Mrs. Norma Turkington
Box 233
Homer, Alaska 99603

Feb. 18, 1976

The Honorable Jay S. Hammond
Governor, State of Alaska
Juneau, Alaska 99801

Dear Governor Hammond:

I believe by now that you realize HB 626 is completely unacceptable. I concur with that feeling.

I also reject SB612. I believe in controling all our resources but have many question as to why these approaches are taken. I believe our fish and wildlife can be protected with the laws that now exist. The department of Fish and Game can reduce or close areas and seasons when and where they feel it necessary to protect our creatures. These proposed laws imply that the department isn't able to do its job. I don't believe the legislature should get involved in management. I believe there are qualified people in the department to make decisions. The approach that I think the legislature and administration should take is to allow sufficient funds for study and enforcement of the regulations necessary for protection. DON't WRITE ANY MORENEW LAWS.

It appears the bills we are seeing are written in a panic, with far too much emotion and haste.

I object to taking a partially good bill and tacking on any clause that "just gets rid of the oil company leases". Its discrimination to pick on any one industry or group. I can't go along with this approach.

I appreciate Mr. Vennekens, Mr. Gross and Mr. Palmer comming to Homer and meeting with us. A few questions that had been on my mind were answered. I couldn't go along with the "straw poll" of various ways of wording a new bill. The wording was confusing. After seeing some of the bills already written, I wouldn't commit myself to any suggested concept. It might just come back with a different interpertation. (like HB 626) With all due respects to Mr. Gross, He seems like a very nice man, I didn't think is fair to have an attorney chair the meeting. How many laymen can ask an attorney a question and get an answer he can understand? As for the meeting in general, I was dissappointed. Where the meeting was intended to get the thinking of the people,(I thought) it left a feeling that the people were being guided as to how they should think.

I sincerely hope we can find a way to be fair to all concerned. To quote Earl Wilson " We have 35 million laws trying to enforce the Ten Commandments" Do we really need any more?

Sincerely,

Norma Turkington

INGLIMA'S

RICHARD AND LYNN INGLIMA'S
P. O. BOX 1296 HOMER, ALASKA 99603

April 6, 1976

Honorable Nels Anderson, Chairman
Natural Resources Committee,
House of Representatives
Juneau, Alaska

Dear Sir:

I have been a resident of Alaska for thirty years, most of which has been spent on the Southern Kenai Peninsula. I am an owner-operator of Inglima's Supermarket and have been in the retail business for twenty two years; I also fished commercially for ten years.

I believe the economic conditions on the Southern Kenai Peninsula, although they have improved, cannot support the people of the area, and while tourism is important, it is only a three month season.

Herring and salmon were the major fisheries in the twenties, thirties and forties, but were depleted in the fifties and sixties, though they are now making somewhat of a comeback in the seventies. Shrimping and crabbing are the major fisheries in the area now, but both are on a quota limit. Shrimping was in trouble when a group of Kodiak boats came in to Kachemak Bay and in a few days got enough shrimp to close the area, due to the quota. The king crab fishery is a very important industry to the area, but when the first crabbing started, the winter crabs averaged close to fifteen pounds and now the average is eight to nine pounds. The summer crab has also dropped proportionately, which means the fishermen are harvesting the crab as they become of legal size. One years poor return on crab would cause the fishermen much economic hardship. The reason I bring this up is to show that the whole economy could be severely hurt with just one poor season.

All branches of our fishing industry need money; for research, for enforcement, loans for boats and equipment, etc. I feel that the only way to get this money is from the tax revenue brought in from the oil industry. I believe the oil and fishing industries can be compatible, with the proper safeguards. It will take a lot of people a lot of time to sit down and compromise and come up with a solution that would be equitable to both the fishing and oil interests, but I feel that we need them both.

Very sincerely yours,

Richard P. Inglima

Richard P. Inglima

South-Central Timber Development, Inc.

April 8, 1976

Repr. Nels A. Anderson, Jr.
Chairman
House Resources Committee
Pouch V
Juneau, Alaska 99811

Re: SSHB 626 (Kachemak Bay Marine Sanctuary)

Dear Representative Anderson and Members of the House Resources Committee:

By way of introduction let me state that I am the sawmill manager of South-Central Timber Development, Inc.'s sawmill at Jakalof Bay. Jakalof Bay is within the proposed Kachemak Bay Marine Sanctuary. The logging operations of Western Alaska Logging Company, Inc. and the milling and shipping operations of South-Central Timber Development, Inc. in this area provide employment for over 55 people.

We are concerned that the establishment of a Kachemak Bay Marine Sanctuary would have the effect of eliminating these timber harvesting and processing activities.

We believe that the existing systems of environmental control and fishery regulation through general law are more than sufficient, and we suggest that the establishment of a marine sanctuary is not needed.

Detailed comments prepared by our legal counsel are attached to this letter.

Thank you for noting our opposition to those portions of SSHB 626 which would establish a Kachemak Bay Marine Sanctuary.

Sincerely yours,

SOUTH-CENTRAL TIMBER DEVELOPMENT, INC.

By Floyd Beach
Floyd Beach
Sawmill Manager

dkl

Enclosure: Letter of James N. Wanamaker, attorney for South-Central Timber Development, Inc. and Western Alaska Logging Company, Inc., dated April 5, 1976

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JAMES N. WANAMAKER
LEROY EUGENE DeVEAUX
RICHARD L. CRABTREE

TELEPHONE
AREA CODE 907
279-6591

April 5, 1976

Repr. Nels A. Anderson, Jr.
Chairman
House Resources Committee
Pouch V
Juneau, Alaska 99811

Sen. Kay Poland
Chairman
Senate Resources Committee
Pouch V
Juneau, Alaska 99811

Committee Members:

Theodore G. Smith, (V. Chmn.)
Alvin Osterback
Fred E. Brown
Richard I, "Dick" Eliason
H. M. "Mike" Hershberger
Leo Rhode
James H. Huntington
Leslie E. "Red" Swanson

H. D. "Pete" Meland, (V. Chmn.)
Chancy Croft
John L. Rader
Patrick Rodey
John Butrovich
Joseph L. Orsini

Re: SSHB 626 (Kachemak Bay Marine Sanctuary)

Dear Legislators:

I am writing on behalf of our clients South-Central Timber Development, Inc. and Western Alaska Logging Company, Inc. companies which currently employ over 55 people in the Kachemak Bay Area. These companies are operating logging and sawmill activities in the Jakalof Bay and Kasitsna Bay Areas.

These companies are concerned that their logging and sawmill activities could be curtailed or eliminated under the permit type system to be established by the Marine Sanctuary portions of this bill. They therefore strongly oppose the creation of the Kachemak Bay Marine Sanctuary as proposed in this bill. They submit that the present system of environmental control through general law are sufficient.

SSHB626 HAS MANY SUBJECTS:

SSHB has many subjects. I would characterize these subjects as follows:

1. Amendment to Alaska Statutes Title 38 to empower The Department of Natural Resources to establish and regulate marine sanctuaries.

2. To amend Alaska Statutes Title 41 to add planning and implementation for marine sancturaries to the powers of the Department of Natural Resources.

3. By a new section, 41.20.415 to declare all of Kachemak Bay and a large area of the adjoining Cook Inlet as the "Kachemak Bay State Marine Sancturary".

4. By a new Section 41.20.420 to create a new form of government for Kachemak Bay similar to the structures of the earlier proposed Coastal Zone Management Bill. Natural Resources will have primary "management responsibility" subject to seven special exceptions.

5. A new section 41.20.425 is created to provide a means to buy or condemn existing oil and gas leases.

Our principal comments relate to points numbered 3 and 4 as identified above. Our clients are strongly opposed to the passage of points 3 or 4.

THE MARINE SANCTUARY REGULATORY SCHEME:

SSHB 626 pays little attention to the fact that there are already in existence extensive mechanisms for the control of water pollution, solid waste pollution, air pollution, and any other activities which could potentially damage the environment of this area.

It attempts to establish a new layer of governmental authority to have "management responsibility" for the area.

It contains a shift in emphasis from the present concept of free movement and use of the waters and lands provided one does not break the law, to a new concept that the land is a preserve and no use may be made of the preserve without permission.

It is readily obvious that all parties recognise the true nature of this bill as being an attempt to put Kachemak Bay under a new governmental system of permits and exceptions. This is implicit in the Governor's letter of March 2, 1976, transmitting the "sponsor substitute".

Thus in this new version seven special uses ranging from the gathering of driftwood to the development of deep water ports and the discharge of treated fish wastes are "legislatively determined not to significantly affect the environment of the areas" (AS 41.20.420(b) page 5 SSHB 626).

If this is how the system is to be structured we would request a special exemption No. 8 to read as follows:

> (8) Activities related to commercial or subsistence logging including the operation of all authorized logging gear and the building, operation and maintenance of wood products processing plants.

WHAT LANDS ARE PUT IN THE SANCTUARY?

The area of the sanctuary as delineated by proposed AS 41.20.415 is Huge. The area goes well beyond the head of Kachemak Bay and out into Cook Inlet. The sanctuary extends far beyond the area of the Kachemak Bay State Park.

In effect, all of Kachemak Bay and this portion of Cook Inlet would be put under a permit system run by the Department of Natural Resources.

LIVING WITHIN THE EXISTING LAW:

It being the case that the State of Alaska already owns the tidelands concerned, and already has an extensive system of environmental monitoring and environmental control as well as a fine system of fish and game enforcement, one wonders why it is necessary to create a new level of government.

The only addition made by parts 3 and 4 of SSHB 626 would be that it would exchange a "permit system" for the present freedom of action system.

We emphasize our clients' opposition to SSHB 626, parts 3 and 4 (as summarized at the start of this letter).

We understand that other versions of this bill are in preparation. We request copies of such new versions at the earliest opportunity.

Thank you for your attention to the concepts set forth in this letter.

Sincerely yours,

WANAMAKER and DeVEAUX

By James H. Wanamaker

JHW/dkl

City of Seldovia
P. O. DRAWER B TELEPHONE 234-7643
SELDOVIA, ALASKA 99663

House Bill 626 was presented in Seldovia as the only avenue open to the State that would provide a means of condemning the Kachemak Bay leases.

Do we need after the fact legislation to remove ourselves from a bad deal? The first thought that came to mind after that presentation was Article one, Section ten of the United States Constitution. That section specifies that no State shall pass any law impairing the obligation of contracts. It could be said that this did not happen entered into by the State.

I have been taught that a man's word is his bond and have always lived with that doctrine.

This bill in its present form and intent will seriously damage the States credibility and the credibility of every Alaskan.

Could it be that this is the reasoning behind the introduction of the bill to further impede any economic growth in the State of Alaska.

If we don't live up to our word we will in the future have trouble getting any one to do business with us

The investment climate in the State of Alaska because of this bill and proposed oil taxation won't be very good.

I say that we should live up to our word, honor all deals we make. Try to get this State on a paying basis and not try to introduce legislation that we can't afford.

City of Seldovia

John Colberg
Mayor

BARBARA C. MANLEY
PO BOX 955
HOMER, ALASKA

TESTIMONY APRIL 9, 1976
HOUSE RESOURCE COMMITTEE
RE: LEGISLATION ON KACHEMAK BAY
CSHB626

MR. CHAIRMAN, THE HONORABLE MEMBERS OF THE COMMITTEE, FRIENDS AND FELLOW ALASKANS. I AM BARBARA MANLEY AND I AM FROM HOMER.

DURING THE PAST TWO YEARS THERE HAS BEEN SO MUCH PUBLICITY FROM ONE SEGMENT OF OUR COMMUNITY OVER THE KACHEMAK BAY OIL LEASES THAT GOVERNMENT AGENCIES, THE NEWS MEDIA, PETROLEUM INDUSTY AND OTHER COMMUNITIES WERE FIRMLY CONVINCED THAT HOMER DID NOT WANT ANY GROWTH OR DEVELOPMENT IN THE COMMUNITY. PARTICULARLY, THE CITIZENS DID NOT WANT ANY OIL AFFILIATED BUSINESS IN HOMER, WHETHER IT WAS SUPPLY AND SUPPORT VESSELS, THE PERSONNEL OF THE INDUSTRY OR EXPLORATION AND ACTUAL DEVELOPMENT OF OIL AND GAS.

THE FUROR CREATED BY THIS MINORITY SEGMENT HAD TOTALLY OVERSHADOWED THE FACT THAT THERE WERE OTHER COMMUNITIES ADJACENT TO KACHEMAK BAY. IT WAS ASSUMED THAT THE HOMER PEOPLE'S ATTITUDE WAS ALSO THE VIEW OF THEIR NEIGHBORS.

IN JANUARY THIS YEAR, SEVERAL BUSINESS PEOPLE HAD DIRECT AND INDIRECT INFORMATION FROM SOME OF THE OIL COMPANIES THAT SINCE THIS WAS THE ATTITUDE OF THE HOMER RESIDENTS, THEY WOULD NOT IMPOSE THEMSELVES ON THE COMMUNITY; THAT HOMER WOULD BE TOTALLY BY-PASSED WITH ANY DEVELOPMENT, EVEN FROM THE LOWER COOK INLET.

ON JANUARY 20, 1976 A GROUP OF BUSINESSMEN MET TO DISCUSS THE MEANS

BY WHICH THE COMMUNITY COULD OVERCOME THE ERRONEOUS CONCEPT OF OUR COMMUNITY'S ATTITUDE TOWARD THE PETROLEUM INDUSTRY. THE GROUP BELIEVED THE FIRST APPROACH WOULD BE TO TRY TO PROMOTE THE USE OF THE PORT OF HOMER. THE GROUP ELECTED TO CALL THEMSELVES "THE COMMITTEE TO PROMOTE THE UTILIZATION OF THE PORT OF HOMER".

A LETTER WAS WRITTEN TO GOVERNOR HAMMOND ADVISING HIM OF THE FORMATION OF THE COMMITTEE AND ITS PURPOSE. A COPY WAS ALSO MAILED TO EACH OF THE 60 LEGISLATORS.

WHEN THE COMMITTEE BECAME AWARE OF HOUSE BILL 626, IT SEEMED TO IMMEDIATELY DEFEAT THE PURPOSE OF THE COMMITTEE IN PROMOTING THE USE OF THE PORT OF HOMER. A PETITION, READING: "WE, THE UNDERSIGNED, PETITION JAY HAMMOND, GOVERNOR OF THE STATE OF ALASKA, HIS ADMINISTRATION AND THE LEGISLATORS OF THE 9TH LEGISLATURE OF THE STATE OF ALASKA TO RENDER ASSISTANCE THROUGH EVERY MEANS AVAILABLE TO THEM TO PROMOTE THE MAXIMUM POTENTIAL FOR DIVERSIFIED UTILIZATION OF THE PORT OF HOMER LOCATED ON KACHEMAK BAY, HOMER, ALASKA."

THESE PETITIONS WERE DISTRIBUTED THROUGHOUT THE AREA FOR A PERIOD OF TWO WEEKS. ON FEBRUARY 19TH, THE PETITONS, WITH 624 SIGNATURES, WERE SENT TO GOVERNOR HAMMOND. ON FEBRUARY 27TH GOVERNOR HAMMOND ACKNOWLEDGED RECEIPT OF THE PETITIONS, AND THE REMAINDER OF HIS THREE PAGE LETTER WAS AN IN-DEPTH EXPLAINATION OF THE "TOWN MEETING" CONDUCTED IN HOMER ON FEBRUARY 17TH BY ATTORNEY GENERAL GROSS, BOB PALMER AND PAT WENNEKENS. THE NOW FAMOUS "TOWN MEETING" PROVED TO HIM THAT ONLY 17 PEOPLE IN HOMER OPPOSED THE CONDEMNATION OF THE KACHEMAK BAY LEASES AND WHO SUPPORTED ANY KIND OF OIL DEVELOPMENT THROUGH HOMER.

IT WAS NOT THE INTENT OF THE COMMITTEE TO BECOME INVOLVED IN THE KACHEMAK BAY ISSUE AS IT WAS THE CONSENSUS OF THE GROUP THAT THIS WAS A MATTER TO BE DECIDED BY THE SUPREME COURT OF THE STATE OF ALASKA. HOWEVER, IN VIEW OF THE "TOWN MEETING" ATTENDED (AND VOTES ACCEPTED BY MR. GROSS) BY UNDER VOTING AGE HIGH SCHOOL STUDENTS, NOT ONLY FROM HOMER BUT ALSO KENAI, AND THE ORGANIZED BLOCK OF ONE SEGMENT IN THE COMMUNITY, THE COMMITTEE FELT THIS WAS NOT REPRESENTATIVE OF THE RESIDENTS OF MANY YEARS, THE TAXPAYERS, AND THAT IT SHOULD NOT BE THE BASIS FOR A DECISION THAT NOT ONLY AFFECTED THE KACHEMAK BAY COMMUNITIES, BUT EVERY TAXPAYER WITHIN THE STATE OF ALASKA.

ON JANUARY 25TH THE COMMITTEE, AS A COMMUNITY SERVICE, MAILED 500 SETS OF POST CARDS, FIVE CARDS PER SET, ASKING YES OR NO QUESTIONS ON CONDEMNATION, IF THE AMOUNT TO BE PAID SHOULD BE ON A REFERENDUM, IF IT SHOULD BE A LEGISLATIVE DECISION AND IF THE INDIVIDUAL OWNED PROPERTY. THE CARDS WERE TO BE SIGNED AND MAILED DIRECT. THEY WERE ADDRESS TO GOVERNOR HAMMOND, HONORABLE NELS ANDERSON, HONORABLE KAY POLAND, HONORABLE LEO RHODE AND OUR COMMITTEE.

