

M E M O R A N D U M

TO: Council Members, SSC and AP
FROM: Jim H. Branson
Executive Director
DATE: November 25, 1980
SUBJECT: King Crab Draft Fishery Management Plan

ACTION REQUIRED

No action is required at this time.

BACKGROUND

Terry Leitzell, the Assistant Administrator for Fisheries of NOAA/NMFS, has returned the King Crab Draft Fishery Management Plan and its accompanying Draft Environmental Impact Statement. The principal reason cited for this action is the lack of a designated preferred management option. NMFS, Washington, D.C., maintains that their policy requires Draft Fishery Management Plans to contain preferred management options. Please refer to the following action memorandum and letter received from NMFS.

The public hearings on the present draft FMP have been held as scheduled. Council members will receive synopses of the public testimony and written comments after the close of the public comment period on December 15.

Patrick J. Travers of the NOAA Regional General Counsel's Office will present a legal opinion on the viability of Plan Option #2, Plan Developed and Federal Regulations Not Issued.

If the Council designates a preferred management regime at the February meeting, then a comprehensive document containing the Final FMP, Draft EIS and Draft RA can be resubmitted for Secretarial Review by March 15. The FMP would then be subject to the following time constraints before it could become effective:

60 days	for Secretarial Review
15 days	to prepare the Notice of Proposed Rule Making
60 days	Public Comment Period
30 days	to respond to Public Comments and prepare the Notice of Final Rule Making
30 days	Administrative Procedures Act Cooling Off Period before the FMP becomes effective

195 days total elapsed time

The FMP could become effective by October 1, 1981.

The environmental review and regulatory analysis review normally should require 145 days.



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Washington, D.C. 20236

F/CM:REG

DEC 1 1980

TO: F - Terry L. Leitzell

FROM: *[Signature]*
F/CM - William G. Gordon

SUBJECT: National Marine Fisheries Service (NMFS) Review of the North Pacific Fishery Management Council's (Council) Draft Fishery Management Plan (Discussion Paper (DP)) and Draft Environmental Impact Statement (DEIS) for the Western Alaska King Crab Fishery—ACTION MEMORANDUM (by December 4, 1980)

As a result of our review of the Council's western Alaska king crab DP/DEIS, we have found a major deficiency. The documents fail to identify preferred alternatives. I am proposing that the plan be turned back to the Council to correct this problem.

BACKGROUND

A fishery management plan (FMP) for western Alaska king crab has been under consideration and development by the Council for approximately two years. Since it was started before January 9, 1979, we accept the fact that this plan does not require a work plan.

On October 27, 1980, we received a DEIS/DP for NMFS/NOAA review and clearance. During the latter half of October, the Council staff regularly was in telephone contact with NMFS staff urging quick review and emphasizing the need to have the Environmental Protection Agency publish a notice of availability on November 14, 1980 (thereby coinciding with the 20-day notice of public hearings). The Council has already mailed the DEIS and DP to members of the public and announced public hearings. The first hearing was held in Dutch Harbor on October 21, 1980; the remaining hearings are scheduled for December 6, 1980, in Seattle and Kodiak, and December 9, 1980, in Anchorage.

The plan is politically very sensitive, with Seattle-based fishermen feeling discriminated against and urging plan adoption and with some Alaskan fishermen reluctant to support Federal management. The Alaska Department of Fish and Game representative to the Council proposed the plan go forward for public review with a "No Plan" option. The Council felt that the designation of preferred alternatives prior to public hearings would greatly impede Council's decisionmaking following the public comment period (see attached Branson to Leitzell letter of October 28, 1980).

NATIONAL MARINE FISHERIES
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It is unlikely that a Federal management system could be in place for the 1981 king crab fishing season (primary fishery to start September 10), even if we approved the DP and DEIS "as is" for public review and internal processing.

ISSUE: Acceptability of the DP and DEIS; Lack of Preferred Alternatives

The NMFS Operational Guidelines for the Fishery Management Plan Process (Operational Guidelines) indicate, among other things, the various types of documents required in the FMP review process. The Operational Guidelines (pg. 21) state that the Council should submit a single document incorporating the DP, the DEIS (as required under the National Environmental Policy Act (NEPA)), and the DRA (as required under Executive Order 12044 (E.O. 12044)). They (pg. 23) further state that a draft fishery management plan, when made available to the public, should clearly identify the preferred management alternative(s) to achieve the stated objectives of the FMP. While the Operational Guidelines indicate that it is permissible for Councils to list only the alternatives and select the preferred alternative(s) after public input, the guidelines say that in such cases the document must be recirculated for public review of the preferred option(s) before the Council adoption and submission of the FMP to the Secretary of Commerce.

Neither the DP nor the DEIS contain a preferred management regime or a preferred alternative with respect to the need for an FMP. While an RA has been drafted by F/ARR and is currently being finalized for Council review, it was not submitted. According to the Operational Guidelines (pg. 23), the required elements of a DRA include a detailed explanation of the reasons for choosing one alternative over the others. It follows that unless the DP identifies preferred alternatives, then the DRA, if submitted now, would be inadequate.

An October 2, 1980, memorandum concerning the Pacific pink shrimp fishery (copy attached) establishes current policy with regard to required contents of plans. It expressly requires the DP/DEIS/DRA to analyze comparatively the preferred management regime and its alternatives and consider how each will achieve the management objectives. The failure to indicate a preferred alternative and to analyze all alternatives is a critical deficiency of the submitted king crab documents.

It is also important to note the mounting criticism by the President's Council on Environmental Quality (CEQ) and the Office of Ecology and Conservation of NOAA's Office of Policy and Planning (PP) that FMP environmental documents are often deficient in failing to provide an adequate basis for public comment. For example, they fail unnecessarily to state a proposed or preferred action and to contain an adequate impact analysis. Rare exceptions may be granted to NMFS/PP policy of requiring a single preferred alternative management regime. Exceptions may arise from lack of data that may only be gathered in a public forum or from an inability to predict the

Impact of alternative management regimes without public comment available only through the medium of a public hearing. Controversiality alone is not an acceptable reason. Exceptions should be requested in writing, together with the rationale, well in advance of submission of the DEIS for approval. In order to be eligible for an exception the document should contain the management measures grouped into a few (usually not more than three) easily identifiable, complete management regimes and the impacts of these to the extent known that will allow fruitful public discussion. The listing of a large number of possible management measures will not be acceptable.

At the recent October 1980 meetings with Council Chairman and Executive Directors in Puerto Rico, you emphasized the need to identify preferred alternatives. In his October 28, 1980, letter to you, Jim Brason indicated that the Council was aware that MRS policy requires references to be designated. However, he argued that the western Alaska king crab plan should be an exception to that policy given the political climate (and the need to know the position of interest groups and the number of expected participants in next year's fishery). I cannot agree. While the ODJ regulations do not mandate the identification of preferred alternatives in every circumstance, lawyers at ODJ would rejoice that political considerations are unacceptable reasons for not stating preferred alternatives.

The rationale used in the Pacific fishery trip decision was that the public had insufficient information (impact evaluation) on which to make an educated choice of management options. Applying essentially that same rationale, I believe the western Alaska king crab situation is inadequate and should not be excepted from our policy of desisting from references. Further, a regulatory analysis is needed to conform with MRS/MRA policy requirements and to satisfy B.O. 12044.

To avoid canceling the upcoming scheduled Council hearings on western Alaska king crab, the Council could refer those hearings as fishery Conservation and Management Act fact-finding hearings. On the basis of information received, the Council should identify preferred options concerning the need for a fishery management plan, the fishery management unit, and specific management measures, including the determination of optimum yield. The DE, DEIS, and DRA (with preferred alternatives indicated in each) should then be submitted for MRS/MRA clearance and release to the public. In this way the Council could hold a minimum number of additional hearings. For example, one hearing could be held in Anchorage and another in Seattle on the preferred alternatives. This suggestion would allow the Council to gather information useful in determining preferred alternatives and would minimize the number of hearings once those referred alternatives were announced to the public.

RECOMMENDATION

In light of the deficiencies I have noted above, I recommend that you advise the Council that its western Alaska king crab plan is critically deficient and that internal processing and public review through MRA and B.O. 12044 channels will cease until those deficiencies are corrected. If you concur, please also review the attached letter to the Council.

I do not feel that the controversial nature of this plan makes it unique or exceptional, thus justifying an exception. We should work with the Council and the Regional Office to find a process as reasonable as possible to complete action.

T. L. Lettzell 12/5/80

action

I am in agreement with the Regional Office's position. We should work with the Council and the Regional Office to find a process as reasonable as possible to complete action.

DATE	SIGNATURE
12/15/80	<i>[Signature]</i>
12/15/80	<i>[Signature]</i>

TERRY L. LETTZELL
Assistant Administrator
for Fisheries

[Signature]

DATE
12/14/80

I do not object. *See attached*

I concur.

Mr. Clement V. Tillion
Chairman, North Pacific Fishery
Management Council
P.O. Box 3136 DT
Anchorage, AK 99501

Dear Clem:

NMFS recently completed its initial review of the draft fishery management plan (DFMP) and draft environmental impact statement (DEIS) for the western Alaska king crab fishery submitted by the North Pacific Fishery Management Council. Unfortunately, it is necessary for us to return these documents because they do not conform to the National Marine Fisheries Service (NMFS) and National Oceanic and Atmospheric Administration (NOAA) policy which requires the designation of preferred alternatives, except in unusual circumstances. The rationale for this decision and exceptions for unusual circumstances are contained in the enclosed action memorandum of December 1, 1980.

This letter also responds to Jim Branson's October 28, 1980, letter to Terry L. Leitzell which explains the concerns of the Council and its difficulty in deciding on preferred alternatives in the king crab plan. While we appreciate the Council's concerns, NMFS cannot agree that an exception for king crab should be made to our policy requiring the designation of preference.

In situations where a draft fishery management plan without preferred alternatives has been released to the public, and the preferred alternatives are selected after public review, the document must be recirculated for public review of the preferred options before Council adoption and submission of the fishery management plan to the Secretary of Commerce. The Council could reframe its recently conducted hearings on western Alaska king crab as Fishery Conservation and Management Act fact-finding hearings. On the basis of the information received, the Council should identify preferred options concerning: (1) the need for a fishery management plan; (2) the geographic coverage of the management unit; and (3) specific management measures, including the determination of optimum yield. The DFMP, DEIS, and draft regulatory analysis (DRA) (with preferred alternatives indicated in each) should then be submitted for NMFS/NOAA clearance and release to the public. The Council would subsequently need only to hold a minimum number of additional hearings.



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When the DFMP and DEIS have been modified, please submit them and a DRA to allow simultaneous review of these three mutually supporting documents. As indicated, all three documents should identify a single preferred alternative management regime. If this is not possible due either to (1) a lack of data that may only be gathered in a public forum or to (2) an inability to predict the impact of alternative management regimes without a public hearing, then you should request an exception to our policy on those grounds.

A request for an exception should be in writing, together with the rationale. In order to be eligible for an exception, the document(s) should contain the management measures grouped into a few easily identifiable, complete management regimes and the impacts of these to the extent known that will allow fruitful public discussion.

If an exception is granted and the documents are otherwise acceptable for formal NEPA and E.O. 12044 review, hearings should be held once the Environmental Protection Agency notice of availability of the DEIS has been published in the Federal Register. At the conclusion of those hearings, the Council would need to select a single preferred alternative management regime for inclusion in their submission of the final FMP, FEIS, and RA to the Secretary.

We look forward to receiving the DFMP, DEIS, and DRA in acceptable form so that we can begin the review process. The Region will continue to assume the lead role in developing the DRA if you so desire. Thank you for your assistance in this matter.

Sincerely

Robert R. Simpson

for Robert W. McVey
Director, Alaska Region

Enclosure



**UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration**

Office of General Counsel
P.O. Box 1668, Juneau, Alaska 99802
Telephone (907) 586-7414

DATE: December 8, 1980

TO : North Pacific Fishery Management Council Members
NPFMC - Jim Branson
GCF - Jay Johnson

FROM: GCAK - Patrick J. Travers *Pat*

SUBJ: Alternatives to Conventional King Crab FMP and Implementing Regulations

INTRODUCTION

The purpose of this memorandum is to discuss the availability to the North Pacific Fishery Management Council (Council), the Assistant Administrator for Fisheries, NOAA (Assistant Administrator), and the State of Alaska, of management procedures for the western Alaska king crab fishery (fishery) other than the preparation and approval of a fishery management plan (FMP) and the implementation of that FMP through the promulgation of detailed regulations by the Assistant Administrator.

Since Alaska attained statehood in 1959, its government has asserted and effectively exerted a high degree of management authority over the fishery both within and without the three-mile limit, and with respect to both fishermen residing in Alaska and those residing in other states, particularly the State of Washington. In exercising this authority, Alaska has taken advantage of the fact that the fishery takes place in extremely remote areas, and that it has until recent years almost exclusively required the delivery of live crab to shore-based processors. Because the landing of live crab caught in the fishery in a state other than Alaska is unfeasible due to the fishery's remoteness, both Alaskan and non-Alaskan participants in the fishery have of necessity landed their catches in Alaska, thereby subjecting themselves to a comprehensive system of landing laws and regulations governing many features of the fishery. These regulations are promulgated by the Alaska Board of Fisheries (Board) and implemented by the Alaska Department of Fish and Game (ADF&G), both of which are agencies of the Alaska state government. Alaska's authority to use these regulations to manage participation in the fishery beyond the three-mile limit by non-Alaskans was endorsed by the Alaska Supreme Court in State v Bundrant,



546 P.2d 530 (1976), even though enforcement of previously promulgated regulations had been preliminarily enjoined by a three judge Federal district court in Hjelle v Brooks, 377 F Supp. 430 (D. Alaska 1974). Each of these cases involved Seattle-based fishermen who participated in the fishery beyond the three-mile limit.

The insertion of the second sentence of section 306(a) into the FCMA is generally believed to have been an attempt engineered by the Washington congressional delegation to overrule Bundrant. This sentence provides:

"No State may directly or indirectly regulate any fishing which is engaged in by any fishing vessel beyond its boundaries, unless such vessel is registered under the laws of such State."

As you know, this sentence has turned out to be ambiguous, because it is the Federal government, and not the states, that registers (in the usual sense of "documents") vessels the size of those participating in the fishery. Taking advantage of this ambiguity, Alaska has required all vessels landing king crab on its shores or otherwise coming into its territory incidentally to participation in the fishery, to "register" in Alaska. This "registration" is actually a conventional permitting system, rather than a system of vessel documentation. By requiring such registration, Alaska believes that it has effectively asserted its management authority over the activities of such vessels in the fishery conservation zone (FCZ) beyond its three-mile limit in a manner consistent with FCMA section 306(a). This belief is vigorously contested by Seattle fishermen like those involved in the Hjelle and Bundrant cases, but has generally enjoyed the support of the NMFS Alaska Region and the Council. The Alaska Supreme Court endorsed this position in its recent American Eagle decision.

There is a small, but growing, number of catcher/processor vessels that participate in the fishery. Because these vessels can process their catch at sea, they do not have to land it live in Alaska ports, or otherwise come within Alaska territory. As a result, they are able to avoid "registering" under Alaska law without fear of suffering sanctions that might be imposed by Alaska upon those landing king crab within its territory. Because the Alaska management system for the fishery does not apply to these catcher/processors, and because there is not yet a Federal management system to fill the vacuum, the fishery operations of these catcher/processors are, as a practical matter, unregulated.

The Seattle fishermen have argued strongly for the prompt adoption by the Council of an FMP for the fishery, and for the implementation of that FMP through regulations of the Assistant Administrator that would displace Alaska's regulations to the extent they apply to the fishery in the FCZ. A number of Council members, however, believe that continued

direct participation of the Board and ADF&G in management of the fishery in the FCZ would be desirable. They and the Council staff have asked that alternatives to the conventional approval and implementation of an FMP for the fishery that would allow such participation by Alaska in its management be analyzed.

The main alternatives that are under consideration are as follows:

- (1) Approval of a "framework" FMP without adoption by the Assistant Administrator of any implementing regulations, with implementation of the FMP left to Alaska through its registration and landing regulations.
- (2) Approval of a "framework" FMP with adoption by the Assistant Administrator of a regulation delegating authority for implementation of the FMP to the Board and ADF&G.
- (3) Joint adoption by the Council and the Board of a set of management standards and policies other than an FMP, with implementation of those standards and policies resting with the Board and ADF&G.

The feasibility under the FCMA of each of these alternatives for management of the king crab fishery will now be considered.

(1) Framework FMP Approved But Federal Implementing Regulations Not Adopted

It has been suggested that NOAA and the Council might ensure a continuing role for Alaska in the management of the fishery by developing and approving a "framework" FMP, but declining to promulgate regulations to implement that FMP under FCMA section 305. A "framework" FMP for this purpose is an FMP that does not prescribe specific fishery management measures in detail, but rather sets forth more general management goals and standards to be implemented through measures adopted by ordinary rule-making. Such a format would eliminate the need to amend the FMP every time it was desired to change a management measure. Under this proposal, ADF&G and the Board would continue to regulate participation in the fishery by vessels registered under the laws of Alaska subject to the management objectives and standards set forth in the FMP. There would be no Federal regime for management of the fishery other than Council and NMFS oversight of Alaska's regulatory activities to ensure that they complied with the FMP, and periodic review of the FMP itself to determine whether it was in need of amendment. The Assistant Administrator would retain authority to adopt Federal regulations overruling Alaska regulations that were found to be inconsistent with the FMP or with any amendment thereto.

The primary advantage perceived in this proposal is that it would forego the establishment of a new Federal king crab management regime which many believe would simply duplicate a management capability

currently possessed by Alaska, at least with respect to vessels registered in Alaska. Proponents of this alternative suggest the unlikelihood, due largely to budgetary constraints, that any Federal king crab management system could in the foreseeable future acquire the research, monitoring, and data-gathering capacity currently available to ADF&G and the Board in their management of the fishery. It is thus suggested that a Federal king crab management regime would largely be a bureaucratic overlay of Alaska's management system that would add little of substantive significance to the quality of management while imposing significant additional administrative burdens. Those making this suggestion find support for it in the current regulatory situations of the Tanner crab and Alaska salmon troll fisheries, and in the confusion that has surrounded development of a Bering Sea herring FMP.

A disadvantage of this alternative would be that it would leave unmanaged participation in the fishery by the catcher/processors based in Washington State that are not even arguably "registered" in Alaska due to their nondependence on Alaska shore-based facilities. This disadvantage could be ameliorated if Washington, in cooperation with NMFS, the Council, and Alaska, were to adopt its own king crab management regime to implement the FMP, covering vessels "registered" in Washington.

The viability of this proposal would, of course, depend upon continued adherence by NOAA to its liberal interpretation of the second sentence of FCMA section 306(a), under which each State is considered to have great latitude in determining which vessels are to be considered "registered" under its laws, provided that it has substantial relationships with those vessels.

The primary legal obstacle to adoption of this alternative for king crab management is presented by FCMA section 305(c) which provides, in part:

"The Secretary shall promulgate regulations to implement any fishery management plan or any amendment to any such plan . . . if he finds that the plan or amendment is consistent with the national standards, the other provisions of the Act, and any other applicable law."

[Emphasis added.]

The use of the mandatory "shall" in this provision would seem on its face to require the Assistant Administrator to adopt implementing regulations for any approved FMP. In contrast with FCMA section 302(h) (1) discussed below, which contains similar mandatory language concerning Council preparation of FMP's, there is no other provision of the FCMA

that might qualify the language of section 305(c). Thus, the better view is probably that the Assistant Administrator must adopt regulations of some sort to implement an FMP which he has approved although, as will be discussed in connection with the next alternative, he probably has substantial leeway as to the exact content and nature of those regulations.

It could be that the "shall" of FCMA section 305(c) could be read in a nonmandatory way, despite its usual mandatory significance. Such a reading could be supported by the general disinclination of Congress, particularly over the past few years, to espouse unnecessary Federal regulation. A party challenging the nonadoption by the Assistant Administrator of a regulation he had specifically found to be unnecessary would at the very least be in a somewhat awkward position, although that party's chances of success would not be negligible. Therefore, the Council and NOAA may not at this time want to dismiss the pursuit of this first alternative, recognizing that it does entail a legal risk that does not accompany the two alternatives discussed below.

(2) Framework FMP Approved and Implementing Authority Delegated by Federal Regulation to State Agencies

The second alternative for management of the fishery would involve the adoption and approval by the Council and NOAA of a framework FMP, and the promulgation by the Assistant Administrator of an implementing regulation that would simply delegate authority for implementation of the FMP to ADF&G and the Board. This would have substantially the same practical advantages and disadvantages as the first alternative. As would be the case with that alternative, the regulation of catcher/processors not registered in Alaska could be accomplished through a similar delegation to Washington State management agencies.

The primary legal issue raised by this alternative is the extent to which the Assistant Administrator may subdelegate his authority under FCMA section 305 to implement an FMP to State agencies such as ADF&G and the Board. This authority was delegated to the Secretary of Commerce by Congress in enacting the FCMA, and was subdelegated by the Secretary to the NOAA Administrator, who further subdelegated it to the Assistant Administrator.

The law of subdelegation of regulatory authority appears to be quite confused, and the cases focus almost exclusively upon subdelegation by an agency head to subordinates within the agency. See, generally, 1 K. Davis, *Administrative Law Treatise* (2d ed.) 216-23 (1978). Yet, the current approach of courts and agencies to subdelegation appears to be quite permissive. Id. at 218-20. The leading case on the subject appears

to be Fleming v Mohawk Wrecking and Lumber Company, 331 U.S. 111 (1947). There, the Court cited a provision of the Emergency Price Control Act which stated that the Price Administrator

"may, from time to time, issue such regulations and orders as he may deem necessary or proper in order to carry out the purposes and provisions of this Act."

