MEMORANDUM

TO: Council, AP, and SSC Members

FROM: Clarence G. Pautzke
Executive Director

DATE: January 12, 1993

SUBJECT: Management of the Weathervane Scallop Fishery

ACTION REQUIRED

Consider developing federal FMP and moratorium for weathervane scallops.

BACKGROUND

At the December meeting, the Council received testimony from a scallop vessel owner who requested a permit moratorium be placed on the weathervane scallop fishery. The fisherman testified that the nine vessels harvesting weathervane scallops in 1992 were fully exploiting the scallop stocks. He was particularly concerned about the potential for a rapid increase in effort due to an expected influx of 50-75 vessels from the East Coast. Proposed management measures to limit effort on sea scallops in the New England and mid-Atlantic areas allow for the possibility that some vessels would move their operations to Alaska.

Under the proposed Amendment 4 of the New England Fishery Management Council's Sea Scallop Fishery Management Plan, the only vessels that will be allowed to participate in future scallop fisheries must have held a federal sea scallop permit and landed scallops between January 1, 1988 and March 2, 1990. Yet there were 152 vessels that landed scallops in 1991 that will not qualify for the fishery, and may also be unable to switch to groundfish due to a moratorium in that fishery. Of the 152 vessels, 94 vessels derived less than 15% of their total revenues from scallops, 24 vessels derived 15-85% of their revenue from scallops, and 34 vessels derived > 85% of their revenue from scallops. It is likely that only this last group of vessels would consider moving to Alaska. Of these, only 10 to 14 vessels have the potential to make the journey based on vessel size and age.

Management of weathervane scallops is currently under the jurisdiction of the State of Alaska, as no federal FMP exists for this species. ADF&G recognizes the need for weathervane scallop management and has developed an Interim Fishery Management Plan (IFMP), which is available for public review. The IFMP calls for three major management measures to be taken: (1) setting area specific guideline harvest levels and gear restrictions to prevent localized overharvesting, (2) creating an observer program to monitor the fishery and obtain biological information, and (3) restricting effort. The Alaska Board of Fisheries plans to evaluate the potential of indirect effort control measures (e.g, limit crew size, prohibit automated shucking) at its spring 1994 meeting. However, because the fishery meets their policy criteria of a "high impact emerging fishery", ADF&G can implement other IFMP management measures by emergency regulation. The State can also issue a permit moratorium. Historical participation and landings are shown in Table 1.

The Council may wish to continue to defer the management of weathervane scallops to the state, or could opt to make it a federally managed fishery. If the Council determines that federal management of scallops is necessary, either a federal FMP could be developed for this fishery, or the species could be incorporated into the existing groundfish plan. A preliminary FMP for Alaska scallops was drafted by the NPFMC in 1976 but never adopted. If the Council chooses to proceed with developing a separate FMP for this fishery, perhaps the FMP could be structured similar to the salmon and crab plans, with cooperative state and federal management of the fishery. Weathervane scallops could be incorporated into the Comprehensive Rationalization Plan, and individual quotas could be developed as a possible management measure for this fishery. A comparative summary of the salmon and crab plans is under item C-5(a).

Table 1. Historic number of vessels, number of landings, landed weight of shucked meats, price per pound, exvessel value, landings per vessel, and exvessel value per vessel for the weathervane scallop fishery in Alaska during 1967-1991. All data for 1967-1968, and prices and exvessel values for 1967-1975 and 1979 were taken from Kaiser (1986); all other data were summarized from fish tickets. The 1991 data are preliminary. In years when only one or two vessels participated in a fishery, the harvest statistics are confidential.*

Year	No. of Vessels	No. of Landings	Landings Wt. (lbs)	Price ($/lb)	Exvessel Value ($)	Landings (lbs) per Vessel	Value ($) per Vessel
1967	<----------Confidential---------->						
1968	19	125	1,677,268	0.85	1,425,678	88,277	75,036
1969	19	157	1,850,187	0.85	1,572,659	97,378	82,772
1970	7	137	1,440,338	1.00	1,440,338	205,763	205,763
1971	5	60	931,151	1.05	977,709	186,230	195,542
1972	5	65	1,167,034	1.15	1,342,089	233,407	268,418
1973	5	45	1,109,405	1.20	1,331,286	221,881	266,257
1974	3	29	504,438	1.30	655,769	168,146	218,590
1975	4	56	435,672	1.40	609,941	108,918	152,485
1976	<----------Confidential---------->						
1977	<----------Confidential---------->						
1978	0	0	0	-	0	0	0
1979	<----------Confidential---------->						
1980	8	56	632,535	4.32	2,732,551	79,067	341,569
1981	18	101	924,441	4.05	3,743,986	51,358	207,999
1982	13	120	913,996	3.77	3,445,765	70,307	265,059
1983	6	31	194,116	4.88	947,286	32,353	157,881
1984	10	61	389,817	4.47	1,742,482	38,982	174,248
1985	9	54	647,292	3.12	2,019,551	71,921	224,395
1986	9	86	682,622	3.66	2,498,397	75,847	277,600
1987	4	55	583,043	3.38	1,970,685	145,761	492,671
1988	4	47	341,070	3.49	1,190,334	85,268	297,584
1989	7	54	525,598	3.68	1,934,201	75,085	276,314
1990	9	144	1,488,642	3.37	5,016,724	165,405	557,414
1991	10	125	1,006,332	3.75	3,773,745	100,633	377,375

*Table from: Kruse, G.H., P.R. Larson, and M.C. Murphy. 1992. Proposed Interim Management Measures for Commercial Scallop Fisheries in Alaska. ADF&G Regional Information Report 5J92-08. 29p.