THE COMMITTEE DID NOT ATTEMPT TO PERSUADE THE PEOPLE TO BE FOR OR AGAINST REVOKING THE LEASES, ONLY TO EXPRESS THEIR OPINIONS AND SEND THEM TO GOVERNOR HAMMOND AND EACH OF THE RESOUCE COMMITTEES. IT WAS OUR BELIEF THAT THE FISHERMEN'S OPINIONS HAVE BEEN WELL KNOWN AND STATED MANY TIMES DURING THE PAST TWO YEARS, HOWEVER, THERE ARE MANY RESIDENTS IN HOMER WHO ARE NOT FISHERMEN. EACH INDIVIDUAL HAS AN EQUAL RIGHT TO HIS OPINION, HIS RIGHT FOR A VOICE IN OUR DEMOCRATIC PROCESS. WE WERE ONLY ENCOURAGING THE USE OF THESE RIGHTS AND TRYING TO PROVIDE THE CHANCE FOR MORE PEOPLE TO HAVE A VOICE ON AN ISSUE IN OUR STATE GOVERNMENT.

OUR COMMITTEE HAD 342 POST CARDS RETURNED. OUT OF THIS NUMBER 322 DID NOT WANT THE OIL LEASES IN KACHEMAK BAY CONDEMNED. OF THE 20 WHO WANTED TO REVOKE THE LEASES TEN INDICATED THEY WANTED THE COST OF THE PURCHASE ON A REFERENDUM, AND TEN WANTED THE PURCHASE AND COST TO BE A LEGISLATIVE DECISION.

HOMER NEEDS A MORE STABLE ECONOMY AND THIS IS A FACT RECOGNIZED BY THE MAJORITY OF THE RESIDENTS, ESPECIALLY THOSE WHO EARN A LIVING THROUGH FREE ENTERPRISE. THE COMMUNITY IS GROWING, THIS IS TRUE. HOWEVER THAT GROWTH IS ALSO CREATING "GROWTH" IN THE DEMANDS ON THE CITY FOR SERVICE, THE SCHOOLS, THE WHOLE ECONOMY. GROWTH IN POPULATION DOES NOT CREATE GOWTH IN REVENUE THAT IS DIRELY NEEDED TO PROVIDE THE SERVICES DEMANDED, IT DOES NOT CREATE EMPLOYMENT FOR THE YOUTH WHO HAVE BEEN REARED IN OUR COMMUNITY WHO ARE NOW YOUNG ADULTS WHO NEED TO PROVIDE FOR THEIR OWN FAMILIES: NOR DOES IT PROVIDE EMPLOYMENT FOR THE INFLUX OF NEW RESIDENTS.

THE FISHING INDUSTRY CANNOT PROVIDE THIS VOLUME OF EMPLOYMENT THAT IS NEEDED TO STABALIZE OUR ECONOMY. THE SEASONAL CONSTRUCTION WORK THAT FLUCTUATES FROM YEAR TO YEAR CANNOT PROVIDE A LIVLIHOOD FOR MANY OF OUR CITIZENS.

OUR PORT HAS MANY GREAT POTENTIALS. POTENTIALS TO PROVIDE LOCAL EMPLOYMENT AND TO PROVIDE REVENUE TO THE CITY WITHOUT THE BURDEN OF INCREASED PROPERTY TAX FOR THE RESIDENTS. THIS CAN BE GENERATED FROM BOTH STATE AND FEDERAL OFFSHORE LEASES, AND WITH THE LEAST IMPACT ON THE COMMUNITY.

IT IS DISTRESSING TO ME THAT OUR ADMINISTRATION IS ATTEMPTING TO

DETER THIS DEVELOPMENT THROUGH DISCRIMINATION AGAINST ONE INSUSTRY, ESPECIALLY WHEN THE DISCRIMINATION IS BASED ON EMOTIONALISM RATHER THAN SCIENTIFIC FACT. THE ENCROACHMENT ON THE RIGHTS OF A COMMUNITY AND ITS CITIZENS BASED ON EMOTION AND/OR PERSONAL PREJUDICE OF ANY ADMINISTRATION IS INCONCEIBLE FOR A DEMOCRATIC GOVERNMENT.

I AM DEEPLY CONCERNED, NOT ONLY FOR THE WELFARE OF MY CITY, BUT FOR THE IMAGE OF OUR STATE. THROUGHOUT THE YEARS, THE IMAGE OF ALASKA HAS HAS NOT ONLY BEEN THAT OF THE VASTNESS OF THE STATE IN SIZE AND AESTHETIC BEAUTY, BUT ALSO OF HER PEOPLE: PEOPLE OF STAMINA, HOSPITABLE PEOPLE, NEIGHBOR HELPING NEIGHBOR, PEOPLE OF INTREGRITY AMONG WHOM A MAN'S WORD WAS HIS BOND, CREDITABLE PEOPLE.

UPON THE ADVENT OF STATEHOOD, I BELIEVE IT WAS THE INTENT OF THE PEOPLE OF ALASKA THAT THEIR STANDARDS OF INTREGRITY AND CREDIBILITY BE EXERCISED BY THE ADMINSTRATIONS OF THE STATE OF ALASKA.

THE KACHEMAK BAY OIL LEASES ARE LITIGATED TO THE STATE SUPREME COURT. ALTHOUGH NO DECISION HAS BEEN HANDED DOWN, THIS ADMINISTRATION HAS PERSISTED IS PASSING LEGISLATION TO CIRCUMVENT AN ANTICIPATED RULING OF THE SUPREME COURT. THIS IS A DEPLORABLE REFLECTION ON THE ABILITY OF THE STATE SUPREME COURT. IT LENDS TO THE DESTRUCTION OF THE PUBLIC'S CONFIDENCE IN JUSTICE FROM THE HIGHEST COURT IN OUR STATE. ADVOCATION OF REVOKING THE KACHEMAK BAY OIL LEASES INFERS THE TOTAL DISREGARD BY THE ADMINISTRATION FOR THE HIGHEST JUDICIAL AUTHORITY OF THE STATE OF ALASKA IF ITS DECISION IS NOT IN AGREEMENT WITH THE DESIRES OF THE ADMINISTRATION. I FIND THIS TRAGIC AT T TIME IN OUR SOCIETY WHEN SO MANY YOUNG PEOPLE BELIEVE THERE IS NO CREDIBILITY IN ANY GOVERNMENT.

I BELIEVE THAT ANY LEGISLATION TO REVOKE THE KACHEMAK BAY OIL LEASES NOT ONLY DESTROYS THE CREDIBILITY OF THE ADMINISTRATION TO THE PEOPLE OF ALASKA, BUT TO THE NATION AND TO THE WORLD.

IN CONCLUSION, MAY I EXPRESS MY SINCERE APPRECIATION TO EACH MEMBER OF THIS COMMITTEE FOR YOUR DELIGENCE IS SEEKING OUT ALL OF THE FACTS AND WEIGHING THE OPINIONS OF ALL OF THE CITIZENS IN YOUR SINCERE EFFORT TO ARRIVE AT A RECOMMENDATION THAT IS TRULY IN THE BEST INTEREST OF THE TOTAL OVER-ALL COMMUNITY. I AM DEEPLY GRATIFUL TO EACH OF YOU.

THANK YOU.

As requested by you on March 11, 1976, I have reviewed the document Kachemak Bay A Status Report prepared by the staff of the Alaska Department of Fish and Game. My review and comments are enclosed.

The main point that I wish to make in this covering letter is that, after reading the document, I am forced to conclude that the department has acted hastily by releasing this report in its present form. I recognize that it is not always possible to afford the time necessary for an independent review of such a report, but this report does not appear to have received even internal review and editing. As a consequence it is extremely difficult to read and comprehend, and contains many inconsistancies and factual errors. In addition, much of it is written in an extremely emotional style, which may embarrass the department.

Of greater importance than possible departmental embarrassment, however, is that the release of this report to the public cannot help but confuse and inflame the controversial issues surrounding the leases in Kachemak Bay. It seems to me that what was needed was a status report on the several ongoing studies of the area to provide factual, preliminary information to decision makers and the public. This document in its present form does not meet that objective.

The potentially most valuable information in the document is contained in Section I concerning the mass transport question. I suggest that all the available data and the methodology for this study be reviewed in detail. I would recommend that this be done by the Department of Oceanography at Oregon State University because of their considerable experience with coastal drogue work. Such a review need not take more than a few weeks.

I appreciate this opportunity to be of service. If you have any questions regarding my review and comments, please do not hesitate to call me.

FRANK ~~HEUFF~~
HEUER.

REVIEW

STATUS REPORT KACHEMAK BAY

SCOPE

This report, a document in five sections, is intended to "discuss and summarize salient findings emerging from ongoing field studies and analysis(sic) of current literature as they relate to man's disruption of the marine environment, especially by oil and gas related activities" - page one of the introduction. Sections I and II of the report are concerned with the ongoing field studies, Section III is a literature study, and Section IV and V are philosophical essays that do not meet this stated intent.

CONTENT AND FINDINGS

Section I, The Marine Environment of Kachemak Bay is concerned chiefly with a recent Alaska Department of Fish and Game (ADF&G) radar tracked drogue study of water circulation and transport in Kachemak Bay and vicinity. Some additional data on circulation and physical oceanography are provided.

The main purpose for the circulation study was to test a hypothesis that water transport in Kachemak Bay is sufficiently slow that the drifting, planktonic, larvae of resident bay animals can develop and settle within the bay. For this hypothesis to be tenable, it is necessary to demonstrate that the exchange rate of water between Kachemak Bay and the outside is longer than the time of the planktonic existence of the larval animals - approximately 60 days (or 3 to 4 months according to the quote on page IV-3 of the report).

For some reason this question, though raised on page I-5, is not discussed again in this section in terms of the study results. The abstract of the report does state, "Residence time of the waters within the Bay appears to be 20 days at the most and the Bay must be considered as an input-output system with respect to the dispersal and settling of crustaceans larvae". How this conclusion was reached is not stated in this section.

The drogue and some concurrent drift card studies both strongly suggest that the previously proposed residence times for water in the bay are excessive. The data given in the report are too incomplete or illegible to allow a detailed critique

of this section. But it is clear that there is considerable net transport into and out of the area, particularly near the surface and to the west of the Homer spit. The conclusion made in the abstract appears to be valid.

The balance of Section I deals with bathymetry (adequately) and the bay. The latter is of limited value owing to the complexities of the circulation in this area. No biological data are included in this section on the "Marine Environment".

Section II, Environmental and Biological Attributes of Kachemak Bay provides a short report on marine algae, presumably a contract study, a considerable amount of fishery information and data, and a discussion of crustacean larval biology. One paragraph and four figures cover the higher vertebrates - birds and mammals.

The fishery data are in two parts: an overview that deals primarily with the economic aspects of the Kachemak Bay fisheries, and a species by species historical review of the more important fisheries. The economic discussion lacks objectivity as does the immediately following pages covering the productivity and aesthetics of the area (see Reviewer's General and Specific Comments). The base year used in the economic discussion is 1973, a record catch year, although data for 1974 and 1975 were available. No attempt was made to put the Bay's fisheries into proper prospective with those of the rest of the state. (In 1973 the ex-vessel value of Kachemak Bay fisheries was 2.58% of the state total.)

The species overview, which begins on page II-23, shows signs of hasty preparation and is difficult to interpret. This is particularly true of the figures, many of which do not provide the units of measure. The introduction to this section needs editing to gain objectivity.

The section on marine plants consists of observational notes at a series of stations in the bay. The locational and observational data are qualitative in the report, but precise locations and quantitative measurements presumably are available. The purpose of this study was not stated.

The section on crustacean larval biology beginning on page II-60 continues the discussion of larvae persistance in the "gyre" begun in Section I of the Status Report. There is considerable confusion in this section between the tentative conclusions drawn from a 1972 plankton survey of the area and the results of the 1975 circulation study discussed in Section I. These discrepencies should be resolved. In this section, on page II-63, the basis for the 20 day transit time given in the abstract may possibly be found. The maximum transit time on the figure appears to be 16 days, however. The remainder of this section consists of an abstract(?) of the 1972 National Marine Fisheries Service (NMFS) study of crab and shrimp

larvae distribution in the Bay. Since these investigations preceded the drogue and drift card studies, the interpretation of these data are probably in error, although this point is not made clear by the author of this section.

Section III, Sensitivities of Kachemak Bay to Man's Impact attempts to estimate the effect of man's activities upon the ecosystem. With the exception of one paragraph on page III-1, the discussion is directed at oil and gas development activities. No further mention is made of the possible effects of population pressures, waste disposal, renewable resource use, i.e. logging, fishing, etc. Since oil and gas activities are the main issue at this time, this dismissal of other factors is understandable in view of the intent stated in the introduction, but the title of Section III should reflect this emphasis.

The bulk of section III consists of a restatement of a number of reviews of the effects of oil on marine systems. The attempt is made to put these discussions into the Kachemak Bay site. Some calculated spill trajectories for the Bay are given.

There are many inaccuracies in this section. Some of these are in the statements of the author and some are in the literature quoted.

The author relies heavily on the Metula spill to develop an oil spill scenario for Kachemak Bay. He does not provide any projections of tanker traffic in the Bay but assumes that a Metula size spill will occur near the Homer spit. He provides an estimated oil dosage of 400 bbls per square mile (page III-17) for the inner bay. This apparently alarming statistic will undoubtedly be accepted as fact by some readers of the report. The author does not relate this dosage to the toxicity table on page III-51. If he had he could show that even his major spill does not cause toxic levels to be reached, in fact there is a safety factor of about 100.

This toxicity table, Table 24, page III-51, is a summary of acute toxicity data for several groups of organisms. Because of its convenience one can expect it to be widely quoted. Because of this possibility, the table should be clarified: The first column should be identified as water soluble fractions (chiefly aromatics), the last column should not use exponents but should be written out - e.g. 10,000 - 100,000, and the heading over this and the middle column should be rewritten to emphasize that these values are total oil added to the system i.e. the amount of oil per volume of water.

Figure 54, page III-55 is a summary figure purporting to show potential impacts of oil spills on Kachemak Bay. Because of its summary nature and probable wide use, it should be reviewed for accuracy and the wording changed to reflect its speculative nature.

The impact of oil and gas development and oil spills on fisheries is not discussed in this section. Several case histories of oil spills are reviewed, but not with this objective in mind. The author should be advised that there are data available from several areas of major oil and gas production, notably, the Gulf of Mexico, southern California, and Venezuela, where fishery data are concurrently available. These data do not indicate that the two activities are incompatible. In addition, there have been several major spills, some of which are mentioned by the author, where careful investigation failed to prove or even indicate any damage to the fisheries. These include the Torrey Canyon, the Santa Barbara, and the Chevron Pass Block 41 spills. None of the reports indicate damage to the fishery resources, either short or long term. A report of these findings would seem to be germane to the discussion.

Section IV, Conservancy and Protection of the Renewable Energy Resources of Kachemak Bay is a philosophical discussion of some of the points of conflict in present day resource use. The position taken here, and this is purported to be the position of the ADF&G, is that present practices for oil and gas development in the state waters of Alaska are unacceptable from the standpoint of environmental safety. This concern on the part of the staff of ADF&G also is claimed to be that of the citizens of the entire state (page IV-26), although this position is not supported by any documentation.

This section is not a status report per se on Kachemak Bay, but rather an expression of the ADF&G staff's feelings about the issues. As such it might have been more appropriately published in some other medium.

Section V, Kachemak Bay Perspective and Overview is a continuation of Section IV with additional philosophical discussions of energy and the use of non-renewable resources. This section states that the ADF&G has not been given information on the potential size of the Kachemak Bay field, which presumably would affect their recommendations on the environmental safeguards needed during the development (although from the discussion at the end of Section IV the size of the development does not seem to matter). The price paid for the leases, however, is a matter of record and one wonders why some comparison of the sale price with the value of the fisheries was not made.

This section also infers that using the area to produce fish is in some way more socially valuable than to produce oil, even though the two have not been shown to be mutually exclusive. The fact that the fish produced are luxury items that do not contribute to the world or the U.S. protein needs has been ignored. Further, the high energy imput required for fish production has been sidestepped by comparing foreign distant water fishing with small-boat Alaskan fisheries. The

question could be raised as to why this document does not take this opportunity to recommend a return to salmon traps. This section, as the preceding section, does not constitute a status report on Kachemak Bay.

Reviewer's General Discussion

The purpose of this document is nowhere clearly stated. According to the statement of intent in the introduction, one gets the impression that the document was prepared to provide decision makers in the state government and the interested segment of the public with recently obtained information on the Kachemak Bay question. This goal appears to be met by the abstract which, with the exception of the paragraph dealing with an analysis of the current literature, is concise, factual, and objective.

The balance of the document does not compare favorably with the abstract. All of the five sections are poorly edited and difficult to understand. Section I is objective but suffers from the lack of any useful conclusions about the question of the persistence of larvae in the Kachemak Bay "gyre". Since this was the reason for undertaking the study, this oversight is unfortunate. Instead the reader is forced to rely on the rather confused discussion in Section II to find that the earlier held view had been refuted, that the Kachemak Bay system is not closed, and that larvae enter and leave the system during their planktonic life time.

The remaining four sections of the document lack objectivity. They are used to support what is evidently the ADF&G staff's position on oil and gas development in the area. They include two unnumbered figures of high emotional content, and numerous emotional phrases, and obviously biased statements. This lack of objectivity alone seriously detracts from the usefulness of this document for the decision maker and can not help but stir up those segments of the public that are opposed to oil industry activity in the area. Furthermore, the poor editing, which may be excused in part because of the press of a close release deadline, obscures the factual information and will result in misinterpretation.

It is the reviewer's conclusion that the general release of this document in its present form would be a serious error. Because some of the information contained in it is valuable, the document should be carefully edited for purpose, organization, and objectivity.

Reviewer's Specific Comments

Abstract

Paragraph four suggests that the Metula spill can be used to assess the impact of a similar accident in the lower Cook

Inlet. Nothing in the studies undertaken of that spill suggests that such information will be developed, and this statement should be re-examined.

Introduction

Page one sets the stage for the lack of objectivity characteristic of the report.

It would be helpful if the "intent" statement in the last paragraph were expanded to include a statement of purpose so the reader could be prepared and oriented for what follows.

Page two. The second paragraph leaves one wondering whether the transport studies alone or environmental studies in general are "challenging".

