the is-

suance of the public notice, shall make a preliminary assessment of impacts of the project should it be approved and make a preliminary determination as to whether the quality of the human environment would be significantly affected. This preliminary assessment will normally be based on experience with similar type activities performed in the past. A statement of the District Engineer's preliminary determination shall be included in the public notice. This preliminary determination will be reconsidered as additional information is developed.

(2) If the District Engineer's final determination after consideration of all additional information developed (including responses to the public notice) is that the proposed work will not significantly affect the quality of the human environment, the District Engineer's determination shall be documented, dated, and placed in the record as his Environmental Assessment (see § 325.2(a)(4)).

(3) At such time as the District Engineer believes that a permit may be warranted but that the proposed activity would significantly affect the quality of the human environment, he will require the applicant to furnish any additional information that the District Engineer considers necessary to allow his preparation of an EIS. The applicant should also be advised at this time that there is no assurance that favorable action will ultimately be taken on his application. Additionally, if the District Engineer has previously announced a preliminary determination that no EIS would be required, he shall issue a supplemental public notice to advise the public of the changed determination. If the applicant is unable to furnish certain information considered by the District Engineer to be necessary for the EIS, the District Engineer may, after obtaining written approval from the Division Engineer, charge the applicant pursuant to 31 U.S.C. 483(a) for those extraordinary expenses incurred by the Government in developing the information. All money so collected shall be paid into the Treasury of the United States as miscellaneous receipts. Otherwise the costs of the preparation and distribution of the EIS itself shall be borne by the Federal Government. In those cases when the determination has been made that an EIS will be required, the District Engineer shall consider inviting public comments as to specific factors of concern which should be addressed in the draft EIS. Upon preparation of the draft EIS, a public notice shall be issued summarizing the facts of the case and announcing the availability of the draft EIS. A copy of that notice shall be furnished to all recipients of the draft EIS including CEQ. If a public hearing is to be held pursuant to § 325.2(a)(5), the hearing may be held anytime after completion of the draft EIS.

(4) If another agency is the lead agency as defined by the CEQ guidelines (40 CFR 1500.7(b)) the District Engineer will coordinate with that agency to insure that the resulting EIS adequately describes the impact of the activity which is subject to Corps permit authority. That previously prepared EIS will be referenced in the public notice announcing the permit application and a statement included that the effects of the proposed activity on the environment as outlined therein will be carefully considered in the evaluation of the permit application.

(c) *Public notice on EIS filing.* The 30-day wait period required by the National Environmental Policy Act for issuing a permit for which an EIS has been prepared begins with notation in the Federal Register that the FEIS has been filed with CEQ or on the date of delivery to U.S. Postal Service facilities for mailing of copies of the FEIS to agencies, groups, and individuals on the project mailing list, whichever date is later. In order to notify the interested public of their opportunity to comment on the FEIS, the District Engineer shall issue a public notice when the filing notation has been published in the Federal Register to all parties receiving the original application notice or draft EIS and to all others who have expressed an interest in the application. The public notice should include:

(1) A brief summary of application (applicant, work, date of public notice, date of draft EIS release, date of public hearing, if held);

(2) Opportunity to comment to the District Engineer on the FEIS until the deadline date projected by the 30-day wait period;

(3) A statement that the comments received on the FEIS will be evaluated and considered in arriving at the final decision on the application; and

(4) Information on how interested parties can obtain or have access to the FEIS.

§ 325.5 Forms of authorization.

(a) *General.* (1) Department of the Army authorizations under this regulation shall be in the form of an individual permit, general permit, or letter of permission, as appropriate. The basic format shall be ENG Form 1721, Department of the Army Permit (Appendix A).

(2) While the general conditions included in ENG Form 1721 are normally applicable to all permits, some may not apply to certain authorizations (e.g., after-the-fact situations where work is completed, or situations in which the permittee is a Federal agency) and may be deleted by the issuing officer. Special conditions applicable to the specific activity will be included in the permit as necessary to protect the public interest.

(b) *Letters of permission.* In those cases subject to Section 10 of the River and Harbor Act of 1899 in which, in the opinion of the District Engineer, the proposed work is minor, will not have significant impact on environmental values, and should encounter no opposition, the District Engineer may omit the publishing of a public notice and authorize the work by a letter of permission. However, he will coordinate the proposal with all concerned fish and wildlife agencies, Federal and State, as required by the Fish and Wildlife Coordination Act. The letter of permission will not be used to authorize the discharge of dredged or fill material into waters of the United States nor the transportation of dredged material for purposes of dumping it in ocean waters. The letter of permission will be in letter form and will identify the permittee, the authorized work and location of the work, the statutory authority (i.e., 33 U.S.C. 403), any limitations on the work, a construction time limit and a requirement for a report of completed work. A copy of the general conditions from ENG Form 1721 will be attached and will be incorporated by reference into the letter of permission.

(c) *General permits.* The District Engineer may, after compliance with the other procedures of this regulation, issue general permits for certain clearly-described categories of structures or work, including discharges of dredged or fill material, requiring Department of the Army permits. After a general permit has been issued, individual activities falling within those categories that are authorized by such general permits do not have to be further authorized by the procedures of this regulation unless the District Engineer determines, on a case-by-case basis, that the public interest requires.

(d) *Section 9 permits.* Permits for structures under Section 9 of the River and Harbor Act of 1899 will be drafted during review procedures at Department of the Army level.

(e) *Nationwide permits.* Nationwide permits mean Department of the Army authorizations that have been issued by the regulations for certain specified activities nationwide. If certain conditions are met, the specified activities can take place without the need for an individual or general permit.

§ 325.6 Duration of authorizations.

(a) *General.* Department of the Army authorization may authorize both the work and the resulting use. Authorizations continue in effect until they automatically expire or are modified, suspended, or revoked.

(b) *Structures.* Authorizations for the existence of a structure or other activity of a permanent nature are usually for an indefinite duration with no expiration date cited. However, where a temporary structure is authorized, or where restoration of a waterway is contemplated, the authorization will be of limited duration with a definite expiration date. Except as provided in subparagraph (e), below, permits for the discharge of dredged material in the waters of the United States or for the transportation of dredged material for the purpose of dumping it in ocean waters will be of limited duration with a definite expiration date.

(c) *Works.* Authorizations for construction work or other activity will specify time limits for accomplishing the work or activity. The time limits will specify a date by which the work must be started, normally one year from the date

of issuance, and a date by which the work must be completed. The dates will be established by the issuing official and will provide reasonable times based on the scope and nature of the work involved. An authorization for work or other activity will automatically expire if the permittee fails to request an extension or revalidation.

(d) *Extensions of time.* Extensions of time may be granted by the District Engineer for authorizations of limited duration, or for the time limitations imposed for starting or completing the work or activity. The permittee must request the extension and explain the basis of the request, which will be granted only if the District Engineer determines that an extension is in the general public interest. Requests for extensions will be processed in accordance with the regular procedures of § 325.2, including issuance of a public notice, except that such processing is not required where the District Engineer determines that there have been no significant changes in the attendant circumstances since the authorization was issued and that the work is proceeding essentially in accordance with the approved plans and conditions.

(e) *Periodic maintenance.* If the authorized work includes periodic maintenance dredging, an expiration date for the authorization of that maintenance dredging will be included in the permit. The expiration date, which in no event is to exceed ten years from the date of issuance of the permit, will be established by the issuing official after his evaluation of the proposed method of dredging and disposal of the dredged material in accordance with the requirements of 33 CFR Parts 320 to 325. In such cases, the District Engineer shall require notification of the maintenance dredging prior to actual performance to insure continued compliance with the requirements of the regulation and 33 CFR Parts 320–324. If the permittee desires to continue maintenance dredging beyond the expiration date, he must request a revalidation of that portion of his permit which authorized the maintenance dredging. The request must be made to the District Engineer six months prior to the expiration date, and include full description of the proposed methods of dredging and disposal of dredged materials. The District Engineer will process the request for revalidation in accordance with the standard procedures including the issuance of a public notice describing the authorized work to be maintained and the proposed methods of maintenance.

§ 325.7 Modification, suspension or revocation of authorizations.

(a) *General.* The District Engineer may reevaluate the circumstance and conditions of a permit either on his own motion or as the result of periodic progress inspection, and initiate action to modify, suspend, or revoke a permit as may be made necessary by considerations of the general public interest. Among the factors to be considered are the extent of the permittee's compliance with the terms and conditions of the permit; whether or not circumstances relating to the activity authorized have changed since the permit was issued, extended or revalidated, and the continuing adequacy of the permit conditions; any significant objections to the activity authorized by the permit which were not earlier considered; revisions to applicable statutory and/or regulatory authorities; and the extent to which modification, suspension, or other action would adversely affect plans, investments and actions the permittee has reasonably made or taken in reliance on the permit. Significant increases in scope of a permitted activity will be processed as new applications for permits in accordance with Sec. 325.2, and not as modifications under this paragraph.

(b) *Modification.* The District Engineer, as a result of revaluation of the circumstances and conditions of a permit, may determine that protection of the general public interest requires a modification of the terms or conditions of the permit. In such cases, the District Engineer will hold informal consultations with the permittee to ascertain whether the terms and conditions can be modified by mutual agreement. If a mutual agreement is reached on modification of the terms and conditions of the permit, the District Engineer will give the permittee written notice of the modification, which will then become effective on such date as the District Engineer may establish, which in no event shall be less than ten days from its date of issuance. In the event a mutual agreement cannot be reached by the District Engineer and the permittee, the District Engineer will proceed in accordance with subparagraph (c), below, if immediate suspension is warranted. In cases where immediate suspension is not warranted but the District Engineer determines that the permit should be modified, he will notify the permittee of the proposed modification and reasons therefor, and that he may request a hearing. The modification will become effective on the date set by the District Engineer which shall be at least ten days after receipt of the notice unless a hearing is requested within that period. If the permittee fails or refuses to comply with the modification, the District Engineer will proceed in accordance with 33 CFR Part 326.

(c) *Suspension.* The District Engineer may suspend a permit after preparing a written determination and finding that immediate suspension would be in the general public interest. The District Engineer will notify the permittee in writing by the most expeditious means available that the permit has been suspended with the reasons therefor, and order the permittee to stop all previously authorized activities. The permittee will also be advised that following this suspension a decision will be made to either reinstate, modify, or revoke the permit, and that he may request a hearing within 10 days of receipt of notice of the suspension to present information in this matter. If a hearing is requested the procedures prescribed in 33 CFR 327 will be followed. After the completion of the hearing (or within a reasonable period of time after issuance of the notice to the permittee that the permit has been suspended if no hearing is requested), the District Engineer will take action to reinstate the permit, modify the permit, or recommend revocation of the permit in accordance with subparagraph (d), below.

(d) *Revocation.* Following completion of the suspension procedures in subparagraph (c), above, if revocation of the permit is recommended, the District Engineer will prepare a report of the circumstances and forward it together with the record of the suspension proceedings to DAEN-CWO-N. The Chief of Engineers may, prior to deciding whether or not to revoke the permit, afford the permittee the opportunity to present any additional information not made available to the District Engineer at the time he made the recommendation to revoke the permit including, where appropriate, the means by which he intends to compy with the terms and conditions of the permit. The permittee will be advised in writing of the final decision.

§ 325.8 Authority to issue or deny authorizations.

(a) *General.* Except as otherwise provided in this regulation, the Secretary of the Army subject to such conditions as he or his authorized representative may from time to time impose, has authorized the Chief of Engineers and his authorized representatives to issue or deny authorizations for construction or other work in or affecting navigable waters of the United States pursuant to Sections 10 and 14 of the Act of March 3, 1899, and Section 1 of the Act of June 13, 1902. He also has authorized the Chief of Engineers and his authorized representatives to issue or deny authorizations for the discharge of dredged or fill material in waters of the United States pursuant to Section 404 of the Federal Water Pollution Control Act Amendments of 1972 or for the transportation of dredged material for the purpose of dumping it into ocean waters pursuant to Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972, as amended. The authority to issue or deny permits pursuant to Section 9 of the River and Harbor Act of March 3, 1899 has not been delegated to the Chief of Engineers or his authorized representatives.

(b) *District Engineer's authority.* District Engineers are authorized to issue in accordance with this regulation permits and letters of permission which are subject to such special conditions as are necessary to protect the public interest in the waters of the United States or ocean waters pursuant to Sections 10 and 14 of the River and Harbor Act of March 3, 1899; Section 1 of the River and Harbor Act of June 13, 1902; Section 404 of the Federal Water Pollution Control Act Amendments of 1972; and Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972, as amended, in all cases in which there are no known substantive objections to the proposed work or activity or in which objections

have been resolved to the satisfaction of the District Engineer. Unless otherwise precluded by this regulation, District Engineers may issue permits over an unresolved objection of another Federal agency if that agency indicates to the District Engineer that it does not desire to refer the application to a higher level of authority for review. It is essential to the legality of a permit that it contain the name of the District Engineer as the issuing officer. However, the permit need not be signed by the District Engineer, in person; but may be signed for and in behalf of him by whoever he designates. District Engineers shall deny permits when required State or local authorization and/or certification has been denied or when a State has objected to a required certification of compliance with its coastal zone management program and the Secretary of Commerce has not reviewed the action and reached a contrary finding. A District Engineer may also deny any permit if he determines that the proposed activity is not in the public interest provided the referral requirements of § 325.8(d) below are not applicable. In such cases the Findings of Fact should be in the general format required for reports under Sec. 325.11 and must conclusively justify a denial decision. All other permit applications including those cases in § 325.7 (c) and (d) below will be referred to Division Engineers. District Engineers are also authorized to add, modify, or delete special conditions in permits, except for those conditions which have been imposed by higher authority, and to suspend permits according to the procedures of § 325.7(c).

(c) *Division Engineer's authority.* Division Engineers will review, attempt to resolve outstanding matters, and evaluate all permit applications referred by District Engineers. Division Engineers may authorize the issuance or denial of permits pursuant to Sections 10 and 14 of the River and Harbor Act of March 3, 1899; Section 1 of the River Harbor Act of June 13, 1902, Section 404 of the Federal Water Pollution Control Act Amendments of 1972; and Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972, as amended; and the inclusion of conditions to those permits as may be necessary to protect the public interest in waters of the United States or ocean waters in accordance with the policies cited in this regulation. Except as provided in subparagraph (d), below, if the Division Engineer determines that issuance of a permit with or without conditions is in the public interest, but there is continuing objection to the issuance of the permit by another Federal agency, he shall advise the regional representative of that Federal agency of his intent to issue the permit. The Division Engineer shall not proceed with the issuance of a permit if, within 15 days after the date of this notice of intent to issue a permit, an authorized representative of that Federal agency indicates to the Division Engineer in writing that he wishes to bring his concerns to the Departmental level and has Departmental concurrence to do so. In such cases, the proposed permit will be forwarded to higher authority for resolution. Thereafter, a permit will be issued only pursuant to and in accordance with instructions from such higher authority. Every effort should be made to resolve differences at the Division Engineer level before referring the matttr to higher authority.