The Court then stated:

"Such a rule-making power may itself be an adequate source of authority to delegate a particular function, unless by express provision of the Act or by implication it has been withheld."

331 U.S. at 111.

In Mohawk, the Court departed sharply from the much more restrictive approach to subdelegation that it had adopted earlier in Cudahy Packing Company v Holland, 315 U.S. 357 (1942), in which it held that the Wage and Hour Administrator of the Department of Labor could not subdelegate his statutory authority to sign subpoena duces tecum. While the Court in Mohawk made a somewhat strained attempt to distinguish Cudahy, 331 U.S. at 120-21, it in fact appears to have adopted a generous approach to subdelegation similar to that espoused by Justice Douglas in his Cudahy dissent, 315 U.S. at 367-73, and Cudahy is no longer treated as viable precedent, Davis, *supra*, at 218. The Court reaffirmed this approach in Jay v Boyd, 351 U.S. 345 (1956). Concerning the provision of the Immigration and Nationality Act of 1952 which provided that the Attorney General "may, in his discretion" suspend the deportation of certain aliens, the Court stated:

"Petitioner does not suggest, nor can we conclude that Congress expected the Attorney General to exercise his discretion in suspension cases personally. There is no doubt but that the discretion was conferred upon him as an administrator in his capacity as such, and that under his rulemaking authority, as a matter of administrative convenience, he could delegate his authority to special inquiry officers with review by the Board of Immigration Appeals."

Id. at 351 n. 8.

In NLRB v Duval Jewelry Company of Miami, 357 U.S. 1 (1958), the Court drew a distinction between cases of the kind just discussed, which involve complete subdelegations of regulatory authority, and situations in which the delegator retains the right to make the final decision by way

of an appeal procedure, even though the initial decision is made by a delegate. Id. at 6-8. The Court seemed to indicate that subdelegations of the latter, partial type would be even more readily allowed than complete delegations. Id. at 8.

In United States v Giordano, 416 U.S. 505 (1974), the Court reiterated the liberal approach to subdelegation established in Mohawk, but held that the statute under consideration in the instant case specifically forbade the delegation of the function in question. Id. at 513-14.

In reviewing subdelegations of certain administrative functions by the Equal Employment Opportunity Commission under its authority to make procedural rules, two circuits have applied the liberal approach to subdelegation prescribed by the Supreme Court. EEOC v Raymond Metal Products Company, 530 F.2d 590 (4th Cir. 1976); EEOC v Laclede Gas Company, 530 F.2d 281 (8th Cir. 1976). In Raymond Metal, the Court placed some emphasis upon the fact that judicial review of the subdelegated administrative actions was available, even though there was no express provision for administrative review of those actions. 530 F.2d at 594.

An apparent aberration in the generous approach taken by the Federal courts to subdelegation is presented by certain dicta in Relco, Incorporated v Consumer Product Safety Commission, 391 F. Supp. 841 (S.D. Texas 1975).

In that case, a manufacturer challenged the issuance of preliminary adverse publicity concerning one of its products by the CPSC's Bureau of Compliance under a provision of the Consumer Product Safety Act. This function had been subdelegated by the Commission to the Bureau under a provision of the Act specifically authorizing the Commission to delegate any function or power other than the power to issue subpoenas. In considering the Plaintiff's claim that authority to issue the adverse publicity had been improperly subdelegated by the Commission to the Bureau, the Court stated:

" . . . [S]ome functions are so primary and so basic to the implementation of the statute as to be nondelegable. Functions constituting final agency action, such as administrative adjudications and rule making, must be made or ratified by the Commissioners and may not be delegated to subordinates under broad grants of authority . . . While intra-agency delegation is a necessity in carrying out some of its functions, such delegation cannot be excessive . . . "

391 F. Supp. at 845-46.

The Court cited absolutely no case authority for this statement, referring only to a passage in an earlier version of the Davis treatise which has since been replaced by the new sections cited above. If accepted, the court's statement would probably invalidate the delegation of FCMA authority from the Secretary of Commerce to NOAA, and it appears to be totally unsupported by any viable judicial precedent. Fortunately, the statement was plainly mere dictum: the court dismissed the complaint for lack of exhaustion of administrative remedies and the CPSC, having won the case, had no occasion to challenge the statement before a higher court. Relco has not been cited once in any other judicial decision since its release almost six years ago.

The cases discussed above deal with subdelegations within the Federal government. The subdelegation of king crab management authority that is under consideration would be from a Federal agency to a State agency. This raises the question whether subdelegations to entities outside the Federal government must be analyzed under principles substantially differing from those discussed above.

A decision of the District of Columbia circuit indicates that this is not so. In Tabor v Joint Board for Enrollment of Actuaries, 566 F.2d 705 (D.C. Cir. 1977), certain actuaries challenged regulations of a Federal agency established for their certification under which membership in a private actuarial association could substitute for the passing of a professional examination. The plaintiffs challenged this provision as an unlawful subdelegation of the Board's authority to a private party. The Court responded as follows:

"As a factual matter, the Board has not substantially delegated its responsibility to set and administer enrollment standards. Permitting association members to short-cut the regular certification process does not mean that the Board has delegated its control over that process. Each applicant can obtain certification through a process superintended by the Board in every respect. And there is no claim that the Board has set the pass rate for its exam at such a high level that, in practice, the private associations actually set the enrollment standards.

"In any event, appellants are incorrect in asserting that express statutory authority is necessarily required for delegation by an agency. [The court cited Mohawk, distinguishing it from Cudahy and Giordano on the ground that those

cases involved prohibitions by Congress on subdelegation.] Congress has evidenced no such intent here. In fact, Congress granted the Joint Board discretion to establish reasonable standards and qualifications. . . ' for certification of competence."

566 F.2d at 708 n. 5.

Thus, the court appears to have held that, even assuming that the Board had subdelegated its authority to the Association, such subdelegation was permissible under the cases discussed above.

United States v Matherson, 367 F. Supp. 779 (E.D.N.Y. 1973), involved the challenge of certain National Park Service regulations providing that a permit for use of a motor vehicle in the Fire Island National Seashore would be granted only if an adjacent municipality had already issued a permit. The court rejected the argument that this was an unlawful subdelegation of NPS authority.

"Both parties agree that the purpose of the [local ordinance and the challenged Federal regulation] is to prevent erosion on Fire Island. The local municipalities and the Superintendent of the National Seashore have endeavored to cooperate with each other to maintain the natural beauty of Fire Island. [Footnote omitted.] It was in furtherance of this spirit of cooperation that the Superintendent promulgated [the challenged regulation]. This section is in no way an abdication of the Superintendent's power to administer the National Seashore. Rather, the instant section merely exemplifies an effort by the Superintendent to facilitate the orderly prevention of erosion on the island. The Superintendent still makes the ultimate determination of whether to grant a vehicular permit to travel on National Seashore land . . . Moreover, the practicalities of the situation dictate that such a regulation be in existence. The local municipalities and the National Seashore are contiguous."

367 F. Supp. at 782.

It must, on the other hand, be noted that the court observed that the municipality "has absolutely no power to grant a vehicular permit for the National Seashore." It did not, however, indicate that its decision would have been different if such power had been subdelegated. In fact, the court cited approvingly Gauley Mountain Coal Company v Director, U.S. Bureau of Mines, 224 F.2d 887 (4th Cir. 1955), and Clark Distilling Company v Western Maryland Railroad Company, 242 U.S. 311 (1917), both involving congressional delegations to the States, and stated that these delegations were

"far more extensive than the local municipalities' delegated authority under the instant regulation. In those two cases, the state's classification was final and all that remained was to apply the federal regulation. In contrast, under [the Federal regulation challenged in Matherson] the Superintendent retains the ultimate decision-making power."

367 F. Supp. at 783.

The Matherson court's citation of Gauley and Clark Distilling is significant, because it indicates both that the court believed the same standards to apply to congressional and administrative delegations of Federal authority to non-Federal entities; and that the court would have tolerated an even greater degree of delegation to the municipalities in Matherson.

In Gauley, a Federal statute imposed limitations on the use of electrical equipment in any mine found to be "a gassy or gaseous mine pursuant to and in accordance with the law of the State in which it is located," the State determination as to gaseousness being nonreviewable by the responsible Federal agency. 224 F.2d at 888-89. The statute was challenged as an impermissible delegation of Federal authority to the State. The court responded as follows:

"There is no delegation by Congress of its own power to a state agency, but merely the acceptance by Congress of state action as the condition upon which its exercise of power is to become effective. Congress has done this in a number of other fields of the law. [Here, among other statutes, is cited the Assimilative Crimes Act, which extends the criminal law of each State and Territory to areas under Federal jurisdiction located there.] . . .

. . . .

"In the case at bar, the regulations prescribed by Congress with respect to gaseous mines became effective upon a determination by a state agency under state law. That determination is not made under the authority of Congress. Congress merely applies its regulation in aid of state regulation after the state has classified the mine as subject to regulation as a gaseous mine. In the light of the authorities cited, this is clearly not delegation of Congressional power to the states . . ."

Id. at 890-91.

Gauley is thus notable both for the conclusive effect of the State determination upon the operation of the Federal management regime and for the court's obvious discomfort with the idea that this was a "delegation" of Federal authority, despite the fact that it obviously was, as was recognized in Matherson. 367 F. Supp. at 783.

Clark Distilling, *supra*, cited in both Matherson and Gauley, involved a challenge to the Webb-Kenyon Act. This pre-Prohibition statute made unlawful the transportation into a State of liquor in violation of laws of that State which, it was conceded, would otherwise have been unconstitutional under the Commerce Clause. The Supreme Court stated:

"The argument as to delegation to the states rests upon a mere misconception. It is true the regulation which the Webb-Kenyon Act contains permits state prohibitions to apply to movements of liquor from one state into another, but the will which causes the prohibitions to be applicable is that of Congress, since the application of state prohibitions would cease the instant the act of Congress ceased to apply."

242 U.S. at 326.

Based upon these authorities, the better view would seem to be that there is no necessary legal impediment to the delegation by the Assistant Administrator to State agencies of authority to implement a PMP for the fishery, pursuant to his general rulemaking authority under FCMA section 305. This would be particularly true if express provision is made for timely review of the State management measures by the Council and NMFS. The review procedure, which it would be advisable to prescribe in the delegation, could include joint meetings of the Council and the Board before the Board's adoption of new regulations; a recommendation by the Council to NMFS (either the Assistant Administrator or the Regional Director) as to the compliance of the new regulations with the FMP; and a decision of the Assistant Administrator or Regional Director, based on the Council's decision, whether to adopt Federal regulations to supplement or supersede those of the State. Assuming that the "framework" format of the FMP worked as planned, amendments to the FMP would be rare, and actions of the Board and of NMFS would be almost entirely through normal notice-and-comment rulemaking.

(3) Joint Council/Board Policy Statement Adopted and State Management Continues Without an FMP

The third alternative to the conventional FCMA enforcement mechanism that is being considered for the fishery would be the adoption by the Council and the Board of a joint statement of management policies and

standards for the fishery that would not, however, constitute an FMP. The Board and ADF&G would agree to be bound by this statement in their own management of the fishery, but otherwise the current State management system would not be disturbed and no Federal management regime would be established.

It has been argued that adoption of this alternative is impermissible under the FCMA. This argument is based upon FCMA section 302(h) (1), which provides:

"Each Council shall, in accordance with the provisions of this Act -
 (1) prepare and submit to the Secretary a fishery management plan with respect to each fishery within its geographical area of authority . . . "

Read in isolation, this provision appears on its face to require the Council to prepare an FMP for every fishery off Alaska, including that for king crab, regardless of its views as to the necessity of an FMP. This interpretation is vigorously endorsed by the Seattle fishermen, and would undoubtedly form the basis for a legal challenge if the Council declined to adopt an FMP for the fishery.

Another provision of the FCMA, however, seems to indicate that the Council's obligation to prepare an FMP for the fishery is somewhat less stringent than an isolated reading of section 302(h) (1) would suggest. FCMA section 304(c) (1) (A) provides:

"The Secretary may prepare a fishery management plan with respect to any fishery, or any amendment to any such plan, in accordance with the national standards, the other provisions of this Act, and any other applicable law, if -
 (A) the appropriate Council fails to develop and submit to the Secretary, after a reasonable period of time, a fishery management plan for such fishery, or any necessary amendment to such a plan, if such fishery requires conservation and management. . . "

[Emphasis added.]

Under this remedial provision, the Assistant Administrator is not even authorized, much less required, to develop an FMP in default of Council action unless the fishery "requires conservation and management." Since

section 304(c)(1)(A) prescribes the administrative remedy for violation by the Council of section 302(h)(1), and since no such remedy was authorized by Congress when the fishery is not one that "requires conservation and management," it would be reasonable to interpret the Council's underlying obligation so as not to require the preparation of an FMP for a fishery not requiring "conservation and management." Such an interpretation is bolstered by common sense and by the current offensive against unnecessary Federal regulation.

Assuming that this latter interpretation is adopted, the question arises whether the fishery for king crab is one that "requires conservation and management" within the meaning of the FCMA. If this phrase is interpreted in the absolute sense, with no consideration of the existing management regime, then the fishery would generally be conceded to require "conservation and management," since the capacity of the various participants far exceeds the amount of king crab that can be taken without reducing the reproductive capacity of the resource. If, however, assessment of the need for Federal "conservation and management" under sections 302(h)(1) and 304(c)(1)(A) can take into account the efficacy of existing non-Federal management regimes, then the fishery for king crab may well be one that the Council and the Assistant Administrator could reasonably find not to require such "conservation and management." Either interpretation of this phrase would seem to be reasonable, given the apparent absence of legislative history on the subject, and the Council and the Assistant Administrator could therefore, in the exercise of their administrative discretion, select the interpretation they desired. Courts would be required to defer to this interpretation by the Council and NMFS of the statute they are charged to administer. Udall v Tallman, 380 U.S. 1, 16 (1965). As you are aware, some Federal courts tend to honor this principle in the breach, and there is no guarantee that they would be inclined to follow it in this instance. Despite the presence of some legal risk, however, I am persuaded that the Council could, in accordance with the FCMA, find that the current king crab management regime of the State of Alaska effectively protects the king crab resource, and that the fishery is not, therefore, one that "requires conservation and management."

If it adopted this position, the Council would be well advised to compile a record, including comments and hearing summaries on the draft FMP and DEIS and background information on the provisions of its joint statement with the Board. Following compilation and review of this record, and finalization of the Council/Board statement, the Council would adopt a formal finding based on the record that the fishery is not one that "requires conservation and management," as long as the Board adheres to the statement in its own management of the fishery. It might

be advisable to include in the finding a discussion of the impact of catcher/processors that are beyond Alaska's jurisdiction. The Assistant Administrator would then review the Council's finding in light of the record, perhaps accepting public comments on it, and, if he concurred in the finding, issue a formal notice to that effect. The Council would periodically review the Board's management of the fishery and either renew its finding or, if it found that the joint statement was not being complied with or needed an amendment that the Board would not agree to, either undertake the preparation of an FMP for the fishery or request the Assistant Administrator to do so.

CONCLUSION

Thus, there do not appear to be serious legal impediments to adoption of at least the latter two alternatives discussed above by the Council and NMFS.

I will be happy to respond to any questions or comments on this conclusion, either at the meeting or afterward, and will keep the Council staff informed on GCF's response to it.

cc: GC - Jim Brennan
F/AKR12 - Jim Brooks
ADF&G - Guy Thornburgh
ADF&G - Fred Gaffney



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AN ANALYSIS OF SIZE LIMITATION FOR THE ALASKA RED KING CRAB

D.L. Alverson

October 1980

Funded by the North Pacific
Fishing Vessel Owners
Association and the Alaska
Marketing Association of
Seattle, Washington

Funding was also
supplied by
Ursin Seafoods Inc.

TABLE OF CONTENTS

	Page
List of Figures.....	i
List of Tables.....	ii
Acknowledgments.....	iii
Glossary of Terms Used.....	iv
<u>Introduction</u>	1
<u>Background</u>	2
<u>Data Sources</u>	5
<u>Growth and Decay of Red King Crab Cohorts</u>	14
<u>Yield Per Recruit Analysis</u>	21
<u>Yield Per Recruit and Current Fishing Practices</u>	35
<u>Spawner-Recruit Relationships and Reproductive Behavior</u> ...	39
<u>Operational Factors</u>	48
<u>Recommended Size Limit</u>	49
<u>Discussion and Conclusions</u>	51
Literature cited.....	56
Appendix.....	58

List of Figures

	Page
1. RELATIONSHIP OF CARAPACE LENGTH TO CARAPACE WIDTH, INCLUDING SPINES, AT DIFFERENT AGES FOR MALE RED KING CRAB--BRISTOL BAY.....	15
2. RELATIONSHIP OF CARAPACE LENGTH TO CARAPACE WIDTH, INCLUDING SPINES, AT DIFFERENT AGES FOR MALE RED KING CRAB--KODIAK ISLAND.....	16
3. RELATIONSHIP OF WEIGHT TO AGE FOR MALE RED KING CRAB--BRISTOL BAY.....	17
4. RELATIONSHIP OF WEIGHT TO AGE FOR MALE RED KING CRAB--KODIAK ISLAND.....	18
5. ACTUAL AVERAGE STOCK COMPOSITION (1970-79) OF RED KING CRAB IN THE BERING SEA.....	20
6. RED KING CRAB MALES--BRISTOL BAY MORTALITY SCHEDULE OF REEVES AND MARASCO.....	23
7. RED KING CRAB MALES--BRISTOL BAY $M=0.2$ FOR AGES 4-9..	24
8. RED KING CRAB MALES--BRISTOL BAY AVERAGE OF MORTALITY ESTIMATES.....	25
9. RED KING CRAB MALES--KODIAK ISLAND MORTALITY SCHEDULE. AGES 7-12, ELDRIDGE, OTHER AGES, REEVES AND MARASCO..	26
10. RED KING CRAB MALES--KODIAK ISLAND MORTALITY SCHEDULE. AGES 7-12, ELDRIDGE, OTHER AGES, BRISTOL BAY AVERAGE.	27
11. CHANGE IN COHORT'S BIOMASS AT GIVEN AGES AND DIAGRAMATIC ILLUSTRATION OF THE CHANGING FISHING STRATEGY REQUIRED TO MAXIMIZE YIELD-PER-RECRUIT WITH INCREASING FISHING EFFORT.....	29
12. YIELD PER RECRUITMENT FOR MALE RED KING CRAB IN THE SOUTHEASTERN BERING SEA.....	30
13. STUDY A. RED KING CRAB, BRISTOL BAY AVERAGE OF MORTALITY ESTIMATES.....	31
14. STUDY B. RED KING CRAB, BRISTOL BAY $M=0.2$ FOR AGES 4-9.....	32
15. STUDY A. RED KING CRAB, KODIAK ISLAND MORTALITY SCHEDULE. AGES 7-12, ELDRIDGE, OTHER AGES, BRISTOL BAY AVERAGE.....	33
16. STUDY B. RED KING CRAB, KODIAK ISLAND MORTALITY SCHEDULE. AGES 7-12, ELDRIDGE, OTHER AGES, REEVES AND MARASCO.....	34
17. COMPARISON OF GENERAL SPAWNER-RECRUIT RELATIONSHIPS--BERING SEA..	44

List of Tables

	Page
1. 1980-81 MAJOR STATE OF ALASKA REGULATIONS FOR KING... CRAB FISHING.....	3
2. RED KING CRAB MALES MORTALITY ESTIMATES FROM THE LITERATURE.....	8
3. AGE-SIZE DATA FOR RED KING CRAB, BRISTOL BAY.....	9
4. AGE-SIZE DATA FOR RED KING CRAB, KODIAK ISLAND.....	10
5. NEW SHELL MALE KING CRAB CARAPACE LENGTH-WIDTH-WEIGHT CONVERSION TABLE.....	11
6. RED KING CRAB MALES BIOMASS DISTRIBUTION (MILLIONS OF POUNDS).....	22
7. OPTIMAL AGE OF ENTRY FOR DIFFERENT FISHING RATES BASED ON FIVE YIELD PER RECRUIT (Y/R) STUDIES.....	36
8. OPTIMAL (INSTANTANEOUS) FISHING RATES FOR VARIOUS SIZE LIMITS BASED ON FIVE YIELD PER RECRUIT (Y/R) STUDIES.....	37
9. ESTIMATED YIELDS FOR 1980 BY MINIMUM SIZE LIMIT AND EXPLOITATION RATE.....	50

Acknowledgments

The study was initiated and funded by the North Pacific Fishing Vessel Owners Association and the Alaska Marketing Association headquartered in Seattle, Washington. The author is indebted to J.W. Balsiger, J.R. Reeves, T. Laevastu, D.E. Bevan, D.G. Chapman, R.A. Fredin and S. Jaeger for their critical suggestions and critical review of this report. The study was facilitated by information made available by the Alaska Department of Fish and Game and the National Marine Fisheries Service.

Glossary of Terms Used

- ABC--Allowable or acceptable biological catch that considers the current biological conditions of the resource or stock, as defined by the North Pacific Fishery Management Council.
- Age-specific mortality--the mortality rate occurring for a defined age or period.
- Biomass--Weight of biological material for specific age classes present.
- Cohort--A group of animals (crabs) which were all spawned during a particular time period, e.g., winter of 1970. Used here as a year class.
- Carapace length--measurement extending from eye socket to the mid-point of the posterior margin of carapace.
- Carapace width--(legal measure) straight line measurement across carapace at right angle to a line mid-way between the eyes to mid-point of the posterior margin of carapace including spines.
- Critical Age--Age at which a cohort will maximize its biomass.
- Density -dependent--A relationship between the density of the population or population size and other observed parameters of the population, e.g., a relationship between the number or spawners and the subsequent recruitment.
- Fishing mortality rate--the rate a population decreases as a result of fishery related deaths.
- Instantaneous mortality rate-- A rate used which allows easy recalculation of mortality rates for shorter or longer time periods. It is usually calculated as the number of deaths in a small time interval related to the number of fish present at that time. The instantaneous rate is equal to the natural logarithm (with the sign changed) of the complement of the annual (actual) mortality rate (Ricker, 1958).
- Maturation--Changes from adolescent into mature animals capable of reproduction.
- Maximum biomass of a year class or cohort--the maximum weight in time achieved by a group of animals (crabs) spawned during a particular time period or year.