Last page. The 1974-75 NMFS Auke Bay project did include bioassays. These data have not been released. The statement that low levels of oil induced mortalities on early life forms is misleading. What is a low level? Certainly we should be told whether the levels are lower than levels reported elsewhere, assuming that ADF&G know the answer.

The 1975 USFWS; Rutgers University study appears to be of salt marshes. Does Dr. Crow mean that the salt marshes only or the entire bay are the richest area he has ever studied?

Section I

Page I-4. No reference to ADF&G (1974, 1975) is given in the bibliography.

Page I-5. The statement beginning in line five needs a reference.

Page I-32. The results should include some discussion of transport times at the various depths. Although there may be some questions regarding methodology, the evidence is quite strong against the stagnant "gyre" hypothesis.

The question posed on page I-5 should be addressed.

In paragraph three the question of stratification has not been addressed by the drogue work.

Page I-39. Site E results deserve some comment, particularly in light of the trajectories in Section III.

Page I-43. Why are the low temperatures, line seven, of interest?

How does this discussion relate to the stratification statement in paragraph 3 on page I-32? An explanation of sigma-t density surfaces should be given so that the public can make some sense out of what follows.

Section I needs editing and careful synthesis. Preliminary conclusions should be presented in a summary at the end.

Section II

Page II-1. Why was 1973 selected as the statistical base year? It would be useful to give some relative comparisons here between the $3.2 million catch from Kachemak Bay and the catch for the rest of the state. What is the value of the oil leases to the state? What is the value of oil and gas production in the upper Cook Inlet to the state?

Page II-2. The statement in line three and four needs a reference.

Bluff Point is not shown on figure 35.

Page II-5. It would be enlightening to be told why the area was set aside as a crucial critical habitat, and what does this mean?

The wording of paragraph three is more suitable for a travelogue than a scientific status report, even including the Freudian slip re: crabs. Such obviously emotional reporting is prevalent throughout the report and should be edited out.

The last paragraph is an attempt to paint a false picture of the bay. The blanketing of the bottom of the bay by individual shrimp is not supported by the T.V. survey in figure 36. Nor do the NMFS trawl surveys support his statement. To be conservative and assume that the statute mile is used for the distance of the drag rather than the more likely nautical mile, and that the foot rope of the trawl covers 40 feet, the highest catch - 4444 lbs - gives a density of 0.02 lbs/ft^2 or about two individuals per square foot of bottom. Most of the stations are less productive by a factor of 10 or more.

Page II-8. This section on Macrophytic ecology is too technical for the purpose of this report. It needs to be summarized in a more detailed fashion than is done on page II-22 if it is to have any meaning for the general or technical reader.

Page II-23. There seems to be a size discrepancy between the 35 by 10 miles given here and the 45 by 22 miles given on page I-1.

Page II-24. No reference in bibliography for the report cited in line 13.

The last paragraph is more travelogue rhetoric.

Page II-25. The 1973 Kachemak Bay catch of $3.2 KK was 2.58% of Alaska catch.

Line 21. Nearly 60% by weight but less than 50% by value.

Page II-26. What are the units of salmon catch?

Page II-27. Why not use 1974 or 1975? Is it because the value dropped considerably?

A more honest table is given below:

1973 Ex-vessel Value
($millions)

Species	Kachemak Bay	Alaska	Kachemak Bay % of Alaska
Salmon	0.2	60.0	0.3
King Crab	1.7	44.7	3.8
Tanner Crab	0.7	10.8	6.5
Shrimp	0.4	3.9	10.2
Dungeness Crab	0.2	3.4	5.9
Herring	0.03	2.6	1.2
Total	$3.23	$125.4	

Note: $\frac{3.23}{125.40} \times 100 = 2.58\%$. This is the percent of the total Alaska ex-vessel value taken in Kachemak Bay.

Page II-31. What are the units?

Page II-33. What do these numbers mean?

Page II-51. The first paragraph needs some data and references to support the statement.

Page II-60. This begins a very poorly edited and confusing section. The problem stems in part from combining speculation based on a 1972 study with the recent investigations by the department described in Section I. The results is that statements such as that in line 18ff are in conflict with statements elsewhere - cf. page II-61, bottom and page II-62, bottom.

Page II-62. Line three admits that the conclusions in these studies do not "quite tally". "Quite" should be omitted.

The planktonic times given in paragraph four should be checked and references given.

Page II-65ff. This portion of the section needs editing and clarification as to who did it, when, and what it now means.

Section III

Page III-3. The choice of words "Nondegradable Pollutant" is unfortunate since the category is defined as including slowly degradable substances. In nature such substances are continuously entering various ecosystems. There they are usually quickly dispersed or otherwise kept below effective concentration levels by various natural processes. This point should be made here for the discussion that follows on page III-5ff.

There is little evidence to suggest that biological magnification in the food chain really occurs. The so-called magnification is confined to only one or occasionally two trophic levels.

Page III-5. The transition from an introductory discussion to the specifics of Kachemak Bay came swiftly. The Bay as an input-output system must be considered in order for the Odum model to apply. The author has lost sight of the fact that figure 47 is an illustration of principles and does not actually depict Kachemak Bay. The assumption that the "pollutional state" of Kachemak Bay lies close to the ordinate is not a fact that has been verified for inclusion in a status report.

Page III-7. This figure needs an explanation of where these data came from. If these are speculations on the part of the author, he should so state.

Page III-8. The choice of the Metula spill for developing a spill scenario is ridiculous. There is virtually no data available yet from this spill, nor is there likely to be. The Gunnarson narrative does not reveal anything that enables one to make a quantitative assessment of the effect on the fisheries (if there was any effect, or any fisheries to be affected).

If a total of only 7 tissue (mussel) samples were collected as is stated then the outlook for an intensive study is dim.

There have been several major spills that have been studied and that occurred in areas where fishery statistics were available. None of these spills resulted in any detectable effect on the fisheries. Many of these are summarized in Table 4-1 of Petroleum in the Marine Environment, National Academy of Sciences (1975). Others are available in the recent literature. The only thing that recommends the Metula spill is its size and the high latitude location. However, in view of the lack of quality investigations, this spill cannot provide an insight into the Kachemak Bay situation.

Page III-13. The conversion of tons to gallons should be checked.

It is unlikely that an uncontrolled well could spill anywhere near the amount suggested, namely, more than 20,000,000 gallons.

Page III-17. This discussion of dosage is pointless, however, if it is to be made, the author might carry it a bit further. Four hundred barrels of oil per square mile is about 20 g/m^2. Taking only the upper meter of the bay, this dosage would be less than 20 ppm total oil or 0.02 ppm SAD (as defined in his table 24, page III-51). Since the bay is more than one meter deep, this is a high estimate of dosage and well below the LD_{50} for larvae (table 24). This is a good indication of why spills do not seem to affect open water fisheries.

Page III-22. The second paragraph needs to be developed further. The studies mentioned seem to suggest that an accident in the leased area would not remain in the bay but would be carried away. The drogue trajectories and the spill trajectories would not coincide. He should differentiate between the slicks on the surface and the hydrocarbons in the water column.

Page III-27. Forester also provided some concentration data in his tar particle study. These were all in the low parts per billion <u>total oil</u>.

Page III-29. Lethal levels should stipulate the exposure time. Most of the values in the literature are for four day (96 hr) exposures. The best study of field dosage to date is the McAuliffe et al study: <u>Chevron Main Pass Black 41 Oil Spill: Chemical and Biological Investigations</u>. In the 1975 Conference on Prevention and Control of Oil Pollution. (555-566) According to this study neither the dosage nor the exposure time were great enough to cause biological effects during a multi-day spill of some 65,000 bbl.

Page III-37. The author does not tell us that prior to the spill similar quantities of oil were found in the sediments in the Santa Barbara Channel, evidently from the natural seeps. Nor does he mention that natural seeps in the Santa Barbara area produce the equivalent of two Santa Barbara spills each year. It would be interesting to learn what the flow rates are in the Cook Inlet seeps, and how that volume is assimilated by the ecosystem.

Page III-44. The <u>Torrey Canyon</u> spill was a tragedy perhaps, but it did not result in any detectable damage to the fisheries in the area, a fact that needs to be emphasized.

PageIII-38. The following, and the preceding for that matter, are much better discussed in the 1975 National Academy of Sciences <u>Petroleum in the Marine Environment</u>.

Page III-55. This summary figure suffers from the use of "will" rather than less definite verb. As a result, the fact that this is the author's conjecture of fate and effects is easily lost.

Section IV

This entire section does not seem to belong in a status report. Rather it expresses the view of a single author who is using this opportunity to publicize his particular philosophy. His desire may be understandable but the use of this forum is questionable.

One of the false impressions that this section gives is that the designation of the Kachemak Bay Critical Habitat preceded the lease sale when in fact this designation was imposed after the state had received its money.

Following page IV-27 there is an unnumbered figure of questionable value to the report.

Section V

This section is a continuation of the author's philosophical essay on environmental affairs. His arguments do not add to the usefulness of the document as a status report.

The author makes much of the use of the area for food production, but ignores the fact that none of the species exploited are cheap food, all are luxuries. Almost all the catch is exported. His statement on page V-11, second paragraph is clearly fallacious.

Following page V-14 is another unnumbered figure.

Frank J. Hester
Santa Barbara, CA
March 17, 1976

Draft Statement to State of Alaska - House of Representatives Committee on Resources Hearing on Proposed Legislation to Create a Marine Sanctuary in Kachemak Bay and Prohibit Oil and Gas Operations

Much of the concern about compatibility of oil and gas operations with fishing has addressed the effect of oil on the marine life if it does enter the water. At least as important is the question of whether or not an oil spill might occur during exploratory drilling.

A number of safeguards are applied in the drilling of any exploratory well to prevent oil from getting into the water.

First, during the drilling of any well where oil or gas may be encountered, the well is filled with drilling mud to prevent uncontrolled flows of fluids to the surface. This is called primary control.

Second, a system of valves and control devices is placed on the well during drilling to provide a means of closing the well, should the control by mud be lost. This equipment is called a blowout preventer and provides a back-up if the mud system fails. It is, therefore, called secondary control. Personnel on the drilling vessel are thoroughly trained to recognize symptoms indicative of a loss of primary control and to take the requisite control measures before the well can begin uncontrolled flow. Regular and frequent drills are performed by the crew using the blowout preventers to assure prompt and correct response by the personnel and proper working order of the equipment.

Third, equipment and response capability are provided, both on board the drilling rig and at convenient shore sites to contain and recover any spilled oil which could result from a failure of one of the above systems.

This is called the oil spill response capability. The rig itself has on board some 800 feet of boom to be deployed if significant oil volumes were spilled. Additionally, the rig will have on board a skimmer to pick up any oil contained by the boom. Sorbent and dispersant materials will also be available for use in picking up or dispersing small amounts of oil not recoverable by the skimmer. Again, the drilling crew and the crews of the support boats will be trained in handling the oil spill containment and recovery equipment.

A massive oil spill, such as have been associated with tanker groundings, is not a realistic prospect from exploratory drilling. In all offshore drilling to date, only 3 significant oil spills have resulted from blowouts of drilling wells. Even in such cases where considerable volumes of oil have been released to the water such as in the Santa Barbara spill, follow-up environmental studies have shown rapid and thorough recovery of the biota.

In summation of this necessarily brief and simple statement about a highly complex problem, I want to emphasize:

1. If oil and/or gas are encountered, the chance is [redacted] remote [redacted] that the well fluids will not be controlled by the drilling mud.

2. If the drilling mud should fail to provide primary control of any oil or gas the blowout preventers would be activated to close in the well.

3. If all of the above should fail, oil spill containment and recovery equipment is provided on board the drilling rig for

prompt deployment and recovery of any significant amounts of spilled oil.

4. In the very unlikely event of an oil spill, experience has shown, without exception, that there has been rapid recovery of the biota and no significant lasting damage has occurred.

Summary Chapter from:

ACUTE TOXICITY AND UPTAKE-DEPURATION STUDIES WITH COOK INLET CRUDE OIL, PRUDHOE BAY CRUDE OIL, NO. 2 FUEL OIL AND SEVERAL SUBARCTIC MARINE ORGANISMS

By

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Final report to Marathon Oil Corporation, Phillips Petroleum Corporation, Shell Oil Company, Standard Oil Company of California, Texaco Incorporated, and Union Oil Company of California on contracted laboratory studies relevant to oil development in Kachemak Bay, Alaska.

December 1, 1975

1 Summary

1.1 Background and Scope

This is a laboratory study of the effects of petroleum hydrocarbons on selected Alaskan marine animals. The purpose was to determine whether or not commercially important Alaskan marine animals react differently to crude oil than do marine animals in other areas, particularly those areas where oil and gas development activities have been established for a considerable time with no apparent effect on the fisheries.

This study was conducted by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northwest Fisheries Center, using the facilities and personnel at the Auke Bay Fisheries Laboratory and the Kasitsna Bay Field Station. Funding was provided by a contract with the Shell Oil Company, and was cosponsored by Marathon Oil Corporation, Phillips Petroleum Corporation, Standard Oil Company of California, Texaco Incorporated, and Union Oil Company of California.

The primary objectives of this study were:

to determine the acute toxicity of Cook Inlet crude oil to various life stages of fish and shellfish found in Kachemak Bay.

to determine the rate and degree of uptake and depuration of hydrocarbons by these animals when they were exposed to sublethal concentrations of the water-soluble fractions of crude oil.

to compare our results to published literature to determine to what degree, if any, Alaskan marine animals differ from animals in other areas in their response to oil contamination.

Secondary objectives included the identification and quantitation of some sublethal behavioral and physiological effects.

1.2 Methods

1.2.1 Acute Toxicity

The acute toxicity of crude oil to Alaskan marine animals was determined by standard bioassay. All the bioassays were static; that is, the test solution was not replenished with fresh solution during the course of the four-day (96-hour) test period. As a consequence, evaporation and bacterial decomposition decreased the concentration of many of the soluble fractions during the tests. Both oil-water dispersions (OWD's)* and water-soluble fractions (WSF's)* were used for the bioassays. The oil-water dispersions (microscopic oil droplets in water) were prepared by short-term but high-energy mixing of oil and seawater. The water-soluble fractions were prepared by stirring an oil-water mixture for 20 hours and then siphoning off the water and dissolved oil fractions from under the remaining oil slick. The concentrations of hydrocarbons in the test solutions were determined by infrared and ultraviolet spectrophotometry. Ultraviolet measurements appear to be the superior method for monitoring toxicity.

1.2.2 Uptake and Depuration

The rate and amount of hydrocarbon uptake and depuration (the release of hydrocarbons from body tissue) were determined as follows.

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*For a glossary of the abbreviations used throughout this report, see Appendix A.

The test animals were exposed to seawater containing less than 20% of the WSF concentration that would be expected to kill 50% of the animals in 96 hours (the 96-hr TLm [median tolerance limit]). Samples of tissue from the test animals were taken periodically during exposure and depuration for determination of their hydrocarbon concentrations by gas chromatography. Exposure and depuration periods typically lasted for 96 hours each.

1.2.3 Low Level Effects

In addition to acute bioassays and uptake-depuration experiments, some preliminary investigations were made of the effects of low-concentration exposures on behavior and physiology. These included behavioral observations of larvae in the vicinity of surface oil slicks, and physiological studies of crab respiration as affected by dissolved oil fractions.

1.3 Results

1.3.1 Acute Toxicity

Acute oil bioassay studies are subject to technical problems not usually encountered in acute bioassays using less complex substances. As a consequence, the values obtained from oil bioassays are dependent to some extent on experimental techniques. The results generally exhibit a considerable range of variability making it difficult to assess minor differences in sensitivity among different species, especially among different studies.

The results of the acute toxicity studies on both adults and

larvae are summarized in Table S-1. For comparative purposes, data from other investigations of oil toxicity on marine animals from the west coast and the Gulf of Mexico are included. The Alaskan species appear to be more sensitive than the Gulf of Mexico or Pacific coast animals tested by Anderson et al. (1974b) and Battelle (1973b, 1974a) since the ranges of median tolerance limits for Alaskan species are lower and do not overlap those for Gulf of Mexico or Pacific coast species. This apparent sensitivity of Alaskan species may actually reflect differences in test oils, temperature, salinity, or test procedures used in this study and the other studies. Since as previously stated, there is considerable variation between replicate bioassays in this and the other studies, we cannot state that these apparent differences in sensitivity are statistically significant.

Larvae tested in this study are generally more sensitive than adults, but their range of sensitivity does overlap with those reported for adults.

1.3.2 Uptake and Depuration

The uptake and retention of hydrocarbons by Alaskan species appears identical to the pattern reported for temperate and subtropical species. Actual quantitative differences in accumulation or depuration rates may exist but cannot be determined for lack of statistical confidence limits on the tissue analysis of hydrocarbon concentrations. All of the species we tested accumulated significant amounts of aromatic hydrocarbons. Methylnaphthalene was accumulated to the greatest extent and persisted the longest (Figure S-1). Naphthalene and other

substituted naphthalenes showed similar uptake and depuration behavior but did not accumulate to such high levels in the tissues.

1.3.3 Low Level Effects

Larvae were apparently unable to detect or avoid oil slicks.

The results of the preliminary experiments on crab respiration were inconclusive and their chief interest lies in suggesting paths for future inquiry.

1.4 Conclusions

We caution the users of these data that the reported concentrations are for dissolved or dispersed petroleum hydrocarbons. They should not be confused with volumetric additions of oil to water.

1.4.1 Conclusions on Acute Toxicity

1. The acute toxicity bioassays (Table S-1) suggest that the Alaskan species tested are more sensitive to dissolved and dispersed petroleum hydrocarbons than are species from other areas. However, this apparent sensitivity may be the result of differences in test oils, temperature, salinity, and test procedures. The precision of the comparative data is not sufficient to permit us to test these differences for statistical significance. However, the magnitude of the differences suggests that they may not be statistically significant.