Comparative Summary of Salmon and Crab FMPs

Salmon FMP

1. Establishes two broad fishery management areas east and west of Cape Suckling and allows commercial fishing outside 3 miles only in the eastern area off Southeast.
2. Sets non-numerical OYs equal to all-gear harvest ceilings set by the Pacific Salmon Commission and allocations of those harvests as set by the Alaska Board of Fisheries.
3. Establishes six objectives and defines the roles of the Council and other entities in managing the fisheries.
4. Limits access by the power troll fleet.
5. Defers regulations of commercial and recreational fisheries to State, but measures must be consistent with FMP and Magnuson Act.
6. Leaves monitoring to the State and assigns enforcement responsibility to NMFS, the Coast Guard and the State.
7. Establishes review and appeals procedures.
8. Summarizes habitat concerns and adopts overfishing policies of State and Pacific Salmon Commission.
9. Incorporates EA and RIR.

Crab Plan

1. Defines the fishery management unit to include red, blue, scarlet, and brown king crab, C. bairdi and opilio Tanner crab, grooved and triangle Tanner crab in the BSAI.
2. Sets numerical OYs for C. bairdi and opilio Tanner crab and for red, blue, and brown species of king crab combined.
3. Establishes a single management goal and seven specific management objectives.
4. Three categories of management measures are described: (1) those fixed in the FMP, (2) frameworked with criteria that the State can change, and (3) measures that are neither rigidly specified nor frameworked in the FMP. Implementation by the State must be consistent with the FMP, Magnuson Act, and other applicable law (see table 8.1 on next page).
5. Legal gear, permit requirements, observer requirements and limited access all are fixed in the FMP.
6. Establishes appeals and review procedures of State regulations.
7. Establishes a Crab Interim Action Committee to sort out policy differences, and a Pacific Northwest Crab Industry Advisory Committee to advise the Board about PNW concerns.
8. Contains stock status and habitat sections and a detailed description of regulatory areas.
9. Contains overfishing definitions specific to each crab stock and area, and related to the status of information on the stock and exploitation rates.

Table 8.1. Management measures used to manage king and Tanner crabs in the BS/AI management unit by category.

Category 1 (Fixed in FMP)	Category 2 (Frameworked in FMP)	Category 3 (Discretion of State)
Legal Gear	Minimum Size Limits	Reporting Requirements
Permit Requirements	Guideline Harvest Levels	Gear Placement and Removal
Federal Observer Requirements	In-season Adjustments	Gear Storage
Limited Access [Reserved]	Districts, Subdistricts and Sections	Vessel Tank Inspections
	Fishing Seasons	Gear Modifications
	Sex Restrictions	Bycatch Limits (in crab fisheries
	Pot Limits	State Observer Requirements
	Registration Areas	Other
	Closed Waters	

Although specific strategies for attainment of objectives in the FMP are not described, management measures described in this chapter are all derived to attain one or more of those objectives. Any subsequent management measures must also be justified based upon consistency with the objectives in this FMP. All management measures must, further, be consistent with the Magnuson Act and other applicable Federal law.

Kodiak Fish Company

f/v Alliance f/v Provider
P.O. Box 469, Kodiak, Alaska 99615
907-486-6002
Fax 907-486-2617

September 26, 1992

Mr. Carl Rosier
Commissioner
Alaska Department of Fish and Game
P.O. Box 25526
Juneau, AK 99802-5526

Dear Commissioner Rosier:

We would like to thank the Department for the effort involved in resolving what we feel are management deficiencies in this fishery. We know that the scallop fishery is a minor one compared to the State's economic return from salmon and crab so we realize that any effort expended on our fishery is time taken away from these others. We feel, however, that a careful selection of management measures (which we believe should include a moratorium) can be developed that would be cost effective.

We have reviewed the Proposed Interim Management Measures for commercial scallop fisheries in Alaska and have the following comments.

We believe that this management plan should cover only fisheries conducted for weathervane scallops (Patinopecten caurinus Gould, 1850). Fisheries for other species of scallops in the State are of such a limited and developing nature that we do not believe that the specific management measures outlined here will fit the needs of that type of fishery. We believe that the Department can exercise much more flexibility in other scallop fisheries by dealing with them via individual permits which allow the Department broad management authority. Unforeseen events, such as the entry into a fishery for pink scallops by smaller inshore vessels, may be severely curtailed by regulations designed to deal with the much different weathervane scallop fishery. Further, certain management measures we strongly support - such as crew size limits and a ban on mechanical shucking devices - would economically prohibit participation by vessels wishing to enter the fishery for Icelandic scallops in the Bering Sea.