(d) *Referral to the Chief of Engineers.* Division Engineers will refer to the Chief of Engineers the following cases:

(1) When it is proposed to issue a permit and there are unresolved objections from another Federal agency which must be handled under special procedures specified in statutes or Memoranda of Understanding which thereby preclude final resolution by the Division Engineer;

(2) When the recommended decision is contrary to the stated position of the Governor of the State in which the work is to be performed;

(3) When there is substantial doubt as to authority, law, regulations, or policies applicable to the proposed activity;

(4) When the Chief of Engineers requests the case be forwarded for decision;

(5) When the proposed activity would affect the baseline used for determination of the limits of the territorial sea; and

(6) When Section 9 of the River and Harbor Act of 1899 authority is involved.

§ 325.9 Supervision and enforcement.

(a) *Inspection and monitoring.* District Engineers will assure that authorized activities are conducted and executed in conformance with approved plans and other conditions of the permits. Appropriate inspections should be made on timely occasions during performance of the activity and appropriate notices and instructions given permittees to insure that they do not depart from the approved plans. Revaluation of permits to assure compliance with its purposes and conditions will be carried out as provided in § 325.7. If there are approved material departures from the authorized plans, the District Engineer will require the permittee to furnish corrected plans showing the activity as actually performed.

(b) *Non-compliance.* Where the District Engineer determines that there has been non-compliance with the terms or conditions of a permit, he should first contact the permittee and attempt to resolve the problem. If a mutually agreeable resolution cannot be reached, a written demand for compliance will be made. If the permittee has not agreed to comply within 5 days of receipt of the demand, the District Engineer will issue an immediately effective notice of suspension in accordance with § 325.7(c) and consider initiation of appropriate legal action.

(c) *Surveillance.* For purposes of inspection of permitted activities and for surveillance of the waters of the United States for enforcement of the permit authorities the District Engineer will use all means at his disposal. All Corps of Engineers employees will be instructed to observe and report all activities in waters of the United States which would require permits. The assistance of members of the public and personnel of other interested Federal, State and local agencies to observe and report such activities will be encouraged. To facilitate this surveillance, the District Engineer will, in appropriate cases, require a copy of ENG Form 4336 to be posted conspicuously at the site of authorized activities and will make available to all interested persons information on the scope of authorized activities and the conditions prescribed in the authorizations. Furthermore, significant actions taken under § 325.7 will be brought to the attention of those Federal, State and local agencies and other persons who express particular interest in the affected activity. Surveillance in ocean waters will be accomplished primarily by the Coast Guard pursuant to section 107(c) of the Marine Protection, Research and Sanctuaries Act of 1972, as amended.

(d) *Inspection expenses.* The expenses incurred in connection with the inspection of permitted activity in waters of the United States normally will be paid by the Federal Government in accordance with the provisions of section 6 of the River and Harbor Act of 3 March 1905 (33 U.S.C. 417) unless daily supervision or other unusual expenses are involved. In such unusual cases, and after approval by the Division Engineer, the permittee will be required to bear the expense of inspections in accordance with the conditions of his permit; however, the permittee will not be required or permitted to pay the United States inspector either directly or through the District Engineer. The inspector will be paid on regular payrolls or service vouchers. The District Engineer will collect the cost from the permittee in accordance with the following:

(1) At the end of each month the amount chargeable for the cost of inspection pertaining to the permit will be collected from the permittee and will be taken up on the statement of accountability and deposited in a designated depository to the credit of the Treasurer of the United States, on account of reimbursement of the appropriation from which the expenses of the inspection were paid.

(2) If the District Engineer considers such a procedure necessary to insure the United States against loss through possible failure of the permittee to supply the necessary funds in accordance with subparagraph (1), above, he may require the permittee to keep on deposit with the District Engineer at all times an amount equal to the estimated cost of inspection and supervision for the ensuing month, such deposit preferably being in the form of a certified check, payable to the order of Treasurer of the United States. Certified checks so deposited will be carried in a special deposit account (guaranty for inspection expenses) and upon completion of the work under the permit the funds will be returned to the permittee provided he has paid the actual cost of inspection.

(3) On completion of work under a permit, and the payment of expenses by the permittee without protest, the account will be closed, and outstanding deposits returned to the permittee. If the account is protested by the permittee, it will be referred to the Division Engineer for approval before it is closed and before any deposits are returned to the permittee.

(e) *Bonds.* If the permitted activity includes restoration of the waterway to its original condition, or if the issuing official has reason to consider that the permittee might be prevented from completing work which is necessary to protect the public interest in the waterway, he may require the permittee to post a bond of sufficient amount to indemnify the government against any loss as a result of corrective action it might take.

§ 325.10 Publicity.

The District Engineer will establish and maintain a program to assure that potential applicants for permits are informed of the requirements of this regulation and of the steps required to obtain permits for activities in navigable waters or ocean waters. Whenever the District Engineer becomes aware of plans being developed by either private or public entities who might require permits in order to implement the plans, he will advise the potential applicant in writing of the statutory requirements and the provisions of this regulation. Similarly when the District Engineer is aware of changes in Corps of Engineers regulatory jurisdiction, he will issue appropriate public notices.

§ 325.11 Reports.

The report of a District Engineer on an application for a permit requiring action by the Division Engineer or by the Chief of Engineers will be in a letter form with the application and all pertinent comments, records, photographs, maps, and studies including the final Environmental Impact Statement if prepared, as inclosures. The inclosures for all cases referred to the Chief of Engineers will be in duplicate. If an EIS has been prepared, the report shall not be forwarded until expiration of the 30-day comment period following filing of the final EIS and shall address any comments received on the final EIS. The following items will be included or discussed in the report:

(a) Name of applicant.

(b) Location, character and purpose of proposed activity, including a description of any wetlands involved.

(c) Applicable statutory authorities and administrative determinations conferring Corps of Engineers regulatory jurisdiction.

(d) Other Federal, State, and local authorizations obtained or required and pending.

(e) Date of public notice and public hearings, if held, and summary of objections offered with comments of the District Engineer thereon. The comments should explain the objections and not merely refer to inclosed letters.

(f) Views of State and local authorities.

(g) Views of District Engineer concerning probable effect of the proposed work on:

(1) Navigation, present and prospective.

(2) Harbor lines, if established.

(3) Flood heights, drift and flood damage protection.

(4) Beach erosion or accretion.

(5) Fish and Wildlife.

(6) Water Quality.

(7) Aesthetics.

(8) Historic values.

(9) Recreation.

(10) Economy.

(11) Water supply.

(12) Energy needs.

(13) Land use classification and coastal zone management plans.

(h) Other pertinent remarks, such as:

(1) Extent of public and private need.

(2) Appropriate alternatives.

(3) Extent and permanence of beneficial and/or detrimental effects.

(4) Probable impact in relation to cumulative effects created by other activities.

(i) A copy of the environmental assessment or the Environmental Impact Statement. If an EIS is prepared, a summary of comments received on the final EIS together with the District Engineer's response to those comments.

(j) A discussion of conformity with the guidelines published for the discharge of dredged or fill material in waters of the United States (40 CFR Part 230) or the dumping of dredged material in ocean waters (40 CFR Parts 220 to 229), as applicable.

(k) Conclusions.

(l) Recommendations including any proposed special conditions.

APPENDIX A—PERMIT FORM

Application No. _____
Name of Applicant _____
Effective Date _____
Expiration Date (If applicable) _____

DEPARTMENT OF THE ARMY

Permit

Referring to written request dated _____ for a permit to:

( ) Perform work in or affecting navigable waters of the United States, upon the recommendation of the Chief of Engineers, pursuant to Section 10 of the Rivers and Harbors Act of March 3, 1899 (33 U.S.C. 403);

( ) Discharge dredged or fill material into waters of the United States upon the issuance of a permit from the Secretary of the Army acting through the Chief of Engineers pursuant to Section 404 of the Federal Water Pollution Control Act (86 Stat. 816, Pub. L. 92-500);

( ) Transport dredged material for the purpose of dumping it into ocean waters upon the issuance of a permit from the Secretary of the Army acting through the Chief of Engineers pursuant to Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (86 Stat. 1052; Pub. L. 92-532); _____

_____

_____

(Here insert the full name and address of the permittee.)

is hereby authorized by the Secretary of the Army: to _____

_____

_____

_____

_____

_____

_____

(Here describe the proposed structure or activity, and its intended use. In the case of an application for a fill permit, describe the structures, if any proposed to be erected on the fill. In the case of an application for the discharge of dredged or fill material into waters of the United States or the transportation for discharge in ocean waters of dredged material, describe the type and quantity of material to be discharged.)

in _____

_____

_____

_____

_____

_____

_____

(Here to be named the ocean, river, harbor, or waterway concerned.)

at _____

_____

_____

_____

_____

_____

_____

(Here to be named the nearest well-known locality—preferably a town or city—and the distance in miles and tenths from some definite point in the same, stating whether above or below or giving direction by points of compass.)

in accordance with the plans and drawings attached hereto which are incorporated in and made a part of this permit (on drawings; give file number or other definite identification marks). Subject to the following conditions:

I. General conditions: (a) That all activities identified and authorized herein shall be consistent with the terms and conditions of this permit; and that any activities not specifically identified and authorized herein shall constitute a violation of the terms and conditions of this permit which may result in the modification, suspension or revocation of this permit, in whole or in part, as set forth more specifically in General Conditions j or k hereto, and in the institution of such legal proceedings as the United States Government may consider appropriate, whether or not this permit has been previously modified, suspended or revoked in whole or in part.

(b) That all activities authorized herein shall, if they involve, during their construction or operation, any discharge of pollutants into waters of the United States or ocean waters, be at all times consistent with applicable water quality standards, effluent limitations and standards of performance, prohibitions, pretreatment standards and management practices established pursuant to the Federal Water Pollution Control Act of 1972 (Pub. L. 92-500; 86 Stat. 816), the Marine Protection, Research and Sanctuaries Act of 1972 (Pub. L. 92-532, 86 Stat. 1052), or pursuant to applicable State and local law.

(c) That when the activity authorized herein involves a discharge during its construction or operation, of any pollutant (including dredged or fill material), into waters of the United States, the authorized activity shall, if applicable water quality standards are revised or modified during the term of this permit, be modified, if necessary, to conform with such revised or modified water

quality standards within 6 months of the effective date of any revision or modification of water quality standards, or as directed by an implementation plan contained in such revised or modified standards, or within such longer period of time as the District Engineer, in consultation with the Regional Administrator of the Environmental Protection Agency, may determine to be reasonable under the circumstances.

(d) That the discharge will not destroy a threatened or endangered species as identified under the Endangered Species Act, or endanger the critical habitat of such species.

(e) That the permittee agrees to make every reasonable effort to prosecute the construction or operation of the work authorized herein in a manner so as to minimize any adverse impact on fish, wildlife, and natural environmental values.

(f) That the permittee agrees that it will prosecute the construction or work authorized herein in a manner so as to minimize any degradation of water quality.

(g) That the permittee shall permit the District Engineer or his authorized representative(s) or designee(s) to make periodic inspections at any time deemed necessary in order to assure that the activity being performed under authority of this permit is in accordance with the terms and conditions prescribed herein.

(h) That the permittee shall maintain the structure or work authorized herein in good condition and in accordance with the plans and drawings attached hereto.

(i) That this permit does not convey any property rights, either in real estate or material, or any exclusive privileges; and that it does not authorize any injury to property or invasion of rights or any infringement of Federal, State, or local laws or regulations nor does it obviate the requirement to obtain State or local assent required by law for the activity authorized herein.

(j) That this permit may be summarily suspended, in whole or in part, upon a finding by the District Engineer that immediate suspension of the activity authorized herein would be in the general public interest. Such suspension shall be effective upon receipt by the permittee of a written notice thereof which shall indicate (1) the extent of the suspension, (2) the reasons for this action, and (3) any corrective or preventative measures to be taken by the permittee which are deemed necessary by the District Engineer to abate imminent hazards to the general public interest. The permittee shall take immediate action to comply with the provisions of this notice. Within ten days following receipt of this notice of suspension, the permittee may request a hearing in order to present information relevent to a decision as to whether his permit should be reinstated, modified or revoked. If a hearing is requested, it shall be conducted pursuant to procedures prescribed by the Chief of Engineers. After completion of the hearing, or within a reasonable time after issuance of the suspension notice to the permittee if no hearing is requested, the permit will either be reinstated, modified or revoked.

(k) That this permit may be either modified, suspended or revoked in whole or in part if the Secretary of the Army or his authorized representative determines that there has been a violation of any of the terms or conditions of this permit or that such action would otherwise be in the public interest. Any such modification, suspension, or revocation shall become effective 30 days after receipt by the permittee of written notice of such action which shall specify the facts or conduct warranting same unless (1) within the 30-day period the permittee is able to satisfactorily demonstrate that (a) the alleged violation of the terms and the conditions of this permit did not, in fact, occur or (b) the alleged violation was accidental, and the permittee has been operating in compliance with the terms and conditions of the permit and is able to provide satisfactory assurances that future operations shall be in full compliance with the terms and conditions of this permit; or (2) within the aforesaid 30-day period, the permittee requests that a public hearing be held to present oral and written evidence concerning the proposed modification, suspension or revocation. The conduct of this hearing and the procedures for making a final decision either to modify, suspend or revoke this permit in whole or in part shall be pursuant to procedures prescribed by the Chief of Engineers.

(l) That in issuing this permit, the Government has relied on the information and data which the permittee has provided in connection with his permit application. If, subsequent to the issuance of this permit, such information and data prove to be false, incomplete or inaccurate, this permit may be modified, suspended or revoked, in whole or in part, and/or the Government may, in addition, institute appropriate legal proceedings.

(m) That any modification, suspension, or revocation of this permit shall not be the basis for any claim for damages against the United States.

(n) That the permittee shall notify the District Engineer at what time the activity authorized herein will be commenced, as far in advance of the time of commencement as the District Engineer may specify, and of any suspension of work, if for a period of more than one week, resumption of work and its completion.

(o) That if the activity authorized herein is not started on or before _____ day of _____, 19—, (one year from the date of issuance of this permit unless otherwise specified) and is not completed on or before _____ day of _____, 19—, (three years form the date of issuance of this permit unless otherwise specified) this permit, if not previously revoked or specifically extended, shall automatically expire.

(p) That this permit does not authorize or approve the construction of particular structures, the authorization or approval of which may require authorization by the Congress or other agencies of the Federal Government.

(q) That if and when the permittee desires to abandon the activity authorized herein, unless such abandonment is part of a transfer procedure by which the permittee is transferring his interests herein to a third party pursuant to General Condition S hereof, he must restore the area to a condition satisfactory to the District Engineer.

(r) That if the recording of this permit is possible under applicable State or local law, the permittee shall take such action as may be necessary to record this permit with the Register of Deeds or other appropriate official charged with the responsibility for maintaining records of title to and interests in real property.

(s) That there shall be no unreasonable interference with navigation by the existence or use of the activity authorized herein.

(t) That this permit may not be transferred to a third party without prior written notice to the District Engineer, either by the transferee's written agreement to comply with all terms and conditions of this permit or by the transferee subscribing to this permit in the space provided below and thereby agreeing to comply with all terms and conditions of this permit. In addition, if the permittee transfers the interests authorized herein by conveyance of realty, the deed shall reference this permit and the terms and conditions specified herein and this permit shall be recorded along with the deed with the Register of Deeds or other appropriate official.