2. The median tolerance limits of the eight species tested with oil were quite similar. Juvenile king crabs and scallops were consistently the most resistant while fish and shrimp were least resistant.

3. The median tolerance limits of Cook Inlet crude oil water-soluble fractions (WSF's) to herring, crab, and shrimp larvae ranged from 1.8 ppm to above 8 ppm (determined by infrared spectrophotometry). Many of the early stage larvae would lie moribund on the bottom, unable to swim, for several days before actual death. The median effective concentrations (ECm's) for this condition of moribundity ranged between 0.3 and 3 ppm (determined by infrared spectrophotometry). The later stages of coonstripe shrimp larvae appeared to be more sensitive to oil than earlier stages. Molting coonstripe larvae were more sensitive than inter-molt larvae.

4. Larvae are the most vulnerable of the life stages of the organisms tested in this study. They were quantitatively more sensitive to oil toxicity, especially during molting. Crustacean larvae may be particularly susceptible to oil toxicity compared to adults because of the frequency that larvae molt.

5. Comparisons of dodecylsodium sulfate (DSS) toxicity from several studies show extreme variance within some species. No quantitative conclusion about species differences was made. The use of DSS as a standard toxicant as recommended by La Roche et al. (1970) is not indicated.

1.4.2 Conclusions on Uptake-Depuration of Hydrocarbons

1. We found the uptake and depuration of hydrocarbons by the Alaskan species tested to be qualitatively identical to the patterns reported for species from other areas. The quantitative differences between the hydrocarbon uptake studies cannot be compared directly. There are no

estimates of variance since the cost of chemical analyses precluded running replicates in any of the studies.

2. With the exception of scallops, all the species we tested seemed able to resist n-paraffin accumulation.

3. All species tested accumulated relatively higher concentrations of aromatic hydrocarbons as compared to paraffin accumulation. Pink salmon fry were able to rid themselves of most of the accumulated naphthalenes while remaining in contaminated seawater. Juvenile king crabs were able to depurate within 48 hours after removal to clean seawater. Depuration by scallops and shrimp was slower and incomplete by the end of a 48-hour depuration period in clean seawater. The rate of depuration for these species suggests it would take up to several weeks to return to control levels of aromatic hydrocarbon concentrations.

1.4.3 Conclusions on Behavior and Physiology

1. Dungeness crab larvae and herring larvae were apparently unable to detect and avoid oil. Larvae were observed to touch oil slicks repeatedly in observations on behavior. At high concentrations of oil the larvae began to settle in the water column, which was interpreted as inability to swim to the surface rather than avoidance behavior.

2. When king crabs were exposed to the water-soluble fractions of Cook Inlet crude oil the respiration rate was depressed, but only at oil concentrations equal to or just below the 96-hour median tolerance limit. Measurement of metabolism does not appear to be a sensitive index of oil toxicity stress to crabs.

1.4.4 General Conclusions

1. Our studies do not suggest that major differences exist between the responses of the Alaskan marine animals tested and the responses of marine animals from other areas as reported in the literature.

2. The concentration of oil in water dispersions and water-soluble fractions of oil in solutions is dependent on a number of factors, including oil volume, confinement of the oil, mixing duration, and mixing energy. As a consequence, we do not attempt to transfer the results of our study to a field situation (including Kachemak Bay) or attempt to establish the potential effects of oil contamination on the environment. If oil pollution did occur, the oil concentrations that would occur in the water column are difficult to predict, since the oil volume, mixing duration, mixing intensity, and confinement of the spill are all important but unknown variables that would depend on the specific conditions prevailing at the time of the spill. Further, there are too few quantitative studies on the effects of an oil spill in arctic and subarctic waters that include measurements of oil in the water column for us to state that our laboratory exposure concentrations might be encountered under a field spill situation.

3. Our findings are most useful for establishing the similarities of the effects of oil on Alaskan marine animals and on animals elsewhere, and quantitating the relative sensitivity of larvae compared to adults or juvenile forms.

Table S-1.--Summary of acute toxicity of several crude oils and No. 2 fuel oil to several marine species. Data are from four studies, each using at least two different crude oils. Ranges of 96-hr median tolerance limits (TLm's) are reported in ppm of oil as measured by IR (2930 cm^{-1}).

Study and species tested	Temperature range	(WSF) Crude oil	(WSF) No. 2 fuel oil	(OWD) Crude oil
Battelle 1973b [1/]				
Two species of fish	8°C	15-65	---	---
Battelle 1974a [1/]				
Coonstripe shrimp, juvenile salmon (flowthrough)	10-11°C	6.6-24.9	---	---
Coonstripe shrimp (static)	8°C	1.3-4.9	---	---
Anderson et al. 1974b				
Three crustacean species	18-22°C	3.6->19.8	1.3-4.9	18-62
Three fish species	18-22°C	5.5-19.8	3.9-6.3	38-78
This study				
Four shrimp species	3.5-5.4°C	1.26-4.34	0.53-1.69	2.31-13.9
One crab species	3.8-7.8°C	2.35-4.21	5.10	5.3-7.80
One scallop species	3.9-7.4°C	1.57-3.15	0.8	8.04-9.34
Two fish species	3.6-10.2°C	1.10-2.94	0.81-2.29	3.41-16.4
Coonstripe shrimp	3.6-4°C	1.96-2.72	---	---
Six species of crustacean larvae (Stage I-VI)	3.5-13°C	TLm = 0.54->8 ECm = 0.24-3.9 [2/]	--- ---	--- ---

[1/] Battelle studies do not report TLm's directly in the form of IR ppm. The values presented for Battelle are measured from their raw data. Some of their tests are flowthrough and others are static. They used different mixing procedures and their data may not be directly comparable to ours.

[2/] For larvae we also report this ECm, or mean effective concentration for moribundity. Moribund larvae showed some motion, but were unable to swim, and destined for death.

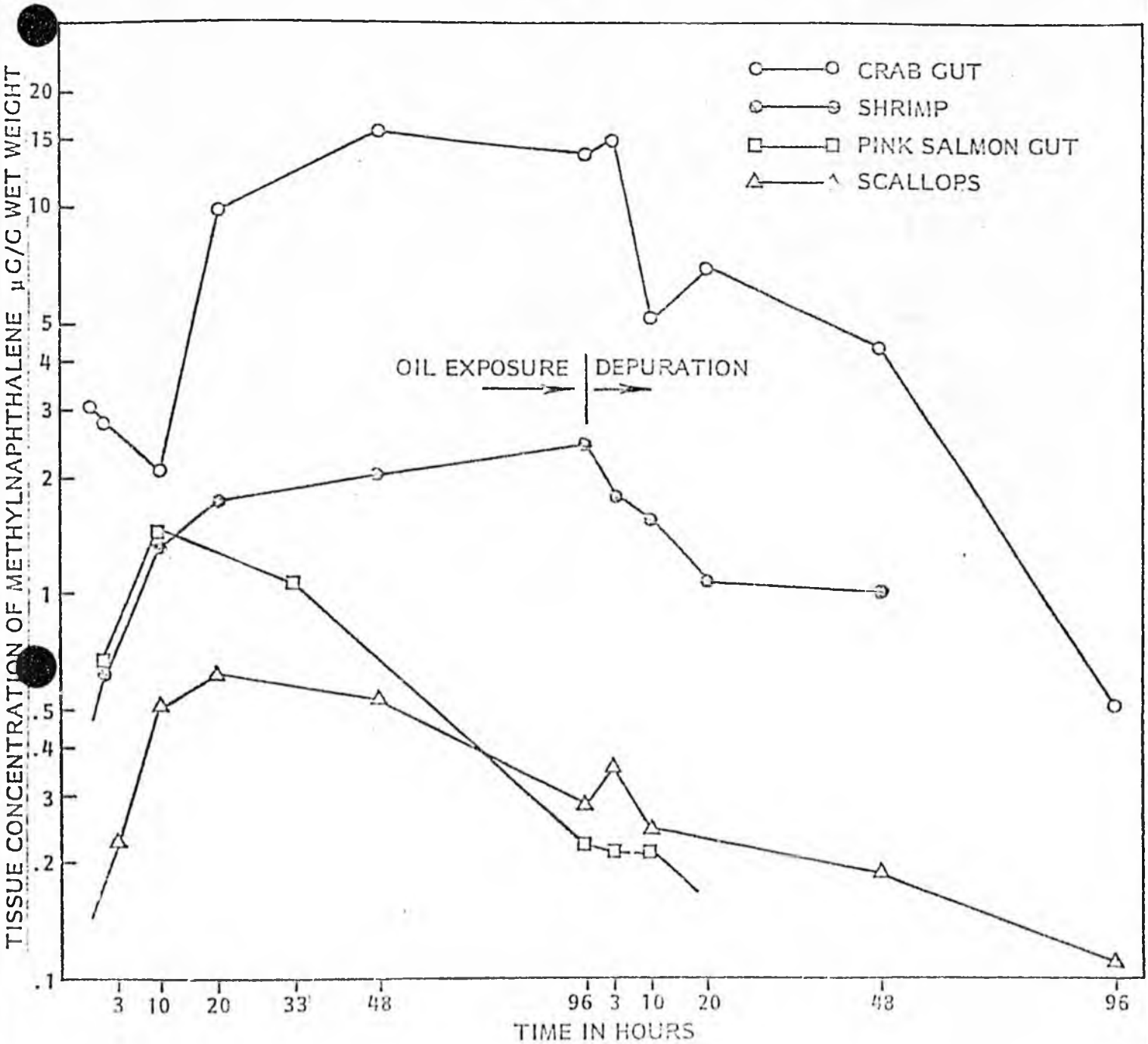


Fig. S-1. Comparison of methylnaphthalene accumulation in juvenile king crab gut, whole shrimp, pink salmon gut, and whole scallops exposed to the water-soluble fraction of Cook Inlet crude oil. Methylnaphthalene accumulated to a greater extent than any other aromatic compound in these tissues. Concentrations during exposure were approximately equal.

Testimony of Loren B. Flagg, Habitat Protection Biologist. Alaska Department of Fish and Game (Homer, Alaska)

before the

Alaska House Resources Committee

on

Sponsor Substitute H.B. 626 relating to establishment of marine sanctuaries and condemnation of the Kachemak Bay Oil and Gas Leases

March 22, 1976
Juneau, Alaska

Mr. Chairman and committee members. My name is Loren B. Flagg and I'm representing the Alaska Department of Fish and Game. I have been employed as a biologist for the state for the past 8 years. During this time I have been stationed in Homer and have worked in the Kachemak Bay and lower Cook Inlet area both as a Commercial Fisheries Management Biologist and, more recently, as a biologist for the Habitat Protection Section of the Department of Fish and Game.

Kachemak Bay, on a per acre basis, is considered by biologists of the Alaska Department of Fish and Game to be one of the most highly productive marine environments in the world. This contention is based upon historical harvest data and from results of oceanographic and biological studies by the Department of Fish and Game and the National Marine Fisheries Service. Five species of salmon as well as king crab, tanner crab, shrimp, dungeness crab, herring and halibut are harvested on an annual basis from Kachemak Bay. In addition to the presence of adult age classes of the species mentioned above, the Bluff Point area on the north side of Kachemak Bay is known to be a major release area for shrimp, tanner crab and king crab larvae. Juvenile age classes of both shrimp and king crab are abundant in the area. Bluff Point is a major reproduction area for king and tanner crab and breeding,

molting and egg hatching take place in this area, primarily from late winter to mid-summer.

To put this in perspective, Kachemak Bay comprises only 2.6% of the marine waters of the Cook Inlet management area, yet yields 60% of the entire shellfish harvest. Tagging studies as well as recent studies of currents and larvae transport indicate that Kachemak Bay harbors important life stages of shellfish ultimately harvested in other areas outside the bay. King crab tagged in the bay during the breeding season have been recovered in harvest areas to the south in the vicinity of Cape Douglas and the Barren Islands (Cook Inlet Map - Figure 1).

In 1973, the year the oil and gas leases took place, there was a total salmon harvest in the Kachemak Bay area of 126,407. The king crab catch for 1973 was 2.1 million pounds, tanner crab 3.8 million pounds, shrimp 4.7 million pounds, and dungeness crab 308,000 pounds. There were also 407,500 pounds of herring taken from Kachemak Bay in 1973. The Kachemak Bay commercial harvest by year and by species appears in Table 1. The total value of the 1973 Kachemak Bay commercial fisheries harvest, was 3.2 million dollars to fishermen and 7.3 million dollars on a first wholesale basis. (Table 2.)

The number of vessels participating in the various Kachemak Bay commercial fisheries during 1973 was king crab-56, tanner crab-80, dungeness crab-53, pot shrimp-40, trawl shrimp-8, herring-12, and salmon-60. There were also a considerable number of halibut vessels that fished Kachemak Bay during 1973, however, statistics on this fishery are kept by the International Pacific Halibut Commission.

The following is a brief discussion of the various commercial fisheries in the Kachemak Bay area.

SALMON

The major portion of salmon taken in Kachemak Bay are taken with seine gear and the major species caught are pink salmon. Pink salmon have made up 82.7 percent of the catch since 1954 followed by chum salmon (8.2 percent), sockeye salmon (7.8 percent), coho salmon (1.2 percent) and king salmon (.1 percent). The annual average total salmon catch for Kachemak Bay since 1954 is 248,886.

Catch figures for Kachemak Bay for 1975 indicate it will be the highest year on record with a total salmon catch of over 900 thousand. The bulk of this year's catch were pink salmon (866,335). The peak escapement counts in 1975 for the pink salmon run to Kachemak Bay totaled 120 thousand to the four major streams. Salmon catch zones and spawning streams in Kachemak Bay are shown in Figure 2.

KING CRAB

In 1973 a total of 56 different vessels landed 2.1 million pounds of king crab from Kachemak Bay. In 1974 there were a total of 138 king crab vessel registrations in the Cook Inlet area. Of these, 76 vessels landed 1.6 million pounds of crab from Kachemak Bay. The bulk of the king crab harvest is taken during the months of August and September and the major fishing area lies along the south side of the bay. (Figure 3).

TANNER CRAB

The commercial catch of tanner crab in Kachemak Bay from 1968 through 1974 has averaged 1.7 million pounds. The peak year of production occurred

in 1973 when 3,763,060 pounds were landed. A total of 80 vessels landed tanner crab from Cook Inlet waters in 1973 and most of these vessels fished Kachemak Bay during the peak of the season. Market conditions were poor and effort fell off during 1974 and these factors as well as an apparent weak year class were responsible for the reduced catch of 1.1 million pounds. Figure 4 shows the tanner crab as well as the winter king crab harvest areas.

DUNGENESS CRAB

The peak year of production for dungeness crab occurred in 1963 when 1.7 million pounds were landed from the bay. Since 1969 the dungeness fishery has been sporadic in Kachemak Bay with an average annual yield of 235 thousand pounds. The highest year of production since 1964 was in 1974 when 721 thousand pounds were landed from the bay. A total of 36 vessels participated in the 1974 fishery and made a total of 609 landings. The bulk of the catch was made in the Bluff Point area between July and November. (Figure 5).

SHRIMP

The trawl shrimp season presently runs from June 1 through March 31. The waters of Kachemak Bay inside a line from Anchor Point to Point Pogibski are on a guideline harvest level or quota of 5.0 million pounds annually. The major fishing areas are shown in Figure 6. The trawl shrimp catch from 1970 through 1974 averaged 5.2 million pounds for the Bay. Since the trawl shrimp catch averages about 100 shrimp to the pound, 5 million pounds then represents about 500 million total shrimp.

The average C.P.U.E. for the Kachemak Bay trawl shrimp fishery is the highest in the state, surpassing even the most productive areas in the Kodiak

region. It is also higher than the Gulf of Mexico and the Gulf of Maine where major trawl fisheries on shrimp also occur. The C.P.U.E. in the Kachemak Bay trawl fishery is the highest we know of in the United States and may quite possibly be the highest in the world. Catch rates have been recorded as high as 22,000#/drag hour in Kachemak Bay.

There is also a pot shrimp fishery in Kachemak Bay. This fishery did not start up on a significant basis until 1971 when 55,665 pounds were landed. The 1974 catch of 678,097 pounds was the highest on record to date and the fishery presently appears to be in a healthy state.

HERRING

Pacific herring have undergone two periods of exploitation in Kachemak Bay. The first period was from 1914 through 1928 when a salt fishery was centered in the Halibut Cove area. A total of nearly 90 million pounds of herring were harvested during this time period. The second fishery on herring in Kachemak Bay started in 1969 when a sac roe market developed. Since 1969 a total of 7.2 million pounds have been harvested from Kachemak Bay. In the peak year of 1970, 11 vessels landed 5.4 million pounds. The herring fishery occurs during May and early June in the Kachemak Bay area and most of the catch comes from the Halibut Cove - Glacier Spit and Mallard Bay areas.

In addition to commercial fisheries there are substantial subsistence and sports fisheries in Kachemak Bay which harvest all of the above mentioned species plus several species of bottom fish and clams. The subsistence fishery is the highest use subsistence fishery in the Cook Inlet area and probably in the state of Alaska. It is a year round fishery on a multitude of species. The Kachemak Bay sports fishery in terms of man days of effort expended was the highest use sports fishery in the state in 1973. Over 31,000 man days of

effort was recorded between June and September. (Sports Fish Investigations of Alaska, 1974 Report)

Kachemak Bay is not only unique as judged by it's greatly diverse and highly productive marine fisheries. It is unique in many other ways. At various seasons of the year the Bay harbors tremendous concentrations of shore birds, sea birds, and waterfowl. There are several species of marine mammals including harbor seals, porpoises, sea otters, sea lions and several species of whales which are common in the Bay. Several major big game species including black bear, brown bear, moose, mountain goats, and Dall sheep inhabit the shore line and adjacent mountainous area around Kachemak Bay. All of the above forms of life are found elsewhere in the state of Alaska. But nowhere else in the State can one find the diversity and abundance of life all together in one place as it is in the Kachemak Bay area. You add to this the fantastic scenic qualities of the area and this is what makes Kachemak Bay so unique and so worth protecting. A map depicting the environmental attributes of the Kachemak Bay area appears in Figure 7.