By and large, we have no objections to the goal and objectives

outlined in the proposal document. As written, they seem to cover everything one would wish a plan to cover. We do feel that maximizing yield per recruit is an important objective that could be achieved either under the biological conservation objective or the sustainable and orderly fishery objective. Either way, we would like to see this objective spelled out in the final document.

We have no objection to registration requirements for scallop fishing vessels to identify and monitor fishing effort.

We strongly object to closure of the commercial season during the spawning season for three months of the year. First, the extent and duration of spawning is currently a guess by the Department. Second, the spawning of individual populations of scallops throughout the range is quite varied and may vary much more than the May to July dates identified in the draft proposal. And when scallops do spawn, according to researchers on other species, an entire population will all spawn within hours of each other. Clearly three months is neither going to cover all the populations during spawning nor allow the fishery to be conducted during the 89 days when spawning is not occurring. Third, environmental conditions which trigger spawning will vary from year to year. Research data on other species indicate that spawning can occur twice a year in some areas and once a year in others. Neither research on the precise environmental conditions necessary for weathervanes to spawn nor detailed information on the spawning characteristics of weathervanes is available. Fourth, there is no data to indicate any biological reason to cease fishing efforts during spawning. According to many researchers, spat survival is more dependent on environmental conditions than any other factor. In fact, in "North Irish Sea Scallop Fisheries; A Review of Changes" by A.R. Brand, E.H. Allison and E.J. Murphy, the authors state " What is evident, however, is that the areas most heavily fished also have the best recruitment..." They further suggest that the possible explanations (among others) are tidal currents which bring large numbers of recruits into the area and that fishing acts in some way to enhance spat settlement. In point of fact, this particular fishery <u>is</u> closed during the summer spawning season. However, in the same paper, the authors state that these closures were based on commercial requirements of the fishery and not on any biological reason to protect the stocks during their spawning cycle. There are commercial reasons for closures during spawning. For example, in European fisheries where roe on meats are marketed, a spent gonad is not marketable during this period immediately during and post spawning. An extended closure would be warrented to allow the gonad to recover. Product quality is somewhat diminished during this time (as in most other commercial seafood) as the animals convert energy to gonad development. However, the diminished quality is relative. We would suffer severe economic damage by this proposed closure. We depend on these better weather months to fish in certain areas. Smaller vessels than ours will be even more severely impacted. We believe that one

smaller vessel now participating in this fishery only fishes during the spring and summer.

We see no justification for establishment of fishing periods to allow inseason monitoring of catch and effort by area. We believe this type of regulation is only necessary if an annual harvest level is established. We do not believe an annual harvest level will be any more effective in attaining the objectives of this plan than measures to limit efficiency of harvesters and restrict the taking of smaller scallops.

We oppose the establishment of any guideline harvest levels or limits on annual harvests. The Department has no data other than annual catch reports on which to base the establishment of harvest levels. A GHL would change the nature of the fishery immediately - turning it into a contest between participating vessels to take as much of the harvest as possible. We believe that this type of fishery will encourage behavior that would be detrimental to the resource. A GHL could lead to situations where specific populations of scallops are overfished and other populations are not fished at all. With inadequate funding, it is unlikely that the Department will be able to properly manage a scallop fishery incorporating a GHL. To do this correctly, populations must be surveyed and a far greater understanding of the dynamics of the weathervane would have to be achieved. Given the reduced level of Department funding for established programs in recent years, we think it highly unlikely that the new dollars which this will require will be available for scallop research.

If scallop populations are genetically separate from bed to bed or area to area, individual GHL's would have to be set for each distinct area. And if the populations are all supplied by the same larval source, then a GHL which encouraged vessels to concentrate on dense populations of smaller scallops may be of more danger to the stocks than the status quo. Without any data on which to base a guideline harvest level, we cannot support its use as a management tool at this time. We believe that a moratorium on further entry to the fishery combined with efficiency limits will produce more consistent results than the establishment of a guideline harvest level.

We do support a mix of measures to curtail harvesting and processing rates. We propose a maximum individual dredge width of 15 feet and overall dredge width maximum of 30 feet. In addition, we propose a limit on crew size, and prohibition of shell stocking and automated shucking equipment. The overall effect of these measures will be to limit the daily harvests. Further, this would influence the behavior of the harvesters to target on larger scallops and reduce the level of effort on beds of smaller scallops thus achieving the objective of maximizing yield per recruit. Restriction of dredge width will limit harvest capability for scallops and prevent use of larger dredges - a 17 foot dredge, for

example, is 2-3 times heavier than a 15 foot dredge. The greatly increased weight of these dredges could cause damage to benthic communities and prohibition of this size dredge - though not commonly in use at this time - will serve to prevent their becoming the standard and perhaps alleviate concerns of impacts on other species.