II. Special Conditions: Here list conditions relating specifically to the proposed structure or work authorized by this permit. The following Special Conditions will be applicable when appropriate:

Structures In or Affecting Navigable Waters of the United States

(a) That this permit does not authorize the interference with any existing or proposed Federal project and that the permittee shall not be entitled to compensation for damage or injury to the structures or work authorized herein which may be caused by or result from existing or future operations undertaken by the United States in the public interest.

(b) That no attempt shall be made by the permittee to prevent the full and free use by the public of all navigable waters at or adjacent to the activity authorized by this permit.

(c) That if the display of lights and signals on any structure or work authorized herein is not otherwise provided for by law, such lights and signals as may be prescribed by the United States Coast Guard shall be installed and maintained by and at the expense of the permittee.

(d) That the permittee, upon receipt of a notice of revocation of this permit or upon its expiration before completion of the authorized structure or work, shall, without expense to the United States and in such time and manner as the Secretary of the Army or his authorized representative may direct, restore the waterway to its former conditions. If the permittee fails to comply with the direction of the Secretary of the Army or his authorized representative, the Secretary or his designee may restore the waterway to its former condition, by contract or otherwise, and recover the cost thereof from the permittee.

(e) Structures for Small Boats: That permittee hereby recognizes the possibility that the structure permitted herein may be subject to damage by wave wash from passing vessels. The issuance of this permit does not relieve the permittee from taking all proper steps to insure the integrity of the structure permitted herein and the safety of boats moored thereto from damage by wave wash and the permittee shall not hold the United States liable for any such damage.

Maintenance Dredging

(a) That when the work authorized herein includes periodic maintenance dredging, it may be performed under this permit for —— years from the date of issuance of this permit (ten years unless otherwise indicated);

(b) That the permittee will advise the District Engineer in writing at least two weeks before he intends to undertake any maintenance dredging.

Discharges of Dredged or Fill Material Into Waters of the United States

(a) That the discharge will be carried out in conformity with the goals and objectives of the EPA Guidelines established pursuant to Section 404(b) of the FWPCA and published in 40 CFR 230;

(b) That the discharge will consist of suitable material free from toxic pollutants in other than trace quantities;

(c) That the fill created by the discharge will be properly maintained to prevent erosion and other non-point sources of pollution; and

(d) That the discharge will not occur in a component of the National Wild and Scenic River System or in a component of a State wild and scenic river system.

Dumping of Dredged Material Into Ocean Waters

(a) That the dumping will be carried out in conformity with the goals, objectives, and requirements of the EPA criteria established pursuant to Section 102. of the Marine Protection, Research and Sanctuaries Act of 1972, published in 40 CFR 220–228.

(b) That the permittee shall place a copy of this permit in a conspicuous place in the vessel to be used for the transportation and/or dumping of the dredged material as authorized herein.

This permit shall become effective on the date of the District Engineer's signature.

Permittee hereby accepts and agrees to comply with the terms and conditions of this permit.

(Permittee)

(Date)

By authority of the Secretary of the Army:

(District Engineer)

(Date)

Transferee hereby agrees to comply with the terms and conditions of this permit.

(Transferee)

(Date)

APPENDIX B—MEMORANDUM OF UNDERSTANDING BETWEEN THE SECRETARY OF THE INTERIOR AND THE SECRETARY OF THE ARMY

In recognition of the responsibilities of the Secretary of the Army under sections 10 and 13 of the Act of March 3, 1899 (33 U.S.C. 403 and 407), relating to the control of dredging, filling, and excavation in the navigable waters of the United States, and the control of refuse in such waters, and the interrelationship of those responsibilities with the responsibilities of the Secretary of the Interior under the Federal Water Pollution Control Act, as amended (33 U.S.C. 466 et seq.), the Fish and Wildlife Coordination Act, as amended (16 U.S.C. 661–666c), and the Fish and Wildlife Act of 1956, as amended (16 U.S.C. 742a et seq.), relating to the control and prevention of water pollution in such waters and the conservation of the Nation's natural resources and related environment, including fish and wildlife and recreational values therein; in recognition of our joint responsibilities under Executive Order No. 11288 to improve water quality through the prevention, control, and abatement of water pollution from Federal and federally licensed activities; and in recognition of other provisions of law and policy, we, the two Secretaries, adopt the following policies and procedures:

POLICIES

1. It is the policy of the two Secretaries that there shall be full coordination and cooperation between their respective Departments on the above responsibilities at all organizational levels, and it is their view that maximum efforts in the discharge of those responsibilities, including the resolution of differing views, must be undertaken at the earliest practicable time and at the field organizational unit most directly concerned. Accordingly, District Engineers of the U.S. Army Corps of Engineers shall coordinate with the Regional Directors of the Secretary of the Interior on fish and wildlife, recreation, and pollution problems associated with dredging, filling, and excavation operations to be conducted under permits issued under the 1899 Act in the navigable waters of the United States, and they shall avail themselves of the technical advice and assistance which such Directors may provide.

2. The Secretary of the Army will seek the advice and counsel of the Secretary of the Interior on difficult cases. If the Secretary of the Interior advises that proposed operations will unreasonably impair natural resources or the related environment, including the fish and wildlife and recreational values thereof, or will reduce the quality of such waters in violation of applicable water quality standards, the Secretary of the Army in acting on the request for a permit will carefully evaluate the advantages and benefits of the operations in relation to the resultant loss or damage, including all data presented by the Secretary of the Interior, and will either deny the permit or include such conditions in the permit as he determines to be in the public interest, including provisions that will assure compliance with water quality standards established in accordance with law.

PROCEDURES FOR CARRYING OUT THESE POLICIES

1. Upon receipt of an application for a permit for dredging, filling, excavation, or other related work in navigable waters of the United States, the District Engineers shall send notices to all interested parties, including the appropriate Regional Directors of the Federal Water Pollution Control Administration, the United States Fish and Wildlife Service, and the National Park Service of the Department of the Interior, and the appropriate State conservation, resources, and water pollution agencies.

2. Such Regional Directors of the Secretary of the Interior shall immediately make such studies and investigations as they deem necessary or desirable, consult with the appropriate State agencies, and advise the District Engineers whether the work proposed by the permit applicant, including the deposit of any material in or near the navigable waters of the United States, will reduce the quality of such waters in violation of applicable water quality standards or unreasonably impair natural resources or the related environment.

3. The District Engineer will hold public hearings on permit applications whenever response to a public notice indicates that hearings are desirable to afford all interested parties full opportunity to be heard on objections raised.

4. The District Engineer, in deciding whether a permit should be issued, shall weigh all relevant factors in reaching his decision. In any case where Directors of the Secretary of the Interior advise the District Engineers that proposed work will impair the water quality in violation of applicable water quality standards or unreasonably impair the natural resources or the related environment, he shall, within the limits of his responsibility, encourage the applicant to take steps that will resolve the objections to the work. Failing in this respect, the District Engineer shall forward the case for the consideration of the Chief of Engineers and the appropriate Regional Director of the Secretary of the Interior shall submit his views and recommendations to his agency's Washington Headquarters.

5. The Chief of Engineers shall refer to the Under Secretary of the Interior all those cases referred to him containing unresolved substantive differences of views and he shall include his analysis thereof, for the purpose of obtaining the Department of Interior's comments prior to final determination of the issues.

6. In those cases where the Chief of Engineers and the Under Secretary are unable to resolve the remaining issues, the cases will be referred to the Secretary of the Army for decision in consultation with the Secretary of the Interior.

7. If in the course of operations within this understanding, either Secretary finds its terms in need of modification, he may notify the other of the nature of the desired changes. In that event the Secretaries shall within 90 days negotiate such amendment as is considered desirable or may agree upon termination of this understanding at the end of the period.

Dated: July 13, 1967.

STEWART L. UDALL,
Secretary of the Interior.

Dated: July 13, 1967.

STANLEY RESOR,
Secretary of the Army.

PART 326—ENFORCEMENT

Sec.
326.1 Purpose.
326.2 Discovery.
326.3 Investigation.
326.4 Legal Action.
326.5 Processing After-the-fact Applications.

AUTHORITY: 33 U.S.C. 401 et seq.; 33 U.S.C. 1344; 33 U.S.C. 1413.

§ 326.1 Purpose.

This regulation prescribes the policy, practice, and procedures to be followed by the Corps of Engineers in connection with activities requiring Department of the Army permits that are performed without prior authorization.

§ 326.2 Discovery of unauthorized activity in Progress

When the District Engineer becomes aware of any unauthorized activity which is still in progress, he shall immediately issue a cease and desist order to all persons responsible for and/or involved in the performance of the activity. If appropriate, the District Engineer may also order interim protective measures to be taken in order to protect the public interest.

§ 326.3 Investigation.

The District Engineer shall commence an immediate investigation of all unauthorized activities brought to his attention to ascertain the facts surrounding the activity. In making this investigation, the District Engineer shall solicit the views of the Regional Administrator of the Environmental Protection Agency, the Regional Director of the U.S. Fish and Wildlife Service, and the Regional Director of the National Marine Fisheries Service, and other appropriate Federal, State, and local agencies. He shall also request the persons involved in the unauthorized activity to provide appropriate information on the activity to assist him in his evaluation and in recommending the course of action to be taken. The District Engineer shall evaluate the information and views developed during this investigation in conjunction with the appropriate factors and criteria that pertain to the particular unauthorized activity as cited in 33 CFR Parts 320, 321, 322, 323, and 324, and the guidance contained in § 326.4, below. Following this evaluation, the District Engineer shall formulate recommendations as to the appropriate administrative and/or legal action to be taken.

§ 326.4 Legal action.

(a) District Engineers shall be guided by the following policies in determining whether an unauthorized activity requires appropriate legal action.

(1) *Criminal action.* Criminal action is considered appropriate when the facts surrounding an unauthorized activity reveal the necessity for punitive action and/or when deterrence of future unauthorized activities in the area is considered essential to the establishment or maintenance of a viable permit program.

(2) *Civil action.* Civil action is considered appropriate when the preliminary evaluation of the unauthorized activity reveals that (i) restoration is in the public interest and attempts to secure voluntary restoration have failed, or (ii) the unauthorized activity is in the public interest but must be altered or modified by judicial order because attempts to secure voluntary compliance have failed, or (iii) a civil penalty under Section 309 of the FWPCA is warranted.

(b) Preparation of case. If the District Engineer determines that legal action is appropriate, he shall prepare a litigation report which shall contain an analysis of the data and information obtained during his investigation and a recommendation of appropriate civil and criminal action. In those cases where the analysis of the facts developed during his investigation (when made in conjunction with the appropriate factors and criteria specified in 33 CFR Parts 320, 321, 322, 323, and 324) leads to the preliminary conclusion that removal of the unauthorized activity is in the public interest, the District Engineer shall also recommend restoration of the area to its original or comparable condition.

(c) Referral to local U.S. Attorney. Except as provided in subsection (d), District Engineers are authorized to refer the following cases directly to the local U.S. Attorney.

(1) All unauthorized structures or work in or affecting navigable waters of the United States that fall exclusively within the purview of Section 10 of the River and Harbor Act of 1899 (see 33 CFR Part 322) for which a criminal fine or penalty under Section 12 of that Act (33 USC 406) is considered appropriate.

(2) All civil actions involving small unauthorized structures, such as piers, which the District Engineer determines are (i) not in the public interest and therefore must be removed, or (ii) are in the public interest but must be altered or modified by judicial order, because attempts to secure voluntary compliance have failed.

(3) All violations of Section 301 of the Federal Water Pollution Control Act Amendments of 1972 (33 USC 1311) involving the unauthorized discharge of dredged or fill material into the waters of the United States where the District Engineer determines, with the concurrence of the Regional Administrator, that civil and/or criminal action pursuant to Section 309 of the FWPCA is appropriate.

(4) All cases for which a temporary restraining order and/or preliminary injunction is appropriate following noncompliance with a cease and desist order.

Information copies of all letters of referral shall be forwarded to the Chief of Engineers, ATTN: DAEN-CCK, and the Chief Pollution Control Section, Land and Natural Resources Division, Department of Justice, Washington, D.C. 20530.

(d) Referral to Office, Chief of Engineers. District Engineers shall prepare and forward a litigation report to the Office, Chief of Engineers, ATTN: DAEN-CCK, for all other cases not identified in subsection (c) in which civil and/or criminal action is considered appropriate, including:

(1) All cases involving significant questions of law or fact;

(2) All cases involving discharges of dredged or fill material into waters of the United States that are not interstate waters or navigable waters of the United States, or part of a surface tributary system to these waters;

(3) All cases involving recommendations for substantial or complete restoration;

(4) All cases involving violations of Section 9 of the River and Harbor Act of 1899; and

(5) All cases involving violations of the Marine Protection, Research and Sanctuaries Act of 1972.

(e) If the District Engineer refers a case to the local U.S. Attorney or if criminal and/or civil action is instituted against the responsible person for any unauthorized activity, the District Engineer shall not accept for processing any application for a Department of the Army permit until final disposition of the referral action and/or all judicial proceedings, including the payment of all prescribed penalties and fines and/or completion of all work ordered by the court. Thereafter, the District Engineer may accept an application for a permit; provided, that with respect to any judicial order requiring partial or total restoration of an area, the District Engineer, if so ordered by the court, shall supervise this restoration effort and may allow the responsible persons to apply for a permit for only that portion of the unauthorized activity for which restoration has not been so ordered.

§ 326.5 Processing after-the-fact applications.

In those cases in which the District Engineer determines that the unauthorized activity does not warrant legal action, the following procedures shall be followed.

(a) Processing and evaluation of applications for after-the-fact authorizations for activities undertaken without the required Department of the Army permits will in all other respects follow the standard policies and procedures of 33 CFR Parts 320–325. Thus, authorization may still be denied in accordance with the policies and procedures of those regulations.

(b) Where after-the-fact authorization in accordance with this paragraph is determined to be in the public interest, the standard permit form for the activity will be used, omitting inappropriate conditions, and including whatever special conditions the District Engineer may deem appropriate to mitigate or prevent undesirable effects which may have occurred or might occur.

(c) Where after-the-fact authorization is not determined to be in the public interest, the notification of the denial of the permit will prescribe any corrective actions to be taken in connection with the work already accomplished, including restoration of those areas subject to denial, and establish a reasonable period of time for the applicant to complete such actions. The District Engineer, after denial of the permit, will again consider whether civil and/or criminal action is appropriate in accordance with § 326.4.

(d) If the applicant declines to accept the proposed permit conditions, or fails to take corrective action prescribed in the notification of denial, or if the District Engineer determines, after denying the permit application, that legal action is appropriate, the matter will be referred to the Chief of Engineers, ATTN: DAEN-CCK, with recommendations for appropriate action.

PART 327—PUBLIC HEARINGS

Sec.

AUTHORITY: 33 U.S.C. 1344; 33 U.S.C. 1413.

§ 327.1 Purpose.

This regulation prescribes the policy, practice and procedures to be followed by the U.S. Army Corps of Engineers in the conduct of public hearings conducted in the evaluation of a proposed Department of the Army permit action or Federal project as defined in § 327.3 below including those held pursuant to Section 404 of the Federal Water Pollution Control Act (FWPCA) (33 U.S.C. 1344) and Section 103 of the Marine Protection, Research and Sanctuaries Act (MPRSA), as amended (33 U.S.C. 1413).