Natural mortality rate-- the rate a population decreases as a result of factors other than fishing.

Optimum age of entry--The age of entry into a fishery which will maximize the harvest at a given fishing rate.

OY--Optimum yield as defined in the Fishery Conservation and Management Act of 1976.

Yield per recruit analysis--A study of the amount of biological material which can be produced using different exploitation rates and ages of entry into the fishery.

Introduction

In May 1980 the North Pacific Fishery Management Council issued a Draft Fishery Management Plan for Western Alaska King Crab.^{1/} The draft FMP, which will be released for public comment, provides information on the biological and environmental characteristics of king crab resources along with information on historical fishing and management activities. The proposed management regime is of particular interest to fishermen, processors and conservationists. In order to achieve the goals and objectives set out in the draft FMP, comprehensive sets of management measures including fishing seasons, size limits, sex restrictions, harvest quotas, registration areas and gear restrictions, are proposed under several options.

Natural Resources Consultants (NRC) was contacted in June 1980 by the North Pacific Fishing Vessel Owners Association and the Alaska Marketing Association and requested to review the draft FMP in terms of the data supporting size limits and to recommend a size limit based on the best scientific information available. The analyses in this report are based on information contained in the draft FMP and/or on referenced documents. The report consists of (1) a review of the biological information upon which a size limit might be based,

^{1/} Anonymous, May 1980. Western Alaska King Crab draft fishery management plan. Council review draft. North Pacific Fishery Management Council, Anchorage, Alaska, 92 p.

(2) an evaluation of the growth and decay of red king crab cohorts; (3) an analysis of yield-per-recruit relationships, (4) an examination of spawner/recruit relationships and reproduction behavior, and (5) a review of other biological information influencing size regulations. The report concludes with a suggested harvest and management strategy based on the information reviewed and vessel operating factors influencing cost and effect on the resource.

Background

The draft FMP notes (Sections 7.1, 7.2) that a variety of size limits have been imposed on foreign and domestic fishermen conducting king crab fisheries in the Gulf of Alaska and Bering Sea. In the early Bering Sea fishery (1955), Japanese fishermen adopted a "self-imposed" size limit of 5.1 inches.* The U.S. government subsequently (1965) imposed a minimum carapace width of 6.25 inches on the foreign fisheries in the eastern Bering Sea. Domestic regulations for king crab off Alaska began in 1941 with a minimum size limit of 5.5 inches. In 1950 the U.S. Bureau of Commercial Fisheries increased the size limit to 6.5 inches. Following statehood the Alaska Department of Fish and Game subsequently modified size limits for red king crab by establishing limits between 6.25 inches and 7.5 inches depending on the management areas and time of year that fishing occurred. Size limits imposed by areas for king crab are shown in Table 1.

*Presumably carapace width, including spines.

TABLE 1.

1980-81 MAJOR STATE OF ALASKA REGULATIONS FOR KING CRAB FISHING.

<u>Management Area</u>	<u>Minimum Size Limits (carapace width) and Seasons</u>
Kodiak	7" Sep 15 Nov 30 7½" Dec 1-Jan 15
Alaska Peninsula	6½" from Sep 10 until closed by emergency order. 7½" during periods opened by emergency order until Jan 15.
Dutch Harbor	6½" Nov 1-Feb 15. 7½" during periods opened and closed by emergency order.
Adak	6½" from Jan 15 until closed by emergency order.
Bristol Bay	6½" for red, brown, and blue crab Sep 10-Apr 15. 7" red, brown, and blue crab during periods opened and closed by emergency order.
Bering Sea	Pribilof district 6½" red, blue, and brown crab Sep 10-Apr 15. 7" red and brown crab during periods opened and closed by emergency order. Pribilof district 6½" blue crab Sep 15-May 31. Northern district: 4-3/4" red crab Jul 15-Sep 3. 5½" blue crab Jul 15-Sep 3.

Source: ADF&G Alaska Commercial Fishing Shellfish Regulations, 1979.

The biological bases for promulgating various size limits during early developmental stages of the fishery are not well documented but appear to have been based on "state of knowledge" concepts of the growth characteristics of the species by area, approximations of natural mortality rates, and behavior characteristics of the species. Current state regulations (Section 7.3 of the draft FMP) are stated to have been established to "...insure that fishing mortality is not allowed on a year class until that class approaches maximum biomass; i.e., until loss due to natural mortality within that year class approaches the growth rate." It is also explicit in the draft FMP that state size limits considered the desirability of retaining a sufficient number of male crabs of the appropriate size to meet reproductive needs. The draft FMP notes that historically size limits have generally been based on growth rates and that growth rates vary between areas; hence, different size limits may apply to various stocks.

In Section 10.3.2 of the draft FMP additional reasons given for establishing size limits are: size limits are generally established to ensure the reproductive integrity of a stock and size limits can be used to establish a minimum market size. There is no elaboration of what is meant by the term "reproductive integrity" of the stock but presumably it is consistent with the objective of providing an adequate number of males of the appropriate sizes to ensure fertilization of the mature

female population. Whether or not the genetic diversity was considered is not clear.

Although data is available on the growth features of certain red crab populations and on age-specific mortality rates, no published comprehensive study of the growth and decay of king crab year classes (cohorts) and yield per recruit information is available to support historical changes in size regulations. Some data are contained within the draft FMP although the options proposed are not specifically evaluated in terms of known growth, mortality and/or reproductive aspects of king crab species under exploitation. Reeves and Marasco (1980), however, consider these factors in a preliminary way in their more recent studies. Finally, size and growth data provided in the draft FMP are given in carapace length while proposed regulations are concerned with carapace width (including spines). Since neither conversion figures nor an equation relating length to width are provided, the reader cannot readily equate size limits to the biological data presented in the draft FMP.

Data Sources

Size limits are generally set to (1) minimize unnecessary losses of small, undesirable fish or shellfish (which may be a function of market demand), (2) maximize the yield from the available recruits, (3) protect reproductive elements of the population and (4) achieve economic efficiency. Data needed to

evaluate the biological bases for setting size limits include an understanding of the growth characteristics of the individuals within a population(s), natural mortality rates (preferably age-specific data), levels of fishing mortality, maturation schedules and reproductive behavior and stock-recruitment relationships.

Although the draft FMP does not contain an analysis to support historical or proposed management options for red king crab, it does provide references and information upon which such an evaluation can be undertaken. The draft FMP also refers to sources which contain more complete information on age and growth, natural mortality and maturation rates, and preliminary analyses of size regulations. The specific information contained within the draft FMP and utilized in this study includes:

1. Growth curve for southeastern Bering Sea immature king crab (Balsiger, 1974).
2. Growth curve used in simulation studies for adult male and female red king crab in the southeastern Bering Sea (Reeves and Marasco, 1980).
3. Growth simulation of individual king crab carapace lengths taken from the Kodiak Island area (McCaughran and Powell, 1977).
4. Age-specific population parameters used in king crab simulations (Reeves and Marasco, 1980).
5. Yield per recruitment for male red king crab in the southeastern Bering Sea.

Natural mortality values used are based on the works of a number of scientists as taken from the literature (Table 2). Estimates of natural mortality in the literature are given as a function of size. Age-specific mortality given in this report correspond to the available data on size-specific mortality. Slight differences in age and growth relationships occur in this analysis compared to that reported by Reeves and Marasco (1980). In the Reeves and Marasco (1980) study the equation for length at age set the parameter "t sub zero" at zero (see table 3 & 4 for equations). The current analyses uses the actual filtered estimates and hence should be more accurate. The differences, however, are small and make little difference in the final selection of an appropriate size limit.^{1/}

Age-size data for red king crab for Bristol Bay and Kodiak Island are given in Tables 3 and 4. These values are based on data contained in Reeves and Marasco (1980), the draft FMP and on material referenced at the end of this report. It is not new information, but a consolidation of published data. The conversion of length information to carapace width, including spines, which is the measurement used in size regulations, was difficult because of a lack of specificity in the referenced reports. In order to minimize disagreement over conversion factors, the conclusions reached in this report are based on data for the Kodiak length-width relationship used by ADF&G (Table 5). The latter differs slightly from our tables but is accepted as the most current information available

^{1/} Various age-weight relationships have been developed and are in use. The data in this report show weights that are slightly less during the earlier years than reported in ADF&G studies. The age-weight relationship used leads to a more conservative conclusion in terms of the size limit. Faster growth at age 3-7 will shift the critical age to a younger age.

TABLE 2
 RED KING CRAB MALES
 NATURAL MORTALITY (INSTANTANEOUS) ESTIMATES FROM THE LITERATURE

BRISTOL BAY STOCK

AGE	REEVES ^ MARASCO(1980)	BALSIGER(1974) 1954-61*1966-68*	HIRSHHORN (1966)	CLEAVER (1963)	AVERAGE OF FIRST FOUR
4		.61	.05		.33
5	.13	.43	.13		.23
6	.12	.56	.12		.27
7	.08	.34	.08		.17
8	.08	.10	.08	.06	.08
9	.11	.24	.15	.11	.15
10	.23	.28	.30	.23	.26
11	.50	.57	.66	.32	.51
12	.57	.93	.73	.55	.70
13	.61	.63	.78	.61	.66
14	.76	1.61	.98	.49	.96

KODIAK ISLAND STOCK

AGE	ELDRIDGE(1975) AVERAGE RANGE	
4		
5		
6		
7	.21	.08-.33
8	.29	.22-.35
9	.26	.18-.34
10	.35	.25-.44
11	.42	.33-.50
12	.42	.33-.50
13		
14		

*BALSIGER ANALYZED DATA FROM TWO DIFFERENT TAGGING EXPERIMENTS

TABLE 3.

AGE-SIZE DATA FOR RED KING CRAB,
BRISTOL BAY

AGE (T)	PREDICTED		WEIGHT	
	CARAPACE LENGTH (MM)	WIDTH	KG	LBS
1	10	13	.00	.00
2	38	48	.04	.08
3	62	77	.17	.36
4	82	102	.40	.88
5	99	123	.73	1.60
6	113	141	1.11	2.45
7	125	156	1.53	3.37
8	135	169	1.96	4.31
9	144	180	2.38	5.23
10	151	189	2.78	6.11
11	157	196	3.15	6.92
12	162	203	3.48	7.66
13	167	208	3.78	8.33
14	170	213	4.05	8.92

*
 LENGTH = LINFL(1-EXP(-K(T-TSUBO)))
 LINFL = 190

K = .17
 TSUBO = .68

WT(KG) = A*LENGTH**B
 A = .0000003610
 B = 3.16000

WIDTH = BB*LENGTH
 BB = 1.249

TABLE 4.

AGE-SIZE DATA FOR RED KING CPAB,
KUDIAK ISLAND

*

AGE (T)	PREDICTED CARAPACE		WEIGHT	
	LENGTH (MM)	WIDTH	KG	LBS
1	7	9	.00	.00
2	37	47	.03	.08
3	63	79	.18	.40
4	84	107	.47	1.03
5	103	130	.89	1.95
6	120	151	1.40	3.09
7	134	167	1.99	4.37
8	146	184	2.61	5.74
9	156	197	3.24	7.13
10	165	208	3.86	8.49
11	173	218	4.46	9.80
12	179	226	5.02	11.03
13	185	233	5.53	12.18
14	190	239	6.01	13.22

*
LENGTH = $LINF(1 - \exp(-K(T - TSURO)))$
LINF = .220
K = .15
TSURO = .77

WT(KG) = $A * LENGTH^{**}B$
A = .0000003960
B = 3.15210

WIDTH = $BB * LENGTH$
BB = 1.262

TABLE 5.

NEW SHELL MALE KING CRAB CARAPACE LENGTH-WIDTH-WEIGHT
 CONVERSION TABLE (SOURCE ADF&G)

LENGTH (MM)	OUTSIDE SPINE WIDTH (MM)	WIDTH (MM)	WEIGHT (G)	WEIGHT (LN)
51	65.383	2.574	91.774	0.202
52	66.581	2.621	97.526	0.215
53	67.779	2.668	103.512	0.228
54	68.977	2.715	109.757	0.242
55	70.175	2.763	116.246	0.255
56	71.373	2.810	122.992	0.271
57	72.571	2.857	130.000	0.287
58	73.769	2.904	137.274	0.303
59	74.967	2.951	144.820	0.319
60	76.165	2.997	152.641	0.337
61	77.363	3.044	160.741	0.354
62	78.561	3.092	169.114	0.372
63	79.759	3.140	177.869	0.390
64	80.957	3.187	186.929	0.412
65	82.155	3.234	196.213	0.432
66	83.353	3.282	205.714	0.452
67	84.551	3.329	215.450	0.472
68	85.749	3.376	225.427	0.498
69	86.947	3.423	235.647	0.521
70	88.145	3.470	247.203	0.545
71	89.343	3.517	258.993	0.570
72	90.541	3.565	270.128	0.592
73	91.739	3.612	282.045	0.622
74	92.937	3.659	294.818	0.649
75	94.135	3.706	308.450	0.677
76	95.333	3.753	319.948	0.705
77	96.531	3.800	333.310	0.735
78	97.729	3.848	347.050	0.765
79	98.927	3.895	351.170	0.795
80	100.125	3.942	375.676	0.838
81	101.323	3.989	390.574	0.861
82	102.521	4.036	405.867	0.895
83	103.719	4.083	421.567	0.929
84	104.917	4.131	437.672	0.965
85	106.115	4.178	454.192	1.001
86	107.313	4.225	471.130	1.037
87	108.511	4.272	488.474	1.077
88	109.709	4.319	506.200	1.114
89	110.907	4.365	524.518	1.156
90	112.105	4.414	543.190	1.198
91	113.303	4.461	562.509	1.240
92	114.501	4.509	581.601	1.283
93	115.699	4.555	601.912	1.327
94	116.897	4.602	622.407	1.372
95	118.095	4.649	643.372	1.419
96	119.293	4.697	664.812	1.466
97	120.491	4.744	686.733	1.514
98	121.689	4.791	709.141	1.564
99	122.887	4.838	732.042	1.614
100	124.085	4.885	755.441	1.665
101	125.283	4.932	779.342	1.718
102	126.481	4.980	803.743	1.772
103	127.679	5.027	828.693	1.827
104	128.877	5.074	854.132	1.883
105	130.075	5.121	880.107	1.940
106	131.273	5.169	906.615	1.997
107	132.471	5.215	933.661	2.056
108	133.669	5.263	961.251	2.119
109	134.867	5.310	989.371	2.181
110	136.065	5.357	1018.005	2.254

TABLE 5. (continued)

LENGTH (IN)	OUTSIDE SPINE WIDTH		WEIGHT	
	(MM)	(IN)	(G)	(LB)
111	137.263	5.404	1047.342	2.309
112	138.461	5.451	1077.165	2.375
113	139.659	5.498	1107.561	2.442
114	140.857	5.546	1138.536	2.510
115	142.055	5.593	1170.095	2.580
116	143.253	5.640	1202.244	2.650
117	144.451	5.687	1234.989	2.723
118	145.649	5.734	1268.336	2.796
119	146.847	5.781	1302.290	2.871
120	148.045	5.827	1336.858	2.947
121	149.243	5.874	1372.045	3.025
122	150.441	5.923	1407.857	3.104
123	151.639	5.970	1444.300	3.184
124	152.837	6.017	1481.379	3.264
125	154.035	6.064	1519.102	3.349
126	155.233	6.112	1557.472	3.434
127	156.431	6.159	1596.498	3.520
128	157.629	6.206	1636.183	3.607
129	158.827	6.253	1676.525	3.694
130	160.025	6.300	1717.558	3.787
131	161.223	6.347	1759.259	3.878
132	162.421	6.395	1801.645	3.972
133	163.619	6.442	1844.719	4.067
134	164.817	6.489	1888.490	4.163
135	166.015	6.536	1932.962	4.251
136	167.213	6.583	1978.141	4.341
137	168.411	6.630	2024.034	4.432
138	169.609	6.678	2070.646	4.525
139	170.807	6.725	2117.983	4.619
140	172.005	6.772	2166.052	4.715
141	173.203	6.819	2214.857	4.813
142	174.401	6.866	2264.406	4.912
143	175.599	6.913	2314.703	5.103
144	176.797	6.960	2365.756	5.216
145	177.995	7.008	2417.570	5.330
146	179.193	7.055	2470.150	5.446
147	180.391	7.102	2523.504	5.563
148	181.589	7.149	2577.637	5.683
149	182.787	7.196	2632.554	5.804
150	183.985	7.243	2688.262	5.927
151	185.183	7.291	2744.768	6.051
152	186.381	7.338	2802.076	6.177
153	187.579	7.385	2860.193	6.306
154	188.777	7.432	2919.125	6.436
155	189.975	7.479	2978.878	6.567
156	191.173	7.526	3039.458	6.701
157	192.371	7.574	3000.872	6.836
158	193.569	7.621	3063.124	6.973
159	194.767	7.668	3226.222	7.113
160	195.965	7.715	3290.170	7.254
161	197.163	7.762	3354.976	7.396
162	198.361	7.809	3420.645	7.541
163	199.559	7.857	3487.184	7.688
164	200.757	7.904	3554.598	7.836
165	201.955	7.951	3622.894	7.987
166	203.153	7.998	3692.077	8.140
67	204.351	8.045	3762.154	8.294
68	205.549	8.092	3833.130	8.451
69	206.747	8.140	3903.013	8.609
70	207.945	8.187	3977.807	8.774

TABLE 5. (continued)

LENGTH (MM)	OUTSIDE SPINE WIDTH (MM)	OUTSIDE SPINE WIDTH (IN)	WEIGHT (G)	WEIGHT (LB)
171	209.143	8.234	4051.520	8.932
172	210.341	8.281	4126.157	9.077
173	211.539	8.328	4201.794	9.263
174	212.737	8.375	4278.227	9.432
175	213.935	8.423	4355.673	9.603
176	215.133	8.470	4434.068	9.775
177	216.331	8.517	4513.417	9.950
178	217.529	8.564	4593.727	10.127
179	218.727	8.611	4675.005	10.307
180	219.925	8.658	4757.255	10.488
181	221.123	8.706	4840.485	10.671
182	222.321	8.753	4924.701	10.857
183	223.519	8.800	5009.908	11.045
184	224.717	8.847	5096.113	11.235
185	225.915	8.894	5183.322	11.427
186	227.113	8.941	5271.541	11.622
187	228.311	8.989	5360.776	11.818
188	229.509	9.036	5451.034	12.017
189	230.707	9.083	5542.321	12.217
190	231.905	9.130	5634.643	12.422
191	233.103	9.177	5728.005	12.628
192	234.301	9.224	5822.415	12.836
193	235.499	9.272	5917.879	13.047
194	236.697	9.319	6014.402	13.259
195	237.895	9.366	6111.991	13.474
196	239.093	9.413	6210.652	13.692
197	240.291	9.460	6310.392	13.912
198	241.489	9.507	6411.216	14.134
199	242.687	9.555	6513.131	14.359
200	243.885	9.602	6616.143	14.586
201	245.083	9.649	6720.258	14.815
202	246.281	9.696	6825.482	15.047
203	247.479	9.743	6931.823	15.282
204	248.677	9.790	7039.285	15.519
205	249.875	9.838	7147.876	15.758
206	251.073	9.885	7257.601	16.000
207	252.271	9.932	7368.467	16.245
208	253.469	9.979	7480.479	16.491
209	254.667	10.026	7593.645	16.741
210	255.865	10.073	7707.971	16.993
211	257.063	10.121	7823.463	17.248
212	258.261	10.168	7940.126	17.505
213	259.459	10.215	8057.960	17.765
214	260.657	10.262	8176.975	18.027
215	261.855	10.309	8297.212	18.292
216	263.053	10.356	8418.627	18.560
217	264.251	10.404	8541.245	18.830
218	265.449	10.451	8665.072	19.103
219	266.647	10.498	8790.119	19.379
220	267.845	10.545	8916.385	19.657

upon which to relate length-width information to size regulations.

Figures 1 and 2 are presented to provide the reader graphic relationships to convert carapace length data to approximate carapace width, including spines (legal measure) for any age. The values are in metric units on the left side of the figures and in inches on the right. The relationship of weight to age for these areas is given in Figures 3 and 4.

Growth and Decay of Red King Crab Cohorts

The draft FMP (Section 7.3) as previously noted states that current regulations are designed to ensure that fishing mortality is not allowed on a year class until that class approaches maximum biomass. The goal as stated is somewhat confusing and at odds with the commonly held view that maximizing yields from a cohort generally requires (depending on the fishing mortality imposed) that fishing be initiated on a year class substantially before the year class maximizes its biomass. How long before depends on the fishing mortality imposed.