The limiting of crew size, prohibition of shell stocking and prohibition of automated shucking equipment are the real measures which will limit efficiency in the sea scallop fishery and are directly comparable to pot limits and net length limits in crab and salmon fisheries. The traditional method of shucking sea scallops manually aboard the catcher vessel is tedious and very limiting. Regardless of the amount of product a vessel can bring aboard, the vessel's daily production is limited to what her crewmembers can shuck. So scalloping success is largely a matter of being able to work 24 hours a day as many days of the year as weather permits. Simply put, the number of people shucking will determine how many scallops can be harvested. Given a choice of sizes of scallops brought aboard, the number of crew available to shuck them will determine the selection of the scallops to be harvested. Further, given the choice between a bed of very abundant but small scallops and a more normal distribution of larger scallops, limited ability to shuck will direct a vessel to choose the bed of larger scallops - leaving the smaller ones until their size increases. These decisions are made because one shucker can complete a limited number of pieces in a given time period regardless of the individual size of those pieces.

The crew size limits should apply only to shuckers, allowing additional crew for the positions of captain, mate, and engineer. We propose that the crew size be limited to ten plus the captain, mate and engineer (and additional licensed personnel if required by law). If crew sizes are limited in order to limit daily harvest capability, then the alternatives of using automated shucking equipment or bringing the unshucked scallops to shore for shucking must be prohibited. Until recently, it was thought that automated shucking equipment could not be developed which would work on weathervanes. We know now that Arctic Alaska, for one, has developed machinery which is working on weathervane scallops. This technological advance completely changes the nature of the fishery by greatly increasing the maximum daily harvest capability.

We oppose the increase of ring size beyond the current 4 inch limit. We do believe that the 4 inch ring size should be made standard throughout the State for the weathervane scallop fishery. There have been some recent studies on the selectivity of ring sizes in the Atlantic sea scallop fishery which indicate that ring size alone is not an adequate tool for restricting catch of smaller scallops. The ring size currently in effect in that fishery is 3 inches though there are proposals to increase that to 3 1/2 inches. Other factors that influence dredge selectivity include method of

bringing the gear aboard, weather and sea conditions, abundance of scallops, and rocks in the areas being fished. Using 4 inch rings, scallops smaller than 4 inches can be retained and scallops larger than 4 inches drop out through the openings between the rings. So the selectivity of the rings is helpful but not a stand alone tool.

Much research has been conducted on the catching efficiency of the New Bedford scallop dredge (used by Alaskan scallopers as well) indicating that the scallop dredge is very inefficient. Videos, which we have provided the Department and which were made by NMFS gear researchers, demonstrate that only the shoe of the dredge (two areas totaling about .4 square feet per dredge) is ever in contact with the bottom. Further, the shoes skip over the bottom and are not in regular contact with the ocean floor. We believe the current 4 inch ring size is effective as a limiting tool but an increase beyond 4 inches will produce completely unknown results - including the possibility of making the dredges unworkable so we oppose any increase in ring size at this time.

We propose that a minimum shell height requirement be imposed in order to reduce or eliminate the taking of small scallops. For preliminary discussion purposes, we propose that no scallops smaller than 4 inches shell height may be taken. Due to the known differences in growth rates between scallops in Southeastern, Kodiak and the Aleutians, it is possible that different shell height requirements may be needed for each of these areas. However, we do propose that none of these areas should permit harvest of any scallops smaller than 4 inches shell height. From the data compiled in Kaiser's report, it appears that even in the area of fastest growth (Kodiak), scallops have spawned at least once before reaching 4 inches shell height.

We oppose the establishment of any additional closed areas either for bycatch reasons or to establish seed stock refuges. Scallopers are currently prohibited from fishing in many areas of the state simply due to fears of bycatch of other species - with little documentation to support such fears. We would like to see the current closures to scallopers be reexamined to determine if populations of king, tanner or dungeness crab are even present in the closed areas. Research in the late sixties identified depths and areas where bycatch of these crab species was occurring. Areas where conflicts occurred were closed to scalloping at that time and have since also been closed to other hard on the bottom gear. This research has demonstrated that bycatch of other commercial (or noncommercial, for that matter) species is nonexistent or minimal.

Given the relative numbers of bycatch which could be caught in the scallop fishery (including all vessels making even one landing is an average of 7 vessels per year since 1967), we believe that the risk of harm to other fisheries is minimal. We believe these risks will be much higher if the fishery continues to escalate in numbers, size of vessels, and daily catch needs due to improved

technology. The greatest protection will be to establish a moratorium and freeze the fleet at its current level. Increased effort and reduced CPUE will send an enlarged fleet to areas avoided by current participants where conflicts could increase to the detriment of both fisheries involved.

The requirement for onboard observers will allow factual information to be gathered in regard to bycatch. The management plan should allow the Department sufficient flexibility to close areas when bycatch problems are encountered. Bycatch in the scallop fishery should be managed in the same manner as is bycatch in all other fisheries. A certain level or number of bycatch should be permitted and seasonal closures rather than yearround closures should be utilized whenever possible to protect stocks which may migrate in and out of areas populated by commercial quantities of scallops.