§ 327.2 Applicability.

This regulation is applicable to all Divisions and Districts responsible for the conduct of public hearings.

§ 327.3 Definitions.

(a) Public hearing means a public proceeding conducted for the purpose of acquiring information or evidence which will be considered in evaluating a proposed Department of the Army permit action, or Federal project, and which affords to the public the opportunity to present their views, opinions, and information on such permit actions or Federal projects.

(b) Permit action, as used herein, means the review of an application for a permit pursuant to Section 10 of the

River and Harbor Act of 1899 (33 U.S.C. 403), Section 404 of the FWPCA (33 U.S.C. .1344), the Outer Continental Shelf Act (43 U.S.C. 1333(f)), and Section 103 of the MPRSA of 1972, as amended (33 U.S.C. 1413), or the modification or revocation of any Department of the Army permit. (See 33 CFR 325.7.)

(c) Federal project means a Corps of Engineers project (work or activity of any nature for any purpose which is to be performed by the Chief of Engineers pursuant to Congressional authorizations) involving the discharge of dredged or fill material into waters of the United States or the transportation of dredged material for the purpose of dumping it in ocean waters subject to Section 404 of the FWPCA (33 U.S.C. 1344), or Section 103 of the MPRSA, as amended (33 U.S.C. 1413; and 33 CFR 209.145. (This regulation supersedes all references to public meetings in 33 CFR 209.145.)

§ 327.4 General policies.

(a) A public hearing will be held in connection with the consideration of a Department of the Army permit application under Section 404 of the FWPCA or Section 103 of the MPRSA, or a Federal project whenever a public hearing will assist in making a decision on such permit application or Federal project. In addition, a public hearing may be held when it is proposed to modify or revoke a permit. (See 33 CFR 325.7.)

(b) Unless the public notice specifies that a public hearing will be held, any person may request, in writing, within the comment period specified in the public notice on a Department of the Army permit application under Section 404 of the FWPCA or Section 103 of the MPRSA or on a Federal project, that a public hearing be held to consider the material matters in issue in the permit application or Federal project. Upon receipt of any such request, stating with particularity the reasons for holding a public hearing, the District Engineer shall promptly set a time and place for the public hearing, and give due notice thereof, as prescribed in § 327.11 below. Requests for a public hearing under this paragraph shall be granted, unless the District Engineer determines that the issues raised are insubstantial or there is otherwise no valid interest to be served by a hearing. The District Engineer will make such a determination in writing, and communicate his reasons therefor to all requesting parties.

(c) In cases involving the evaluation of a Department of the Army permit application only under Section 10 of the River and Harbor Act of 1899 (33 U.S.C. 403), public hearings will be held upon written request whenever the District Engineer determines that there is sufficient public interest to warrant such action. Among the instances warranting public hearings are general public opposition to a proposed work, Congressional requests or requests from responsible local authorities, or controversial cases involving significant environmental issues.

(d) In case of doubt, a public hearing shall be held. HQDA has the discretionary power to require hearings in any case.

(e) In fixing the time and place for a hearing, due regard shall be had for the convenience and necessity of the interested public.

§ 327.5 Presiding officer.

(a) The District Engineer, in whose District a matter arises, shall normally serve as the Presiding Officer. When the District Engineer is unable to serve, he may designate the Deputy District Engineer as such Presiding Officer. In any case, he may request the Division Engineer to designate another Presiding Officer. In cases of unusual interest, the Chief of Engineers reserves the power to appoint such person as he deems appropriate to serve as the Presiding Officer.

(b) The Presiding Officer in each case shall establish a hearing file. The hearing file shall include a copy of any permit application or permits and supporting data, any public notices issued in the case, the request or requests for the hearing and any data or material submitted in justification thereof, materials submitted in opposition to the proposed action, the hearing transcript, and such other material as may be relevant or pertinent to the subject matter of the hearing. The hearing file shall be available for public inspection with the exception of material exempt from disclosure under the Freedom of Information Act.

§ 327.6 Legal adviser.

In each public hearing, the District Counsel or his designee shall serve as legal adviser to the Presiding Officer in ruling upon legal matters and issues that may arise.

§ 327.7 Representation.

At the public hearing, any person may appear on his own behalf, and may be represented by counsel, or by other representatives.

§ 327.8 Conduct of hearings.

(a) Hearings shall be conducted by the Presiding Officer in an orderly but expeditious manner. Any person shall be permitted to submit oral or written statements concerning the subject matter of the hearing, to call witnesses who may present oral statements, and to present recommendations as to an appropriate decision. Any person may present written statements for the hearing file prior to the time the hearing file is closed to public submissions, and may present proposed findings and recommendations. The Presiding Officer shall afford participants an opportunity for rebuttal.

(b) The Presiding Officer shall have discretion to establish reasonable limits upon the time allowed for statements of witnesses, for arguments of parties or their counsel or representatives, and upon the number of rebuttals.

(c) Cross-examination of witnesses shall not be permitted.

(d) All public hearings shall be reported verbatim. Copies of the transcripts of proceedings may be purchased by any person from the Corps of Engineers or the reporter of such hearing. A copy will be available for public inspection at the office of the appropriate District Engineer.

(e) All written statements, charts, tabulations, and similar data offered in evidence at the hearing shall, subject to exclusion by the Presiding Officer for reasons of redundancy, be received in evidence and shall constitute a part of the hearing file.

(f) At any hearing, the Presiding Officer shall make an opening statement, outlining the purpose of the hearing and prescribing the general procedures to be followed. The Presiding Officer shall afford participants an opportunity to respond to his opening statement.

(g) The Presiding Officer shall allow a period of 10 days after the close of the public hearing for submission of written comments. After such time has expired, unless such period is extended by the Presiding Officer or the Chief of Engineers for good cause, the hearing file shall be closed to additional public written comments.

(h) In appropriate cases, the District Engineer may participate in joint public hearings with other Federal or State agencies, provided the procedures of those hearings meet the requirements of this regulation. In those cases in which the other Federal or State agency is required to allow cross-examination in its public hearing, the District Engineer may still participate in the joint public hearing but shall not require cross examination as a part of his participation.

(i) The procedures in subparagraphs (d), (f) and (g) of this Section may be waived by the Presiding Officer in appropriate cases.

§ 327.9 Filing of transcript of the public hearing.

Where the Presiding Officer is the initial action authority, the transcript of the public hearing, together with all evidence introduced at the public hearing, shall be made a part of the administrative record of the permit action or Federal project. The initial action authority shall fully consider the matters discussed at the public hearing in arriving at his initial decision or recommendation and shall address, in his decision or recommendation, all substantial and valid issues presented at the hearing. Where a person other than the initial action authority serves as Presiding Officer, such person shall forward the transcript of the public hearing and all evidence received in connection therewith to the initial action authority together with a report summarizing the issues covered at the hearing. The report of the Presiding Officer and the transcript of the public hearing and evidence submitted there shall in such cases be fully considered by the initial action authority in making his decision or recommendation to higher authority as to such permit action or Federal project.

§ 327.10 Powers of the Presiding Officer.

Presiding Officers shall have the following powers:

(a) To regulate the course of hearing including the order of all sessions and the scheduling thereof, after any initial session, and the recessing, reconvening, and adjournment thereof; and

(b) To take any other action necessary or appropriate to the discharge of the duties vested in them, consistent with the statutory or other authority under which the Chief of Engineers functions, and with the policies and directives of the Chief of Engineers and the Secretary of the Army.

§ 327.11 Public notice.

(a) Public notice shall be given of any public hearing to be held pursuant to this regulation. Such notice shall provide for a period of not less than 30 days following the date of public notice during which time interested parties may prepare themselves for the hearing, except that, in cases of public necessity, a shorter time may be allowed. Notice shall also be given to all Federal agencies affected by the proposed action, and to State and local agencies having an interest in the subject matter of the hearing. Notice shall be sent to all persons requesting a hearing and shall be posted in appropriate government buildings and published in newspapers of general circulation.

(b) The notice shall contain time, place, and nature of hearing; the legal authority and jurisdiction under which the hearing is held; and location of and availability of the draft Environmental Impact Statement or Environmental Assessment.

PART 328—HARBOR LINES

Sec.

AUTHORITY: 33 U.S.C. 401 et seq.

§ 328.1 Purpose and scope.

This regulation prescribes the policy, practice and procedures concerning harbor lines and any work in navigable waters of the United States shoreward of such lines.

§ 328.2 Applicability.

This regulation is applicable to all Corps of Engineers activities and installations having Civil Works responsibilities.

§ 328.3 References.

(a) Section 11 of the River and Harbor Act of 1899 (33 U.S.C. 404).

(b) Section 10 of the River and Harbor Act of 1899 (33 U.S.C. 403).

(c) Public Law 91-190, the National Environmental Policy Act of 1969.

§ 328.4 Definition.

The term "harbor line(s)" is used here in its generic sense. It includes types of harbor lines frequently referred to by other names, including, for example, pierhead lines and bulkhead lines.

§ 328.5 The purpose of harbor lines.

(a) Under previous policies, practices and procedures, riparian owners could erect open pile structures or undertake solid fill construction shoreward of established harbor lines without obtaining a permit under 33 U.S.C. 403. This was a matter of great concern, particularly in cases involving long established harbor lines, since all factors affecting the public interest may not have been taken into account at the time the lines were established. Accordingly, under previous policies, practices and procedures there was the danger that work shoreward of existing harbor lines could be undertaken without appropriate consideration having been given to the impact which such work may have on the environment and without a judgment having been made as to whether or not the work was, on balance, in the public interest.

(b) In order to assure that the public interest will be considered and protected in all instances, all existing and future harbor lines were declared on 27 May 1970 (33 CFR 209.150) to be guidelines for defining, with respect to the impact on navigation interests alone, the offshore limits of open pile structures (pierhead lines) or fills (bulkhead lines). A permit under 33 USC 403 is required in each case for any work which is commenced shoreward of existing or future harbor lines after 27 May 1970. Applications for permits for work in navigable waters of the United States shoreward of harbor lines shall be filed and processed in accordance with the provisions of 33 CFR Part 325. No permit is required for work completed or commenced prior to 27 May 1970 in conformance with existing harbor line authority.

§ 328.6 Establishment or modification of harbor lines.

Applications for the establishment of new harbor lines or the modification of existing harbor lines will be processed in a manner similar to applications for permits for work in navigable waters of the United States. Public notice concerning any such application will be sent to all parties known or believed to be interested in the application and a copy of the notice will be posted in post offices or other public places in the area. Public notices, apart from providing information relative to any harbor line application, shall make it clear that harbor lines are guidelines for defining, with respect to the impact on navigation interests alone, the offshore limits of open pile structures or fills and that the establishment of a harbor line carries with it no presumption that individual applications for permits to undertake work shoreward of any harbor line will be granted. Public hearings will be held in connection with applications for the establishment or modification of harbor lines whenever there appears to be sufficient public interest to justify the holding of a public hearing or when responsible Federal, State or local authorities, including Members of the Congress, request that a hearing be held and it is likely that information will be presented at the hearing that will be of assistance in determining whether the harbor line should be established or modified. District Engineers will forward all recommendations concerning the establishment or modification of harbor lines through the appropriate Division Engineer to the Office of the Chief of Engineers, DAEN-CWO-N. No new harbor lines will be established and no existing harbor lines will be modified unless specifically authorized by the Chief of Engineers.

PART 329—DEFINITION OF NAVIGABLE WATERS OF THE UNITED STATES

Sec.

AUTHORITY: 33 U.S.C. 401 et seq.

§ 329.1 Purpose.

This regulation defines the term "navigable waters of the United States" as it is used to define authorities of the Corps of Engineers. It also prescribes the policy, practice and procedure to be used in determining the extent of the jurisdiction of the Corps of Engineers and in answering inquiries concerning "navigable waters."

§ 329.2 Applicability.

This regulation is applicable to all Corps of Engineers Districts and Divisions having Civil Works responsibilities.

§ 329.3 General policies.

Precise definitions of "navigable waters" or "navigability" are ultimately dependent on judicial interpretation, and cannot be made conclusively by administrative agencies. However, the policies and criteria contained in this regulation are in close conformance with the tests used by the Federal Courts and determinations made under this regulation are considered binding in regard to the activities of the Corps of Engineers.

§ 329.4 General definition.

Navigable waters of the United States are those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. A determination of navigability,

once made, applies laterally over the entire surface of the waterbody, and is not extinguished by later actions or events which impede or destroy navigable capacity.

§ 329.5 General scope of determination.

The several factors which must be examined when making a determination whether a waterbody is a navigable water of the United States are discussed in detail below. Generally, the following conditions must be satisfied:

(a) Past, present, or potential presence of interstate or foreign commerce;

(b) Physical capabilities for use by commerce as in subparagraph (a) above; and

(c) Defined geographic limits of the waterbody.

§ 329.6 Interstate or foreign commerce

(a) *Nature of Sommerce: type, means, and extent of use.* The types of commercial use of a waterway are extremely varied and will depend on the character of the region, its products, and the difficulties or dangers of navigation. It is the waterbody's capability of use by the public for purposes of transportation of commerce which is the determinative factor, and not the time, extent or manner of that use. As discussed in § 329.9 below, it is sufficient to establish the potential for commercial use at any past, present, or future time. Thus, sufficient commerce may be shown by historical use of canoes, bateaux, or other frontier craft, as long as that type of boat was common or well-suited to the place and period. Similarly, the particular items of commerce may vary widely, depending again on the region and period. The goods involved might be grain, furs, or other commerce of the time. Logs are a common example; transportation of logs has been a substantial and well-recognized commercial use of many navigable waters of the United States. Note, however, that the mere presence of floating logs will not of itself make the river "navigable"; the logs must have been related to a commercial venture. Similarly, the presence of recreational craft may indicate that a waterbody is capable of bearing some forms of commerce, either presently, in the future, or at a past point in time.

(b) *Nature of commerce: interstate and intrastate.* Interstate commerce may of course be existent on an intrastate voyage which occurs only between places within the same state. It is only necessary that goods may be brought from, or eventually be destined to go to, another state. (For purposes of this regulation, the term "interstate commerce" hereinafter includes "foreign commerce" as well.)

§ 329.7 Intrastate or interstate nature of waterway.

A waterbody may be entirely within a state, yet still be capable of carrying interstate commerce. This is especially clear when it physically connects with a generally acknowledged avenue of interstate commerce, such as the ocean or one of the Great Lakes, and is yet wholly within one state. Nor is it necessary that there be a physically navigable connection across a state boundary. Where a waterbody extends through one or more states, but substantial portions, which are capable of bearing interstate commerce, are located in only one of the states, the entirety of the waterway up to the head (upper limit) of navigation is subject to Federal jurisdiction.

§ 329.8 Improved or natural conditions of the waterbody.

Determinations are not limited to the natural or original condition of the waterbody. Navigability may also be found where artificial aids have been or may be used to make the waterbody suitable for use in navigation.