In order to properly interpret the consequence of size regulations, it is necessary to examine the growth and decay of year classes represented in the exploited populations. The specific information required to analyze potential distribution of biomass with age includes age-specific growth vs. natural

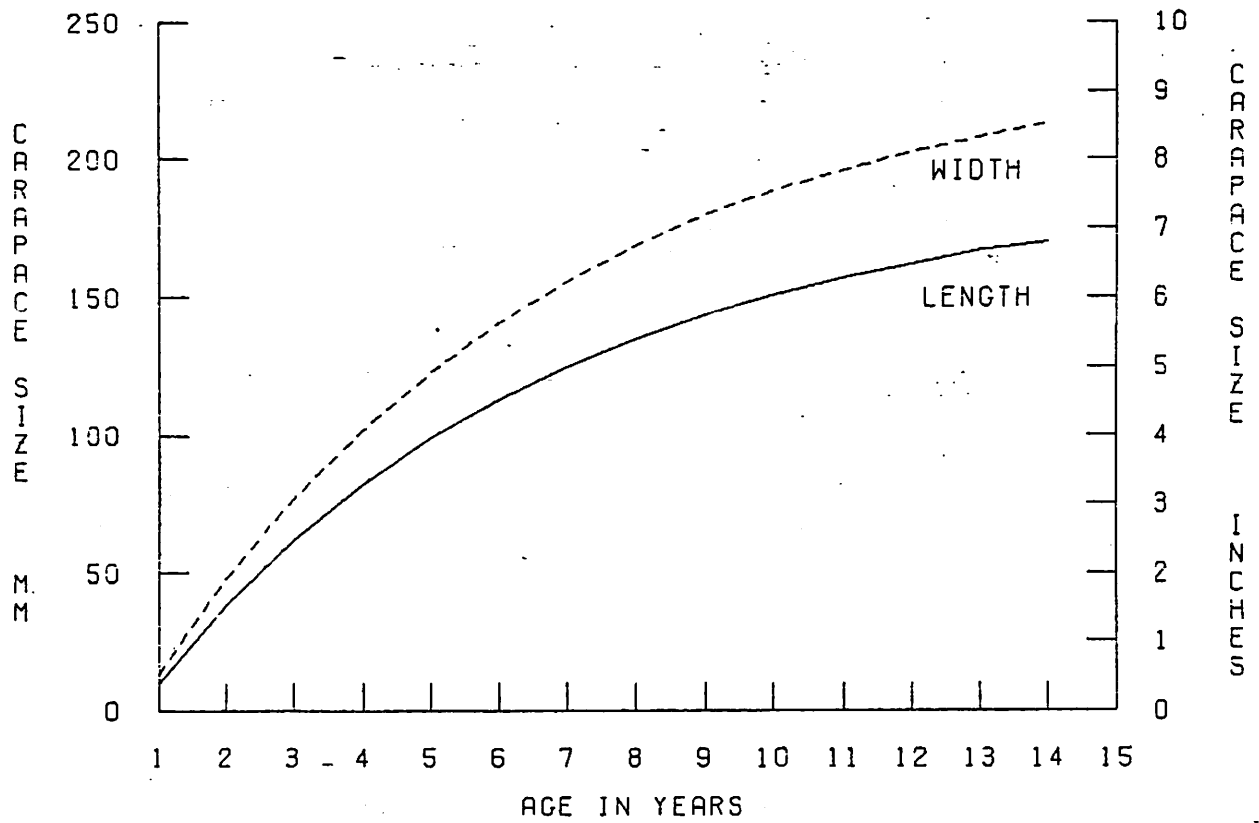


FIGURE 1. RELATIONSHIP OF CARAPACE LENGTH TO CARAPACE WIDTH, INCLUDING SPINES, AT DIFFERENT AGES FOR MALE RED KING CRAB--BRISTOL BAY

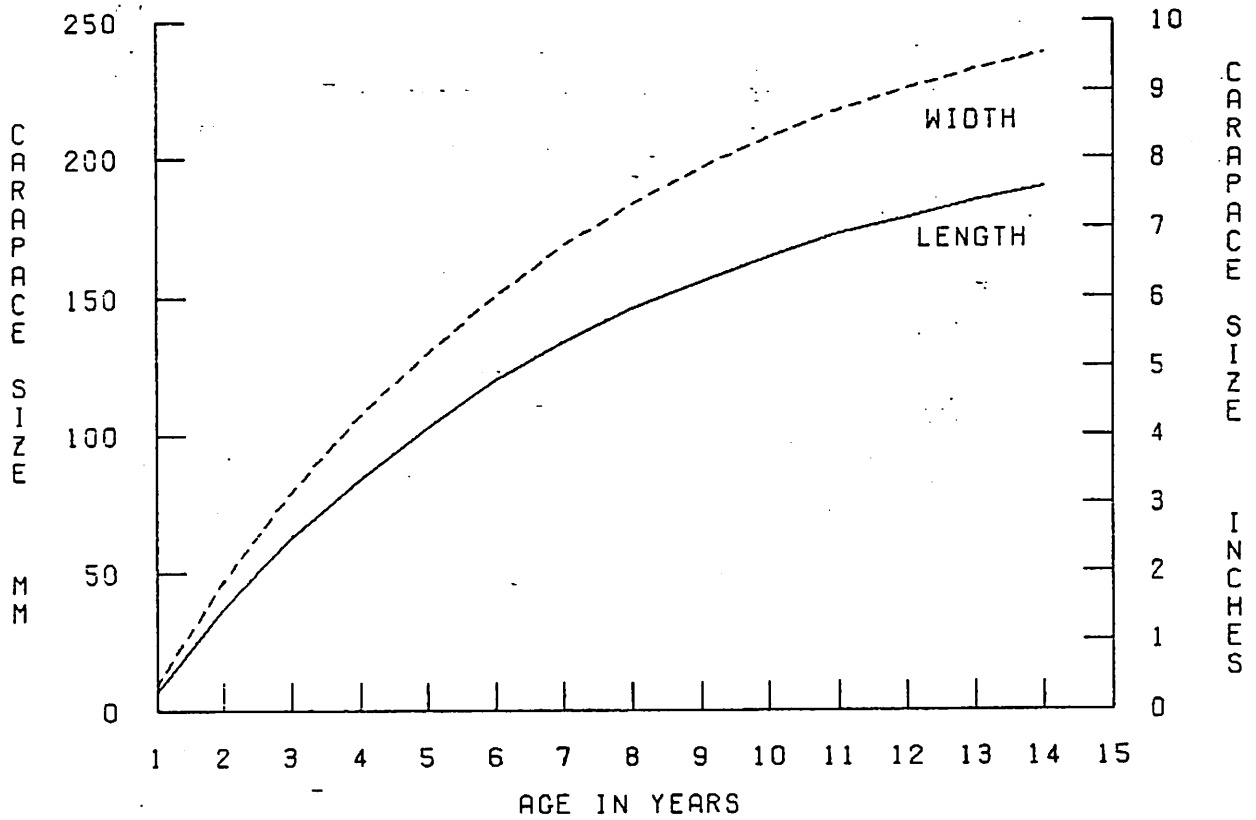


FIGURE 2. RELATIONSHIP OF CARAPACE LENGTH TO CARAPACE WIDTH, INCLUDING SPINES, AT DIFFERENT AGES FOR MALE RED KING CRAB-- KODIAK ISLAND.

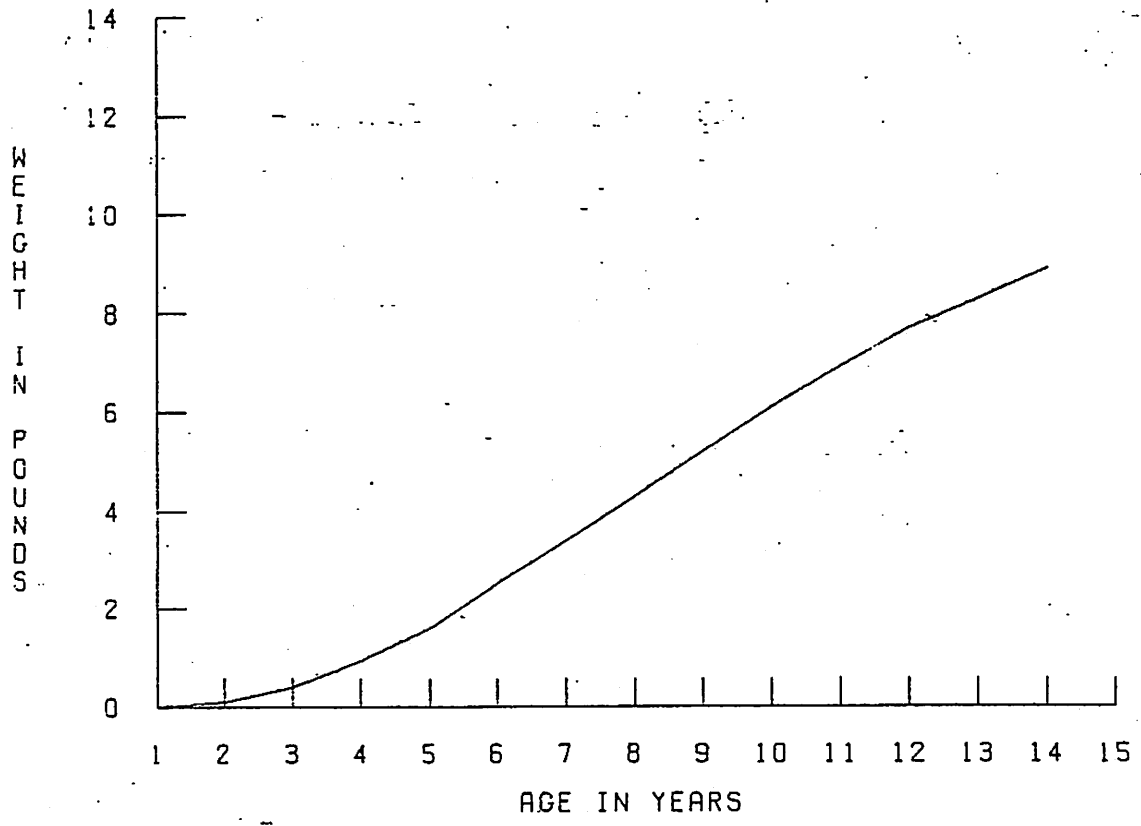


FIGURE 3. RELATIONSHIP OF WEIGHT TO AGE FOR MALE RED KING CRAB--BRISTOL BAY

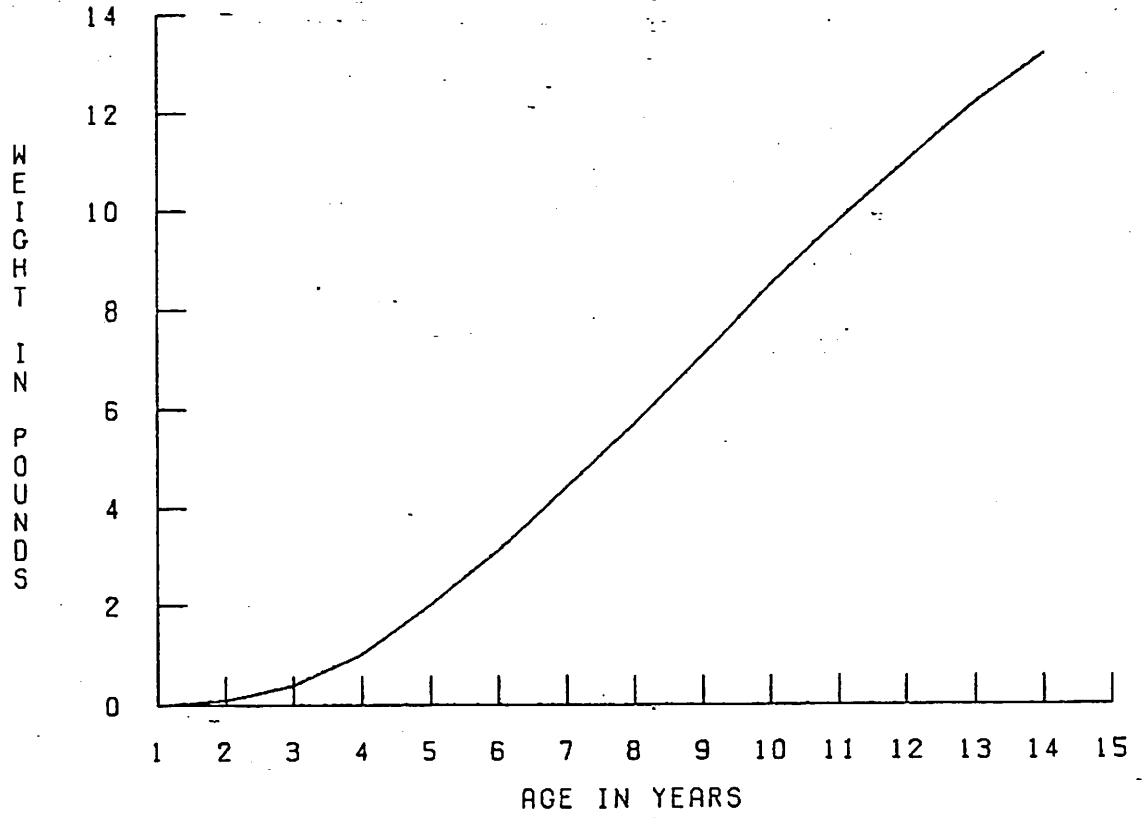


FIGURE 4. RELATIONSHIP OF WEIGHT TO AGE FOR MALE RED KING CRAB--KODIAK ISLAND

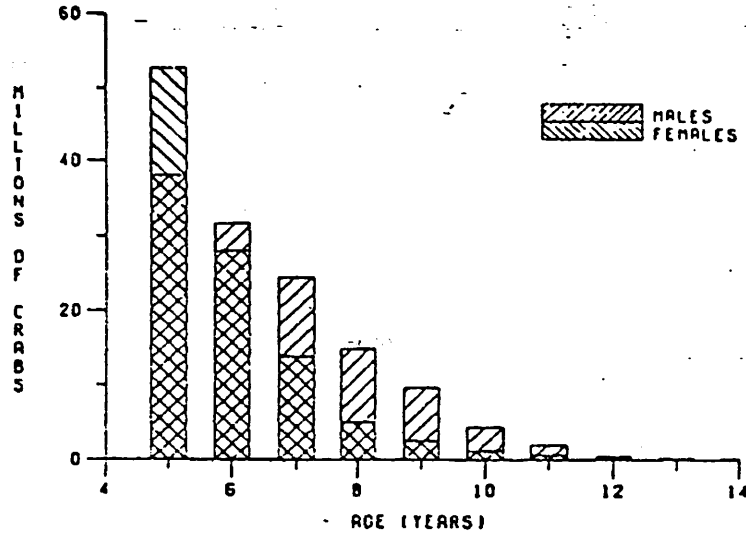
mortality characteristics. A variety of natural mortality coefficients have been suggested by various authors (Table 2) for red king crab in the Bering Sea and it is difficult to select among them. The most recent work of Reeves and Marasco (1980) provides age specific mortality rates (ages 9-14) which are similar to but slightly lower than those proposed by Hirshhorn (1966) and Balsiger (1974). Relatively low natural mortality values, however, are given for ages 5 through 9, which appear at odds with those reported by Balsiger (1974) for the 1954-61 period although similar to his 1966-68 results. The works of Eldridge (1975) and the data (Figure 5) for actual average stock composition (Reeves and Marasco, 1980) imply the mortality rates for ages 5-10 are somewhat higher than those reported by the latter authors.

Clarification of the specific mortality rates at younger ages will be an important factor in formulating future concepts of appropriate size limits.

In this study three mortality schedules were employed to examine the distribution of biomass with age for Bering Sea red king crab; (a) Reeves and Marasco (1980), (b) Reeves and Marasco (1980) except that an instantaneous mortality rate of 0.2 was used for ages 4 through 9 and (c) the average of the mortality estimates found in the literature (Table 2). For the Kodiak area the natural mortality rates proposed by Eldridge (1975) were used for ages 7-12 while Reeves and

FIGURE 5.

ACTUAL AVERAGE STOCK COMPOSITION (1970-79) OF RED KING CRAB IN THE BERING SEA (SOURCE: REEVES AND MARASCO, 1980)



Marasco (1980) rates and Bristol Bay average mortality rates were used for other ages. These data were related to age and weight data given in Tables 3 and 4.

The distribution of biomass using these data for one million entering recruits at age 4 is given in Table 6. The changes in biomass at age 4 and older are given for each mortality schedule in the right hand columns.¹⁾ For the three mortality schedules used for Bering Sea red king crab the biomass increases until ages 9, 7 and 9, respectively. For the Kodiak area the biomass of a cohort would increase to age 7 under both mortality schedules. Beyond the ages noted above, no further increase in biomass occurs.

The change in biomass by age for the five mortality schedules and two areas selected are shown in Figures 6 through 10. For the Bering Sea area the critical age (age of maximum cohort biomass) occurs between ages 9 and 10 using the Reeves and Marasco (1980) mortality schedule and the average of Bering Sea mortality rates. The critical age falls between 7 and 8 when using a 0.2 instantaneous age-specific mortality rate for ages 5 through 9. In the Kodiak area the critical age occurs between age 7 and 8 under both mortality schedules.

Yield Per Recruit Analysis

The yield per recruit analysis is based on an understanding of growth, natural mortality and fishing mortality. These parameters were evaluated to determine the appropriate age of

¹⁾ Although rounding converts values to zero small changes in biomass still occur.

TABLE 6.

RED KING CRAB MALES

BIGMASS DISTRIBUTION (MILLIONS OF POUNDS)

BRISTOL BAY STOCK

AGE	DISTRIBUTION MORTALITY SCHEDULE			CHANGE MORTALITY SCHEDULE		
	1	2	3	1	2	3
4	.88	.88	.88	0	0	0
5	1.58	1.31	1.15	.50	.43	.27
6	1.65	1.64	1.40	.47	.33	.25
7	2.26	1.85	1.47	.41	.21	.07
8	2.67	1.94	1.59	.41	0	.12
9	2.99	1.92	1.78	.32	-.02	.19
10	3.13	1.84	1.79	0	-.08	0
11	2.81	1.66	1.56	-.32	-.18	-.23
12	1.89	1.11	1.04	-.92	-.55	-.52
13	1.16	.68	.56	-.73	-.43	-.48
14	.68	.40	.31	-.48	-.28	-.25

KODIAK ISLAND STOCK

AGE	DISTRIBUTION MORTALITY SCHEDULE		CHANGE MORTALITY SCHEDULE	
	4	5	4	5
4	1.03	1.03	0	0
5	1.68	1.40	.65	.37
6	2.34	1.77	.66	.37
7	2.93	1.91	.59	.14
8	3.12	2.03	0	0
9	2.90	1.89	-.22	-.14
10	2.66	1.73	-.24	-.16
11	2.16	1.41	-.50	-.32
12	1.60	1.04	-.56	-.37
13	1.16	.75	-.44	-.29
14	.69	.42	-.47	-.33

MORTALITY SCHEDULES:

- 1- REEVES AND MARASCO(1980)
- 2- REEVES AND MARASCO, EXCEPT M=.2 FOR AGES 4-9
- 3- AVERAGE OF MORTALITY ESTIMATES IN LITERATURE
- 4- AGES 7-12 ELDRIDGE(1975), OTHER AGES REEVES AND MARASCO
- 5- AGES 7-12 ELDRIDGE(1975), OTHER AGES BRISTOL BAY AVERAGE