Without any information on the sources of larval recruitment in weathervane populations, it is impossible to intelligently set aside scallop seed stock refuges. We do believe that this is an important area for future research and urge the Department to initiate biochemical genetic studies to determine the sources of larval recruitment.

We oppose the establishment of a rotational harvest system. Without information on larval recruitment or stock abundance, there is no way to determine what, if any, benefits a rotational harvest system would have on the resource. With no moratorium and a GHL, certainly management tools such as fishing periods and rotational harvests would become necessary as a derby fishing environment would be created. A moratorium simplifies management by keeping participation in the fishery at a finite level. The natural working of a scallop fishery when stocks are adequate to fill demand would create a rotational harvest without the need for regulatory intervention.

We support the establishment of an onboard observer program. Earlier testimony on this subject regarding the observer program has asked that coverage be 100% as for the crab catcher processor fleet. Unlike the crab catcher processors, scallopers do not generate tremendous revenues and cannot afford the price tag for 100% coverage which we estimate at $75-$100,000 per year. The system that is now being put into place in the federal groundfish fishery could be adapted and would be workable for the sea scallop fishery. We propose that a fee based on a set percentage of exvessel value be imposed on scallop landings to fund the observer program. The observers would be assigned to vessels based on the need for data from particular areas. In this manner, a pool of funds is supplied by industry enabling the Department to assure even coverage of vessels and areas throughout the year. We also propose that the area south of Kodiak currently closed to scallopers but open to other hard on the bottom gear be open to

determine if bycatch problems do exist in these areas.

We oppose the establishment of trip limits. Enactment of minimum shell height requirements, prohibition of shell stocking and automated shucking, crew size limits and gear restrictions will all serve to limit the efficiency of the harvesters.

Finally, we believe that a moratorium on further entry into the fishery is a necessary component of any management plan. Currently, a control date for moratorium exists in all the federal fisheries in Alaska and the groundfish and scallop fishery in the Atlantic. The New England Fishery Management Council has estimated that some 70 scallop vessels have entered the scallop fishery there after the established control date. This leaves the Alaskan scallop fishery as the only remaining open access large boat fishery on either coast. Even though the sea scallop fishery in Alaska takes place almost entirely in federal waters, in the absence of a federal FMP, the State has jurisdiction over the fishery. This means that these vessels in Alaska which have scalloped exclusively over the years have lost the right to enter any of the federal groundfish or crab fisheries. However, all the vessels in the federal groundfish, crab and East Coast groundfish and scallop fisheries may enter the Alaskan sea scallop fishery.

The particular concern is the 70 vessels currently excluded from the Atlantic sea scallop fishery by the control date put in place by the New England Fishery Management Council. When finalized, these vessels will have very few options. The obvious choice for them is to come to Alaska and enter the open access weathervane fishery here. The enactment of the limits we have proposed will make the fishery less attractive but many of these proposed management tools will be of little value if the number of vessels in the fishery doubles or triples. As in the past, we would expect that this kind of effort will quickly reduce the stocks to levels which are not economically fishable. Effort from vessels new to Alaska and spreading out to attempt to survive economically poses threats to those species which are seen as bycatch in scallop dredges. As we stated earlier, a moratorium is the surest way to avoid these conflicts.

A four year moratorium will serve to protect the fishery. Implementation of the other proposed management measures will enable the Department to gather and analyze data on the resource and the fishery which will aid in decision making for a more long term plan.

The moratorium, enacted today and including only those vessels fishing this year, would, we believe, limit the fishery to eight vessels. Two of these vessels, though, are far larger than the traditional scalloper. And one of those two vessels is currently using automated shucking equipment. This enables the vessel to harvest small scallops that the boats shucking by hand could not

economically harvest. The harvests made possible by the automated equipment is equivalent to the daily harvest of five or more vessels manually shucking. That automated shucking equipment also makes it possible to work on beds of very small scallops that would either not be fished at all or only marginally exploited. The reason this vessel is working on beds of small weathervanes is that they have been restricted from the most abundant beds of Icelandic scallops for which this vessel was intended and for which shucking machinery is necessary. This is a clear illustration of how technology combined with restrictions on other areas or fisheries create unforeseen impacts on fishery resources. This particular impact is currently threatening the weathervane fishery.

In the history of the fishery from 1967 to the present, the most vessels which ever participated during one year is listed at 19. We would request that the data be analyzed further to illustrate the number of vessels who were active, fulltime participants in the fishery rather than all vessels who made even one landing. This data would be more revealing as to landings per vessel and would illustrate more clearly the trends in the fishery's CPUE. Kaiser analyzed these trends in the fishery through 1981 and we believe that a similar analysis up to the current year would provide a basis for determining the optimum number of vessels for the fishery.