(a) *Existing improvements: artificial waterbodies.* (1) An artificial channel may often constitute a navigable water of the United States, even though it has been privately developed and maintained, or passes through private property. The test is generally as developed above, that is, whether the waterbody is capable of use to transport interstate commerce. Canals which connect two navigable waters of the United States and which are used for commerce clearly fall within the test, and themselves become navigable. A canal open to navigable waters of the United States on only one end is itself navigable where it in fact supports interstate commerce. A canal or other artificial waterbody that is subject to ebb and flow of the tide is also a navigable water of the United States.

(2) The artificial waterbody may be a major portion of a river or harbor area or merely a minor backwash, slip, or turning area. (See § 329.12(b).)

(3) Private ownership of the lands underlying the waterbody, or of the lands through which it runs, does not preclude a finding of navigability. Ownership does become a controlling factor if a privately constructed and operated canal is not used to transport interstate commerce nor used by the public; it is then not considered to be a navigable water of the United States. However, a private waterbody, even though not itself navigable, may so affect the navigable capacity of nearby waters as to nevertheless be subject to certain regulatory authorities.

(b) *Non-existing improvements, past or potential.* A waterbody may also be considered navigable depending on the feasibility of use to transport interstate commerce after the construction of whatever "reasonable" improvements may potentially be made. The improvements need not exist, be planned, nor even authorized; it is enough that potentially they could be made. What is a "reasonable" improvement is always a matter of degree; there must be a balance between cost and need at a time when the improvement would be (or would have been) useful. Thus, if an improvement were "reasonable" at a time of past use, the water was therefore navigable in law from that time forward. The changes in engineering practices or the coming of new industries with varying classes of freight may affect the type of the improvement; those which may be entirely reasonable in a thickly populated, highly developed industrial region may have been entirely too costly for the same region in the days of the pioneers. The determination of reasonable improvement is often similar to the cost analyses presently made in Corps of Engineers studies.

§ 329.9 Time at which commerce exists or determination is made.

(a) *Past use.* A waterbody which was navigable in its natural or improved state, or which was susceptible of reasonable improvement (as discussed in § 329.8(b) above) retains its character as "navigable in law" even though it is not presently used for commerce, or is presently incapable of such use because of changed conditions or the presence of obstructions. Nor does absence of use because of changed economic conditions affect the legal character of the waterbody. Once having attained the character of "navigable in law," the Federal authority remains in existence, and cannot be abandoned by administrative officers or court action. Nor is mere inattention or ambiguous action by Congress an abandonment of Federal control. However, express statutory declarations by Congress that described portions of a waterbody are nonnavigable, or have been abandoned, are binding upon the Department of the Army. Each statute must be carefully examined, since Congress often reserves the power to amend the Act, or assigns special duties of supervision and control to the Secretary of the Army or Chief of Engineers.

(b) *Future or potential use.* Navigability may also be found in a waterbody's susceptibility for use in its ordinary condition or by reasonable improvement to transport interstate commerce. This may be either in its natural or improved condition, and may thus be existent although there has been no actual use to date. Non-use in the past therefore does not prevent recognition of the potential for future use.

§ 329.10 Existence of obstructions.

A stream may be navigable despite the existence of falls, rapids, sand bars, bridges, portages, shifting currents, or similar obstructions. Thus, a waterway in its original condition might have had substantial obstructions which were overcome by frontier boats and/or portages, and nevertheless be a "channel" for commerce, even though boats had to be removed from the water in some stretches, or logs be brought around an obstruction by means of artificial chutes. However, the question is ultimately a matter of degree, and it must be recognized that there is some point beyond which navigability could not be established.

§ 329.11 Geographic and jurisdictional limits of rivers and lakes.

(a) *Jurisdiction over entire bed.* Federal regulatory jurisdiction, and powers of improvement for navigation, extend laterally to the entire water surface and bed of a navigable waterbody, which includes all the land and waters below the ordinary high water mark.

(1) The "ordinary high water mark" on non-tidal rivers is the line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank; shelving; changes in the character of soil; destruction of terrestrial vegetation; the presence of litter and debris; or other appropriate means that consider the characteristics of the surrounding areas.

(2) Ownership of a river or lake bed or of the lands between high and low water marks will vary according to state law; however, private ownership of the underlying lands has no bearing on the existence or extent of the dominant Federal jurisdiction over a navigable waterbody.

(b) *Upper limit of navigability.* The character of a river will, at some point along its length, change from navigable to non-navigable. Very often that point will be at a major fall or rapids, or other place where there is a marked decrease in the navigable capacity of the river. The upper limit will therefore often be the same point traditionally recognized as the head of navigation, but may, under some of the tests described above, be at some point yet further upstream.

§ 329.12 Geographic and jurisdictional limits of oceanic and tidal waters.

(a) *Ocean and coastal waters.* The navigable waters of the United States over which Corps of Engineers regulatory jurisdiction extends include all ocean and coastal waters within a zone three geographic (nautical) miles seaward from the coast line. Wider zones are recognized for special regulatory powers, such as those exercised over the Outer Continental Shelf.

(1) *Coast line defined.* Generally, where the shore directly contacts the open sea, the line on the shore reached by the ordinary low tides comprises the coast line from which the distance of three geographic miles is measured. On the Pacific coast the line of mean lower low water is used. The line has significance for both domestic and international law (in which it is termed the "baseline"), and is subject to precise definitions. Special problems arise when offshore rocks, islands, or other bodies exist, and the line may have to be drawn to seaward of such bodies.

(2) *Shoreward limit of jurisdiction.* Regulatory jurisdiction in coastal areas extends to the line on the shore reached by the plane of the mean (average) high water. However, on the Pacific coast, the line reached by the mean of the higher high waters is used. Where precise determination of the actual location of the line becomes necessary, it must be established by survey with reference to the available tidal datum, preferably averaged over a period of 18.6 years. Less precise methods, such as observation of the "apparent shoreline" which is determined by reference to physical markings, lines of vegetation, or changes in type of vegetation, may be used only where an estimate is needed of the line reached by the mean high water.

(b) *Bays and estuaries.* Regulatory jurisdiction extends to the entire surface and bed of all waterbodies subject to tidal action. Jurisdiction thus extends to the edge (as determined by § 329.12(a)(2) above) of all such waterbodies, even though portions of the waterbody may be extremely shallow, or obstructed by shoals, vegetation, or other barriers. Marshlands and similar areas are thus considered "navigable in law," but only so far as the area is subject to inundation by the mean high waters. The relevant test is therefore the presence of the mean high tidal waters, and not the general test described above, which generally applies to inland rivers and lakes.

§ 329.13 Geographic limits: shifting boundaries.

Permanent changes of the shoreline configuration result in similar alterations of the boundaries of the navigable waters of the United States. Thus, gradual changes which are due to natural causes and are perceptible only over some period of time constitute changes in the bed of a waterbody which also change the shoreline boundaries of the navigable waters of the United States. However, an area will remain "navigable in law," even though no longer covered with water, whenever the change has occurred suddenly, or was caused by artificial forces intended to produce that change. For example, shifting sand bars within a river or estuary remain part of the navigable water of the United States, regardless that they may be dry at a particular point in time.

§ 329.14 Determination of navigability.

(a) *Effect on determinations.* Although conclusive determinations of navigability can be made only by Federal Courts, those made by Federal agencies are nevertheless accorded substantial weight by the courts. It is therefore necessary that when jurisdictional questions arise, District personnel carefully investigate those waters which may be subject to Federal regulatory jurisdiction under the guidelines set out above, as the resulting determination may have substantial impact upon a judicial body. Official determinations by an agency made in the past can be revised or reversed as necessary to reflect changed rules or interpretations of the law.

(b) *Procedures of determination.* A determination whether a waterbody is a navigable water of the United States will be made by the Division Engineer, and will be based on a report of findings prepared at the District level in accordance with the criteria set out in this regulation. Each report of findings will be prepared by the District Engineer, accompanied by an opinion of the District Counsel, and forwarded to the Division Engineer for a final determination. Each report of findings will be based substantially on applicable portions of the format in subparagraph (c) below.

(c) Suggested format of report of findings:

(1) Name of waterbody_____
(2) Tributary to_____
(3) Physical characteristics_____
(i) Type: (river, bay slough, estuary, etc.)_____
(ii) Length _____
(iii) Approximate discharge volumes:
Maximum _____
Minimum _____
Mean _____
(iv) Fall per mile_____
(v) Extent of tidal influence_____
(vi) Range between ordinary high and ordinary low water_____
(vii) Description of improvements to navigation not listed in subparagraph (5) below _____
(4) Nature and location of significant obstructions to navigation in portions of the waterbody used or potentially capable of use in interstate commerce_____
(5) Authorized projects_____
(i) Nature, condition and location of any improvements made under projects authorized by Congress_____
(ii) Description of projects authorized but not constructed_____
(iii) List of known survey documents or reports describing the waterbody_____
(6) Past or present interstate commerce_____
(i) General types, extent, and period in time _____
(ii) Documentation if necessary_____
(7) Potential use for interstate commerce, if applicable_____
(i) If in natural condition_____
(ii) If improved_____
(8) Nature of jurisdiction known to have been exercised by Federal agencies if any_____
(9) State or Federal court decisions relating to navigability of the waterbody, if any_____
(10) Remarks _____
(11) Finding of navigability (with date) and recommendation for determination_____

§ 329.15 Inquiries regarding determinations.

(a) Findings and determinations should be made whenever a question arises regarding the navigability of a waterbody. Where no determination has been made, a report of findings will be prepared and forwarded to the Division Engineer, as described above. Inquiries may be answered by an interim reply which indicates that a final agency determination must be made by the Division Engineer. If a need develops for an emergency determination, District Engineers may act in reliance on a finding prepared as in § 329.14 above. The report of findings should then be forwarded to the Division Engineer on an expedited basis.

(b) Where determinations have been made by the Division Engineer, inquiries regarding the navigability of specific portions of waterbodies covered by these determinations may be answered as follows:

This Department, in the administration of the laws enacted by Congress for the protection and preservation of the navigable waters of the United States, has determined that _____ (River) (Bay) (Lake, etc.) is a navigable water of the United States from _____ to _____. Actions which modify or otherwise affect those waters are subject to the jurisdiction of this Department,

whether such actions occur within or outside the navigable areas.

(c) Specific inquiries regarding the jurisdiction of the Corps of Engineers can be answered only after a determination whether (1) the waters are navigable waters of the United States or (2) if not navigable, whether the proposed type of activity may nevertheless so affect the navigable waters of the United States that the assertion of regulatory jurisdiction is deemed necessary.

§ 329.16 Use and maintenance of lists of determinations.

(a) Tabulated lists of final determinations of navigability are to be maintained in each District office, and be updated as necessitated by court decisions, jurisdictional inquiries, or other changed conditions.

(b) It should be noted that the lists represent only those waterbodies for which determinations have been made; absence from that list should not be taken as an indication that the waterbody is not navigable.

(c) Deletions from the list are not authorized. If a change in status of a waterbody from navigable to non-navigable is deemed necessary, an updated finding should be forwarded to the Division Engineer; changes are not considered final until a determination has been made by the Division Engineer.

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APPENDIX C

LEGISLATIVE AUTHORITY

LAWS REQUIRING AUTHORIZATION OF STRUCTURES OR WORK (IN NAVIGABLE WATERS OR OCEAN WATERS)

Section 9 of the River and Harbor Act

Section 9 of the River and Harbor Act approved March 3, 1899 (30 Stat. 1151; 33 U.S.C. 401) prohibits the construction of any dam or dike across any navigable water of the United States in the absence of Congressional consent and approval of the plans by the Chief of Engineers and the Secretary of the Army. Where the navigable portions of the waterbody lie wholly within the limits of a single State, the structure may be built under authority of the legislature of that State, if the location and plans or any modification thereof, are approved by the Chief of Engineers and by the Secretary of the Army. The instrument of authorization is designated a permit. Section 9 also pertains to bridges and causeways but the authority of the Secretary of the Army and Chief of Engineers with respect to bridges and causeways was transferred to the Secretary of Transportation under the Department of Transportation Act on October 16, 1966 (80 Stat. 941, U.S.C., 40 1165g(6)(A)).

Section 10 of the River and Harbor Act

Section 10 of the River and Harbor Act approved March 3, 1899 (30 Stat. 1151; 33 U.S.C. 403) prohibits the unauthorized obstruction or alteration of any navigable water of the United States. The construction of any structure in or over any navigable water of the United States, the excavation from or depositing of material in such waters, or the accomplishment of any other work affecting the course, location, condition, or capacity of such waters are unlawful unless the work has been recommended by the Chief of Engineers and authorized by the Secretary of the Army. The instrument of authorization is designated a permit or letter of permission. The authority of the Secretary of the Army to prevent obstructions to navigation in the navigable waters of the United States was extended to artificial islands and fixed structures located on the outer continental shelf by section 4(f) of the Outer Continental Shelf Lands Act of 1953 (67 Stat. 463; 43 U.S.C. 1333(f)).

Section 11 of the River and Harbor Act

Section 11 of the River and Harbor Act approved March 3, 1899 (30 Stat. 1151; 33 U.S.C. 404) authorizes the Secretary of the Army to establish harbor lines channelward of which no piers, wharves, bulkheads, or other works may be extended or deposits made without approval of the Secretary of the Army. Regulations (ER 1145-2-304) have been promulgated relative to this authority and published at 209.150. By policy stated in those regulations effective May 27, 1970, harbor lines are guidelines only for defining the offshore limits of structures and fills insofar as they impact on navigation interests. Except as provided in paragraph (e)(1) of this section below, permits for work shoreward of those lines must be obtained in accordance with Section 10 of the same Act, cited above.

Section 13 of the River and Harbor Act

Section 13 of the River and Harbor Act approved March 3, 1899 (30 Stat. 1152; 33 U.S.C. 407) provides that the Secretary of the Army, whenever the Chief of Engineers determines that anchorage and navigation will not be injured thereby, may permit the discharge of refuse into navigable waters. In the absence of a permit, such discharge of refuse is prohibited. While the prohibition of this section, known as the Refuse Act, is still in effect, the permit authority of the Secretary of the Army has been superseded by the permit authority provided the Administrator, Environmental Protection Agency, under sections 402 and 405 of the Federal Water Pollution Control Act (PL 92-500, 86 Stat. 816, 33 U.S.C. 1342 and 1345).

Section 14 of the River and Harbor Act

Section 14 of the River and Harbor Act approved March 3, 1899 (30 Stat. 1152; 33 U.S.C. 408) provides that the Secretary of the Army on the recommendation of the Chief of Engineers may grant permission for the temporary occupation or use of any seawall, bulkhead, jetty, dike, levee, wharf, pier, or other work built by the United States. This permission will be granted by an appropriate real estate instrument in accordance with existing real estate regulations.

Section 1 of the River and Harbor Act

Section 1 of the River and Harbor Act of June 13, 1902 (32 Stat. 371; 33 U.S.C. 565) allows any persons or corporations desiring to improve any navigable river at their own expense and risk to do so upon the approval of the plans and specifications by the Secretary of the Army and the Chief of Engineers. Improvements constructed under this authority , which are primarily in Federal project areas, remain subject to the control and supervision of the Secretary of the Army and Chief of Engineers. The instrument of authorization is designated a permit.