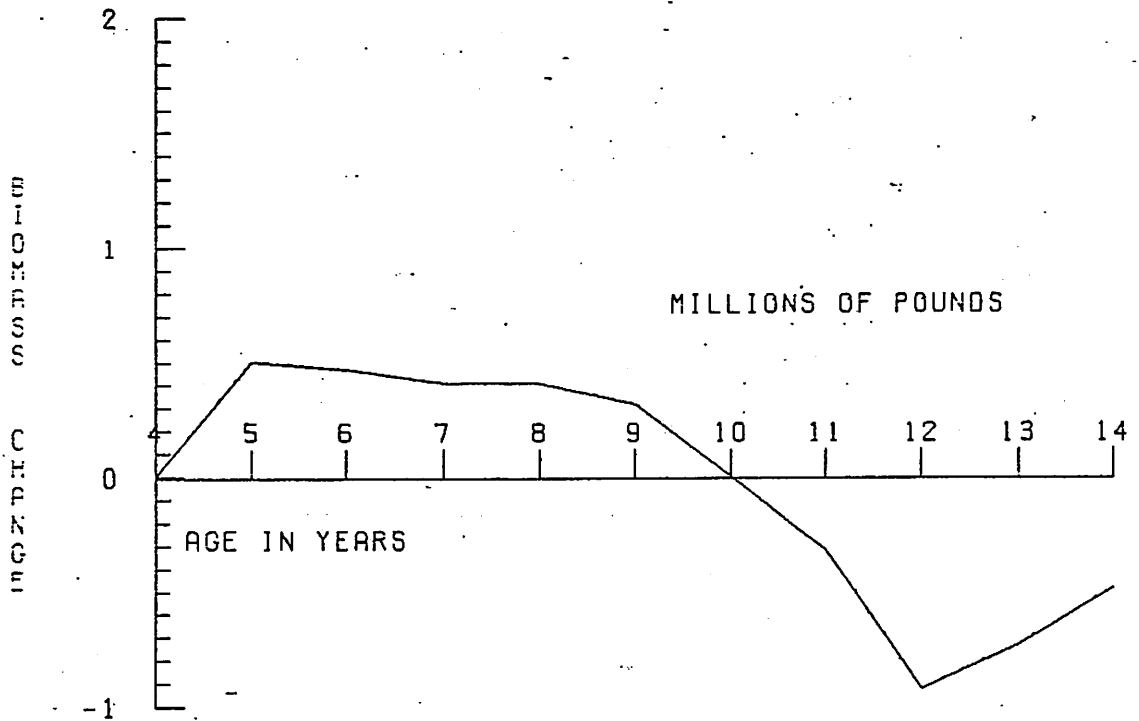


FIGURE 6. RED KING CRAB MALES--BRISTOL BAY
MORTALITY SCHEDULE OF REEVES AND MARASCO

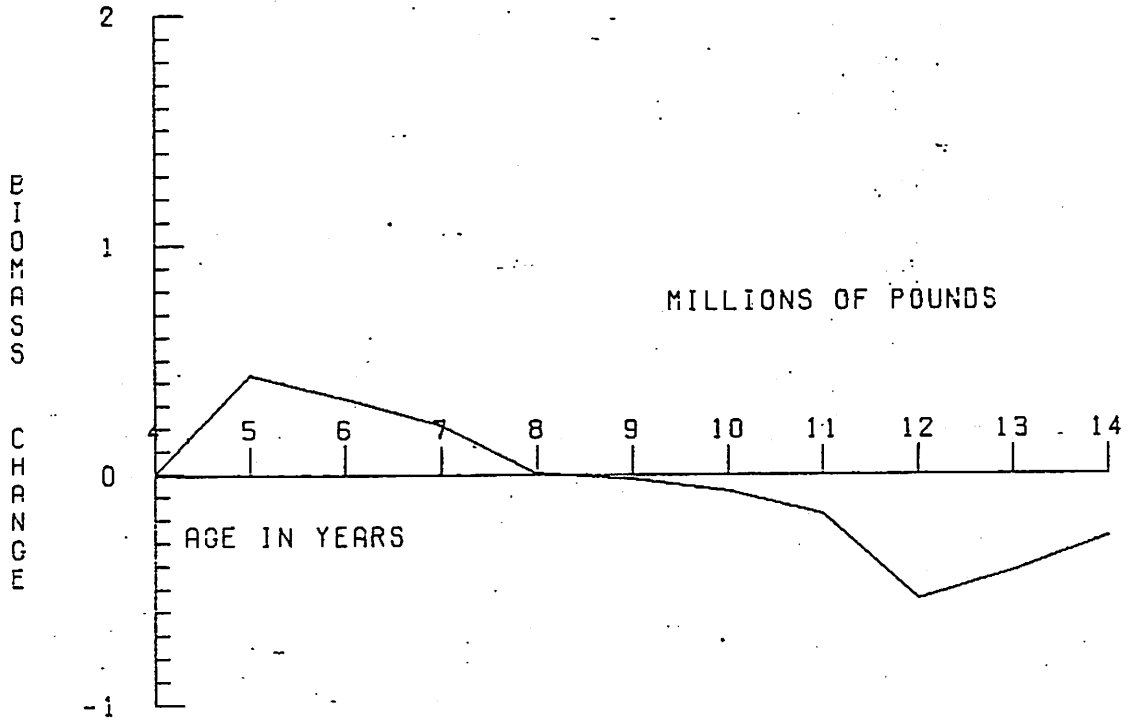


FIGURE 7. RED KING CRAB MALES--BRISTOL BAY
M = 0.2 FOR AGES 4-9

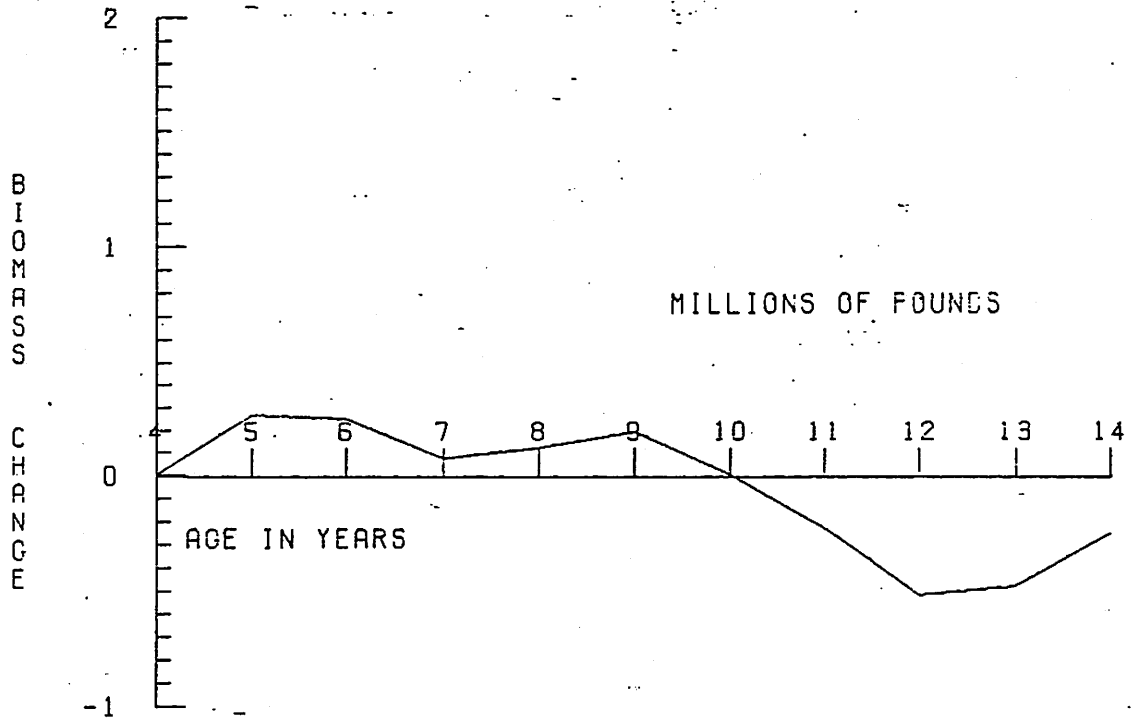


FIGURE 8. RED KING CRAB MALES--BRISTOL BAY
AVERAGE OF MORTALITY ESTIMATES

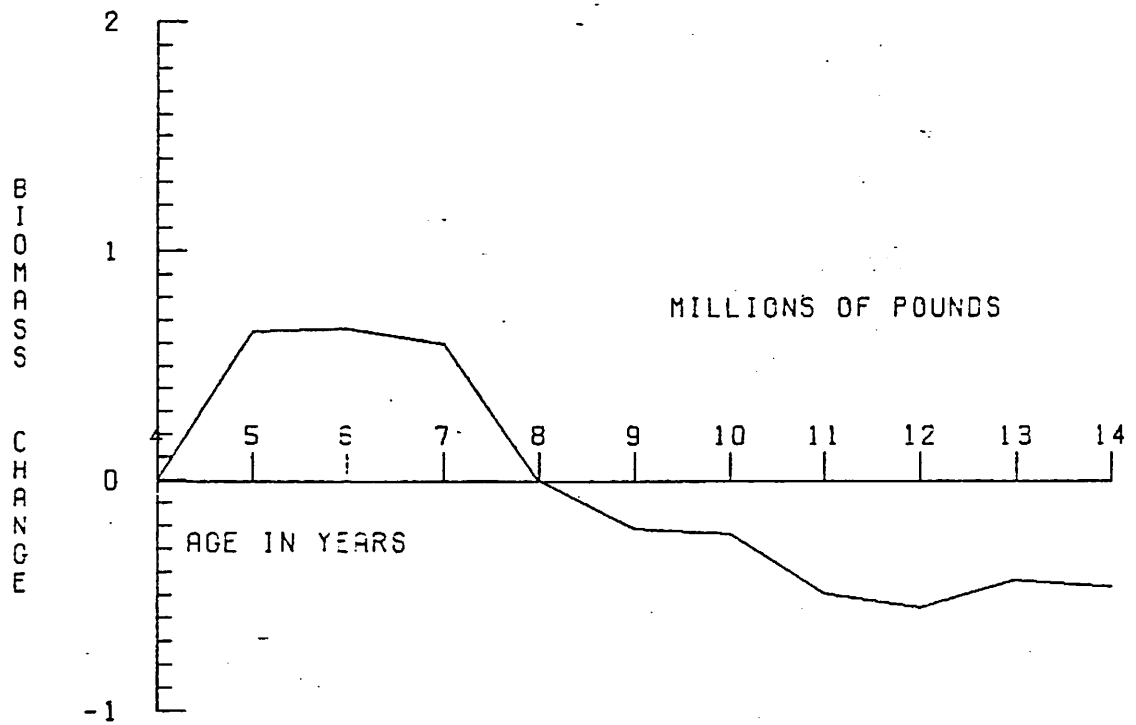


FIGURE 9. RED KING CRAB MALES--KODIAK ISLAND MORTALITY SCHEDULES. AGES 7-12, ELDRIDGE, OTHER AGES, REEVES AND MARASCO

FIGURE 10.

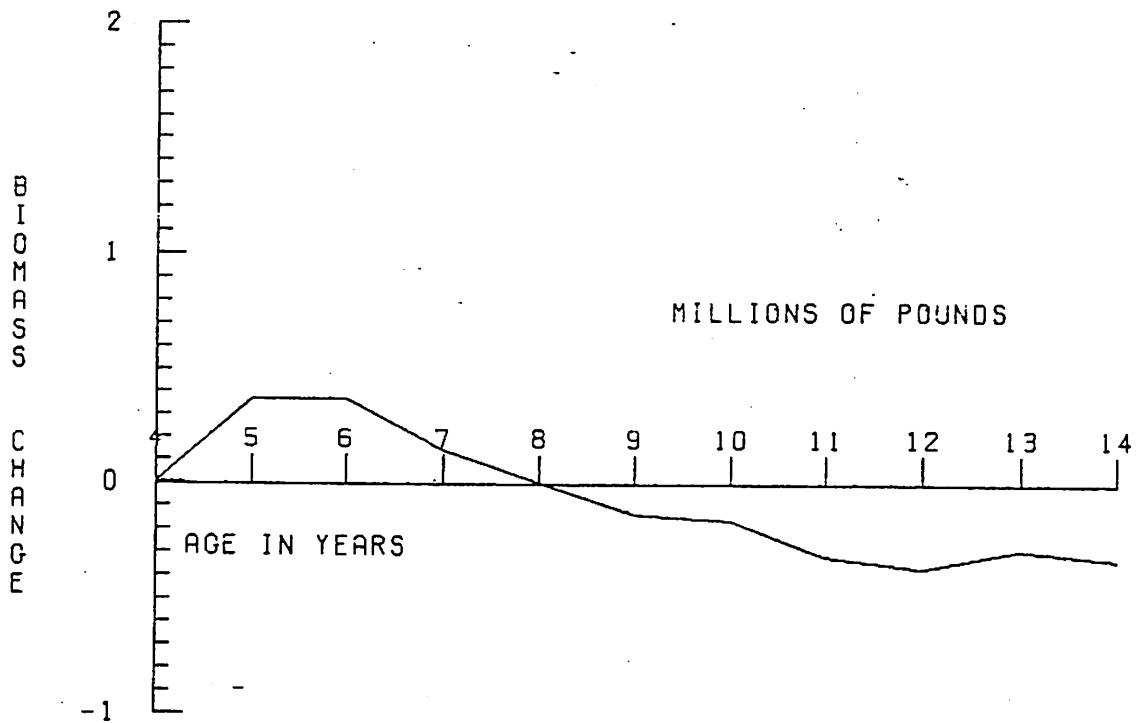


FIGURE 10. RED KING CRAB MALES--KODIAK ISLAND MORTALITY SCHEDULE. AGES 7-12, ELDRIDGE, OTHER AGES, BRISTOL BAY AVERAGE

entry (size limit) which will maximize the yield from a given number of recruits. Alverson and Carny (1975) note that the lower the fishing mortality the earlier fishing must commence in order to maximize the potential harvest. At relatively low fishing rates fishing must commence several years before the critical age to maximize potential yield (Figure 11).

Reeves and Marasco (1980) have calculated such a relationship for red king crab in the Bering Sea using their mortality schedule (Figure 12). For each fishing mortality an appropriate age of entry can be determined on the vertical axis which will maximize the yield per recruit, e.g., for a fishing mortality of .4 an age of entry of about 6.3 years is desirable. The Reeves and Marasco (1980) analysis, however, does not provide an understanding of the potential loss of yield when size limits or fishing rates other than those required to maximize yield are selected.

To explore this relationship a series of graphs showing expected yield at any age of entry and instantaneous fishing mortality were plotted. Results of this analysis for two selected mortality schedules for both the Bristol Bay and Kodiak area are given in Figures 13 through 16. The solid line in each figure shows the maximum possible yield per recruit at various ages of entry and fishing mortalities. The dotted lines show yields at ages of entry and fishing mortality that are less than maximum. For the Bering Sea (Bristol Bay) we have chosen to use the average

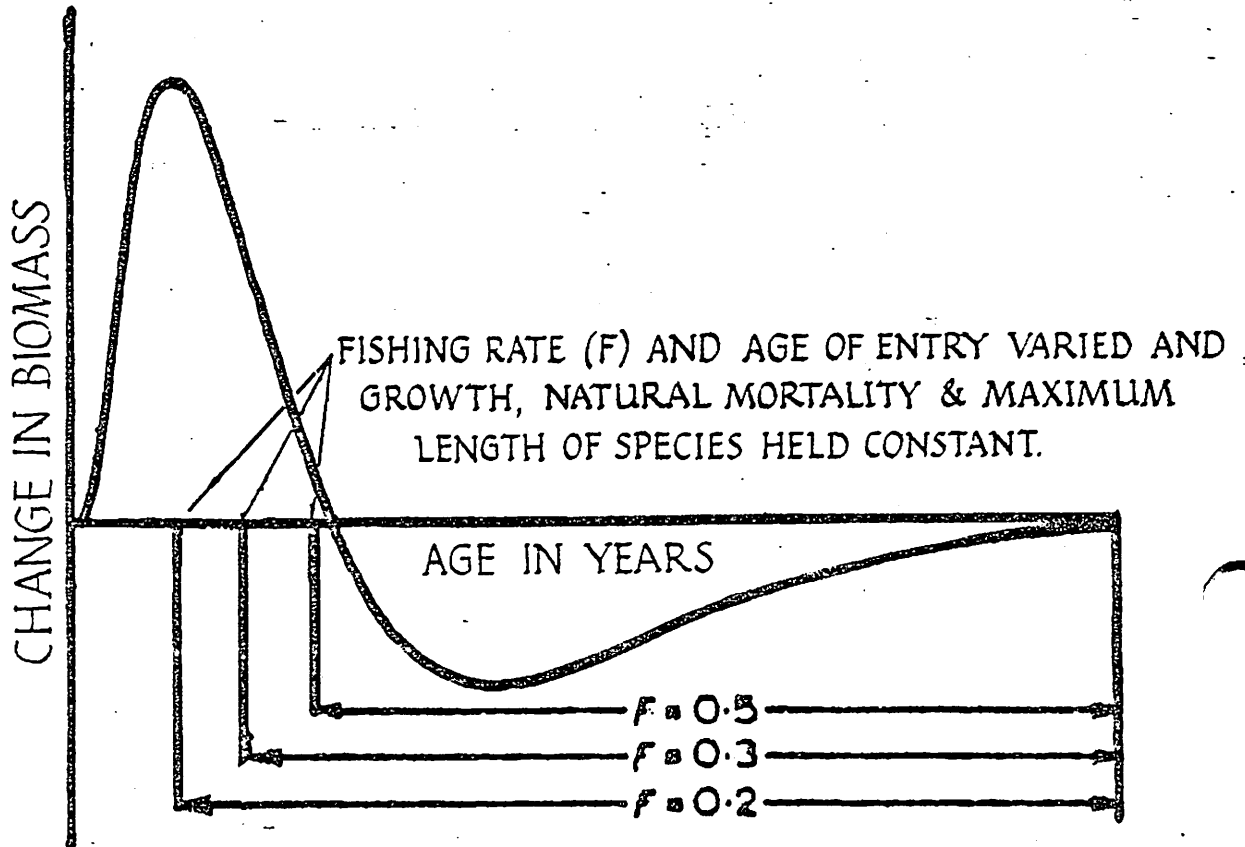


FIGURE 11. CHANGE IN COHORT'S BIOMASS AT GIVEN AGES AND DIAGRAMATIC ILLUSTRATION OF THE CHANGING FISHING STRATEGY REQUIRED TO MAXIMIZE YIELD-PER-RECRUIT WITH INCREASING FISHING EFFORT

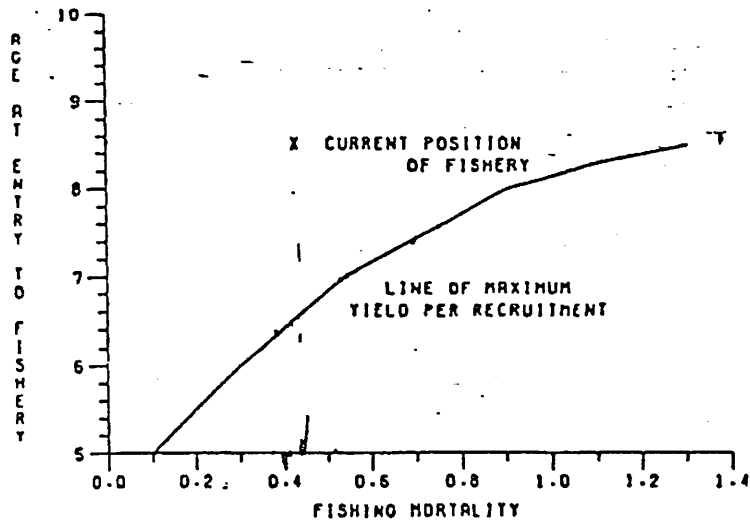


FIGURE-12. YIELD PER RECRUITMENT FOR MALE RED KING CRAB IN THE SOUTHEASTERN BERING SEA. (SOURCE: REEVES AND MARASCO, 1980)