Productivity of a bay cannot simply be measured by the commercial and sports catch. In the case of Kachemak research studies indicate it is contributing to the catch in other areas of lower Cook Inlet and possibly to the northern areas of the Kodiak district. As mentioned earlier results of tagging and larval transport studies have shown this.

CRUSTACEAN LARVAL STUDIES

In 1971 the NMFS began a comprehensive study of the larvae of commercially important crab and shrimp in Kachemak Bay. In general, the study was designed to determine the distribution, abundance, and survival of larvae.

The patterns of larval abundance and distribution in Kachemak Bay in 1972 can be summarized as follows: king crab zoea (which is the initial stage

larvae after the eggs hatch) were released in Kachemak Bay primarily in the Bluff Point area. Many larvae remained in the release area throughout their planktonic or free floating existence.

Larvae first occurred in the plankton samples during the latter half of April. The area of greatest abundance occurred in the Bluff Point area. Abundance decreased rapidly on either side of this area. During the latter half of May larvae were distributed throughout Kachemak Bay. The most obvious feature of larval distribution at this time was the band of highest abundance which extended across the outer bay south of Anchor Point to Seldovia Bay, (Figure 8). Two centers of abundance existed in the outer bay in June. The first centered around the Bluff Point area and extended as a tail in a southwesterly direction from the Bluff Point area. Another extended as a band of abundance from the Homer Spit southward to Kasitsna Bay. In general, the concentrations of larvae from April through June provide evidence of the location of releasing sites. The initial occurrence and higher abundance of these larvae off Bluff Point indicate that this area is the major releasing area in Kachemak Bay for king crab zoea larvae. This assumption is supported by studies of female king crab by the Alaska Department of Fish and Game. These studies show that egg bearing king crab congregate in this area during spring for the purpose of releasing larvae. During the king crab larval study, information was also obtained on other crustacean larvae including shrimp and tanner crab. An analysis of this information indicates that the area of greatest abundance of these species was also in the vicinity of Bluff Point.

Further insight into the importance of Kachemak Bay to early life stages of shellfish was obtained last year as a result of the Alaska Department of Fish and Game Habitat research program. During studies of current patterns using radar tracking, two circular gyres or eddies were located in outer

Kachemak Bay, (Figure 9). Since the planktonic or "free floating" stage of our key species of shellfish larvae lasts for three to nine weeks, without a gyre system they would not have the opportunity to develop to the settling stage while still residents of Kachemak Bay. The gyres afford this opportunity as demonstrated by benthic (bottom) studies conducted in Kachemak Bay last year. These studies showed a tremendous concentration (preliminary estimate of 35 million per square mile) of post larval or first stage juvenile king crab had settled to the bottom along the northern shore of Kachemak Bay, (Figure 10).

Mr. Chairman, if you would like I can review a few reports which show some of the evidence pointing out the dangers to which we are exposing Kachemak Bay with the pending oil development. (Chairman Anderson approves).

The first is a report from the Federal Government entitled "Oil Pollution--A Report to the President" and concerns some of the effects upon the aquatic environment, vividly illustrated by the grounding of the Torrey Canyon. The report states: "The shock, economic to man and lethal to marine and bird life, was created by the thousands of tons of crude oil which were disgorged into the open seas and subsequently blanketed portions of the shores of Great Britain and France.

When surface feeding fishes were observed swimming into the floating oil their bodies and gills became coated. If death did not result from such contact, their flesh absorbed the taste and odor producing fractions of the oil rendering them unfit for human consumption for a long time afterwards. As an oil mass moves landward, toxic oil fractions can bring death to both larval and adult forms of invertebrate marine life which inhabit the shallow inshore areas. Marine life valuable to man as a food resource may be totally destroyed by the oil. When chemical compounds are used in the shallow or littoral areas to precipitate or sink oily materials or otherwise cleanse the surface of the water, the effect to the aquatic community may be more deadly than the floating oil itself."

There have been two oil spills on the east coast of the United States that have been well documented. The first occurred in 1963 in the State of Maine where the effects of a spill were monitored for ten years under the direction of Robert Dow, Research Director of the Maine Department of Marine Resources. His studies showed that 7,000 parts per million of oil in bottom sediment and 200 parts per million in soft shell clams still existed ten years after an 850,000 gallon oil spill by the tanker "Northern Gulf" outside of Casco Bay in Maine.

Studies conducted by Dr. Max Blumer of the Marine Biological Laboratory of Woods Hole, Mass., show similar results. Dr. Blumer reported in 1973-- "that oil was still chemically identifiable and that the original animal populations had not returned except at the most lightly polluted marginal locations."

Dozens of species of fish, shellfish, marsh grasses and bottom living eels and worms washed up dead on shore. The presence of the latter species was a surprise since most people believed that oil would not affect the bottom, but rather float on the surface. These bottom dwellers, however, were apparently coming out of their burrows in hoards and being washed ashore dying or dead. They comprised a major portion of the kill. When sampled, the sediment was found saturated with oil to a depth of at least a foot, and subsequent samplings showed no perceptible reduction.

A more recent report concerns an area closer to home in that the study took place in Alaska. The report, by Mr. Dale Evans and Stanley D. Rice, from National Marine Fisheries Service at Auke Bay, is on the effects of oil on marine ecosystems. They state the following in their summary: "Assessments of the impact of oil pollution cannot depend solely on evaluation of immediate kills of organisms from acute exposures. Chronic low level oil pollution can

cause subtle changes in organisms and is potentially more dangerous to the ecosystem than dramatic, catastrophic spills.

Chronic pollution may eliminate a species from an area entirely, and once eliminated that species may remain suppressed and may not repopulate the area because of continuing pollution or because its niche has been filled by a more tolerant, possibly less desirable species. The adverse effects of oil on animal populations has been of wide concern when stocks of special interest such as those providing the basis of a sport or commercial fishery have been involved."

A report will be published next month from the National Marine Fisheries Service Auke Bay Labratory which will show results of bioassey studies using Cook Inlet crude in tests with various species and stages of shellfish from the Cook Inlet area. Results of this study will show that levels as low as 0.3 ppm is toxic to larval stages of commercially important shellfish species. this confirms the findings of Moore (Table 3) showing that larvae are more susceptable than other forms of marine life. Our concern is that if levels this low are toxic to shellfish larvae, what will happen in the event of a spill in the proposed lease area/during the time of year the larvae are abundant in the water column? We fear that if a spill entered the eddy or gyre system at the same time the larvae were present the result could be devastating. (Figure 11)

What are the odds that we will have a spill in the Kachemak Bay area? The record from oil activities in upper Cook Inlet speaks for itself. From 1962 to 1973 there were a total of 260 reported oil spills. Most of these occurred from 1966 to 1970 at a time when most of the development phase was occurring, (Table 4).

Mr. Chairman, I think it is safe to say there will be more oil spills with future oil development, and I hope you now share our concern for the dangers that this development will bring to Kachemak Bay.

Thank you.

TABLE 1

Kachemak Bay, Cook Inlet, Commercial

Fisheries Harvest, 1966-75

Year	Kings	Reds	Cohos	Pinks	Chums	Total
1966	60	12,192	4,535	177,544	28,754	223,085
1967	173	26,350	2,393	95,100	23,416	147,432
1968	61	18,716	4,671	154,033	4,518	181,999
1969	59	12,578	485	70,753	2,600	86,475
1970	91	12,245	3,705	208,174	8,174	232,389
1971	41	18,403	3,151	50,066	2,857	74,518
1972	69	31,345	1,283	9,126	4,936	46,759
1973	139	24,072	1,241	97,574	3,588	126,614
1974	182	27,029	3,054	48,075	2,725	81,865
1975 1/	138	27,385	1,240	866,335	5,411	900,509

Shellfish (Pounds)

Year	King Crab	Tanner Crab	Shrimp	Dungeness Crab
1966	1,910,364		309,676	12,523
1967	1,279,708		741,438	7,168
1968	996,520	146,491	26,030	484,452
1969	1,302,554	1,436,680	849,710	49,894
1970	1,501,288	1,152,609	5,815,268	209,819
1971	1,251,142	1,186,488	5,438,091	97,161
1972	1,900,006	2,942,082	5,450,498	38,930
1973	2,114,841	3,763,060	4,709,486	308,777
1974	1,609,530	1,106,263	5,740,647	721,183
1975 2/				

Herring

1969	1.1 Million Pounds
1970	5.4 Million Pounds
1971	25,000 Pounds
1972	2,000 Pounds
1973	407,500 Pounds
1974	219,359 Pounds
1975 1/	48,833 Pounds

1/ 1975 data preliminary.

2/ Shellfish seasons still in progress.

TABLE 2

ESTIMATED VALUE IN MILLIONS OF DOLLARS OF KACHEMAK BAY COMMERCIAL FISHERIES IN 1973

SPECIES	VALUE TO FISHERMEN	FIRST WHOLESALE VALUE
SALMON	.2	.4
KING CRAB	1.7	3.3
TANNER CRAB	.7	1.7
SHRIMP	.4	1.5
DUNGENESS CRAB	.2	.4
HERRING	.03	.06
TOTAL	3.2	7.3

Summary of Toxicity Data

Class of Organisms	Estimated Concentration (ppm) of soluble aromatics causing toxicity	Estimated amount (ppm) of Petroleum substances containing equivalent amount of aromatics	
		#2 Fuel Oil	Fresh Crude
Flora	10-100	50-500	$10^4 - 10^5$
Finfish	5-50	25-250	$10^4 - 10^5$
Larvae (all species)	0.1-1.0	0.5-5	$10^2 - 10^3$
Pelagic Crustaceans	1-10	5-50	$10^3 - 10^4$
Gastropods (snails, etc.)	10-100	50-500	$10^4 - 10^5$
Bivalves (oysters, clams, etc.)	5-50	25-250	$10^4 - 10^5$
Benthic Crustaceans (lobsters, crabs, etc.)	1-10	5-50	$10^3 - 10^4$
Other Benthic Invertebrates (worms, etc.)	1-10	5-50	$10^3 - 10^4$

TABLE 3

TABLE 4

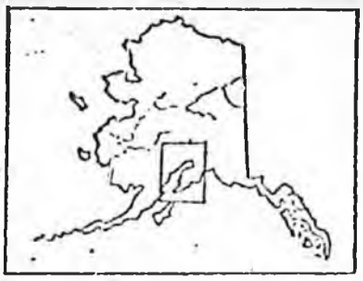
DOCUMENTED OIL SPILLS IN COOK INLET [1]

YEAR	TOTAL KNOWN SPILLS [2]	SPILLS CAUSED BY OIL INDUSTRY [3]
1962	1	1
1965	1	1
1966	27	9
1967	41	22
1968	70	52
1969	39	28
1970	41	17
1971	16	6
1972	17	1
1973	7	6
TOTAL	260	143

[1] SOURCE: EPA RECORDS

[2] TOTAL DOCUMENTED SPILLS IN COOK INLET WATERS.

[3] DOCUMENTED OIL SPILLS IN COOK INLET WATERS CAUSED BY OIL INDUSTRY.