In conclusion, we propose:

1) that a moratorium be instituted;

2) that these regulations govern the weathervane scallop fishery only;

3) that registration requirements be continued;

4) that maximum dredge width of 15 feet per dredge and 30 feet overall be instituted;

5) that a maximum crew size of ten plus captain, mate and engineer be instituted;

6) that shell stocking be prohibited;

7) that use of automated shucking equipment be prohibited;

8) that a ring size of 4 inches be instituted statewide;

9) that an onboard observer program funded by a percentage of exvessel value be instituted;

10) that the closures currently in effect for scallopers be reexamined for reason for closures and current data regarding actual bycatch and populations of bycatch sensitive species be used

in the reexamination;

11) and that a research program be undertaken including biochemical genetic studies to determine sources of larval recruitment.

Thank you for the opportunity to comment.

Sincerely,

Mark Kandianis
Teressa Kandianis

MARK P. KANDIANIS
TERESSA M. KANDIANIS
FV Provider

ALASKA CRAB COALITION

3901 Leary Way (Bldg.) N.W., Suite #6 • Seattle, WA 98107 • (206) 547-7560 • FAX (206) 547-0130

AGENDA C-5
JANUARY 1993
Supplemental

NPFMC AGENDA ITEM C-5, January 1993
SCALLOP MANGEMENT

August 27, 1992

TO: Mr. Carl Rosier, Commissioner
Alaska Dept. of Fish & Game
P.O. Box 25526
Juneau, Alaska 99802-5526

FROM: Arni Thomson, Executive Director

RE: COMMENT ON ADF & G PROPOSED INTERIM MANAGEMENT PLAN FOR THE SCALLOP FISHERIES OF THE STATE OF ALASKA

The Alaska Crab Coalition has reviewed the document "Proposed Interim Management Measures for Commercial Scallop Fisheries in Alaska" and wishes to provide its comments on the proposed regulations for the scallop fisheries.

The ACC is aware that the State of Alaska recognizes that the scallop fisheries are high impact fisheries and as such the interim management plan must follow special guidelines as recently adopted under Authority of the Alaska Administrative Code (AAC): 5 AAC 39.210 (ADF&G 1992) Management Plan for High Impact Emerging Fisheries (See chapter 39: "general provisions" in Appendix 1). The intent of the plan is clear: "to guide management of high impact emerging commercial fisheries a plan is needed that ensures resource conservation, minimizes impacts on existing users, and provides orderly development of new fishery resources."

The ACC has been following the development of scallop fisheries in the Bering Sea and Aleutian Islands the past few years. The ACC is particularly concerned about the potential impacts of scallop dredging to king crab and their benthic habitats in the Petrel Bank and Bristol Bay areas. On June 4th, 1991, the ACC provided your office with a written comment endorsing a permanent closure of the Petrel Bank area to scallop dredging. A copy of that comment is provided as an attachment to these current recommendations.

During the summer of 1991, the ACC also provided a copy of a report by M.M. Aschan to ADF & G staff, "Effects of Iceland

Scallop Dredging on Benthic Communities in the Northeast Atlantic," 1991. This paper is referenced in the proposed interim plan measures and it is one of the most current research papers on the impacts of scallop dredging. In addition to the use of dredging to collect samples, the research team used underwater photography quite extensively which leads to definitive conclusions about disruption of benthic habitats and organisms.

The ACC has also reviewed an industry paper on the proposed regulations, presented by a Kodiak scallop fisherman and notes that the recommendations parallel a number of the ADF & G staff recommendations.

Historically the scallop fisheries in Alaska have represented only a small part of the total economic value of fisheries since 1967. The exvessel value of the fisheries has varied from no season to a high of $5 million dollars in 1990 and currently provides an exvessel value of $3.7 million dollars for 10 vessel entities. This relates to the need to weigh the resource conservation risks this relatively small fishery presents to large scale crab and bottomfish fisheries. Scallop dredges impact not only immature scallops, but other organisms comprising the benthic communities and the alteration of bottom habitats upon which other commercial species depend.

Scallops have been vulnerable to overharvesting, not only in Alaska, but other areas in the world. Depressed stocks are very slow to recover. Characteristically, localized depletion requires scallop fishermen to frequently shift effort to new areas to maintain harvest levels. Bering Sea crab fishermen view recent efforts by scallop fishermen to move into the Bering Sea as a major threat to long term sustained king and tanner crab harvests.

The threat of scallop dredging in the Petrel Bank area and Bristol Bay king crab registration area T remain of intense concern to the members of the Alaska Crab Coalition.

COMMENTS AND RECOMMENDATIONS:

1. A "passive mangement" plan is recommended overall for the scallop fisheries, as described on page 10 of the Proposed Interim Measures. ADF & G is experiencing significant budget reductions in several regions. The Westward Shellfish Division which will have the primary responsibility for managing the scallop fisheries is already severely lacking in management funds for the $350 million dollar Bering Sea king and tanner crab fisheries. The scallop fishery will add an additional financial burden to the Department for research and management of a fishery that pales in economic comparison to the value of the crab fisheries.

The Interim Management Measures document notes that "in the long term, more active scallop fishery management may be needed to ensure resource conservation." (Page 5).

The public notice of proposed changes in scallop regulations (July 27, 1992) states that the proposed "action is not expected to require an increased appropriation."