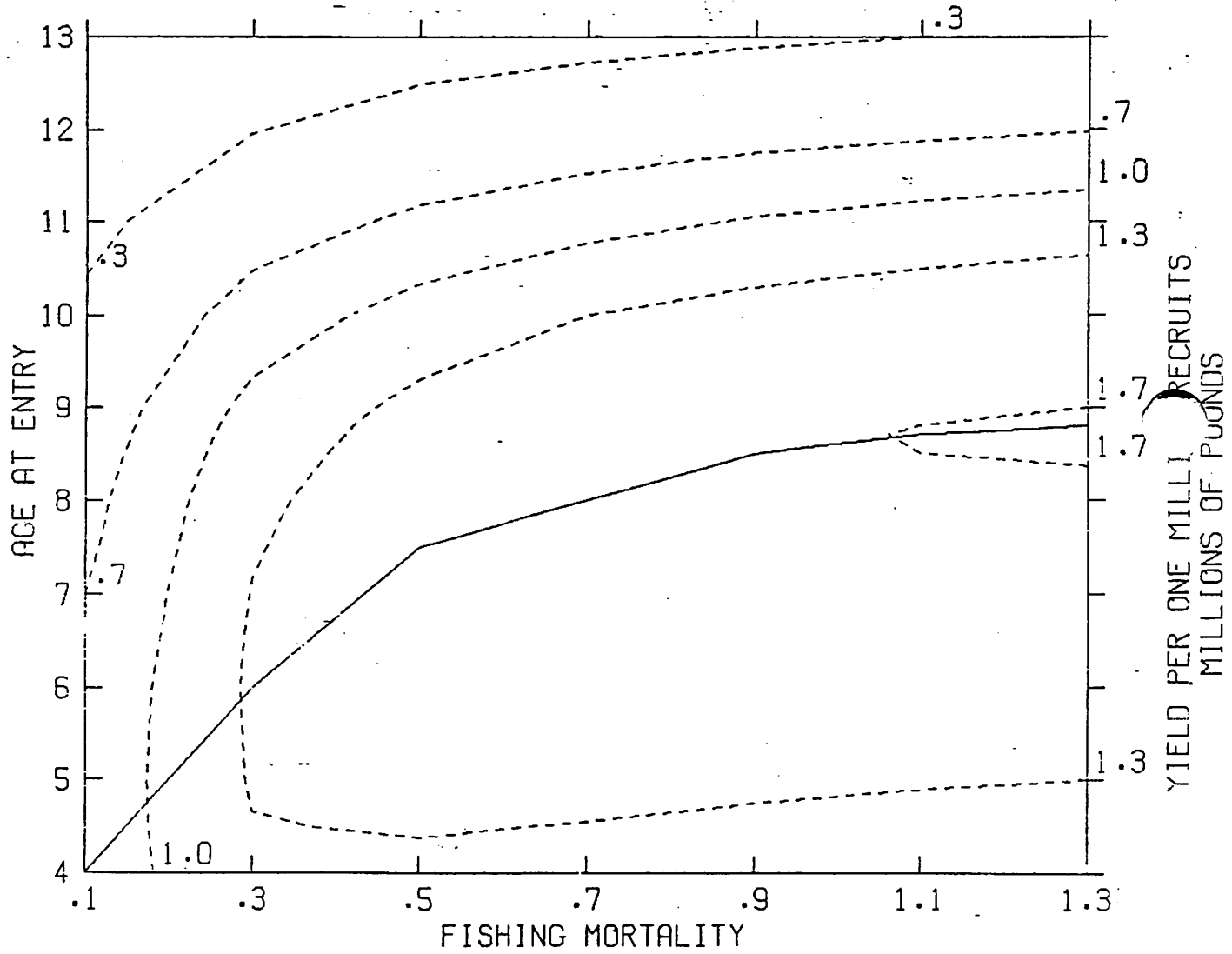


FIGURE 13. STUDY A. RED KING CRAB, BRISTOL BAY AVERAGE OF MORTALITY ESTIMATES

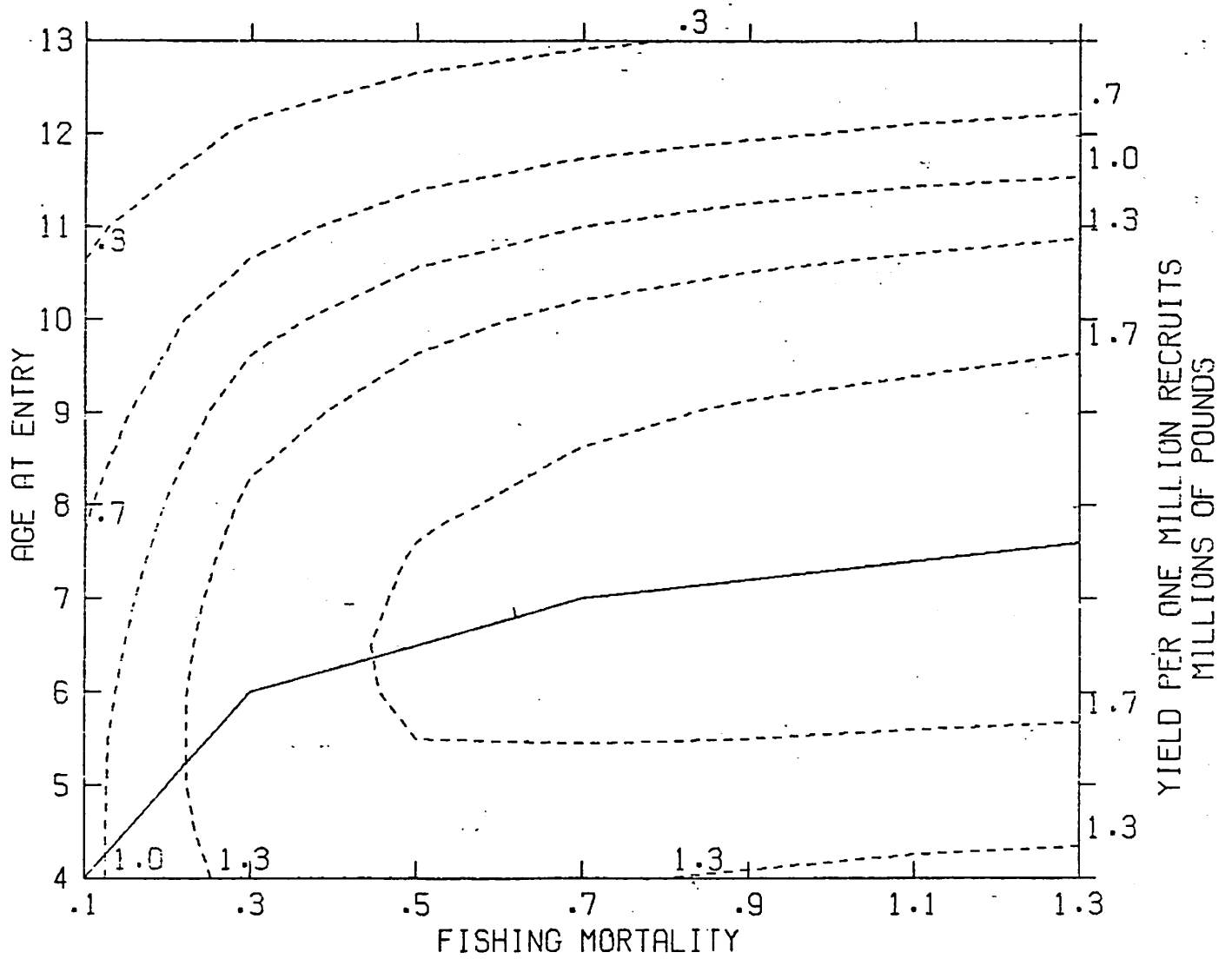


FIGURE 14. STUDY B. RED KING CRAB, BRISTOL BAY $M = 0.2$
FOR AGES 4-9

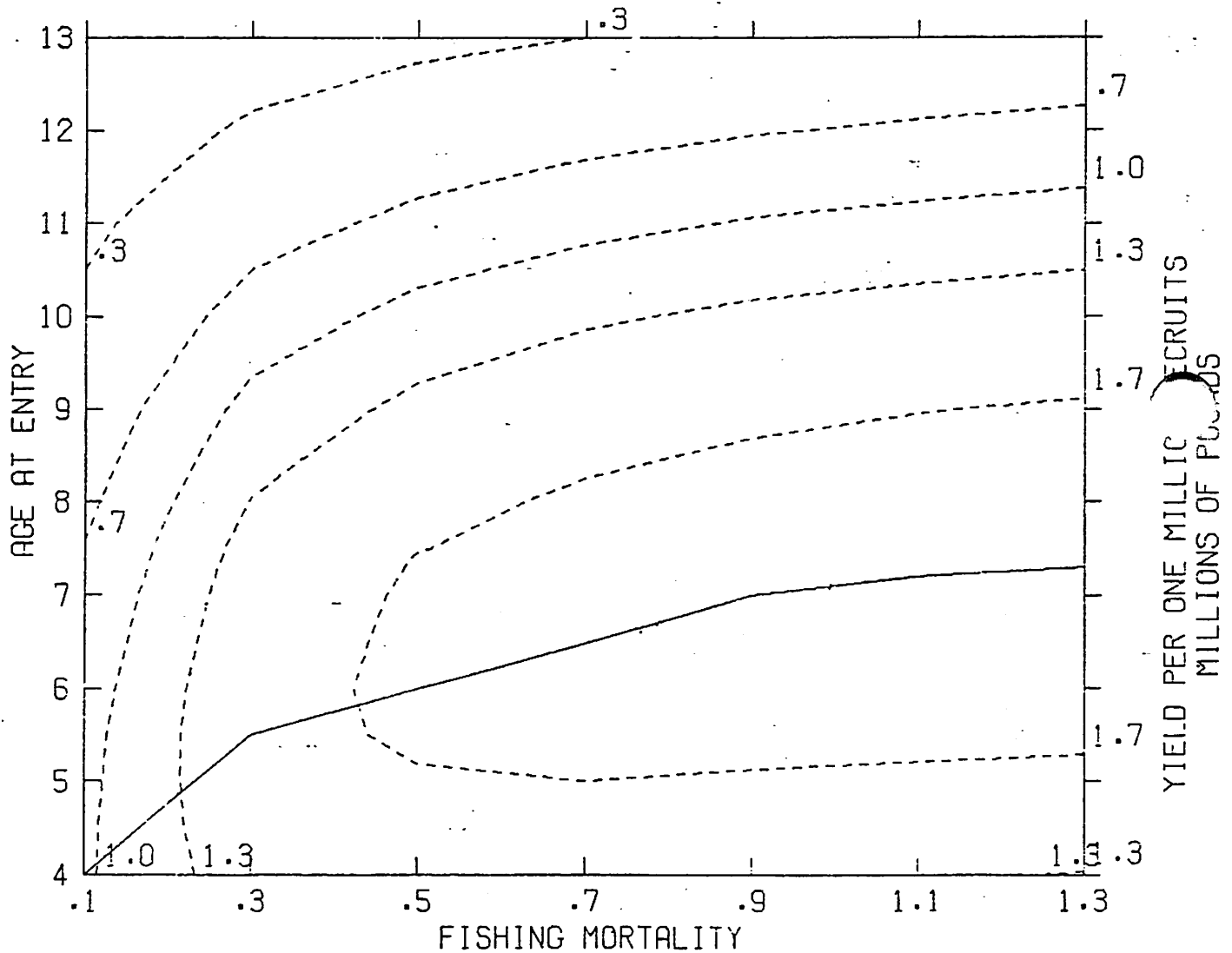


FIGURE 15. STUDY A. RED KING CRAB, KODIAK ISLAND MORTALITY SCHEDULE. AGES 7-12, ELDRIDGE, OTHER AGES, BRISTOL BAY AVERAGE

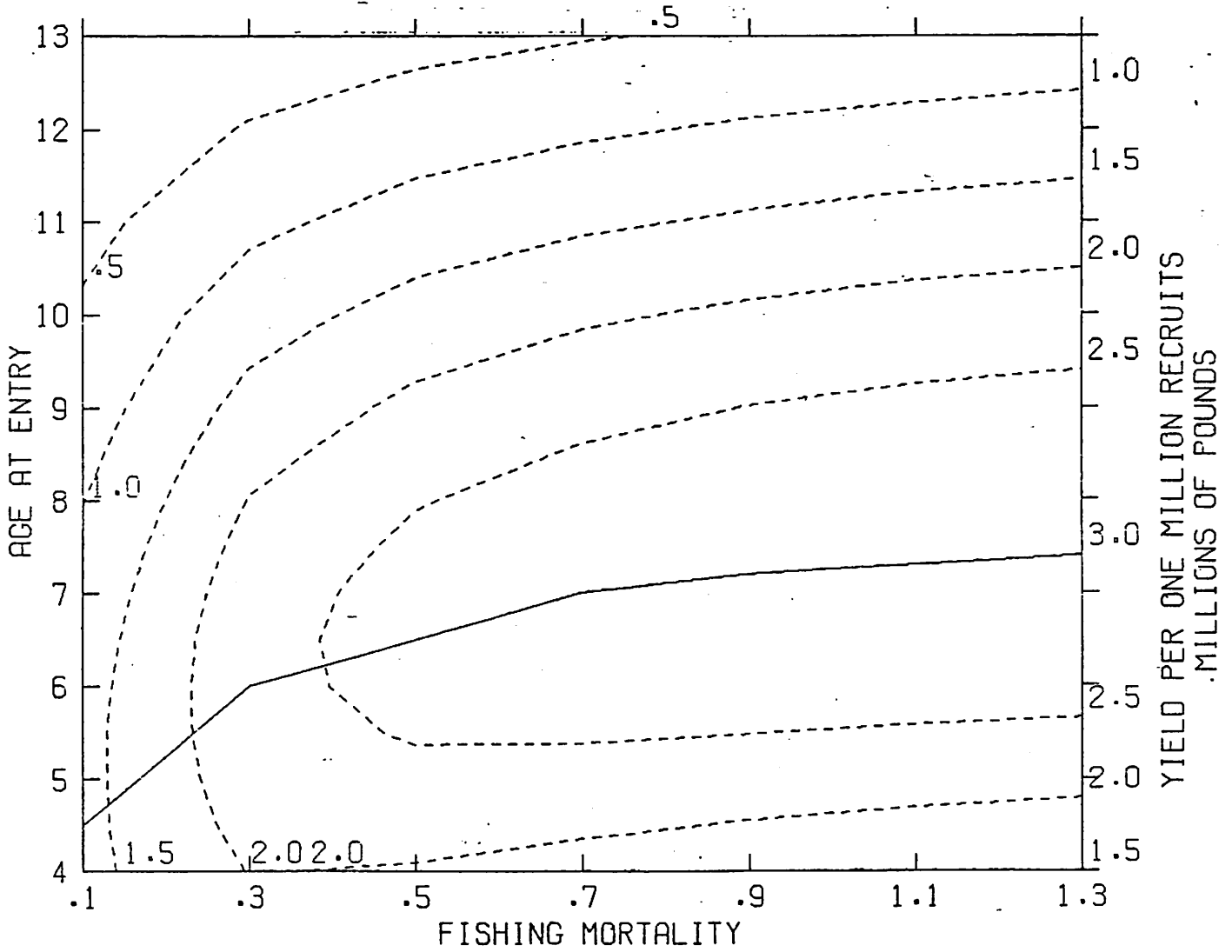


FIGURE 16. STUDY B. RED KING CRAB, KODIAK ISLAND MORTALITY SCHEDULE. AGES 7-12, ELDRIDGE, OTHER AGES, REEVES AND MARASCO

of mortality estimates as giving the most conservative values based on current knowledge of mortality coefficients. The curve of maximum yield at various ages of entry (Figure 13) closely resembles the yield per recruit relationship developed by Reeves and Marasco (1980). A second yield per recruit curve using a natural mortality rate of 0.20 which may be more realistic for ages 4-9 is shown in Figure 14. For the Kodiak area estimates of natural mortality are based on the work of Eldridge (1975) for ages 7-12 and Reeves and Marasco (1980) and the Bristol Bay age-specific average mortality rates for other years (Figures 15 and 16).

These curves were evaluated to determine (1) the optimum age of entry required to maximize yields at various harvest rates and (2) optimum fishing rates needed to maximize yields at various size limits (ages of entry). Results of this evaluation are shown in Tables 7 and 8.

Yield per Recruit and Current Fishing Practices

The exact fishing rates imposed on various king crab stocks are not known. However, the draft FMP states that quotas are generally set at a level which allows 40% fishing mortality per annum on the recruit class. In areas where multiple season and size limits have been employed, harvest of a year class is expected to approach 76% over a three year period which constitutes an instantaneous fishing rate of 0.48.

TABLE 7.

OPTIMAL AGE OF ENTRY FOR DIFFERENT FISHING RATES BASED ON FIVE YIELD PER RECRUIT (Y/R) STUDIES. EQUIVALENT LEGAL SIZE IN INCHES BRACKETED.**

RATE	YIELD PER RECRUIT STUDY*				
	1	2	3	4	5
.4	6.3 (5.5)	6.8 (5.7)	6.1 (5.4)	5.8 (5.5)	6.2 (5.7)
.6	7.0 (5.9)	7.7 (6.2)	6.7 (5.7)	6.2 (5.7)	6.6 (6.1)
.8	7.6 (6.1)	8.0 (6.3)	7.1 (5.9)	6.6 (6.1)	7.0 (6.3)
1.0	8.0 (6.3)	8.2 (6.5)	7.2 (5.9)	7.0 (6.3)	7.1 (6.3)

- * 1 = Y/R curve in Draft Plan
- 2 = Bering Sea Y/R Study A (Figure 13)
- 3 = Bering Sea Y/R Study B (Figure 14)
- 4 = Kodiak area Y/R Study A
- 5 = Kodiak area Y/R Study B

** Legal size is set at .2 inches (5 mm) less than age/width relationships to account for sorting selection.

TABLE 8.

OPTIMAL (INSTANTANEOUS) FISHING RATES FOR VARIOUS SIZE LIMITS BASED ON FIVE YIELD PER RECRUIT (Y/R) STUDIES.

LEGAL SIZE	YIELD PER RECRUIT STUDY*				
	1	2	3	4	5
5.75	.42	.40	.56	.47	.30
6.00	.58	.45	.68	.72	.55
6.25	.70	.53	>1.0	.88	.61
6.50	.90	.76	>1.0	.94	.72
6.75	>1.0	>1.0	>1.0	>1.0	>1.0
7.00	>1.0	>1.0	>1.0	>1.0	>1.0

- * 1 = Y/R curve in Draft Plan
- 2 = Bering Sea Y/R Study A (Figure 13)
- 3 = Bering Sea Y/R Study B (Figure 14)
- 4 = Kodiak area Y/R Study A (Figure 15)
- 5 = Kodiak area Y/R Study B (Figure 16)

For the Bering Sea red king crab the instantaneous fishing mortality has in recent years been about 0.44 (draft FMP Section 10.3.4) or an annual rate of about 36% of the crabs in the harvestable size range. Using this exploitation rate the size limit required to maximize the yield per recruit would be approximately 5.6 inches according to the yield per recruit curve shown in the draft FMP and 5.8 and 5.7 inches, respectively, for Bering Sea Y/R studies A & B (Figures 13 and 14). Under the current instantaneous exploitation rate ($i = 0.44$) and a size limit of 6.5 inches, about 30 to 40% of the maximum potential harvest is lost. Applying the most conservative analysis (Figure 13), a near doubling of the fishing rate is required to maximize the yield in the Bering Sea with a 6.5 inch size limit.

In the Kodiak area, assuming an instantaneous harvest rate of 0.48, fishermen give up from 35-40% of the potential yield. To maximize yield per recruit under a 7 inch size limit, an instantaneous rate of over 1.3 would be required. This would result in an annual harvest rate of 76% for crabs over 7 inches in length.

The results of the Y/R study suggest that a substantial increase in yield can be achieved through either a reduction in size limit or increased harvesting schedule. A harvesting strategy, based on the Y/R analysis, could result in a 24 to 32 million pound increase in annual landings in the Bering Sea (under current stock conditions) and about a 5 million pound annual increase in the Kodiak area.

The yield per recruit analysis, however, does not take into account potential spawning stock-recruitment relationships and/or behavior patterns which influence reproductive success. These factors require consideration in establishing a regulatory regime.

Spawner-Recruit Relationships and Reproductive Behavior

Several objectives of the draft FMP are concerned with a possible relationship between the mature reproductive population and subsequent recruitment. Management strategies designed to protect the reproductive potential of king crab have included fishing seasons, sex limitation, quotas and size limits. The employment of seasons and size limits, and sex limitation have commonly been applied in the management of other crab fisheries.

Size limits are imposed to insure that adequate numbers of a population reach maturity and have the opportunity to participate in the reproductive process. When size limits are examined from this viewpoint, important factors to be evaluated are, time of maturation, reproductive behavior and the numbers of mature crabs in the population.

Maturation of red king crabs encompasses a relatively narrow range of size and age. For the Bristol Bay stock, Wallace, et al. (1949) determined that females mature at carapace lengths of 86-102 mm. MacIntosh, et al. (1979) concluded that females are currently maturing between 80-100 mm, with 50%

maturity at 86-90 mm. Weber (1967) indicated that males mature at 90-100 mm. Thus, in terms of age, Bristol Bay crabs are approximately 100% mature by age 5.

In the Kodiak area, females mature at 86-119 mm, with 50% maturity occurring around 111-113mm. Males mature between 90-113mm (Powell, et al. 1973). Using Kodiak growth data to convert to age, age 5 females are beginning to mature, age 6's are almost 50% fully mature, and age 7 females are fully mature. Currently, fishing is initiated after red king crabs reach an age of about 8.5 years in the Bering Sea area and 8.4 years in the Kodiak area. Hence, harvesting begins on these stocks about 2 to 3.5 years following maturation. This would seem to provide a prolonged period of protection for the male population: far more conservative than normally provided for most finfish species.

The draft FMP, however, provides evidence to suggest that the mature male population does not as a whole become involved in breeding activity. The works of Powell, et al. (1974a) are referenced in noting that of some 3509 observed clasping pairs, 0.2% of the males were smaller than 4 inches, 3% were smaller than 5 inches, 14% were smaller than 7 inches and 83% were over 7 inches.

In reviewing the Powell, et al. (1974a) manuscript, some discrepancies are noted from the information presented in the plan. The draft FMP cites 3509 grasping (mating) pairs as having been observed, but the manuscript shows 3402 as being

observed. Fourteen percent of the breeding males are reported as being smaller than 7 inches and 83% 7 inches or larger. The paper by Powell, et al. (1974a) which summarizes these data shows just the reverse if the data are aggregated by standard length as given in Table 2* of that report. The draft FMP, however, does not state if the above observation was concerned with carapace length or width (including spines). If the latter were intended the percentages still do not conform to the data presented in the Powell, et al. (1974a) report, but are approximately correct. Regardless, it is evident from the above study that most breeding males were 7 inches or greater in carapace width. Examination of Table 2 of the Powell, et al. (1974a) manuscript suggests that the bulk of the males observed as grasping pairs were of ages 8 through 11. Younger males (5-7) made up something less than 15% of the grasping pairs. Although these data must be carefully considered in establishing size limits they should be weighted in relationship to other biological attributes of the population, e.g., life history features influencing the sex ratio and stock-recruitment relationships.

In another study published by Powell, et al. (1974b) different sized crabs were held in captivity and their mating behavior observed. The results of this work seemed somewhat at odds with field observations since relatively young smaller crabs successfully involved themselves in mating. These observations were considered atypical and the authors gave more

*See Appendix

credence to field observations. Inasmuch as the environment and population structure of the crabs held in captivity were substantially different than those found in nature, the conclusion seems likely. The "pen" studies do, however, provide evidence that smaller males are physically able to mate with a significant portion of the female population. The high percentage of larger older males in the observed grasping pairs study may be typical of reproductive behavior in many animals - that is the larger males play the dominant role in selecting female partners.

Examination of the actual stock composition data (Reeves and Marasco, 1980) for the years 1970-1979 (Figure 5) shows that the male population at ages 6 and older has generally exceeded the female population even in the presence of fishing. Apparently this results from a rapid increase in mortality for females during post maturation (Reeves and Marasco, 1980). A similar increase in mortality does not impact males until ages 11 and over. The differential mortality during ages 6-10 thus builds up a large surplus of mature males (in comparison to females). Only at age 5, the first year of maturity, did the female population exceed that of the male population. This life history feature should sharply minimize the risk that fishing at current fishing rates on crabs over 6 inches (legal size) would diminish reproductive capacity.

Reeves (1980) has examined potential spawner-recruit

relationships for red king crab in the Bering Sea (Figure 17). His data shows that the highest number of recruits (5 year old males) occurred for years (early 1970's) when the female population (and male) was at substantially lower levels than now exist. The nature of the spawner-recruit relationship, however, is not so apparent from scatter of plotted points. Reeves (1980) notes that there are two basic choices "(1) those curves which are domed-shaped and (2) those that are flat over a substantial portion of spawning ranges. This latter possibility translates into a situation of randomly changing recruitment over most spawning stock densities. In either event, a threshold level in the mid-range of possible spawning stock densities appears to be appropriate, unless a maximum (in the case of a dome-shaped relationship) or a descending left-hand limb (in the case of a flat relationship) exist at less than intermediate stock levels." The report concludes by suggesting "...some region of mid-stock densities appears to be the best choice."