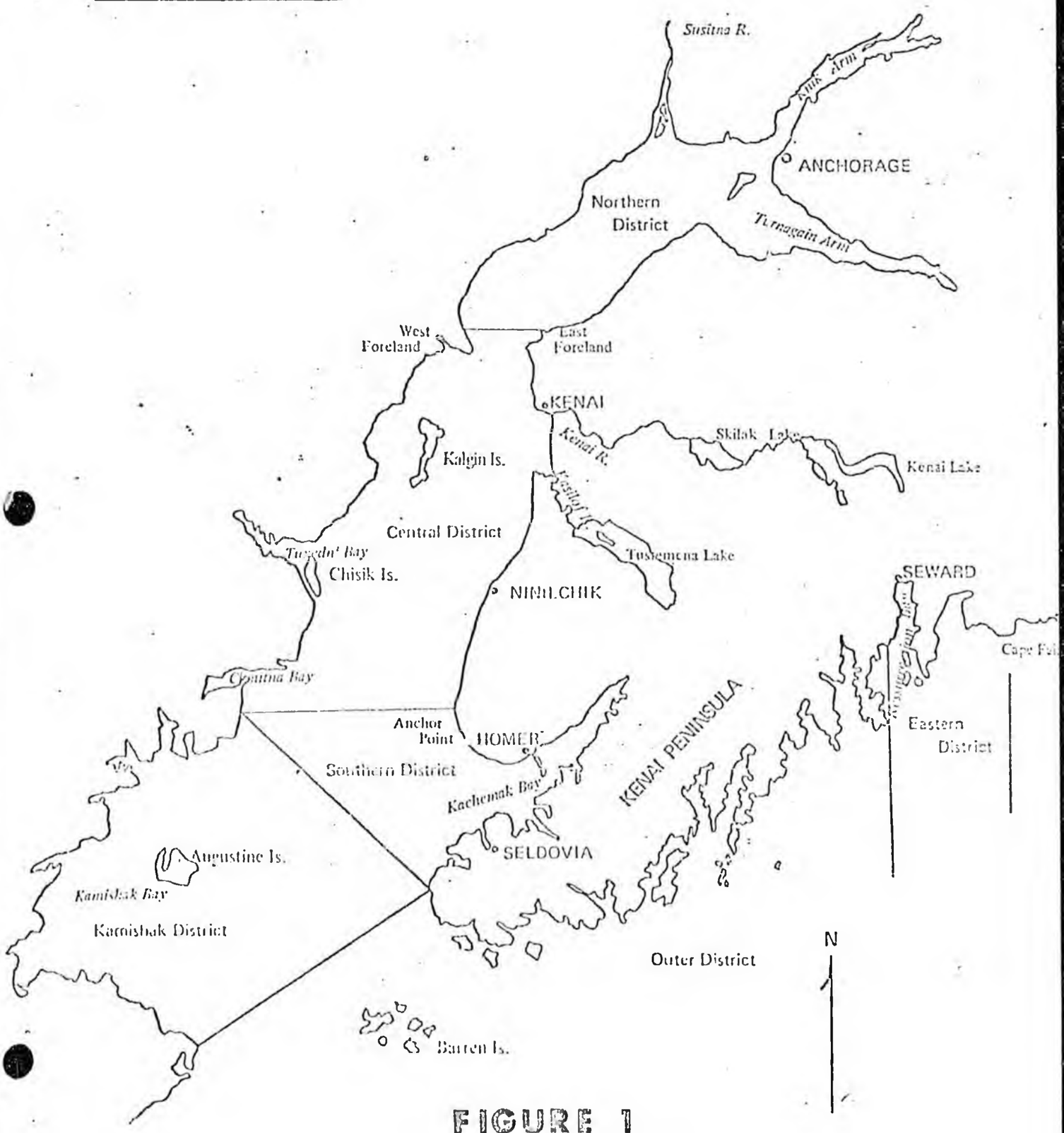


FIGURE 1

Cook Inlet area

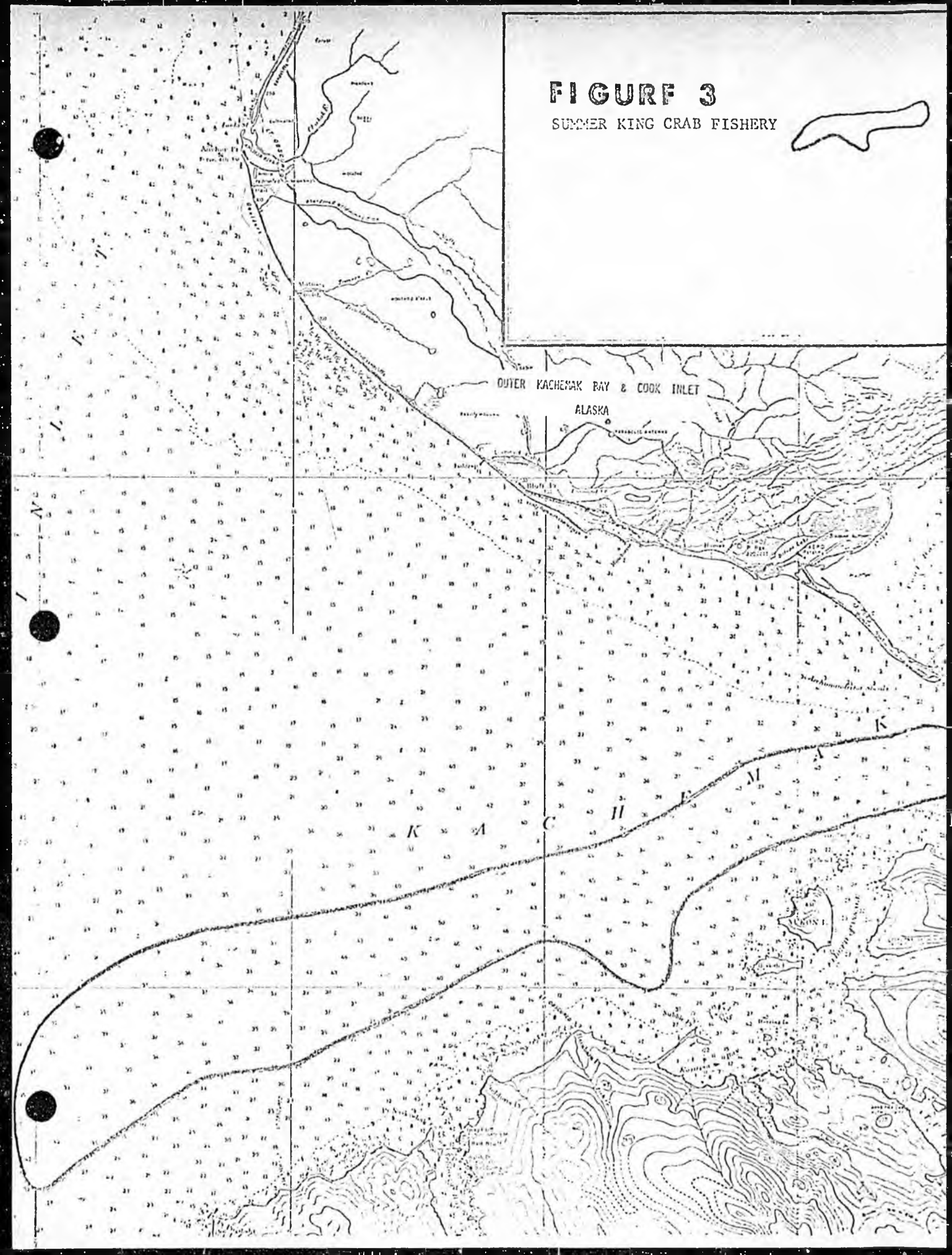


FIGURE 3
SUMMER KING CRAB FISHERY
OUTER KACHEMAK BAY & COOK INLET
ALASKA

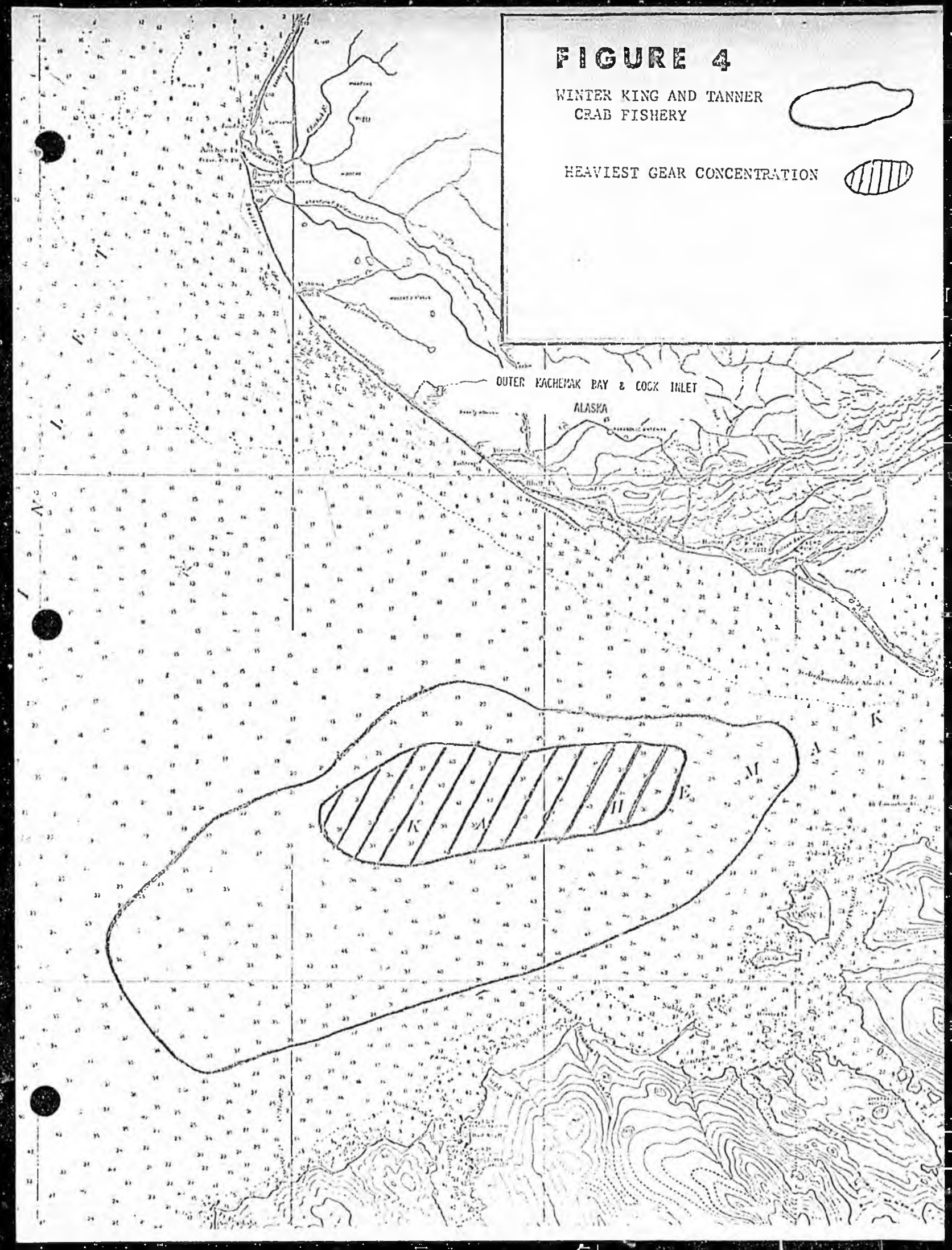
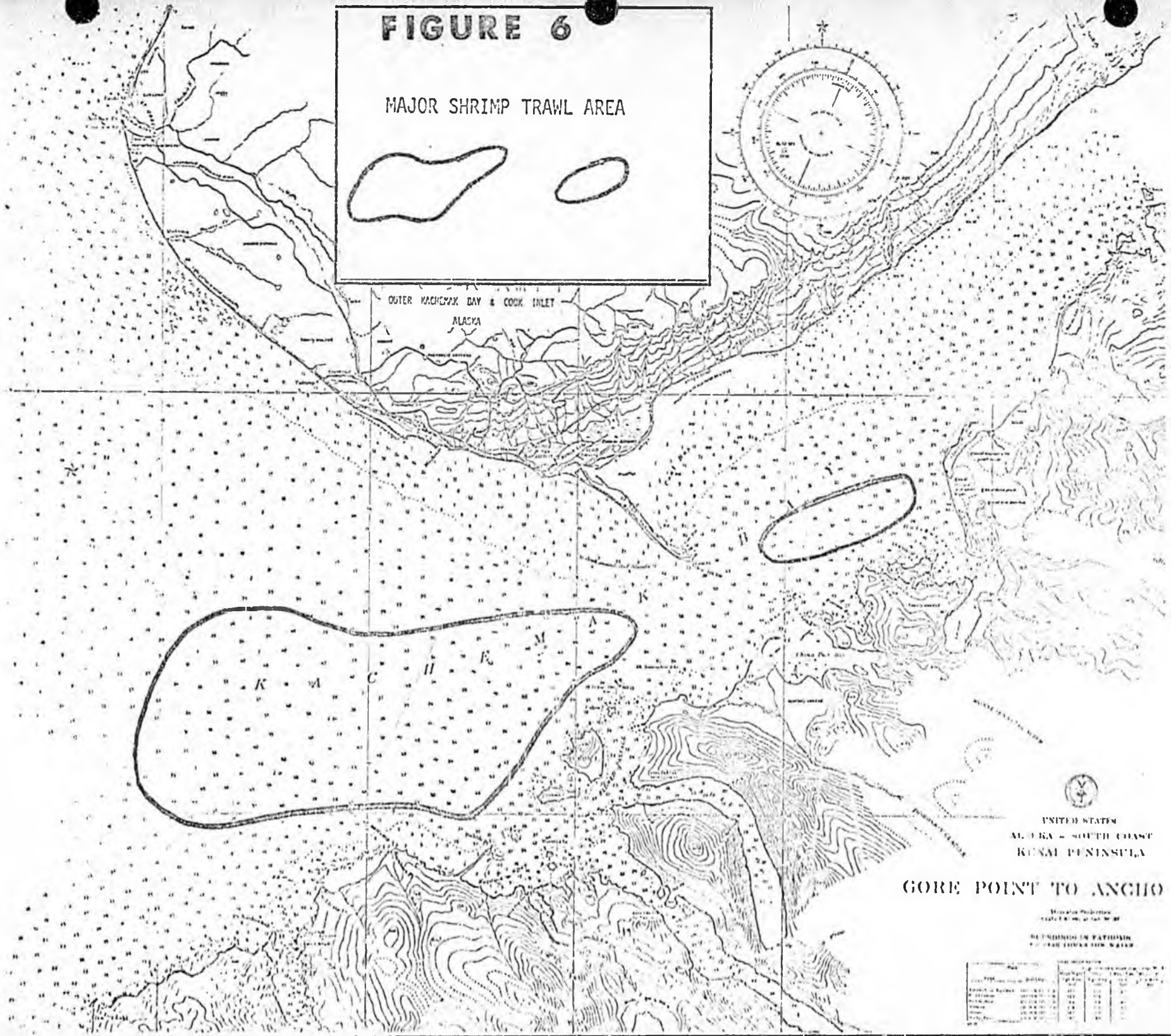


FIGURE 4
WINTER KING AND TANNER CRAB FISHERY
HEAVIEST GEAR CONCENTRATION
OUTER KACHEMAK BAY & COOK INLET
ALASKA

FIGURE 5

FALL DUNGENESS FISHERY

FIGURE 6


MAJOR SHRIMP TRAWL AREA
OUTER KACHEMAK BAY & COOK INLET
ALASKA
UNITED STATES
ALASKA - SOUTH COAST
KENAI PENINSULA
GORE POINT TO ANCHO

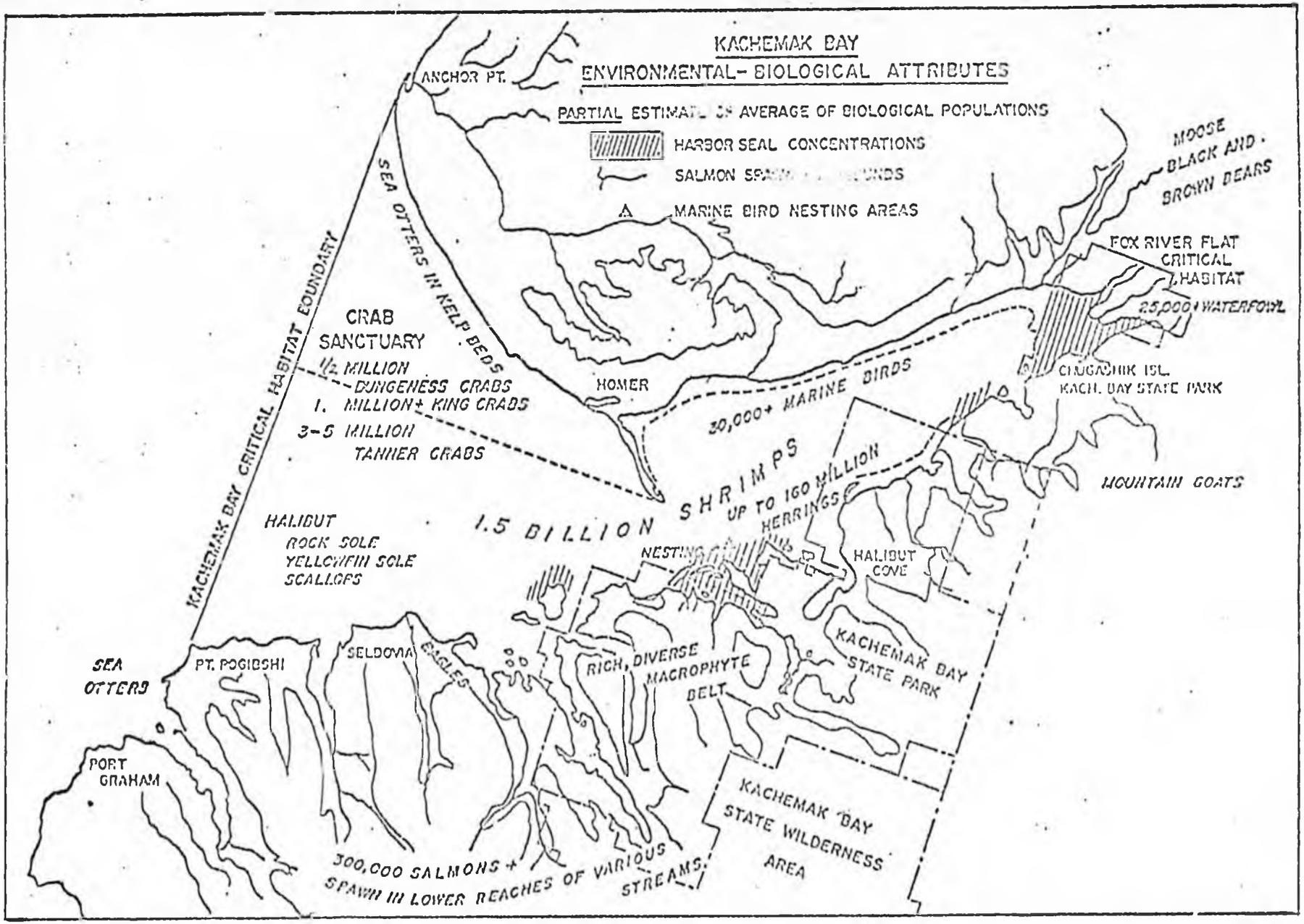


FIGURE 7 Kachemak Bay - Environmental-Biological Attributes

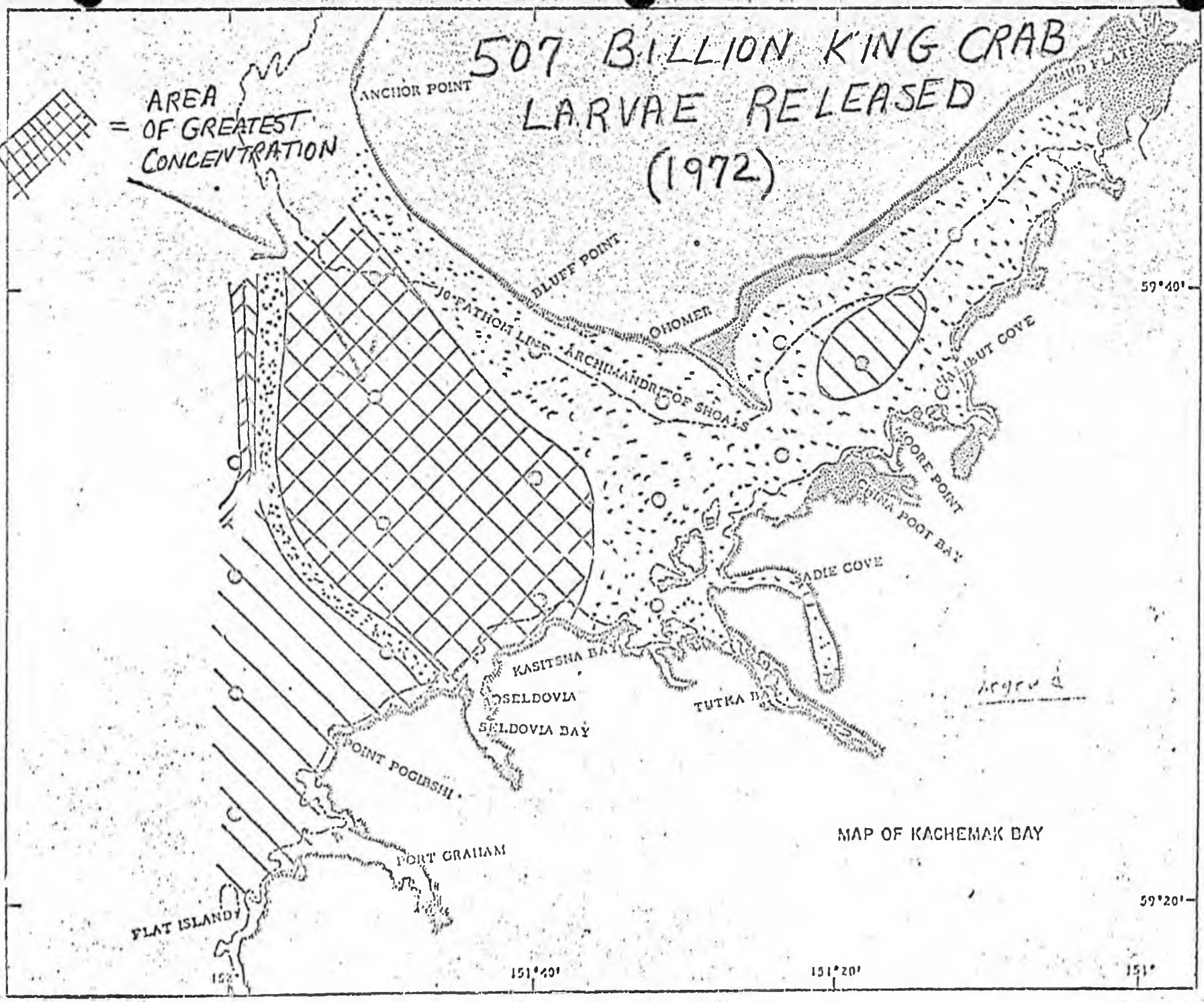

507 BILLION KING CRAB
LARVAE RELEASED
(1972)
= AREA OF GREATEST CONCENTRATION
ANCHOR POINT
BLUFF POINT
OHOMER
ARCHIMANDRITOF SHOALS
59°40'
MOORE POINT
CHINA POOT BAY
SADIE COVE
KASITSNA BAY
SELDOVIA
SELDOVIA BAY
TUTKA BAY
POINT POGIBSHI
PORT GRAHAM
FLAT ISLAND
MAP OF KACHEMAK BAY
59°20'
151°40'
151°20'
151°