Section 404 of the Federal Water Pollution Control Act

Section 404 of the Federal Water Pollution Control Act (PL 92-500, 86 Stat. 816, 33 U.S.C. 1344) authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits, after notice and opportunity for public hearings, for the discharge of dredged or fill material into the navigable waters at specified disposal sites. The selection of disposal sites will be in accordance with guidelines developed by the Administrator of the Environmental Protection Agency (EPA) in conjunction with the Secretary of the Army. Furthermore, the Administrator can prohibit or restrict the use of any defined area as a disposal site whenever he determines, after notice and opportunity for public hearings, that the discharge of such materials into such areas will have an unacceptable adverse effect on municipal water supplies, shellfish beds and fishery areas, wildlife or recreational areas.

Section 103 of Marine Protection, Research & Sanctuaries Act of 1972

Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (PL 92-532, 86 Stat. 1052, 33 U.S.C. 1413) authorizes the Secretary of the Army to issue permits, after notice and opportunity for public hearings, for the transportation of dredged material for the purpose of dumping it in ocean waters. However, similar to the EPA Administrator's limiting authority cited in paragraph (b)(7) of this section, the Administrator can prevent the issuance of a permit under this authority if he finds that the dumping of the material will result in an unacceptable adverse impact on municipal water supplies, shellfish beds, wildlife, fisheries or recreational areas.

Section 122 River and Harbor Act of 1970

Section 122 of the River and Harbor Act of 1970 requires an assessment of the environmental impact of proposed Corps of Engineers actions.

APPENDIX D

INTER-AGENCY MEETING

On 15 June 1977, an inter-agency meeting was held at the offices of the Alaska District, Corps of Engineers in Anchorage. Representatives from several federal, state, and local planning and resource agencies attended the day-long meeting. The Study Team presented findings of the literature search and field work completed during the last week in May of 1977 and the first two weeks in June of 1977.

Following the initial presentation, participants divided into three separate discussions groups. Topics addressed included:

- "What types of activities currently existing on the River should no longer be permitted?"

  The general concensus of those present indicated that groins, jettys, large boat slips or ramps, canal systems, and large bulkheads were detrimental. Reasons for objection to these structures centered on biological, physical, and aesthetic parameters.

- "Is public access a problem?"

  The overwhelming concensus was that insufficient public access had led to the haphazard construction of private river access related structures. It was felt that increased public access facilities would alleviate greatly the need for private structures.

- "Are there areas on or associated with the River which should be protected or preserved in total?"

  A large amount of discussion centered on this question. The concensus of those present was that the tributaries, since they are thought to serve as valuable salmon spawning and nursery areas, should be protected. Wetlands encroachment was discussed, and those present felt this practice should be discouraged. Additional discussions centered on the practice of building structures on or near high energy (cut) banks. The concensus was that this should be discouraged due to the possibility of increased erosion.

- Additional discussions centered on the rapid rate of development in the Study Area and how this trend might affect the River system. Overall, participating members expressed the view that the Kenai Peninsula Borough should formulate a comprehensive land-use plan for the Study Area (as well as the Borough as a whole). It was felt that while in some instances federal or state regulation might be required, the most suitable guidelines for future development trends should originate with the local citizenry.

The meeting concluded with participants agreeing to meet after the Kenai River Environmental Review draft report is published. Following is a listing of those agencies represented at the meeting.

United States Department of the Interior
    U.S. Fish and Wildlife Service
    U.S. Geological Service
    Bureau of Land Management
    Joint Federal-State Land Use Planning Commission
United States Department of Agriculture
    Soil Conservation Service
    U.S. Forest Service
United States Department of Commerce
    National Marine Fisheries Service
United States Department of Defense
    U.S. Army, Corps of Engineers

State of Alaska
    Department of Fish and Game
    Department of Environmental Conservation
    Department of Natural Resources
University of Alaska
    Artic Environmental Information and Data Center
Kenai Peninsula Borough
    Planning and Zoning Commission

APPENDIX E

CONTACTS

U.S. Government Agencies

Department of Defense
- Alaska District, Corps of Engineers

Department of Agriculture
- Soil Conservation Service
- Forest Service (Chugach National Forest)

Department of Interior
- U.S. Fish and Wildlife Service
  - Ecological Service (Anchorage)
  - Kenai National Moose Range
- Joint Federal-State Land Use Planning Commission
- U.S. Geological Survey
  - Water Resources Division
  - Topographic Division
  - Geologic Division
- Bureau of Land Management
- Environmental Protection Agency

Department of Commerce
- National Marine Fisheries Service
- National Oceanic and Atmospheric Administration

Department of Transportation
- Federal Aviation Administration

Department of Health, Education, and Welfare

Department of Labor

State of Alaska Agencies

Department of Fish and Game
- Habitat Protection Division
- Game Division
- Sport Fish Division
- Commerical Fish Division

Department of Community and Regional Affairs

Department of Education

Department of Natural Resources
- Division of Lands
- Division of Water Resources
- Division of Parks
- Division of Oil and Gas
- Division of Geological and Geophysical Surveys

Department of Environmental Conservation

Department of Forestry

University of Alaska
- Artic Environmental Information and Data Center
- College Campus
- Anchorage Campus

Department of Labor

Department of Revenue

Department of Health and Social Services

Others

Izaak Walton League of America

Kenai Peninsula Conservation Society

Alaska Center for the Environment

Dames and Moore, Consultants

CH_2 M Hill, Consultants

Kenai Peninsula Borough
- Planning and Zoning Commission
- Planning Department
- Economic Development Department

City of Kenai

City of Soldotna

Numerous residents of the Study Area

APPENDIX F

VEGETATION TYPICAL OF ALASKAN WETLANDS

Dr. Jack McCormick
WAPORA, Inc.

Batten and Murray (1976) prepared a review of the botanical literature on Alaskan wetlands. Neither of the recent comprehensive floras of the State (Hulten 1968; Welsh 1974), however, was analyzed. Furthermore, no integrated list of plants mentioned in the various individual papers that were reviewed was prepared; many of the papers that were reviewed apparently did not cite species of plants; at least for several papers that contained comprehensive floras of wetland areas, the reviews do not include complete accounts of the species observed by the original authors; and the reviewers cited the scientific names employed by the original authors, and did not attempt to regularize their listings by reference to a standard flora.

To provide a way to evaluate the findings of the investigation on Potter Marsh, and to assist the Alaska District in its Statewide program to regulate wetlands as required by Section 404, Jack McCormick searched the recent flora of Alaska that was prepared by Welsh (1974). This search, which was conducted, resulted in a comprehensive vascular flora of Alaskan wetlands (Table 1). The nomenclature and arrangement are those of Welsh (1974). The number of the page on which the account of each species begins in Welsh (1974) is listed, and the habitats in which each species is reported to occur are indicated by a W (for Welsh) in the table. Spaces also are provided to list the appropriate page in Hulten (1968). For a few species, the accounts in Hulten were consulted, and a letter H was inserted in the table to indicate habitat affinities mentioned in that monograph. Habitats listed both by Welsh and by Hulten are indicated by the letter X.

Species that were mentioned by Batten and Murray (1976) were synonomized, where necessary, and are indicated in the columns under the heading "Corps Regions." Potter Marsh is in Region 2 (Southcentral Alaska). The geographic limits of the eight regions are identified on a map (Figure 3) that was extracted from Batten and Murray (1976). As noted above, however, those reviewers did not include comprehensive lists. Other species, therefore, almost certainly are mentioned in the descriptions of wetlands in the original papers.

The habitats that are listed in the heading of Table 1 are those mentioned by Welsh (1974). Several other terms used by Welsh (1974) were applied to only one or a few species, or were considered unnecessarily detialed for the purpose of the present study. They were grouped as follows:

Coastal marsh: Includes: "tidal marsh," "salt marsh," "salty marshes," and "saline marshes."

Coastal beach: Glaux maritima was listed from: "saline soil" (Welsh 1974:338)

Ponds, streams: Includes "lakes," "submerged aquatics," "emergent aquatics," "saline ponds," "hot pools" (Sanicula marilandica, Valeriana capitata), and "subtidal" (Phyllospadix scouleri, Zostera marina).

Shores:	Includes shores of "ponds" and shores of "lakes."
Springs, seeps:	Includes alpine wet rills (Hippuris montana).
Wet soil:	Includes "moist sites," "mud flats," "mud banks," "roadsides," "roadside ditches," and "sand bars" (Salix rigida).
Marshes:	Includes "marshlands," "marshy lands," "fens" (for herbaceous plants), "wet meadow," and "moist meadow."
Swamps:	Includes "wet woods."
Wet scrub:	Includes "wet lowland thickets," "wet thickets," "wet heathlands," "moist heathlands," and "fens" (for woody plants.)
Also uplands:	Includes any habitat that is not considered to be within the wetland complex.

Any species of vascular plant that was listed from an indisputable wetland habitat type by Batten and Murray (1976) was included in Table 1. Similarly, if only the name of a genus was mentioned by Batten and Murray (1976), the genus name is listed in Table 1 and it is understood to include all species of the genus that occur within the relevant region. Several of the papers that Batten and Murray (1976) reviewed concern habitats that are not necessarily wetlands. In particular, habitats that were characterized as "riverbanks," "sandbars," or "tundra" may, or may not, be wetlands. If a review did not include information that was adequate to determine that the habitat which it describes is a wetland, the review was ignored during the assemblage of Table 1.

During the selection of species of wetlands plants from Welsh (1974), species noted to occur on "streambanks," in "seeps," in "moist meadows," or in "moist sites," but in no more definite wetland habitat type, were ignored. Some of these, as well as other species that were excluded from Table 1, may be added to the list of vascular plants of Alaskan wetlands on the basis of a more thorough examination of the literature or as a result of future field investigations.

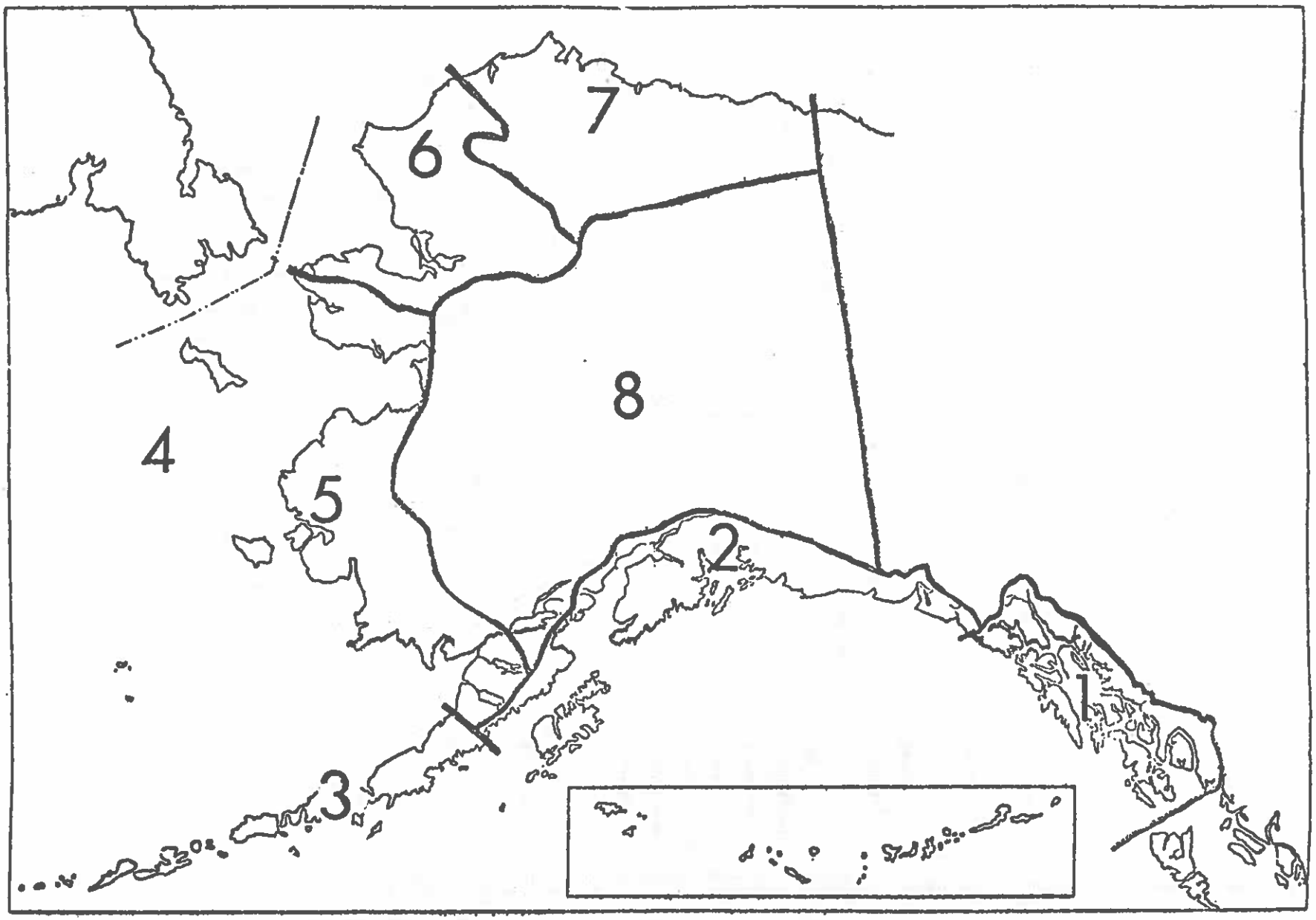

Figure 3 Geographic regions of Alaska.

Table 1. Annotated list of vascular plants known to grow in the wetlands of Alaska. Compiled by WAPORA, Inc., from Welsh (1974). Regional designations are those of Batten and Murray (1976). Pages in Hulten (1968) also are given for convenience.

	Welsh	Hulten	Tidal flats	Coastal marsh	Coastal beach	Ponds, streams	Shores	Streambanks	Springs, seeps	Wet soil	Bogs	Marshes	Swamps	Muskegs	Wet scrub	Wet tundra	Also upland	Corps regions
Isoetes echinospora[n]	2					W												3
Lycopodium annotinum	4																W	1
Lycopodium inundatum	5						W				W							
Lycopodium obscurum	5										W						W	
Lycopodium selago		25									H						H	
Equisetum spp.																		1 2
Equisetum arvense	8			*													W	1 2 7 8
Equisetum fluviatile[j]	8		W	*								W					W	1 * 5 6
Equisetum hyemale	9							W	W			W						
Equisetum palustre	9						W	W				W		W				1 4 6
Equisetum scirpoides	10																W	8
Equisetum variegatum	10							W						W			W	1 8
Botrychium lunaria	12													W			W	
Botrychium multifidum	13													W			W	
Pteridium aquilinum	26													W			W	
Chamaecyparis nootkatensis	29																W	1
Juniperus communis	31							W									W	1
Thuja plicata	31																W	1
Larix laricina	33													W				8
Picea mariana	35											W		W				8

Table 1. Plants of Alaskan wetlands (Continued).