From the data presented one cannot state more than the obvious; that is, the current high stock size in the Bering Sea had its origin during years of relatively low stock abundance. Given a constant physical, chemical and biological environment the character of the density dependent relationship between spawners and recruits might be clarified. There is, however, the

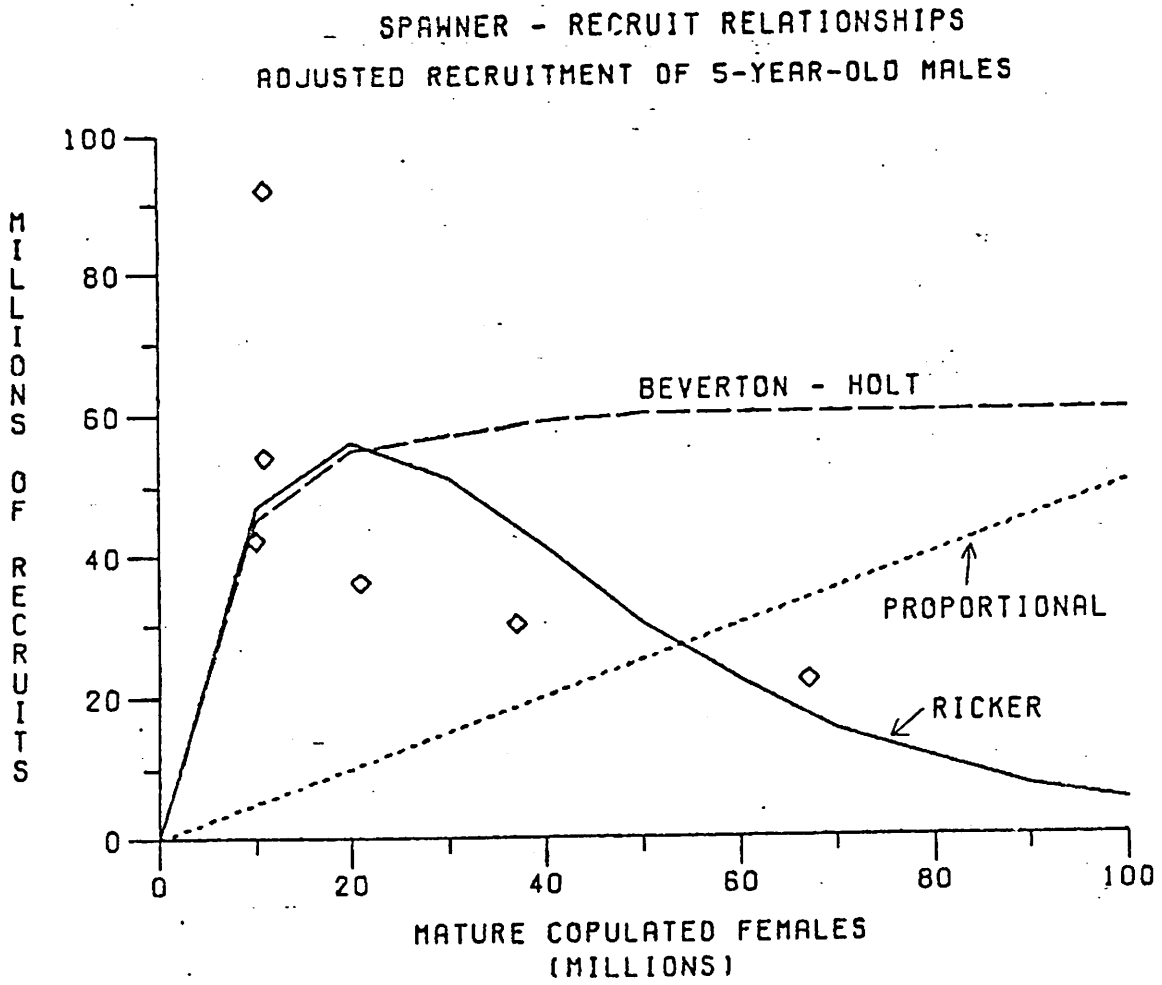


FIGURE 17. COMPARISON OF GENERAL SPAWNER-RECRUIT RELATIONSHIPS--BERING SEA (SOURCE: REEVES, 1980)

strong possibility that of the levels at which the red king crab population has fluctuated historically (even under fishing) environmental factors mask the density-dependent relationships. Hence, no applicable spawner-recruit relationship prevails. This would follow if density independent factors strongly influenced population abundance and environmental parameters were dynamic.

The draft FMP provides strong evidence that such may be the case. First, the scatter of points does not allow one to discern the nature of a spawner-recruit relationship. Second, recruitment is stated (Section 5.1 of draft FMP) to fluctuate greatly. According to the draft FMP catches of king crab in the Kodiak area during the mid-1960's rose to 94 million pounds in 1965, then rapidly declined to 10 million pounds by 1971. "Although there are no recruitment values for the Kodiak fishery during this period, it is assumed the 9 fold decrease in catches were a direct result of poor recruitment into the fishery." Strong recruitment is now reported for the 1980-81 period, a product of apparently relatively low population sizes in the mid-1970's.

Reeves and Marasco (1980) make several pointed statements with regard to the reproductive requirements of the population: (1) "...the current high level of females in the southeastern Bering Sea (estimated at greater than 100 million crabs) is superfluous to maximizing recruitment, and (2) that full female population is not required at high population levels, thereby

minimizing the effect of exploitation on reproductive capacity."

(3) Under several increased exploitation schemes modeled, there was little impact on the reproductive capacity of the stock, and (4) that a significant portion of the male king crab population (above 5.25 inches in carapace width) could be harvested without having an adverse affect on the spawning population.

Inasmuch as (a) male king crabs are polygamous, (b) there is evidence of an excess of mature males over females in the exploited crab population, (c) the spawner-recruit information available suggests large recruitment has generally come from medium to low population sizes, and (d) differential mortality rates between the sexes produces a natural surplus of males, the value of a size limit greater than 6 inches and a relatively low harvest rate seems highly questionable.

The works of Powell, et al. (1974a) have been previously noted in regard to mating and reproductive behavior. They provide a valuable insight into life history features of red king crab and perhaps evolutionary strategies. The biological characteristics of red king crab and its population dynamics, however, sharply lowers the risk of reducing its reproductive capacity when a Y/R fishing strategy is adopted.

The practice of only exploiting males has been chosen for many crab fisheries. Its importance relates to ensuring optimal recruitment from the parental stock. The biological value of this management technique depends to a large extent on the

stock-recruitment relationship, a relationship which has not been defined for red king crab and may be largely masked by environmental factors impacting abundance. It is not the purpose of this paper to examine this aspect of management (which may be concerned as much with economic factors as the biological requirements of the stocks) but to note that at medium to high stock levels there does not appear to be much evidence to suggest a need for maintenance of the full reproductive potential of the population(s).

Other biological attributes of the red king crab which influence management considerations include the mating and molting periods. It has been suggested (draft FMP, Section 10.3.1) that fishing during these periods "...increases the risks of poor reproductive success and mortality associated with handling soft shell post-molt crab." These actions do not directly bear on the issue of size limits, but size limits do influence the amount of sorting required regardless of what seasons are established.

In some areas of Alaska fishing is split into two seasons. The first fishing season is directed toward both recruits and older crabs. This season is followed by a second season designed for the harvest of larger older crabs. The split season also results in establishing two size limits. The goal of the split season is to increase the fishing rate on older crabs, many of which will die of natural causes within a year. The split season concept

has several problems from a biological standpoint. First, larger size limits require increased sorting on the grounds and hence must impose a mortality on the smaller younger animals discarded. Second, the resources can be more effectively used (from a yield per recruit basis) by applying the same harvest rate (in one season) and adopting a smaller size limit.

Operational Factors

This study does not attempt to evaluate a number of economic factors which might influence selection of size limits. There are nevertheless several operational matters that need consideration when opting for a particular size limit. The sorting problem has been previously identified as a potential source of mortality on discarded animals. It must also be considered as a factor influencing manpower requirements. Perhaps of greater importance is the fishing effect and energy requirements associated with a particular yield and size limit. In order to maximize the yield from the available recruits, the size limit needs to be matched to the expected fishing rate. When size limits are set high fewer year classes are involved in the exploitable biomass and the fishing rate must be substantially increased in order to maximize the potential yield. Unless substantial and much-increased effort is generated, it becomes increasingly difficult to harvest the surplus as the size limit approaches the critical size or age. Hence, fuel requirements per unit of effort increase while the average catch per unit of effort decreases.

At smaller size limits the fishing is constituted on a greater number of year classes. The fishing rate necessary to maximize yield per recruit is less and the average catch per unit of effort higher. Costs (fuel) of removal (per pound) hence are substantially less for whatever quota is established. Smaller size limits also have the advantage (when appropriate exploitation rates are used) of producing greater year-to-year stability of catches.

There is, of course, a spectrum of other factors such as market acceptance and quality, product recovery and handling problems, which must be considered. They are of particular importance in setting the lower boundary of potential size limits under optimum yield (OY) considerations.

Recommended Size Limit

Reeves (1980) has recently proposed a method for determining ABC and OY for the Eastern Bering Sea king crab fishery. His proposal is based on the concept that a certain minimum spawning stock is required and that at levels above this threshold the amount of surplus stock dictates the ABC level and various combinations of minimum size limits and exploitation rates that should be used. The results of his proposal are given in a matrix (Table 9) giving potential size limits and possible exploitation rates. Because the evidence to support a spawner-recruit

TABLE 9.

ESTIMATED YIELDS FOR 1980
BY MINIMUM SIZE LIMIT AND EXPLOITATION RATE.

ESTIMATED 1980 YIELDS (millions of pounds)							
SIZE LIMIT	EXPLOITATION RATE						
	.3	.4	.5	.6	.7	.8	.9
7.00"	38	51	63	76	89	101	114
6.75"	51	68	84	101	118	135	152
6.50"	63	84	105	126	147	168	189
6.25"	72	96	120	144	167	191	215
6.00"	79	106	132	159	185	211	238
5.75"	84	112	140	168	196	223	251
5.50"	86	115	144	172	201	229	258
5.25"	88	117	147	176	205	235	264

Source: Reeves (1980)

relationship is fragile at best, our understanding of the dynamics and biology of red king crab is incomplete and a degree of caution as suggested in this approach is warranted. Reeves' (1980) proposal provides a range of size limits and exploitation rates that are similar to those derived from yield-per-recruit data. Combinations of sizes and rates considered to be unacceptable fall within the blocked out portion of Table 9.

The maximum yield for the data presented occurs at a 6.5 inch size limit and a 0.9 exploitation rate. A similar result occurs for our Y/R Study A in the Bering Sea. The increase in yield, however, is achieved at the expense of a substantial increase in effort and a smaller safety factor for the reproductive population. It is our opinion that a 6.25 inch size limit with a 0.6 exploitation rate will (1) substantially increase the yield per exploitable biomass, (2) provide an adequate number of males to maintain high reproductive potential, (3) reduce sorting mortality, (4) increase average catch per unit of effort, (5) decrease energy demands and (6) increase year-to-year harvest stability.

Discussion and Conclusions

The various biological attributes of the red king crab were examined in relation to setting size limits. The data on age and growth and natural mortality of red king crab have improved dramatically in recent years as the result of research conducted by ADF&G and National Marine Fisheries Service. The data are nevertheless spotty and at times in-

compatible. Growth information comes from tagging experiments and the estimates could be subject to error because of possible effects of tagging on growth processes. The most likely bias would be a lower growth rate, although no substantiating data is available.

Estimates of natural mortality (M) also come from tagging experiments and may be subject to the usual errors associated with tagging, especially problems of differential mortality due to tagging, the problem of tag loss, and of non-reporting of recaptured tags. All these problems, if present, will inflate estimates of M. There is no documentation regarding these sources of error. Balsiger's (1974) estimator also depends on molting probability data, which could add to the error, as mentioned above.

Eldridge's (1975) estimates of M for Kodiak deserve some comment. His estimates are not supported by fishing effort. He did, however, attempt to analyze the effects of non-reporting and tag shedding, but purely in an exploratory way, since evidence to indicate that these errors are operating is minimal. This exploratory process does allow Eldridge to provide a range of values for size-specific M. He opts for the lower values, but without convincing evidence for that choice.

Finally, much of the data and information on red king crab comes from unpublished documents which have not been subject

to peer review. Improvements in our knowledge of age-specific mortality and growth rates will ultimately improve our ability to evaluate harvest strategies. A better understanding of environmental factors influencing recruitment patterns would add a management capability that does not now exist.

Based on an analysis of the data presented or referenced in the draft FMP, the following conclusions are reached:

1. Natural mortality estimates have varied between investigators but appear to be relatively low (0.1 to 0.2) at ages 5-10 for males and increase sharply (>0.5) in later years. Females have relatively high natural mortality rates following maturation (>0.5)

2. In the Bering Sea, male cohorts appear to maximize their biomass at about age 9 compared to about age 7 in the Kodiak area.

3. By age 11 in the Bering Sea and age 9 in the Kodiak area there is a sharp loss in male cohort biomass.

4. At relatively low fishing rates, fishing must commence several years prior to the critical age in order to maximize yield per recruit.

5. Using the current Bering Sea harvest rate (about 36% annually) the size limit needed to maximize yield per recruit was found to range from 5.6 to 5.8 inches depending on the mortality schedule used.

6. In the Kodiak area, using a 0.48 fishing rate, the optimal size limit based on Y/R was between 5.7 and 5.9 inches.

7. Yield loss based on Y/R currently ranges between 30 and

40%, depending on area fished.

8. Maturation occurs at about age 5 in the Bering Sea and 6 in the Kodiak area.

9. Large older male crabs (age 8-11) dominate the observed mating pairs.

10. Dominance of large males may reflect natural competition for available females.

11. An excess of mating males over females has been noted on an average in the southeastern Bering Sea.

12. Excessive numbers of males apparently result from the high mortality among females following maturation.

13. Highest observed recruitment of 5 year old males in the Bering Sea is related to years of relatively low parental abundance.

14. No distinct spawning-stock relationship has been defined.

15. Density independent factors may sharply influence abundance trends.

16. A significant portion of the male population greater than 6 inches can be harvested without harming the reproductive potential of the resource.

17. Application of split seasons and different size limits may increase sorting mortality and generate unnecessary fuel costs. Similar yield could be achieved by slight increases in fishing rates at the lower size limits while reducing energy requirements and sorting mortality.

18. Greater annual yield stability can be achieved with lower size limits by increasing the number of "buffering" year classes involved in the fishery if appropriate fishing rates are applied.

19. A size limit of 6.25 inches with a 0.6 fishing rate is proposed for all areas.

20. During years of low population levels, concern for the reproductive potential of the stock could be met by adjusting the exploitation rate and leaving the size limit constant.

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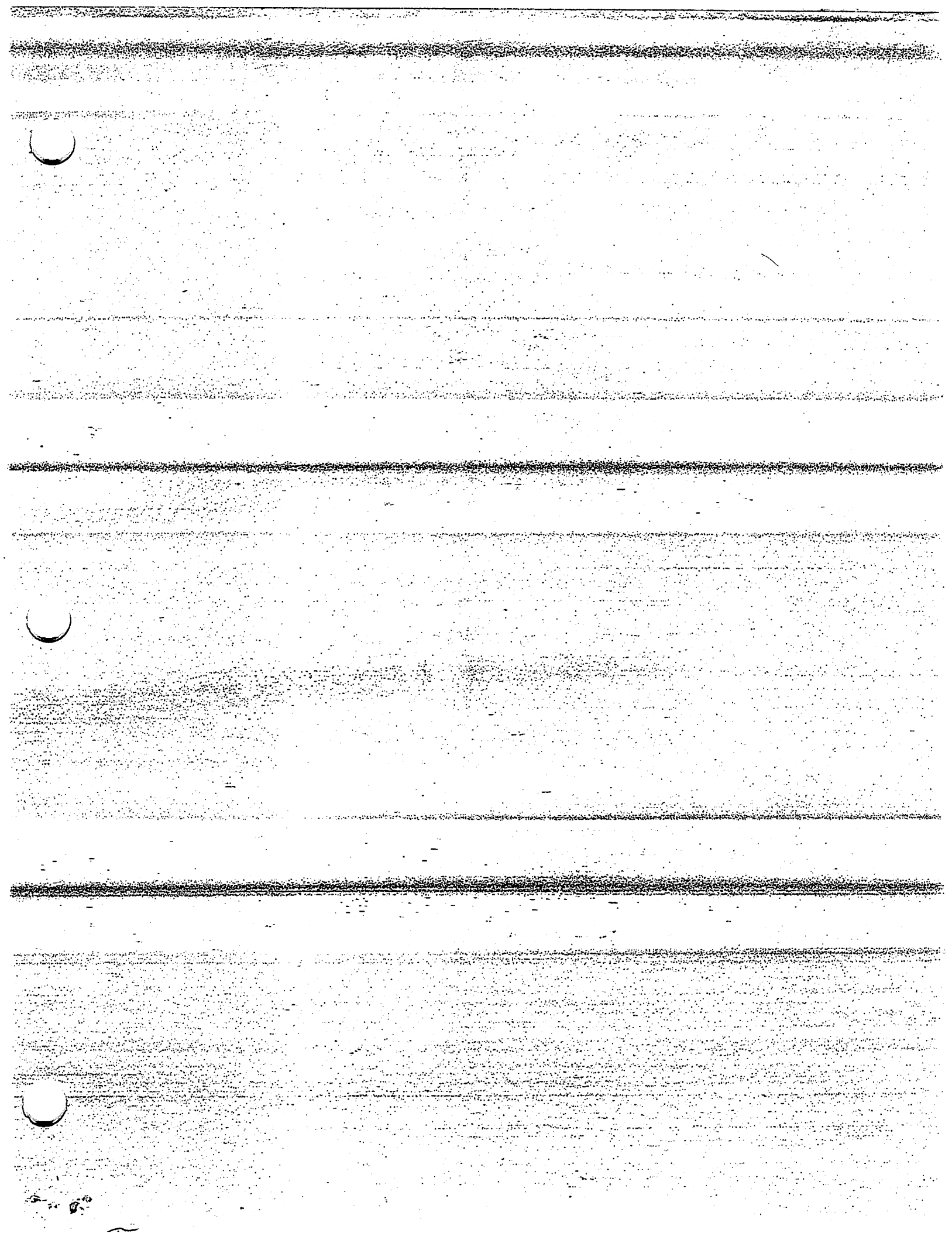
Appendix

Table 2 from Powell, G.C., B.J. Rothschild, and J. Buss. 1974. A study of King Crab (*Paralithodes camtschatica*, Tilesius) Brood Stocks, Kodiak Island, Alaska, 1963-1971. Unpublished manuscript. 30 pp.

Table 2. -- Size of king crabs in grasping pairs 1963-1971, Kodiak Island, Alaska.

Carapace length (mm)	Number of males	Percent of total	Number of females	Percent of total
80-89	2 <u>1/</u>	< 1	3 <u>2/</u>	< 1
90-99	0	0	28	1
100-109	4	< 1	291	9
110-119	19	1	775	23
120-129	76	2	965	28
130-139	256	8	790	23
140-149	651	19	416	12
150-159	756	22	108	3
160-169	641	19	20	1
170-179	460	13	5	< 1
180-189	346	10	1 <u>2/</u>	< 1
190-199	158	5	0	0
200-209	30	1	0	0
210-219	<u>3 <u>1/</u></u>	< 1	<u>0</u>	0
	3402		3402	

1/ The smallest and largest male grasper was 80 and 216 respectively.
 2/ The smallest and largest female grasper was 88 and 181 mm respectively.





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DATE: December 8, 1980

TO : North Pacific Fishery Management Council Members
NPFMC - Jim Branson
GCF - Jay Johnson

FROM: GCAK - Patrick J. Travers *Pat*

SUBJ: Alternatives to Conventional King Crab FMP and Implementing Regulations

INTRODUCTION

The purpose of this memorandum is to discuss the availability to the North Pacific Fishery Management Council (Council), the Assistant Administrator for Fisheries, NOAA (Assistant Administrator), and the State of Alaska, of management procedures for the western Alaska king crab fishery (fishery) other than the preparation and approval of a fishery management plan (FMP) and the implementation of that FMP through the promulgation of detailed regulations by the Assistant Administrator.

Since Alaska attained statehood in 1959, its government has asserted and effectively exerted a high degree of management authority over the fishery both within and without the three-mile limit, and with respect to both fishermen residing in Alaska and those residing in other states, particularly the State of Washington. In exercising this authority, Alaska has taken advantage of the fact that the fishery takes place in extremely remote areas, and that it has until recent years almost exclusively required the delivery of live crab to shore-based processors. Because the landing of live crab caught in the fishery in a state other than Alaska is unfeasible due to the fishery's remoteness, both Alaskan and non-Alaskan participants in the fishery have of necessity landed their catches in Alaska, thereby subjecting themselves to a comprehensive system of landing laws and regulations governing many features of the fishery. These regulations are promulgated by the Alaska Board of Fisheries (Board) and implemented by the Alaska Department of Fish and Game (ADF&G), both of which are agencies of the Alaska state government. Alaska's authority to use these regulations to manage participation in the fishery beyond the three-mile limit by non-Alaskans was endorsed by the Alaska Supreme Court in State v Bundrant,



546 P.2d 530 (1976), even though enforcement of previously promulgated regulations had been preliminarily enjoined by a three judge Federal district court in Hjelle v Brooks, 377 F Supp. 430 (D. Alaska 1974). Each of these cases involved Seattle-based fishermen who participated in the fishery beyond the three-mile limit.

The insertion of the second sentence of section 306(a) into the FCMA is generally believed to have been an attempt engineered by the Washington congressional delegation to overrule Bundrant. This sentence provides:

"No State may directly or indirectly regulate any fishing which is engaged in by any fishing vessel beyond its boundaries, unless such vessel is registered under the laws of such State."

As you know, this sentence has turned out to be ambiguous, because it is the Federal government, and not the states, that registers (in the usual sense of "documents") vessels the size of those participating in the fishery. Taking advantage of this ambiguity, Alaska has required all vessels landing king crab on its shores or otherwise coming into its territory incidentally to participation in the fishery, to "register" in Alaska. This "registration" is actually a conventional permitting system, rather than a system of vessel documentation. By requiring such registration, Alaska believes that it has effectively asserted its management authority over the activities of such vessels in the fishery conservation zone (FCZ) beyond its three-mile limit in a manner consistent with FCMA section 306(a). This belief is vigorously contested by Seattle fishermen like those involved in the Hjelle and Bundrant cases, but has generally enjoyed the support of the NMFS Alaska Region and the Council. The Alaska Supreme Court endorsed this position in its recent American Eagle decision.

There is a small, but growing, number of catcher/processor vessels that participate in the fishery. Because these vessels can process their catch at sea, they do not have to land it live in Alaska ports, or otherwise come within Alaska territory. As a result, they are able to avoid "registering" under Alaska law without fear of suffering sanctions that might be imposed by Alaska upon those landing king crab within its territory. Because the Alaska management system for the fishery does not apply to these catcher/processors, and because there is not yet a Federal management system to fill the vacuum, the fishery operations of these catcher/processors are, as a practical matter, unregulated.