FIGURE 8

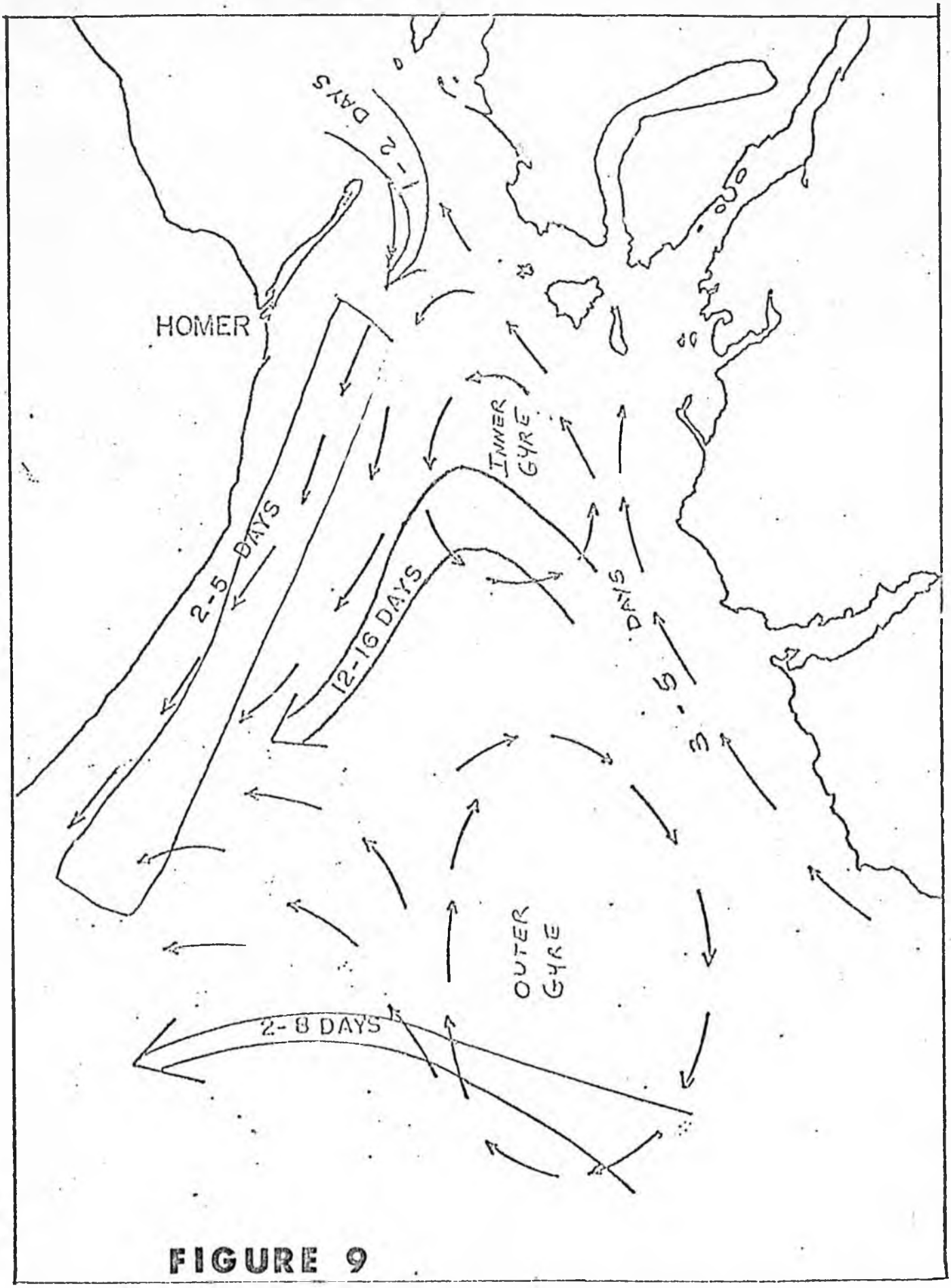
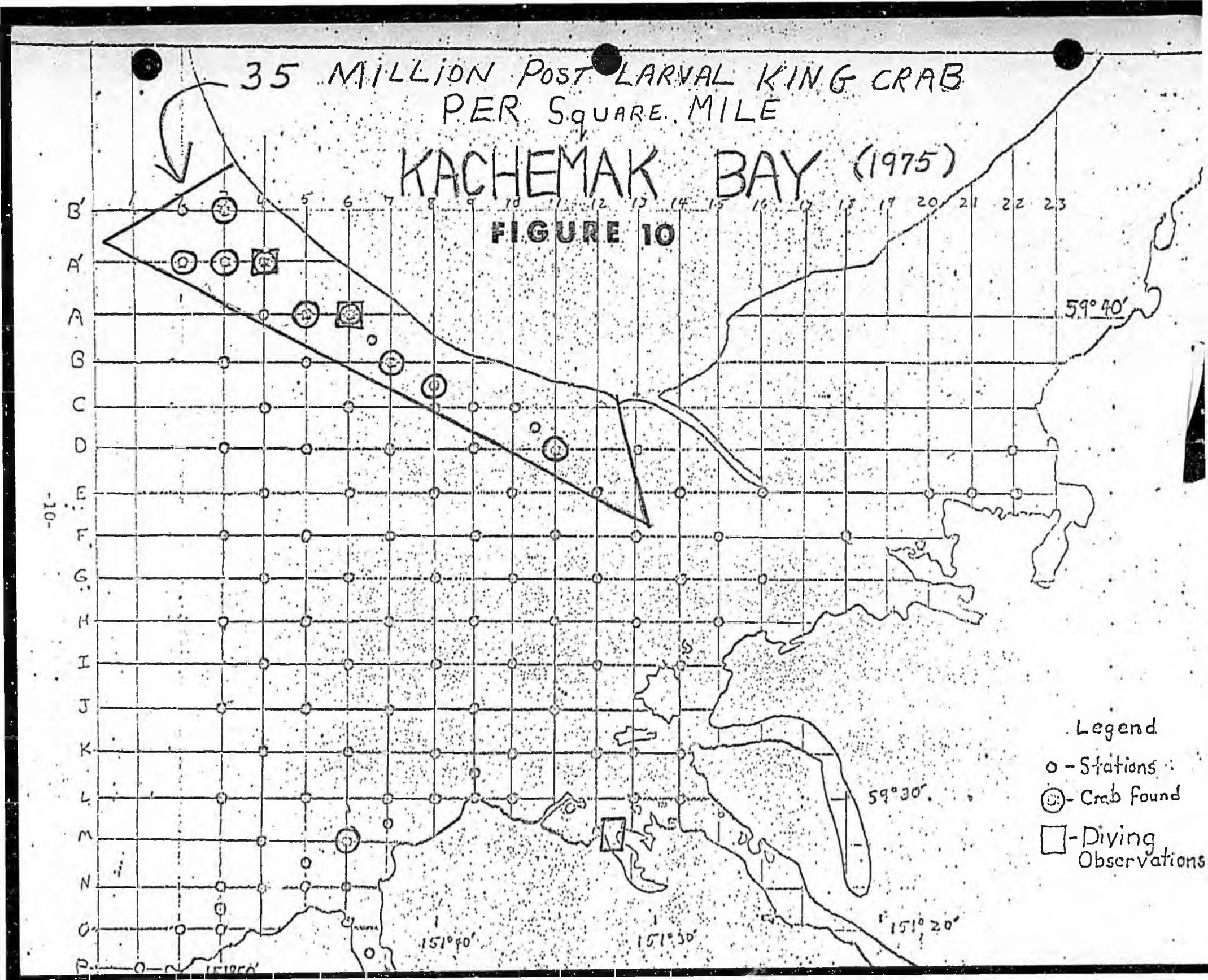


FIGURE 9

NET TRANSPORT VELOCITIES THROUGH KACHEMAK BAY AS DERIVED FROM DROGUE DATA


35 MILLION POST LARVAL KING CRAB
PER SQUARE MILE
KACHEMAK BAY (1975)
FIGURE 10
59° 40'
59° 30'
151° 40'
151° 30'
151° 20'
Legend
o - Stations
- Crab found
- Diving Observations

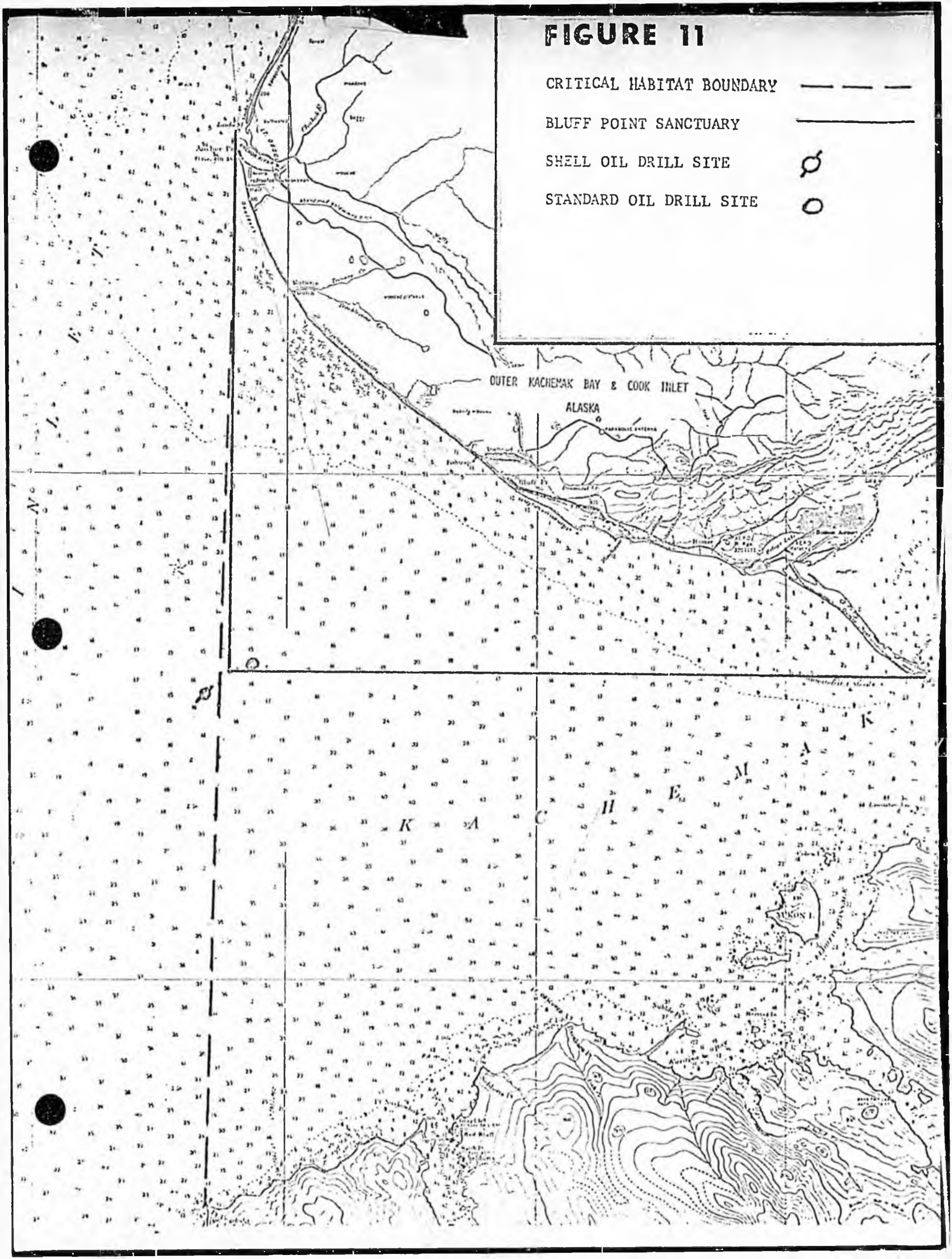


FIGURE 11
CRITICAL HABITAT BOUNDARY
BLUFF POINT SANCTUARY
SHELL OIL DRILL SITE
STANDARD OIL DRILL SITE
OUTER KACHEMAK BAY & COOK INLET
ALASKA
PERSON I.

MISC.

HOUSE

RESOURCES

Comm.

1975

GREATER ANCHORAGE CHAMBER OF COMMERCE

TESTIMONY DELIVERED BY BOB HARTIG

BEFORE THE HOUSE RESOURCES COMMITTEE

JUNEAU, ALASKA

APRIL 16, 1975 AT 8:00 A.M.

RE: 1975 STATE TAX REVENUES

MR. CHAIRMAN AND MEMBERS OF THE COMMITTEE:

I AM ROBERT L. HARTIG OF ANCHORAGE. I AM SPEAKING ON BEHALF OF THE GREATER ANCHORAGE CHAMBER OF COMMERCE.

MAY I BEGIN BY SIMPLY SAYING THAT I RECOGNIZE THE STATE'S NEED FOR SUBSTANTIAL ADDITIONAL REVENUES BETWEEN NOW AND MID-1977 OVER AND ABOVE THOSE PRESENTLY EXPECTED, JUST TO COVER THE STATE'S PROJECTED BUDGETS AND WITHOUT ADDING NEW PROGRAMS REQUIRING ADDITIONAL STATE EXPENDITURES.

WHILE I CAN ACKNOWLEDGE OUR NEED FOR SUBSTANTIAL ADDITIONAL NEAR-TERM REVENUES, I MUST ALSO RECOGNIZE THAT THE PROBLEM WE NOW HAVE IS ONE WHICH FOR THE MOST PART WE HAVE CREATED OURSELVES. WE HAVE LET OUR STATE BUDGETS DRIFT UPWARDS IN THE LAST FIVE YEARS AND BY VERY SUBSTANTIAL AMOUNTS EACH YEAR. WE HAVE TALKED FISCAL RESPONSIBILITY BUT HAVE NOT DONE WHAT WE SAID. WE HAVE ASSUMED AND ARE STILL ASSUMING THAT SOMEHOW ALL OUR BILLS WILL BE PAID BY SOMEBODY ELSE.

MAKE NO MISTAKE. I AM NOT HERE TODAY ON BEHALF OF THE OIL COMPANIES. I AM SPEAKING FOR ALASKAN BUSINESSMEN WHO KNOW, IF YOU'LL PARDON THE EXPRESSION, THAT "YOU CANNOT GO TO THE SAME WELL TOO OFTEN OR YOU BEGIN TO DRY IT UP." THESE SAME BUSINESSMEN KNOW THE RISKS OF CONTINUALLY LIVING BEYOND OUR MEANS. THEY CANNOT DO IT NOR CAN ANY OF US DO IT FOR VERY LONG. THEY ARE DEEPLY CONCERNED ABOUT THE FUTURE OF THIS STATE WITH GOVERNMENT AND GOVERNMENT PROGRAMS GROWING IN SO MANY DIRECTIONS. THEY ARE WORRIED ABOUT THE NEGATIVE IMPACT SUCH A COURSE WILL HAVE ON THE LONGER RUN ECONOMIC HEALTH AND STABILITY OF ALASKA.

CERTAINLY ONE THING THAT IS NEEDED TODAY IS EVERY EFFORT ON THE PART OF THE ADMINISTRATION AND THE LEGISLATURE TO HOLD THE LINE AND EVEN PUSH IT BACK A LITTLE IF YOU CAN. PERHAPS ALASKAN BUSINESSMEN COULD PROVIDE SOME CONSTRUCTIVE COUNSEL TO THE STATE ON THIS, IF THEY WERE ASKED TO DO SO. THIS WOULD HELP, BUT BY ITSELF, IT IS NOT LIKELY TO SOLVE THE NEAR-TERM NEED OF THE STATE FOR SUBSTANTIAL ADDITIONAL REVENUE.

WHAT THEN, ARE THE PRACTICABLE ALTERNATIVES FOR FILLING THE STATE'S REVENUE GAP? ONE IS BEFORE YOU IN THE FORM OF ALTERNATIVE BILLS TO TAX OIL AND GAS RESERVES IN PLACE FOR A COUPLE OF YEARS. THIS WAS THE FIFTH OF FIVE ALTERNATIVES IDENTIFIED BY GOVERNOR HAMMOND ON MARCH 14TH, AND WAS APPARENTLY MENTIONED AS THE STATE'S "LAST RESORT". WITH THE EXCEPTION OF A VERY FEW, EVERYONE FROM THE GOVERNOR ON DOWN IN THE ADMINISTRATION, MANY IN THIS LEGISLATURE, BOTH OF ALASKA'S U.S. SENATORS AND ITS CONGRESSMAN, THIS LEGISLATURE'S ADVISOR MILTON LIPTON, VARIOUS NATIVE CORPORATIONS AND GROUPS, MANY ALASKAN BUSINESSMEN AND BANKERS, AND OUR PRESS HAVE SAID THAT THIS IS A BAD TAX, THAT THEY DON'T LIKE IT, AND THAT IT WOULD HAVE A REGRESSIVE EFFECT ON THE PROPER DEVELOPMENT OF THE STATE. YET HERE WE ARE GIVING THIS "LAST RESORT" FIRST CONSIDERATION!

IN PAST LEGISLATURES, MENTION WAS MADE FROM TIME TO TIME OF THE FAIRNESS OF TAXING BUSINESS, INCLUDING THE OIL AND GAS INDUSTRY, ONCE THEIR BUSINESS WAS UNDERWAY AND THERE WAS CASH FLOW BEING GENERATED TO PAY TAXES. THE DETERRENT EFFECT OF SUBSTANTIAL TAXES DURING THE DEVELOPMENT STAGE OF A BUSINESS SEEMED APPARENT THEN AND STILL IS. IT ALMOST BEGS THE PURSUIT OF ANY OTHER PRACTICABLE REVENUE ALTERNATIVES WHICH MAY BE OPEN TO THE STATE.

BUT IT'S NOT JUST A MATTER OF FAIRNESS OR INCENTIVES IN THE PROPER DEVELOPMENT OF THE STATE. THE CERTAINTY OF REVENUES IS ESSENTIAL, AND I DON'T BELIEVE THAT A RESERVES TAX OFFERS ANY GUARANTEE OF CERTAINTY. THESE LEGISLATIVE PROPOSALS ARE OBVIOUSLY ON THE HORNS OF A DILEMMA. IF THE RESERVES MADE SUBJECT TO THE TAX ARE DEFINED BROADLY ENOUGH TO BE NONDISCRIMINATORY, THE TAX WOULD PROBABLY NOT BE PASSED BY THE LEGISLATURE. ON THE OTHER HAND, IF THE TAX IS NARROWED, AS SEEMS TO BE THE INTENT OF THE BILLS BEING CONSIDERED, TO PLACE SUBSTANTIALLY ALL OF THE BURDEN ON A FEW COMPANIES IN ONE FIELD, THE DISCRIMINATORY ASPECT RAISES SUBSTANTIAL QUESTIONS UNDER THE STATE'S CONSTITUTION AND THE U.S. CONSTITUTION AND INVITES LITIGATION LIKELY TO DELAY PAYMENT OF THE TAX. THE SUBJECT OF RESERVES TAXES HAS BEEN HEAVILY LITIGATED IN OTHER JURISDICTIONS AND THERE IS NO REASON TO BELIEVE THAT ALASKA WILL BE EXEMPT FROM SUCH LITIGATION.