It seems apparent that under the constraints of no increase in appropriation for management and statutory mandates to ensure conservation of the scallop resources and to minimize impacts to existing user groups, a conservative passive management plan is necessary.

The basic elements of a passive management plan include limited open seasons with closures during spawning periods, closures of high bycatch areas, conservative size limits to provide near-maximal growth and high reproductive potential and dredge width and ring size gear restrictions.

2. Continuation of existing areas closed to scallop dredging in the Gulf of Alaska and adjacent to the south side of the Alaska Peninsula is recommended.

In addition, it is requested that new closed areas be established for the entire Petrel Bank area in the Aleutians and Bristol Bay king crab registration area T, to minimize the bycatches of depressed king crab stocks and to prevent disruption of benthic organisms and habitats.

3. Requirement for onboard observers: 100% observer coverage for scallop catcher processors and catcher vessels 125' (LOA) or more in length; and 30% observer coverage for vessels 60' to 125' in length. These levels of coverage are consistent with the federal groundfish observer program.

4. Establishment of GHLs or OYs, based on historic levels, are recommended to prevent overharvests and to promote sustainable fisheries. Resource assessment surveys will require an increase in appropriations.

The ACC has no comment on the proposed moratorium for new entrants into the scallop fisheries at this time.

ICES Benthos Ecology Working Group, Halifax 6-10 May 1991
Special International Workshop on the EFFECTS OF PHYSICAL DISTURBANCE OF THE SEAFLOOR ON BENTHIC AND EPIBENTHIC ECOSYSTEMS
Bedford Institute of Oceanography, 10 May 1991

EFFECTS OF ICELAND SCALLOP DREDGING ON BENTHIC COMMUNITIES IN THE NORTHEAST ATLANTIC

by

Michaela M. Aschan
Norwegian College of Fisheries Science,
University of Tromsø. P. O. Box 3083 Guleng,
9001 Tromsø, Norway

ABSTRACT

In this paper the effects of dredging on the macrobenthos of Chlamys islandica fields will be presented. The study was conducted from the research vessel R/V "Johan Ruud" during the summers 1987-1990 in an area South of Jan Mayen at 60-120 m depth and at the northern side of Spitsbergen at 25-80 m depth. Data on the faunal composition was collected by dredging, photography and underwater video recording.

In addition to Chlamys islandica the dominating species are Strongylocentrotus droebachiensis, Ophiopholis aculeata, Ophiura robusta and Astarte sp. At Jan Mayen both the sea cucumber Cucumaria frondosa and the Crustaceans Sabinea septemcarinatus and Spirontocaris spinus are common. In the Svalbard area, the Crustaceans Hyas coarctatus, Sclerocrangon boreas, Lebbeus polaris and Balanus which encrusts the scallops are caracteristic.

As a result of the scallop dredging the number of species, the number of individuals/sample and the biomass in each sample, deminished from 1987 to 1990 in the Moffen area (N Svalbard). Strongylocentrotus droebachiensis and Pagurus pubescens became more dominant during the four years of heavy dredging, because they probably stand the physical disturbance better than other species. In the Jan Mayen area no recovery could be observed two years after the fishery stopped. However, Ophiura robusta and polychaetes showed an increase.

INTRODUCTION

The Iceland Scallop (Chlamys islandica) is a circumpolar arctic species that is common along the North Norwegian coast, around the Jan Mayen Island and in the Svalbard zone, including the waters around Spitsbergen and the Bear Island (Ekman 1953, Wiborg & Bohle 1968).

The Norwegian Iceland Scallop fisheries started in 1984 and increased rapidly. The production reached its maximum in 1987 and declined dramatically during the subsequent years, this is illustrated by the data in Table 1.

Table 1. The produced frozen scallop muscle and number of processing vessels (Havforskningsinstituttet 1990).

	Scallop muscle	Vessels
1985	100 ton	
1986	1463 ton	
1987	4495 ton	26
1989	2033 ton	7
1990	1350 ton	3
1990	? 400 ton	2

In the beginning of 1987, 26 sea going vessels were dredging for Scallops. The fisheries were concentrated south of the Jan Mayen island, but as the resources decreased the fishery expanded to the Svalbard zone. Here dredging and processing is more difficult because of worse ice and weather conditions and the high density of fouling organisms (Balanus) covering the shells. In June 1987 the scallop density at Jan Mayen was reduced to 25 % of the density in 1986 and the scallop field was closed in August the same year. Today only two vessels are operating.

There have been attempts to fish in Soviet and Canadian waters but with poor success. In August 1987, the whole Jan Mayen area was closed and in December 1988 one area north of Bear Island and one area northwest of Moffen (N Svalbard) were closed. At the same time, the minimum size limit was set to 60 mm. The total Iceland Scallop resource of the area studied was estimated at 450,000 tons round weight in 1986 and was in 1988 reduced by approximately 130,000 tons (30%). It is difficult to forecast the efficiency and profitability of the fisheries this season, but

it is obvious that the production is going to decrease.