The Seattle fishermen have argued strongly for the prompt adoption by the Council of an FMP for the fishery, and for the implementation of that FMP through regulations of the Assistant Administrator that would displace Alaska's regulations to the extent they apply to the fishery in the FCZ. A number of Council members, however, believe that continued

direct participation of the Board and ADF&G in management of the fishery in the FCZ would be desirable. They and the Council staff have asked that alternatives to the conventional approval and implementation of an FMP for the fishery that would allow such participation by Alaska in its management be analyzed.

The main alternatives that are under consideration are as follows:

- (1) Approval of a "framework" FMP without adoption by the Assistant Administrator of any implementing regulations, with implementation of the FMP left to Alaska through its registration and landing regulations.
- (2) Approval of a "framework" FMP with adoption by the Assistant Administrator of a regulation delegating authority for implementation of the FMP to the Board and ADF&G.
- (3) Joint adoption by the Council and the Board of a set of management standards and policies other than an FMP, with implementation of those standards and policies resting with the Board and ADF&G.

The feasibility under the FCMA of each of these alternatives for management of the king crab fishery will now be considered.

(1) Framework FMP Approved But Federal Implementing Regulations Not Adopted

It has been suggested that NOAA and the Council might ensure a continuing role for Alaska in the management of the fishery by developing and approving a "framework" FMP, but declining to promulgate regulations to implement that FMP under FCMA section 305. A "framework" FMP for this purpose is an FMP that does not prescribe specific fishery management measures in detail, but rather sets forth more general management goals and standards to be implemented through measures adopted by ordinary rule-making. Such a format would eliminate the need to amend the FMP every time it was desired to change a management measure. Under this proposal, ADF&G and the Board would continue to regulate participation in the fishery by vessels registered under the laws of Alaska subject to the management objectives and standards set forth in the FMP. There would be no Federal regime for management of the fishery other than Council and NMFS oversight of Alaska's regulatory activities to ensure that they complied with the FMP, and periodic review of the FMP itself to determine whether it was in need of amendment. The Assistant Administrator would retain authority to adopt Federal regulations overruling Alaska regulations that were found to be inconsistent with the FMP or with any amendment thereto.

The primary advantage perceived in this proposal is that it would forego the establishment of a new Federal king crab management regime which many believe would simply duplicate a management capability

currently possessed by Alaska, at least with respect to vessels registered in Alaska. Proponents of this alternative suggest the unlikelihood, due largely to budgetary constraints, that any Federal king crab management system could in the foreseeable future acquire the research, monitoring, and data-gathering capacity currently available to ADF&G and the Board in their management of the fishery. It is thus suggested that a Federal king crab management regime would largely be a bureaucratic overlay of Alaska's management system that would add little of substantive significance to the quality of management while imposing significant additional administrative burdens. Those making this suggestion find support for it in the current regulatory situations of the Tanner crab and Alaska salmon troll fisheries, and in the confusion that has surrounded development of a Bering Sea herring FMP.

A disadvantage of this alternative would be that it would leave unmanaged participation in the fishery by the catcher/processors based in Washington State that are not even arguably "registered" in Alaska due to their nondependence on Alaska shore-based facilities. This disadvantage could be ameliorated if Washington, in cooperation with NMFS, the Council, and Alaska, were to adopt its own king crab management regime to implement the FMP, covering vessels "registered" in Washington.

The viability of this proposal would, of course, depend upon continued adherence by NOAA to its liberal interpretation of the second sentence of FCMA section 306(a), under which each State is considered to have great latitude in determining which vessels are to be considered "registered" under its laws, provided that it has substantial relationships with those vessels.

The primary legal obstacle to adoption of this alternative for king crab management is presented by FCMA section 305(c) which provides, in part:

"The Secretary shall promulgate regulations to implement any fishery management plan or any amendment to any such plan . . . if he finds that the plan or amendment is consistent with the national standards, the other provisions of the Act, and any other applicable law."

[Emphasis added.]

The use of the mandatory "shall" in this provision would seem on its face to require the Assistant Administrator to adopt implementing regulations for any approved FMP. In contrast with FCMA section 302(h) (1) discussed below, which contains similar mandatory language concerning Council preparation of FMP's, there is no other provision of the FCMA

that might qualify the language of section 305(c). Thus, the better view is probably that the Assistant Administrator must adopt regulations of some sort to implement an FMP which he has approved although, as will be discussed in connection with the next alternative, he probably has substantial leeway as to the exact content and nature of those regulations.

It could be that the "shall" of FCMA section 305(c) could be read in a nonmandatory way, despite its usual mandatory significance. Such a reading could be supported by the general disinclination of Congress, particularly over the past few years, to espouse unnecessary Federal regulation. A party challenging the nonadoption by the Assistant Administrator of a regulation he had specifically found to be unnecessary would at the very least be in a somewhat awkward position, although that party's chances of success would not be negligible. Therefore, the Council and NOAA may not at this time want to dismiss the pursuit of this first alternative, recognizing that it does entail a legal risk that does not accompany the two alternatives discussed below.

(2) Framework FMP Approved and Implementing Authority Delegated by Federal Regulation to State Agencies

The second alternative for management of the fishery would involve the adoption and approval by the Council and NOAA of a framework FMP, and the promulgation by the Assistant Administrator of an implementing regulation that would simply delegate authority for implementation of the FMP to ADF&G and the Board. This would have substantially the same practical advantages and disadvantages as the first alternative. As would be the case with that alternative, the regulation of catcher/processors not registered in Alaska could be accomplished through a similar delegation to Washington State management agencies.

The primary legal issue raised by this alternative is the extent to which the Assistant Administrator may subdelegate his authority under FCMA section 305 to implement an FMP to State agencies such as ADF&G and the Board. This authority was delegated to the Secretary of Commerce by Congress in enacting the FCMA, and was subdelegated by the Secretary to the NOAA Administrator, who further subdelegated it to the Assistant Administrator.

The law of subdelegation of regulatory authority appears to be quite confused, and the cases focus almost exclusively upon subdelegation by an agency head to subordinates within the agency. See, generally, 1 K. Davis, *Administrative Law Treatise* (2d ed.) 216-23 (1978). Yet, the current approach of courts and agencies to subdelegation appears to be quite permissive. *Id.* at 218-20. The leading case on the subject appears

to be Fleming v Mohawk Wrecking and Lumber Company, 331 U.S. 111 (1947). There, the Court cited a provision of the Emergency Price Control Act which stated that the Price Administrator

"may, from time to time, issue such regulations and orders as he may deem necessary or proper in order to carry out the purposes and provisions of this Act."

The Court then stated:

"Such a rule-making power may itself be an adequate source of authority to delegate a particular function, unless by express provision of the Act or by implication it has been withheld."

331 U.S. at 111.

In Mohawk, the Court departed sharply from the much more restrictive approach to subdelegation that it had adopted earlier in Cudahy Packing Company v Holland, 315 U.S. 357 (1942), in which it held that the Wage and Hour Administrator of the Department of Labor could not subdelegate his statutory authority to sign subpoena duces tecum. While the Court in Mohawk made a somewhat strained attempt to distinguish Cudahy, 331 U.S. at 120-21, it in fact appears to have adopted a generous approach to subdelegation similar to that espoused by Justice Douglas in his Cudahy dissent, 315 U.S. at 367-73, and Cudahy is no longer treated as viable precedent, Davis, *supra*, at 218. The Court reaffirmed this approach in Jay v Boyd, 351 U.S. 345 (1956). Concerning the provision of the Immigration and Nationality Act of 1952 which provided that the Attorney General "may, in his discretion" suspend the deportation of certain aliens, the Court stated:

"Petitioner does not suggest, nor can we conclude that Congress expected the Attorney General to exercise his discretion in suspension cases personally. There is no doubt but that the discretion was conferred upon him as an administrator in his capacity as such, and that under his rulemaking authority, as a matter of administrative convenience, he could delegate his authority to special inquiry officers with review by the Board of Immigration Appeals."

Id. at 351 n. 8.

In NLRB v Duval Jewelry Company of Miami, 357 U.S. 1 (1958), the Court drew a distinction between cases of the kind just discussed, which involve complete subdelegations of regulatory authority, and situations in which the delegator retains the right to make the final decision by way

of an appeal procedure, even though the initial decision is made by a delegate. Id. at 6-8. The Court seemed to indicate that subdelegations of the latter, partial type would be even more readily allowed than complete delegations. Id. at 8.

In United States v Giordano, 416 U.S. 505 (1974), the Court reiterated the liberal approach to subdelegation established in Mohawk, but held that the statute under consideration in the instant case specifically forbade the delegation of the function in question. Id. at 513-14.

In reviewing subdelegations of certain administrative functions by the Equal Employment Opportunity Commission under its authority to make procedural rules, two circuits have applied the liberal approach to subdelegation prescribed by the Supreme Court. EEOC v Raymond Metal Products Company, 530 F.2d 590 (4th Cir. 1976); EEOC v Laclede Gas Company, 530 F.2d 281 (8th Cir. 1976). In Raymond Metal, the Court placed some emphasis upon the fact that judicial review of the subdelegated administrative actions was available even though there was no express provision for administrative review of those actions. 530 F.2d at 594.

An apparent aberration in the generous approach taken by the Federal courts to subdelegation is presented by certain dicta in Relco, Incorporated v Consumer Product Safety Commission, 391 F. Supp. 841 (S.D. Texas 1975). In that case, a manufacturer challenged the issuance of preliminary adverse publicity concerning one of its products by the CPSC's Bureau of Compliance under a provision of the Consumer Product Safety Act. This function had been subdelegated by the Commission to the Bureau under a provision of the Act specifically authorizing the Commission to delegate any function or power other than the power to issue subpoenas. In considering the Plaintiff's claim that authority to issue the adverse publicity had been improperly subdelegated by the Commission to the Bureau, the Court stated:

" . . . [S]ome functions are so primary and so basic to the implementation of the statute as to be nondelegable. Functions constituting final agency action, such as administrative adjudications and rule making, must be made or ratified by the Commissioners and may not be delegated to subordinates under broad grants of authority . . . While intra-agency delegation is a necessity in carrying out some of its functions, such delegation cannot be excessive . . . "

391 F. Supp. at 845-46.

The Court cited absolutely no case authority for this statement, referring only to a passage in an earlier version of the Davis treatise which has since been replaced by the new sections cited above. If accepted, the court's statement would probably invalidate the delegation of FCMA authority from the Secretary of Commerce to NOAA, and it appears to be totally unsupported by any viable judicial precedent. Fortunately, the statement was plainly mere dictum: the court dismissed the complaint for lack of exhaustion of administrative remedies and the CPSC, having won the case, had no occasion to challenge the statement before a higher court. Relco has not been cited once in any other judicial decision since its release almost six years ago.

The cases discussed above deal with subdelegations within the Federal government. The subdelegation of king crab management authority that is under consideration would be from a Federal agency to a State agency. This raises the question whether subdelegations to entities outside the Federal government must be analyzed under principles substantially differing from those discussed above.

A decision of the District of Columbia circuit indicates that this is not so. In Tabor v Joint Board for Enrollment of Actuaries, 566 F.2d 705 (D.C. Cir. 1977), certain actuaries challenged regulations of a Federal agency established for their certification under which membership in a private actuarial association could substitute for the passing of a professional examination. The plaintiffs challenged this provision as an unlawful subdelegation of the Board's authority to a private party. The Court responded as follows:

"As a factual matter, the Board has not substantially delegated its responsibility to set and administer enrollment standards. Permitting association members to short-cut the regular certification process does not mean that the Board has delegated its control over that process. Each applicant can obtain certification through a process superintended by the Board in every respect. And there is no claim that the Board has set the pass rate for its exam at such a high level that, in practice, the private associations actually set the enrollment standards.

"In any event, appellants are incorrect in asserting that express statutory authority is necessarily required for delegation by an agency. [The court cited Mohawk, distinguishing it from Cudahy and Giordano on the ground that those

cases involved prohibitions by Congress on sub-delegation.] Congress has evidenced no such intent here. In fact, Congress granted the Joint Board discretion to establish reasonable standards and qualifications. . . ' for certification of competence."

566 F.2d at 708 n. 5.

Thus, the court appears to have held that, even assuming that the Board had subdelegated its authority to the Association, such subdelegation was permissible under the cases discussed above.

United States v Matherson, 367 F. Supp. 779 (E.D.N.Y. 1973), involved the challenge of certain National Park Service regulations providing that a permit for use of a motor vehicle in the Fire Island National Seashore would be granted only if an adjacent municipality had already issued a permit. The court rejected the argument that this was an unlawful subdelegation of NPS authority.

"Both parties agree that the purpose of the [local ordinance and the challenged Federal regulation] is to prevent erosion on Fire Island. The local municipalities and the Superintendent of the National Seashore have endeavored to cooperate with each other to maintain the natural beauty of Fire Island. [Footnote omitted.] It was in furtherance of this spirit of cooperation that the Superintendent promulgated [the challenged regulation]. This section is in no way an abdication of the Superintendent's power to administer the National Seashore. Rather, the instant section merely exemplifies an effort by the Superintendent to facilitate the orderly prevention of erosion on the island. The Superintendent still makes the ultimate determination of whether to grant a vehicular permit to travel on National Seashore land . . . Moreover, the practicalities of the situation dictate that such a regulation be in existence. The local municipalities and the National Seashore are contiguous."

367 F. Supp. at 782.

It must, on the other hand, be noted that the court observed that the municipality "has absolutely no power to grant a vehicular permit for the National Seashore." It did not, however, indicate that its decision would have been different if such power had been subdelegated. In fact, the court cited approvingly Gauley Mountain Coal Company v Director, U.S. Bureau of Mines, 224 F.2d 887 (4th Cir. 1955), and Clark Distilling Company v Western Maryland Railroad Company, 242 U.S. 311 (1917), both involving congressional delegations to the States, and stated that these delegations were

"far more extensive than the local municipalities' delegated authority under the instant regulation. In those two cases, the state's classification was final and all that remained was to apply the federal regulation. In contrast, under [the Federal regulation challenged in Matherson] the Superintendent retains the ultimate decision-making power."

367 F. Supp. at 783.

The Matherson court's citation of Gauley and Clark Distilling is significant, because it indicates both that the court believed the same standards to apply to congressional and administrative delegations of Federal authority to non-Federal entities; and that the court would have tolerated an even greater degree of delegation to the municipalities in Matherson.

In Gauley, a Federal statute imposed limitations on the use of electrical equipment in any mine found to be "a gassy or gaseous mine pursuant to and in accordance with the law of the State in which it is located," the State determination as to gaseousness being nonreviewable by the responsible Federal agency. 224 F.2d at 888-89. The statute was challenged as an impermissible delegation of Federal authority to the State. The court responded as follows:

"There is no delegation by Congress of its own power to a state agency, but merely the acceptance by Congress of state action as the condition upon which its exercise of power is to become effective. Congress has done this in a number of other fields of the law. [Here, among other statutes, is cited the Assimilative Crimes Act, which extends the criminal law of each State and Territory to areas under Federal jurisdiction located there.] . . .

. . . .

"In the case at bar, the regulations prescribed by Congress with respect to gaseous mines became effective upon a determination by a state agency under state law. That determination is not made under the authority of Congress. Congress merely applies its regulation in aid of state regulation after the state has classified the mine as subject to regulation as a gaseous mine. In the light of the authorities cited, this is clearly not delegation of Congressional power to the states . . ."

Id. at 890-91.

Gauley is thus notable both for the conclusive effect of the State determination upon the operation of the Federal management regime and for the court's obvious discomfort with the idea that this was a "delegation" of Federal authority, despite the fact that it obviously was, as was recognized in Matherson. 367 F. Supp. at 783.

Clark Distilling, supra, cited in both Matherson and Gauley, involved a challenge to the Webb-Kenyon Act. This pre-Prohibition statute made unlawful the transportation into a State of liquor in violation of laws of that State which, it was conceded, would otherwise have been unconstitutional under the Commerce Clause. The Supreme Court stated:

"The argument as to delegation to the states rests upon a mere misconception. It is true the regulation which the Webb-Kenyon Act contains permits state prohibitions to apply to movements of liquor from one state into another, but the will which causes the prohibitions to be applicable is that of Congress, since the application of state prohibitions would cease the instant the act of Congress ceased to apply."

242 U.S. at 326.

Based upon these authorities, the better view would seem to be that there is no necessary legal impediment to the delegation by the Assistant Administrator to State agencies of authority to implement a PMP for the fishery, pursuant to his general rulemaking authority under FCMA section 305. This would be particularly true if express provision is made for timely review of the State management measures by the Council and NMFS. The review procedure, which it would be advisable to prescribe in the delegation, could include joint meetings of the Council and the Board before the Board's adoption of new regulations; a recommendation by the Council to NMFS (either the Assistant Administrator or the Regional Director) as to the compliance of the new regulations with the FMP; and a decision of the Assistant Administrator or Regional Director, based on the Council's decision, whether to adopt Federal regulations to supplement or supersede those of the State. Assuming that the "framework" format of the FMP worked as planned, amendments to the FMP would be rare, and actions of the Board and of NMFS would be almost entirely through normal notice-and-comment rulemaking.

(3) Joint Council/Board Policy Statement Adopted and State Management Continues Without an FMP

The third alternative to the conventional FCMA enforcement mechanism that is being considered for the fishery would be the adoption by the Council and the Board of a joint statement of management policies and

standards for the fishery that would not, however, constitute an FMP. The Board and ADF&G would agree to be bound by this statement in their own management of the fishery, but otherwise the current State management system would not be disturbed and no Federal management regime would be established.

It has been argued that adoption of this alternative is impermissible under the FCMA. This argument is based upon FCMA section 302(h)(1), which provides:

"Each Council shall, in accordance with the provisions of this Act -
 (1) prepare and submit to the Secretary a fishery management plan with respect to each fishery within its geographical area of authority"

Read in isolation, this provision appears on its face to require the Council to prepare an FMP for every fishery off Alaska, including that for king crab, regardless of its views as to the necessity of an FMP. This interpretation is vigorously endorsed by the Seattle fishermen, and would undoubtedly form the basis for a legal challenge if the Council declined to adopt an FMP for the fishery.

Another provision of the FCMA, however, seems to indicate that the Council's obligation to prepare an FMP for the fishery is somewhat less stringent than an isolated reading of section 302(h)(1) would suggest. FCMA section 304(c)(1)(A) provides:

"The Secretary may prepare a fishery management plan with respect to any fishery, or any amendment to any such plan, in accordance with the national standards, the other provisions of this Act, and any other applicable law, if -

(A) the appropriate Council fails to develop and submit to the Secretary, after a reasonable period of time, a fishery management plan for such fishery, or any necessary amendment to such a plan, if such fishery requires conservation and management. . . ."

[Emphasis added.]

Under this remedial provision, the Assistant Administrator is not even authorized, much less required, to develop an FMP in default of Council action unless the fishery "requires conservation and management." Since

section 304(c)(1)(A) prescribes the administrative remedy for violation by the Council of section 302(h)(1), and since no such remedy was authorized by Congress when the fishery is not one that "requires conservation and management," it would be reasonable to interpret the Council's underlying obligation so as not to require the preparation of an FMP for a fishery not requiring "conservation and management." Such an interpretation is bolstered by common sense and by the current offensive against unnecessary Federal regulation.

Assuming that this latter interpretation is adopted, the question arises whether the fishery for king crab is one that "requires conservation and management" within the meaning of the FCMA. If this phrase is interpreted in the absolute sense, with no consideration of the existing management regime, then the fishery would generally be conceded to require "conservation and management," since the capacity of the various participants far exceeds the amount of king crab that can be taken without reducing the reproductive capacity of the resource. If, however, assessment of the need for Federal "conservation and management" under sections 302(h)(1) and 304(c)(1)(A) can take into account the efficacy of existing non-Federal management regimes, then the fishery for king crab may well be one that the Council and the Assistant Administrator could reasonably find not to require such "conservation and management." Either interpretation of this phrase would seem to be reasonable, given the apparent absence of legislative history on the subject, and the Council and the Assistant Administrator could therefore, in the exercise of their administrative discretion, select the interpretation they desired. Courts would be required to defer to this interpretation by the Council and NMFS of the statute they are charged to administer. Udall v Tallman, 380 U.S. 1, 16 (1965). As you are aware, some Federal courts tend to honor this principle in the breach, and there is no guarantee that they would be inclined to follow it in this instance. Despite the presence of some legal risk, however, I am persuaded that the Council could, in accordance with the FCMA, find that the current king crab management regime of the State of Alaska effectively protects the king crab resource, and that the fishery is not, therefore, one that "requires conservation and management."

If it adopted this position, the Council would be well advised to compile a record, including comments and hearing summaries on the draft FMP and DEIS and background information on the provisions of its joint statement with the Board. Following compilation and review of this record, and finalization of the Council/Board statement, the Council would adopt a formal finding based on the record that the fishery is not one that "requires conservation and management," as long as the Board adheres to the statement in its own management of the fishery. It might

be advisable to include in the finding a discussion of the impact of catcher/processors that are beyond Alaska's jurisdiction. The Assistant Administrator would then review the Council's finding in light of the record, perhaps accepting public comments on it, and, if he concurred in the finding, issue a formal notice to that effect. The Council would periodically review the Board's management of the fishery and either renew its finding or, if it found that the joint statement was not being complied with or needed an amendment that the Board would not agree to, either undertake the preparation of an FMP for the fishery or request the Assistant Administrator to do so.

CONCLUSION

Thus, there do not appear to be serious legal impediments to adoption of at least the latter two alternatives discussed above by the Council and NMFS.

I will be happy to respond to any questions or comments on this conclusion, either at the meeting or afterward, and will keep the Council staff informed on GCF's response to it.

cc: GC - Jim Brennan
F/AKR12 - Jim Brooks
ADF&G - Guy Thornburgh
ADF&G - Fred Gaffney