ONE MIGHT ASSUME THAT THESE TAXES WOULD BE PAID UNDER PROTEST AND THUS BE AVAILABLE TO THE STATE WHILE ANY LITIGATION GRINDS ON. IN THE ORDINARY CASE INVOLVING A FEW DOLLARS, THAT MIGHT BE SO. HERE, SOME OF THE AMOUNTS TO BE RAISED ARE SO LARGE THAT MAJOR FINANCING ARRANGEMENTS WOULD HAVE TO BE UNDERTAKEN. THERE IS A REAL QUESTION WHETHER SUCH FUNDS COULD BE BORROWED WHEN THEIR PURPOSE IS TO PAY A TAX WHOSE VALIDITY IS UNDER SERIOUS CHALLENGE BY SOMEONE, WHETHER IT IS BY A PARTICULAR TAXPAYER OR NOT. LENDERS MIGHT ALSO QUESTION THE ABILITY OF THE STATE TO REPAY SUCH TAXES IF IT LOSES THE LITIGATION. SOME ACTION TO ENJOIN THE PAYMENT OF ANY RESERVES TAX SHOULD SEEM LIKELY.

THESE ARE NOT HAPPY THOUGHTS. THE TROUBLE WITH THIS KIND OF LITIGATION IS THAT YOU DON'T KNOW WHERE YOU STAND UNTIL YOU'RE DONE. IN ANY EVENT, IT WOULD BE DIFFICULT TO ARRANGE FINANCING UNDER ANY REASONABLE TERMS WHEN A BURDEN HAS BEEN PLACED FOR THE PAYMENT OF TAXES SUCH AS THESE UPON A SEGMENT OF OUR INDUSTRY BEFORE A PROJECT HAS EVEN BEGUN.

I THINK IT IS IMPORTANT IN THIS REGARD TO RECOGNIZE THAT THE FUTURE ECONOMIC VIABILITY OF ALASKA IS DEPENDENT TO A GREAT EXTENT UPON THE WISE DEVELOPMENT OF THE STATE'S NATURAL RESOURCES. WE SHOULD ALSO BE MINDFUL THAT, CONTRARY TO SOME BELIEFS, THESE RESOURCES DO NOT OCCUR EVERYWHERE WITHIN THE SUBSURFACE OF THE STATE. THE RESOURCES MUST BE EXPLORED, DEVELOPED, PRODUCED AND MARKETED. IN THIS RESPECT, ALASKA, A RECOGNIZED HIGH-COST EXPLORATION AREA, MUST VIE FOR THESE INDUSTRY DOLLARS IN COMPETITION WITH OTHER MINERAL POTENTIAL AREAS OF THE WORLD.

WHILE IT IS RECOGNIZED THAT REVENUES FROM OUR STATE RESOURCES MUST BE MAXIMIZED, LET'S NOT PLACE UNREASONABLE BURDENS UPON THE OIL AND GAS INDUSTRY WHICH WOULD THWART ALASKAN DEVELOPMENT AND CAUSE THESE DOLLARS TO BE SPENT ELSEWHERE.

FOR THESE REASONS, THE OTHER ALTERNATIVES MENTIONED BY THE GOVERNOR A MONTH AGO DESERVE SERIOUS CONSIDERATION BY HIS ADMINISTRATION AND ENCOURAGEMENT BY THE LEGISLATURE.

OIL AND GAS LEASE SALES

OF THE $400 MILLION NEEDED THROUGH MID-1977, FIGURES FROM $200 MILLION TO UPWARDS OF ONE BILLION DOLLARS HAVE BEEN MENTIONED AS THE POSSIBLE RANGE OF PROCEEDS FROM A BEAUFORT SEA LEASE SALE. IT WOULD APPEAR THAT SOMETHING SUBSTANTIALLY IN EXCESS OF $200 MILLION IS LIKELY, AND THAT THIS IS AN ATTRACTIVE NEAR TERM MEANS FOR THE STATE,

LEGALLY AND WITHOUT ADDITIONAL LEGISLATION, TO COVER MOST OF ITS REVENUE NEEDS, I SHOULD ADD THAT IT'S HARD TO UNDERSTAND WHY PROCEEDS FROM SUCH A SALE SHOULD BE RESTRICTED IN USE BY H.B. 324 WHEN THE NEEDS OF THE STATE ARE REAL AND THE POTENTIAL OF A RESERVES TAX IS FRAUGHT WITH PROBLEMS.

PLANNING SHOULD BE COMPLETED FOR AN EARLY LEASE SALE IN THE LOWER PART OF COOK INLET FOLLOWING THE SUCCESSFUL DETERMINATION BY THE UNITED STATES SUPREME COURT OF THE STATE'S OWNERSHIP TO THESE SUBMERGED LANDS. REDUCED LOGISTICAL PROBLEMS, GREATER ACCESSIBILITY OF MARKETS, FAVORABLE NATURAL GAS PRICES AND THE AVAILABILITY OF CURRENT GEOLOGICAL INFORMATION MARKS THIS GEOLOGICAL PROVINCE AS A PRIME AREA FOR THE RECEIPT OF SUBSTANTIAL LEASE BONUS.

CONSIDERATION SHOULD ALSO BE GIVEN TO A COORDINATED FEDERAL-STATE LEASE SALE IN THE GULF OF ALASKA. PRESENT SCHEDULING CALLS FOR A LEASE SALE OF THE SUBMERGED LANDS BEYOND THE THREE MILE TERRITORIAL SEA IN LATE 1976 OR EARLY 1976 BY THE DEPARTMENT OF THE INTERIOR.

SALE OF ROYALTY GAS

ANOTHER ALTERNATIVE MENTIONED BY THE GOVERNOR AND ONE WHICH MAY BE RECEIVING ACTIVE CONSIDERATION BY HIS ADMINISTRATION AND THE ALASKA ROYALTY OIL AND GAS ADVISORY BOARD, IS THE POSSIBLE ADVANCE SALE OF PART OF THE STATE'S ROYALTY GAS. SUCH A SALE COULD PROVIDE THE STATE WITH FUNDS ON THE ORDER OF $200 MILLION WHEN IT NEEDS THEM AND DO SO ON THE BASIS THAT THE ADVANCE WOULD BE APPLIED AGAINST THE ACTUAL MARKET PRICE OF THE GAS AT THE TIME IT IS ACTUALLY PRODUCED.

THIS ALTERNATIVE AND THE BEAUFORT SEA LEASE SALE WOULD APPEAR TO COVER THE STATE'S NEEDS AND MORE SO, AND WITHOUT ADDITIONAL LEGISLATION OR THE LIKELIHOOD OF LITIGATION, IF THE ADMINISTRATION WILL JUST MOVE AHEAD.

SALE OF ROYALTY OIL

YET ANOTHER ALTERNATIVE INDICATED BY THE GOVERNOR IS THE ADVANCE SALE OF A PART OF THE STATE'S ROYALTY OIL INTEREST IN PRUDHOE BAY. THE POTENTIAL FOR SUBSTANTIAL ADDITIONAL REVENUES, IF NEEDED, IS REASSURING, PARTICULARLY IF THE ROYALTY BOARD CAN ARRANGE SUCH A TRANSACTION TO PROTECT THE STATE'S INTEREST IN ANY APPRECIATION IN FUTURE OIL VALUES, TO MINIMIZE THE INTEREST COST TO THE STATE, AND TO RESERVE MOST OF THE REVENUE POTENTIAL FROM THIS SOURCE FOR FUTURE YEARS.

GIVEN THESE ALTERNATIVES, THE TIME HAS COME FOR THE GOVERNOR AND HIS ADMINISTRATION TO MOVE AND TO MOVE POSITIVELY. ONE OR MORE OF THE THREE ALTERNATIVES NOTED CAN AND SHOULD BE PURSUED NOW WHILE PIPELINE CONSTRUCTION IS IN FULL SWING. THE PROBABILITY OF THEIR SUCCESS SEEMS HIGH, AND NO REASON FOR US TO PANIC.

THE POSSIBILITY OF PIPELINE DELAY CONCERNS US ALL. IT MAY NOT OCCUR, AND WE WILL KNOW A GOOD DEAL MORE ABOUT THAT NEAR THE END OF THIS CONSTRUCTION SEASON. IF THERE IS DELAY, IT WILL AFFECT STATE REVENUES IN FISCAL YEAR 1978, AND CAN BE FULLY CONSIDERED BY THE 1976 SEASON OF THIS LEGISLATURE. I BELIEVE THAT PRUDENCE SAYS WE MUST WATCH THIS CLOSELY, BUT NOT CREATE PROBLEMS FOR OURSELVES.

IN ANY EVENT, THE NEAR TERM REVENUE NEEDS MUST BE MET, AND I URGE YOU TO URGE THE GOVERNOR TO ACT FORTHRIGHTLY.

THANK YOU.

TESTIMONY ON THE PROPOSED WILDLIFE REFUGE AREAS

For the Senate and House Resource Committee Hearings

Mr. Chairman and members. I would like to thank you in advance for this opportunity to present testimony regarding the proposed state game refuges.

My name is Dimitri Bader and I have been with the Alaska Department of Fish and Game for 8 1/2 years; I am presently serving as a regional habitat biologist with the department's Habitat Protection Section. My duties include field and management level statewide responsibilities involving refuges, sanctuaries, critical habitats and game management areas.

The Alaska Department of Fish and Game strongly supports the refuge nominations of the Susitna Flats, Trading Bay, Redoubt Bay and Yakutat-Dry Bay areas.

These areas have a variety of valuable wildlife species, however, the waterfowl resource is our major concern in supporting these proposals.

As you all probably know Alaskan waterfowl are of international importance. The 6-7 million ducks, geese, swans, and 20+ million shorebirds that come to Alaska, with some continuing on to Russia and Canada, nest and produce young which go to South America, Mexico, Asia, Canada and most of the other 49 states.

These waterfowl generally funnel through two major pathways when migrating to Alaska before dispursing to the large Tundra, Arctic and river delta

nesting grounds. These two pathways are identified for the purposes of this hearing as the interior path and the Alaskan coast.

The Yakutat-Dry Bay and Cook Inlet areas are very important waterfowl migration habitats as well as significant nesting areas on the Alaskan coastal migration pathway.

These millions of waterfowl and shorebirds are on a critical climatic and physiological time table during the spring season. Many of the birds have already paired, bred, and are ready to lay eggs as soon as they arrive on the nesting grounds. If there is a significant delay in nest initiation such as caused by late spring breakup or a severe spring storm, the birds begin to reabsorb their unlaid eggs. If they nest at all reproduction is minimal.

A loss or reduction of our major migration areas - such as the refuges we are supporting - would delay the birds timely arrival on their nesting grounds. This could result in a significant reduction of the waterfowl populations in the Central and Pacific Flyways.

During the fall and after the interior areas freeze up, these coastal habitats provide good feeding places where the birds can rest, feed and gain strength before their long flight south.

We view the purposes in designating these areas as refuges as: (1) to protect, preserve and improve the natural habitat and associated fish

and wildlife populations; (2) to protect and preserve existing and projected public demands for hunting; (3) to provide the vehicle for intensive wildlife management as existing and projected public demands dictate; and under certain future situations (4) to provide specialized viewing opportunities in addition to other public wildlife related recreation activities.

The Susitna Flats, Trading Bay, Redoubt Bay, the Yakutat-Dry Bay areas were nominated because they represent some of the best coastal waterfowl areas in the state that the four purposes just mentioned address.

More specifically I will summarize the values and importance of each area as we seem them.

The Susitna Flats

The land status of the proposed refuge includes approximately 391 acres of private property; 60,620 acres of borough selected lands and 240,936 acres of state owned land of which 38,550 acres are classified as mental health lands; this totals approximately 301,947 acres including tidelands, uplands and submerged lands.

The wildlife resources of the Susitna Flats are the most abundant and varied found on any of the present or proposed state refuge areas in Cook Inlet. An estimated 1/2 million ducks, geese, swans and cranes use this area during spring and fall migration periods and about 8,000 ducks, 150 Canada Geese and 25 Trumpeter Swans nest here. Several hundred moose, from at least two (2) different game management units,

winter and calve here. There are at least seven salmon spawning and rearing streams located here. Brown and black bear come from the surrounding mountains and forests to utilize the young spring vegetation, prey on the numerous moose calves as well as on the fall spawned salmon. A variety of small game, furbearers and non game birds, eagles and mammals also exist here in significant numbers.

Hunting, fishing, trapping and viewing are the most popular resource activities occurring in this area. Hunting, specifically for waterfowl, is the greatest public use. The Susitna Flats experiences the highest level of hunter use, as well as ducks harvested, of any location in the State of Alaska. It is also the 6th highest statewide goose harvest area as well as the 3rd highest in South Central Alaska.

The Susitna Flats are used by people statewide, but are most important to the residents from the Matanuska Valley, the Municipality of Anchorage, the Kenai Peninsula and the settlements located on the East side of Cook Inlet.

Many individuals including air charter and guide services have built duck cabins here for the purpose of providing overnight facilities for waterfowl hunters. We are in favor of having such duck cabins, but at the same time quality public hunting can't be maintained if cabins are too concentrated/or located in the prime hunting areas. Other unregulated hunting related development, including short air strips, storage areas and additional cabins, appears annually.

Approximately 15 salmon set net sites, about 391.2 acres of private land and numerous oil and gas leases occur within this area. These refuge lands would naturally be subject to pre-existing lease or ownership rights.

As we see it, the importance of the Susitna Flats refuge designation is to: (1) protect the wildlife habitat and related game populations for the public; (2) to control access and cabin development; (3) to increase wildlife production and hunter use through habitat development; and (4) to provide for anticipated increases in public demands on wildlife resources associated with the increases in human populations related to Alaska's present and future oil and mineral development.

Trading Bay

The land status of the proposed refuge includes approximately five (5) acres of private property and 168,993 acres of state owned lands of which 3,840 acres are classified as mental health lands; this totals approximately 168,998 acres including tidelands, uplands and submerged lands.

The wildlife resources of Trading Bay are varied and include brown bear, black bear, moose, furbearers, small game and waterfowl. Many of the waterfowl that utilize Cook Inlet utilize Trading Bay. There are between 3 and 5,000 ducks that nest here. There are at least five salmon spawning and rearing streams within the area. More than a hundred moose winter and calve here. Brown and black bear utilize the spring vegetation as well as prey on the numerous moose calves and fall spawned salmon.

Hunting, fishing and trapping are the most popular public activities with waterfowl hunting being the most significant. Trading Bay has provided the 9th highest statewide duck harvest and 5th highest South Central (S.C.) Alaska duck harvest. This area is also a significant goose harvest area. Trading Bay is used primarily by people from the Kenai Peninsula and Tyonek; however, people from Anchorage go there specifically for the excellent duck and goose hunting. Several privately built cabins are present. The values of classifying this area a refuge are similar to those of the Susitna Flats.

Several (less than 5) salmon set net sites, about 5 acres of private land and numerous oil and gas leases occur within this area. The refuge classification of these lands would naturally be subject to the pre-existing lease or ownership rights.

Redoubt Bay

The land status of the proposed refuge includes approximately 889 acres of private property; 640 acres of borough selected lands and 205,247 acres of state owned land of which none are classified as mental health or University lands; this totals approximately 206,776 acres including tidelands, uplands and submerged lands.

The wildlife resources of Redoubt Bay include black and brown bear, moose, salmon, small game, furbearers and waterfowl. Of all the waterfowl areas in Cook Inlet, Redoubt Bay has, in addition to Canadian Geese, the only summer resident population (1,000 - 1,500) of white-fronted geese.

Hunting, fishing and trapping are the most popular activities occurring here. Limited aircraft landing areas, however, have prevented the public from utilizing the wildlife resources at levels comparable to Susitna Flats or Trading Bay.

The Alaska Department of Fish and Game anticipates increased demands for wildlife resource utilization here as the human population on the Kenai Peninsula and in Anchorage grows. Redoubt Bay's importance as a refuge lies in preserving and perpetuating the wildlife habitat and game resources for the public; the potential development of wildlife habitat to increase wildlife production and hunter use; and improving additional access necessary to satisfy future public demands.

Less than five (5) salmon set net sites, about 889 acres of private lands and several oil and gas leases exist within this area. The classification of this land would naturally be subject to the pre-existing lease or ownership rights.

Yakutat-Dry Bay

The status of the land within the proposed refuge includes approximately 15 acres of private land; 58,515 acres of National forest service land and 46,403 acres of state owned land of which none are classified as mental health or University lands. This totals approximately 104,934 acres including tidelands, uplands and submerged lands.

Since Senate Bill 637 addresses state owned lands, including tide and submerged land and all those lands acquired in the future, federal lands

included within the Senate Bill 637 description would not be affected by this classification.

The wildlife resources of the Yakutat-Dry Bay area are as varied as found on any of the present or proposed refuge areas in Alaska and includes black and brown bear, moose, salmon, furbearers, harbor seals, small game and waterfowl.

This area is important in providing habitat for most of these wildlife species, but is especially important in protecting critical moose winter habitat and waterfowl migration habitat. Millions of waterfowl and shorebirds utilize this area during the spring, summer and fall seasons.

Hunting, commercial and sport fishing and trapping are presently the most significant resource activities. This area has provided the 10th highest statewide goose harvest as well as the 3rd highest goose harvest in Southeastern Alaska. It is also the 4th highest hunter use and duck harvest area in Southeastern Alaska.

Some of the hunting effort and public interest orginates from the city of Yakutat, but additional hunters come from Juneau and other Southeastern Alaska settlements. Although total human use is now low, it is well known that this area has a future laced with oil development and human population growth.

Our department anticipates significant increases in public demand for wildlife utilization, construction of cabins and commercial uses on wildlife habitats. Therefore, we view the importance of the Yakutat-Dry