	Welsh	Hulten	Tidal flats	Coastal marsh	Coastal beach	Ponds, streams	Shores	Streambanks	Springs, seeps	Wet soil	Bogs	Marshes	Swamps	Muskegs	Wet scrub	Wet tundra	Also upland	Corps regions
Picea sitchensis	35																W	1
Pinus contorta	36													W			W	1
Tsuga heterophylla	37																W	1
Tsuga mertensiana	38																W	1
Alnus crispa	51							W			W						W	
Alnus incana	52							W			W						W	
Betula glandulifera	53							W						W			W	
Betula glandulosa	54							W			W						W	2 5 6 8
Mertensia maritima	62				W			W										
Mertensia paniculata	62							W									W	8
Callitriche anceps	66					W												3
Callitriche hermaphroditica	66					W												
Callitriche verna	66					W												1 8
Campanula lasiocarpa	67													W			W	
Lobelia kalmii	69											W						
Viburnum edule	73						W				W						W	
Arenaria peploides	80				W													1
Lychnis triflora	88													W			W	
Sagina crassicaulis	89			W	W												W	
Sagina intermedia	89				W												W	

Table 1. Plants of Alaskan wetlands (Continued).

	Welsh	Hulten	Tidal flats	Coastal marsh	Coastal beach	Ponds, streams	Shores	Streambanks	Springs, seeps	Wet soil	Bogs	Marshes	Swamps	Muskegs	Wet scrub	Wet tundra	Also upland	Corps regions
Sagina saginoides	90		W														W	
Spergularia canadensis	94			W	W													
Stellaria calycantha	95							W				W					W	
Stellaria crassifolia	96						W							W			W	
Stellaria crispa	96			*	W												W	*
Stellaria humifusa	96				W		W					W						4 5 6
Stellaria longifolia	97											W		W			W	
Stellaria longipes	97						W	W										8
Ceratophyllum demersum	99					W												
Atriplex patula[a]	100		*	W													W	1 * 6
Salicornia europaea[b]	105		W	*			W											2
Salicornia pacifica	106		W		W													
Suaeda maritima	106		W		W													2
Antennaria monocephala	113																W	8
Apargidium boreale	116											W						
Artemissia norvegica	128																W	8
Aster junciformis	132			*							W	W						*
Chrysanthemum arcticum	136		W	*	W			W				W					W	* 6
Cirsium edule	138							W				W						
Cotula coronopifolia	139		W		W													

Table 1. Plants of Alaskan wetlands (Continued).

	Welsh	Hulten	Tidal flats	Coastal marsh	Coastal beach	Ponds, streams	Shores	Streambanks	Springs, seeps	Wet soil	Bogs	Marshes	Swamps	Muskegs	Wet scrub	Wet tundra	Also upland	Corps regions
Erigeron lonchophyllus	145										W						W	
Erigeron peregrinus	145											W					W	3
Matricaria ambigua	153																W	6
Petasites frigidus	155															W	W	5 7 8
Petasites sagittatus	156										W		W					
Saussurea angustifolia	158										W						W	
Saussurea nuda	159																W	6
Senecio congestus	162							W	W		W							6
Senecio lugens	164										W		W					
Senecio pseudo-arnica	165		W		W													
Cornus canadensis	174												W				W	1 2
Sedum rosea	176																W	8
Tillaea aquatica	177		W			W												
Barbarea orthoceras	186				W			W	W								W	
Cakile edentula	190				W													
Cardamine pensylvanica	194						W		W								W	
Cardamine scutata	194					W		W										
Cochlearia officinalis	195				W?													6
Draba alpina	200																W	5
Rorippa nasturtium-aquaticum	214					W		W										

Table 1. Plants of Alaskan wetlands (Continued).

	Welsh	Hulten	Tidal flats	Coastal marsh	Coastal beach	Ponds, streams	Shores	Streambanks	Springs, seeps	Wet soil	Bogs	Marshes	Swamps	Muskegs	Wet scrub	Wet tundra	Also upland	Corps regions
Subularia aquatica	218					W												3
Drosera anglica	220										W		W					8
Drosera rotundifolia	220										W	W	W					1 2 6 8
Empetrum nigrum	222										W		W				W	1 2 3 4 6 8
Andromeda polifolia	224										W	W	W			W		1 2 7 8
Arctostaphylos alpina	225																W	8
Cassiope stelleriana	226																W	1
Cassiope tetragona	227																W	8
Chamaedaphne calyculata	227						W				W	W				W		6 8
Cladothamnus pryolaeflorus	228																W	1
Kalmia polifolia	229										W	W						1
Ledum spp.	229																	1 6
Ledum decumbens	229										W			W			W	2 6 8
Ledum groenlandicum	230										W			W			W	1 8
Oxycoccus microcarpus	231										W		W					1 2 8
Vaccinium caespitosum	235										W	W					W	
Vaccinium uliginosum	236												W	W			W	1 3 6 8
Vaccinium vitis-idaea	237																W	1 3 6 8
Gentiana douglasiana	240										W	W						
Lomotogonium rotatum	244						W	W			W	W						
Swertia perennis	245							W				W					W	

Table 1. Plants of Alaskan wetlands (Continued).

	Welsh	Hulten	Tidal flats	Coastal marsh	Coastal beach	Ponds, streams	Shores	Streambanks	Springs, seeps	Wet soil	Bogs	Marshes	Swamps	Muskegs	Wet scrub	Wet tundra	Also upland	Corps regions
Hippuris montana	248								W			W					W	
Hippuris tetraphylla	248			*		X				W								2 5 6 7
Hippuris vulgaris	249					W				W								1 2 3 4 5 6 7
Myriophyllum alterniflorum	249					W												
Myriophyllum spicatum	249					W												2 3 6
Lycopus asper	255											W						
Lycopus uniflorus	255											W						
Mentha arvensis	256							W	W		W							
Scutellaria galericulata	258						W	W			W	W						
Lathyrus japonicus	268				W												W	
Lithyrus palustris	269		W		W		W										W	2
Vicia gigantea	287				W												W	
Pinguicula villosa	287										W		W					
Pinguicula vulgaris	288						W?	W?	W								W	1
Utricularia intermedia	288					W												
Utricularia minor	288					W												
Utricularia vulgaris	289					W					W							7
Fauria crista-galli[u]	291								W		W	W	W					1
Menyanthes trifoliata	292					W			W		W	W	W					1 2 5 6 7 8
Myrica gale	293			*				W			W	W						1 2

Table 1. Plants of Alaskan wetlands (Continued).

	Welsh	Hulten	Tidal flats	Coastal marsh	Coastal beach	Ponds, streams	Shores	Streambanks	Springs, seeps	Wet soil	Bogs	Marshes	Swamps	Muskegs	Wet scrub	Wet tundra	Also upland	Corps regions
Brasenia schreberi	293					W												
Nuphar polysepalum	294					W												1 2 5 8
Nuphar variegatum	294					W												
Nymphaea tetragona	294					W												1
Epilobium adenocaulon	297							W		W							W	1
Epilobium alpinum	298							W	W		W						W	
Epilobium angustifolium	299																W	8
Epilobium latifolium	300							W									W	4
Epilobium palustre	301							W		W	W						W	1 5 6
Plantago macrocarpa	308			W	W												W	3
Plantago maritima	309		*	W														1 *
Polemonium caeruleum	313																W	5 6 8
Koenigia islandica	316									W								6
Oxyria digynia	316															W	W	8
Polygonum amphibium	319					W				W								1 2
Polygonum bistorta	320																W	8
Polygonum fowleri	321																W	2
Polygonum viviparum	323																W	1 3 6
Rumex arcticus	326																W	6
Rumex maritimus	327						W	W				W						
Rumex occidentalis	327		W	*	W			W				W						1 *
Rumex salicifolius	328				W			W									W	5

Table 1. Plants of Alaskan wetlands (Continued).

	Welsh	Hulten	Tidal flats	Coastal marsh	Coastal beach	Ponds, streams	Shores	Streambanks	Springs, seeps	Wet soil	Bogs	Marshes	Swamps	Muskegs	Wet scrub	Wet tundra	Also upland	Corps regions
Montia chamissoi	331					W			W			W						
Montia fontana	331					W				W								
Claytonia sarmentosa	332																W	8
Claytonia sibirica	333																W	3
Dodecatheon spp.	335																	1
Glaux maritima	338				W				W			W?						1
Lysimachia thrysiflora	338					W	W	W					W					1
Primula borealis	339																W	6
Primula egaliksensis	340							W				W					W	
Primula tschuktschorum	342											W					W	4
Aconitum spp.	348																	1
Anemone richardsonii	352																	8
Caltha natans	354					W				W								5
Caltha palustris	354																	1 2 3 4 5 6 7 8
Coptis asplenifolia	355										W						W	
Coptis trifolia	355											W		W			W	1
Rannunculus acris	359											W		W			W	
Ranunculus aquatilis[1]	359					W												1 3 5 6
Ranunculus cymbalaria	360		*	*		W		W				W						1 *
Rananculus flammula[0]	361					W		W		W								3

Table 1. Plants of Alaskan wetlands (Continued).

	Welsh	Hulten	Tidal flats	Coastal marsh	Coastal beach	Ponds, streams	Shores	Streambanks	Springs, seeps	Wet soil	Bogs	Marshes	Swamps	Muskegs	Wet scrub	Wet tundra	Also upland	Corps regions
Ranunculus gmelinii	361					W				W		W						6 7 8
Ranunculus hyperboreus	362					W				W								2 4 6 7
Ranunculus kamtschaticus	362									W		W				W		
Ranunculus lapponicus	362												W	W			W	
Ranunculus nivalis	363							W			W	W						
Ranunculus pallasii	364					W				W			W					4 5 6 7
Ranunculus sceleratus	366					W		W		W			W	W				
Ranunculus sulphureus	366										W				W	W		
Dryas drummondii[k]	374							W										7
Geum calthifolium	377																W	1 2 3
Potentilla anserina[d]	383		W	★	W		W	W									W	1 2 4 5 6
Potentilla arguta	383										W		W				W	
Potentilla fruticosa	385												W		W	W	W	8
Potentilla palustris	387						W	W			W	W		W				1 2 4 5 6 7 8
Rubus arcticus	393																W	8
Rubus chamaemorus	393	602									H						W	1 2 3 6 8
Rubus stellatus	395																W	1
Sanguisorba menziesii	395																W	1
Sanguisorba stipulata[e]	396																W	1 2
Spiraea beauverdiana	398																W	5
Spiraea douglasii	398						W	W					W					

Table 1. Plants of Alaskan wetlands (Continued).

	Welsh	Hulten	Tidal flats	Coastal marsh	Coastal beach	Ponds, streams	Shores	Streambanks	Springs, seeps	Wet soil	Bogs	Marshes	Swamps	Muskegs	Wet scrub	Wet tundra	Also upland	Corps regions
Galium trifidum	400						W	W			W		W					1
Salix spp.																		4 7
Salix arbusculoides	407							W						W			W	
Salix arctica	407															W	W	6
Salix arctophila	407															W		
Salix athabascensis	408										W			W	W			
Salix barclayi	408						W	W						W	W		W	1
Salix barrattiana	408							W								W	W	
Salix bebbiana	409							W						W	W		W	
Salix brachycarpa spp. brachycarpa	409						W	W							W		W	
Salix candida	410							W							W			
Salix commutata	411							W							W		W	
Salix fuscescens	411													W	W		W	6 7
Salix glauca var. acutifolia	412												W	W			W	
Salix maccalliana	414							W						W	W			
Salix monticola	414													W	W		W	
Salix myrtillifolia	414						W	W						W	W		W	
Salix novae-angliae	415						W	W						W			W	
Salix ovalifolia	415			W	W												W	4 6
Salix pedicellaris	416													W	W			

Table 1. Plants of Alaskan wetlands (Continued).

	Welsh	Hulten	Tidal flats	Coastal marsh	Coastal beach	Ponds, streams	Shores	Streambanks	Springs, seeps	Wet soil	Bogs	Marshes	Swamps	Muskegs	Wet scrub	Wet tundra	Also upland	Corps regions
Salix phlebophylla	416																W	7
Salix planifolia spp. planifolia	417						W	W						W	W		W	
Salix planifolia spp. pulchra var. yukonensis	417													W			W	4 5 6 7 8
Salix polaris	417																W	8
Salix pyrifolia	417						W							W	W			
Salix reticulata spp. reticulata	418													W			W	1 2
Salix rigida	418									W								
Salix rotundifolia	418																W	7
Salix scouleriana	419													W			W	
Salix sphenophylla	420											W					W	
Geocaulon lividum	421																W	1
Chrysosplenium tetrandrum	423						W	W	W									
Chrysosplenium wrightii	423					W				W						W	W?	
Mitella nuda	425							W				W	W					
Mitella pentandra	425							W				W	W					
Parnassia kotzebuei	426					W												3
Parnassia palustris	426																W	1
Saxifraga cernua	434															W	W	
Saxifraga foliolosa	437															W	W	
Saxifraga hirculus	437											W					W?	2 6

Table 1. Plants of Alaskan wetlands (Continued).

	Welsh	Hulten	Tidal flats	Coastal marsh	Coastal beach	Ponds, streams	Shores	Streambanks	Springs, seeps	Wet soil	Bogs	Marshes	Swamps	Muskegs	Wet scrub	Wet tundra	Alas upland	Corps regions
Saxifraga lyallii	438							W	W				W		W	W	W?	
Saxifraga mertensiana	438												W			W		
Saxifraga punctata	439																W	8
Castilleja unalaschensis	448		W														W	
Euphrasia arctica	450							W	W		W							
Lagotis glauca	451																W	7
Limosella aquatica	451					W				W								3
Mimulus guttatus	452							W	W									1
Pedicularis capitata	454															W		7 8
Pedicularis chamissonis	455							W				W						
Pedicularis groenlandica	455											W	W				W	
Pedicularis lanata	456														W	W	W	
Pedicularis langsdorfii	456															W	W	7
Pedicularis parviflora	457										W	W		W				
Pedicularis sudetica	458															W	W	1 6 7
Veronica americana	462							W	W			W	W					
Veronica anagallis-aquatica	462					W	W	W										
Veronica scutellata	464						W				W		W					
Veronica serpyllifolia	464							W	W				W					
Angelica lucida	469																W	5

Table 1. Plants of Alaskan wetlands (Continued).

	Welsh	Hulten	Tidal flats	Coastal marsh	Coastal beach	Ponds, streams	Shores	Streambanks	Springs, seeps	Wet soil	Bogs	Marshes	Swamps	Muskegs	Wet scrub	Wet tundra	Also upland	Corps regions
Cicuta douglasii	470							W				W						1
Cicuta mackenzieana	470			*			W	W				W						2 5
Conioselinum chinense	471				W							W					W	
Oenanthe sarmentosa	473							W				W			W			
Sanicula marilandica	476					W		W						W				
Sium suave	477					W						W						
Valeriana capitata	479					W												6 7 8
Viola adunca	481																W	1
Sagittaria cuneata	485					W	W											
Calla palustris	486					W					W							
Lysichitum americanum	487												W					1 2
Carex spp.																		1 2 7 8
Carex anthoxanthea	498										W	W						3
Carex aquatilis	498							W	W		W	W						1 2 4 5 6 7 8
Carex arcta	499										W	W						
Carex atherodes	499							W			W	W						
Carex atrofusca	500								W		W	W			W			
Carex bebbii	500										W	W		W				
Carex bicolor	501						W	W	W			W		W				
Carex bigelowii	501						W				W			W	W		W	6 8

Table 1. Plants of Alaskan wetlands (Continued).

	Welsh	Hulten	Tidal flats	Coastal marsh	Coastal beach	Ponds, streams	Shores	Streambanks	Springs, seeps	Wet soil	Bogs	Marshes	Swamps	Muskegs	Wet scrub	Wet tundra	Also upland	Corps regions
Carex bonanzensis	502						W		W					W			W	
Carex brunnescens	502										W			W			W	1
Carex buxbaummi	502										W	W					W	
Carex canescens	503										W	W			W		W	
Carex capillaris	503						W	W	W					W			W	
Carex capitata	503							W						W			W	
Carex chrordorrhiza	504						W				W	W					W	7
Carex concinna	504										W			W			W	
Carex diandra	506						W				W	W		W				
Carex dioica	506							W			W	W					W	
Carex disperma	506						W	W						W			W	
Carex echinata	507										W							
Carex enanderi	508										W		W					
Carex glareosa	509		W	W														4 6
Carex heleonastes	509								W		W			W				
Carex interior	510								W		W	W						
Carex lachenalii	511							W	W		W	W					W	4
Carex laeviculmis	511												W	W			W	
Carex lanuginosa	511											W						
Carex lasiocarpa	511							W	W		W							

Table 1. Plants of Alaskan wetlands (Continued).

	Welsh	Hulten	Tidal flats	Coastal marsh	Coastal beach	Ponds, streams	Shores	Streambanks	Springs, seeps	Wet soil	Bogs	Marshes	Swamps	Muskegs	Wet scrub	Wet tundra	Also upland	Corps regions
Carex laxa	512												W	W				
Carex lenticularis[r]	512						W					W		W			W?	1 5
Carex leptalea	512						W				W			W				1
Carex limosa	513								W		W			W				1 2 7
Carex livida	513										W			W				1
Carex loliacea	513								W					W			W	
Carex lyngbyei[f]	513		W	*							W	W						1 2 3 5 6
Carex mackenziei	514								W		W			W				
Carex macloviana	514										W						W	
Carex marcochaeta	515				W						W						W	3
Carex magellanica	515						W				W			W				
Carex maritima	515						W	W			W						W	
Carex media	516					W		W			W			W			W	
Carex membranacea	516					W	W				W	W		W				6 7 8
Carex mertensii	516										W						W	
Carex microglochin	517						W				W				W			7
Carex nesophila	517																W	4
Carex nigricans	518																W	2
Carex oederi[w]	518					W						W		W				
Carex parryana	519		W									W						

Table 1. Plants of Alaskan wetlands (Continued).

	Welsh	Hulten	Tidal flats	Coastal marsh	Coastal beach	Ponds, streams	Shores	Streambanks	Springs, seeps	Wet soil	Bogs	Marshes	Swamps	Muskegs	Wet scrub	Wet tundra	Also upland	Corps regions
Carex pauciflora	519										W	W		W				1 2
Carex phyllomanica	520										W			W				
Carex pluriflora	521										W	W		W				1 2 3
Carex podocarpa	521																W	8
Carex praticola	522													W			W	
Carex rariflora	522					W	W							W			W	3 5 6 7
Carex rhynchophysa	523						W	W		W	W			W			W	
Carex rostrata	523					W	W	W				W		W				1 2 5 6
Carex rotundata	524					W	W				W	W		W				5 6 7
Carex saxatilis	525					W		W						W			W	1 8
Carex scirpoidea	525													W			W	
Carex sitchensis	526										W	W						2
Carex spectabilis	526											W						
Carex stipata	527							W				W		W				
Carex stricta (?)																		2
Carex stylosa	527										W			W				2
Carex subspathacea[8]	527		W	W														2 4 5 6 7
Carex tenuiflora	528						W				W			W				
Carex vaginata	529										W			W				
Carex williamsii	529						W				W							

Table 1. Plants of Alaskan wetlands (Continued).

	Welsh	Hulten	Tidal flats	Coastal marsh	Coastal beach	Ponds, streams	Shores	Streambanks	Springs, seeps	Wet soil	Bogs	Marshes	Swamps	Muskegs	Wet scrub	Wet tundra	Also upland	Corps regions
Eleocharis spp.																		1
Eleocharis acicularis	530						W	W		W				W				
Eleocharis kamtschatica	530		W	W														2
Eleocharis mamillata?																		2
Eleocharis palustris	531						W	W			W			W				1
Eleocharis quinqueflora	531											W		W				
Eriophorum spp.																		1 2 7
Eriophorum angustifolium	532					W					W			W			W	1 2 4 5 6 7 8
Eriophorum brachyantherum	533					W					W	W					W	6
Eriophorum callitrix	533										W						W	8
Eriophorum chamissonis[P]	534						W	W			W	W		W			W	1 3 4 5 6
Eriophorum gracile	535											W		W				
Eriophorum scheuchzeri	535					W	W	W		W		W		W				1 4 5 6 7
Eriophorum vaginatum	535											W					W	1 6 7 8
Eriophorum viridi-carinatum	535										W	W						
Kobresia sibirica	537										W						W?	
Kobresia simpliciuscula	537						W				W						W	
Rhynchospora alba	537										W							1
Scirpus spp.																		1 *
Scirpus americanus	538									W								

Table 1. Plants of Alaskan wetlands (Continued).

	Welsh	Hulten	Tidal flats	Coastal marsh	Coastal beach	Ponds, streams	Shores	Streambanks	Springs, seeps	Wet soil	Bogs	Marshes	Swamps	Muskegs	Wet scrub	Wet tundra	Also upland	Corps regions
Scirpus caespitosus[x]	539						W				W			W			W	1 2 3
Scirpus hudsonianus	539										W			W			W?	
Scirpus microcarpus	539							W					W					
Scirpus paludosus	539		W	*	W													*
Scirpus pumilus	539						W				W							
Scirpus rufus	540		W															
Scirpus subterminalis	540					W												
Scirpus validus	540		W	*		W						W		W				*
Agrostis aequivalvis	550						W				W							
Agrostis alaskana	550				W		W				W							
Agrostis scabra[v]	552						W							W			W	1
Alopecurus aequalis	553					W		W						W			W	3
Alopecurus alpinus	553					W		W			W					W	W	7
Alopecurus geniculatus	554					W				W								
Arctagrotis latifolia	555																W	6 7 8
Arctophila fulva	555						W	W										1 4 5 6 7
Beckmannia syzigachne	557					W								W				
Calamagrotis spp.																		2 6 8
Calamagrotis canadenis	562			*	W			W						W				1 2 6
Calamagrotis deschampsiodes	563			W													W	6

Table 1. Plants of Alaskan wetlands (Continued).

	Welsh	Hulten	Tidal flats	Coastal marsh	Coastal beach	Ponds, streams	Shores	Streambanks	Springs, seeps	Wet soil	Bogs	Marshes	Swamps	Muskegs	Wet scrub	Wet tundra	Alas upland	Corps regions
Calamagrostis inexpansa	564													W			W	2
Calamagrostis lapponica	564							W						W			W	
Calamagrostis neglecta	564						W	W									W	8
Calamagrostis nutkaensis	565				W			W									W	3
Catabrosa aquatica	565					W						W						
Deschampsia spp.																		1
Deschampsia beringensis	569		W		W		W										W	2
Deschampsia caespitosa	569					W		W			W						W	1 6
Dupontia fisheri	570															W	W	4 6 7
Elymus mollis	573		W		W		W										W	4 6
Festuca altaica	574							W									W	8
Festuca elatior?																		2
Festuca rubra	576		W		W									W			W	2 6
Glyceria borealis	577					W	W				W	W	W					
Glyceria grandis	577					W		W			W	W						
Glyceria pulchella	578					W		W				W		W				
Glyceria striata	578		W									W						
Hierochloe odorata	579		W					W				W					W	
Hierochloe pauciflora	580					W					W					W	W	
Hordeum brachyantherum	581		W		W												W	

Table 1. Plants of Alaskan wetlands (Continued).

	Welsh	Hulten	Tidal flats	Coastal marsh	Coastal beach	Ponds, streams	Shores	Streambanks	Springs, seeps	Wet soil	Bogs	Marshes	Swamps	Muskegs	Wet scrub	Wet tundra	Also upland	Corps regions
Hordeum jubatum	581		W		W			W						W			W	
Poa alpina	590						W	W						W			W	
Poa arctica	591						W	W									W	7 8
Poa brachyanthera[y]	592											W					W	1
Poa eminens	592		W		W													4 6
Poa leptocoma	594																W	4
Poa macrocalyx	594				W							W					W	
Poa nemoralis	595		W					W									W	
Poa palustris	595				W		W					W						2
Poa pratensis	595							W						W			W	
Poa stenantha	596											W					W	
Puccinellia andersonii	599		W	W	W													
Puccinellia arctica	599							W									W	5 6
Puccinellia distans	600					W		W									W	
Puccinellia langeana[h]	600				W		W										W	1 2 6
Puccinellia lucida	600		W	*	W													*
Puccinellia nutkaensis	601				W													1 2
Puccinellia phryganodes	601		W		W													2 6 7
Scolochloa festucacea	602						W	W				W						
Torreyochloa pauciflora	604											W					W	

Table 1. Plants of Alaskan wetlands (Continued).

	Welsh	Hulten	Tidal flats	Coastal marsh	Coastal beach	Ponds, streams	Shores	Streambanks	Springs, seeps	Wet soil	Bogs	Marshes	Swamps	Muskegs	Wet scrub	Wet tundra	Also upland	Corps regions			
Trisetum cernuum	605											W					W				
Trisetum sibiricum	605											W					W				
Iris setosa	607		W				W										W	1	3		
Sisyrinchium angustifolium	607		W														W				
Juncus spp.																		1			7
Juncus alpinus	610					W	W	W									W	1		5	
Juncus arcticus[m]	610			W			W	W				W						1	3	6	
Juncus biglumis	611					W	W	W			W										7
Juncus bufonius	611		W				W	W		W		*							*		
Juncus castaneus	612										W	W					W			6	
Juncus effusus	612						W					W		W							
Juncus ensifolius	612						W					W		W			W				
Juncus falcatus	613		W	W																	
Juncus filiformis	613									W		W	W		W						
Juncus mertensianus	613						W	W			W			W			W				
Juncus nodosus	613											W									
Juncus stygius	613					W					W										
Juncus supiniformis[q]	614					W					W		W					1			
Juncus triglumis	614															W	W	1	3		
Luzula parviflora	617						W	W			W						W				

Table 1. Plants of Alaskan wetlands (Continued).

	Welsh	Hulten	Tidal flats	Coastal marsh	Coastal beach	Ponds, streams	Shores	Streambanks	Springs, seeps	Wet soil	Bogs	Marshes	Swamps	Muskegs	Wet scrub	Wet tundra	Alsо upland	Corps regions
Luzula rufescens	617							W				W		W			W	
Scheuchzeria spp.																		1
Scheuchzeria palustris	620						W				W							
Triglochin maritima	621		W	W										W			W	1 2
Triglochin palustris	621		W	*			W	W				W		W				1 2 8
Lemna minor	622					W												
Lemna trisulca	622					W												6
Fritillaria camtchatcensis	625		W														W	1
Smilacina stellata	629		W														W	
Tofieldia glutinosa[s]	630													W			W	1
Habenaria behringiana[z]	637															W		3
Habenaria chorisiana	638										W			W				
Habenaria dilatata[t]	638										W			W			W	1 3
Habenaria hyperborea	638						W	W	W			W					W	3
Habenaria obtusata	639							W						W			W	
Habenaria saccata	639													W			W	
Habenaria unalascensis	639													W			W	
Listera borealis	640													W			W	
Listera cordata	641							W			W						W	
Malaxis monophyllos	641		W		W												W	

Table 1. Plants of Alaskan wetlands (Continued).

	Welsh	Hulten	Tidal flats	Coastal marsh	Coastal beach	Ponds, streams	Shores	Streambanks	Springs, seeps	Wet soil	Bogs	Marshes	Swamps	Muskegs	Wet scrub	Wet tundra	Also upland	Corps regions
Malaxis paludosa	641										W			W				
Orchis rotundifolia	642													W			W	
Spiranthes romanzoffiana	642										W			W			W	1
Potamogeton spp.																		4 5 6 7
Potamogeton alpinus	645					W												1 3 8
Potamogeton berchtoldii	645					W												8
Potamogeton epihydrus	645					W												
Potamogeton filiformis	645		W	*		W												1 2 6 7
Potamogeton foliosus	646					W												
Potamogeton friesii	646					W												
Potamogeton gramineus	646					W												5
Potamogeton natans	646					W												
Potamogeton pectinatus	647					W												6 7
Potamogeton perfoliatus	647					W												3 5
Potamogeton praelongus	648					W												
Potamogeton robbinsii	648					W												
Potamogeton subsibiricus	648					W												8
Potamogeton vaginatus	648					W												
Potamogeton zosterifolius	648					W												
Ruppia maritima	649		W			W												1

Table 1. Plants of Alaskan wetlands (Continued).

	Welsh	Hulten	Tidal flats	Coastal marsh	Coastal beach	Ponds, streams	Shores	Streambanks	Springs, seeps	Wet soil	Bogs	Marshes	Swamps	Muskegs	Wet scrub	Wet tundra	Also upland	Corps regions
Sparganium spp.																		1 2
Sparganium angustifolium	650					W												2
Sparganium emersum	650					W					W							
Sparganium hyperboreum	651					W												1 3 4 5 6 7
Sparganium minimum	651					W												2
Typha latifolia	652					W						W						
Zannichellia palustris	652		W	*		W						W						* 6
Phyllospadix scouleri	653		W															
Zostera marina	654		W															1 2 3 4 5 6

[a]Includes subspecies. *A.* cf. *alaskensis* and *A. gmelini* are synonyms.

[b]*S. herbacea* is a synonym.

[c]*Vaccinium oxycoccus* is a synonym.

[d]*P. egedii* and *P. pacifica* are synonyms.

[e]*S. sitchensis* is a synonym.

[f]*C. cryptocarpa* is a synonym.

[g]*C. ramenskii* is a synonym.

[h]*P. paupercula* is a synonym.

[i]*U. macrorrhiza* is a synonym.

[j]*E. limosum* is a synonym.

[k]*D. integrifolia* is a synonym.

[l]*R. trichophyllus* is included in *R. aquatilis* spp. *capillaceus*.

Table 1. Plants of Alaskan wetlands (Concluded).

[m] *J. balticus* is included in *J. arcticus* ssp. *balticus*.

[n] *I. braunii* and *I. muricata* are synonyms.

[o] *R. reptans* is a synonym.

[p] *E. russeolum* and *E. medium* are synonyms.

[q] *J. oreganus* is a synonym.

[r] *C. hindsii* and *C. lenticularis* are synonyms.

[s] *T. occidentalis* and *T. intermedia* are synonyms.

[t] *Plantathera dilatata* and *Limnorchis dilatata* are synonyms.

[u] *Nephrophyllidium crista-galli* is a synonym.

[v] *A. hiemalis* is a synonym.

[w] *C. viridula* is a synonym.

[x] *Trichophorum caespitosum* is a synonym.

[y] *H. borealeis* is a synonym.

[z] *Plantathera tipuloides* is a synonym.

APPENDIX G

ACKNOWLEDGMENTS

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