The fishing procedure is harmful to benthic organisms. E.g. on the Ms Concordia 3 dredges each 5 m broad dredge continuously at a speed of 4-5 knots (Fig. 1a). Up to 4.000 tons of stones, gravel and organisms were taken on board daily resulting in about 3 tons of produced muscle. In the processing everything with the size between 45 mm and 70 mm narrow, goes through the process including heating to 80 °C (Fig. 1b). (Oterhals 1988).

The field work was done in cooperation with the project "Resource mapping of Chlamys islandica at Jan Mayen and in the Spitsbergen area" lead by Jan Sundet (Rubach & Sundet 1987, Sundet & Rubach 1988). This project had already started already in 1986.

MATERIAL AND METHODS

The study was conducted from the research vessel F/F Johan Ruud in the summers 1987-1989 in an area South of Jan Mayen at 60-120 m depth, and in the summers 1987-90 in the Moffen area (N Spitsbergen) at 25-80 m depth. The study areas were selected according to the results of the "Resource mapping of Chlamys islandica" project in 1986 and were limited to the areas with the highest densities of Chlamys islandica (Fig. 2a & 2b). The stations were layed out along a regular grid when ever the ice conditions premitted.

Data on faunal composition were collected by dredging, underwater photography (Benthos camera on ridge taking pictures of 1.5 m^2), and videorecording (Osspray videocamera on a sledge). A triangular dredge (1*1*1 m) was towed for 3 minutes at each station. When the sample was taken on board, the total volume of the dredge was estimated, the bottom quality was characterised, scallops and cluckers were counted and a subsample of 10 liters was taken for further faunal analysis. The macrozoobenthos of this sample was carefully sorted and then frozen for further analysis in the laboratory.

Species numbers, the distribution of individuals among species and biomass numbers were compared between areas and years. Multivariate statistics will be used to find groups of associated species and to separate stations over time and space.

RESULTS

The Chlamys islandica community

The bottom is stony or rocky, often covered with shell sand and is inhabited by a current-tolerant hard-bottom fauna. In the studied areas the general structure of the communities seems to be quite similar according to dominating species which are, Astarte sp., Strongylocentrotus droebachiensis, Ophiopholis aculeata and Ophiura robusta. However, there are geographic differences especially between the Jan Mayen and the Svalbard communities. At Jan Mayen the seacucumber Cucumaria frondosa is common as well as the Crustaceans Sabinea septemcarinatus and Spirontocaris spinus. In the Svalbard area, the Crustaceans Hyas coarctatus, Sclerocrangon boreas, Lebbeus polaris and Balanus are characteristic. There were 21 species common for both areas in 1987. The number of species was approximately the same for Svalbard and Jan Mayen. The average number of individuals in each sample was smaller in the Svalbard area than off Jan Mayen (see Table 2).

Effects on the fauna

As seen in Table 2 the number of species in the Moffen area has decreased during the years with intensive dredging. At Jan Mayen there is no significant increase in species number since the fisheries stopped. Also the number of individuals and the biomass per sample stays resonably constant during the period studied. At Moffen the species number and the biomass had been reduced to nearly half of that found in 1987.

There has been no increase in the scallop density in the Jan Mayen area since the fishery was stopped in 1987, probably because there has been no successful recruitment. Although the density of the scallops in the whole Svalbard area has not shown any drastic decline, that in the heavily fished area around Moffen has fallen sharply.

The last 7-8 year classes are underrepresented and very few small scallops (1-5 years) have been found within any of the areas studied. Rubach (1989) concludes that the recruitment in the area varies due to unfavourable environmental conditions effecting the sensitive larval and settling stages. The absence of young scallops in a population has often been attributed to the existence of particular nursery ground due to specific substrate demands (Sundet & Aschan submitted). Fevolden (1989) concluded that populations although polymorphic, are mainly recruited from their own area, and that the conservative approach of managing each area as if it was discrete genetic unit of the species, should be adopted. It can not be proved that the heavy dredging activity is the reason to unsuccessful recruitment. Ice-cover seems to effect recruitment through its effect on phytoplankton production (Aschan & Sundet submitted).

DISCUSSION

Dredging is not a quantitative method, the number of individuals of each species per square metre can not be estimated, but a list of dominating species can be achieved. Accurate abundances could be estimated from the photographs and video-recordings taken in 1987 and 1988 respectively, but poor picture quality prevents the identification of small species. Another problem is the scale of aggregation for the species requires a denser station grid. This is not possible with the existing equipment. There are several problems with getting good quantitative faunal data. It seems as video recording of the bottom along depth gradients will give the best results when the picture quality is further enhanced.

Commercial dredging has a great influence at the bottom communities in the scallop fields. This can be to illustrated by the fact that often more than half the stones dredged and taken for processing are washed clean of the normally characteristic

Table 2. The fauna of the Moffen and the Jan Mayen area.

JAN MAYEN

	1987	1988	1989
SAMPLES	33	24	67
SPECIES	31	27	32
IND./SAMPLE	130	136	124
H'	1,17	1,21	1,13

MOFFEN

	1987	1988	1989	1990
SAMPLES	75	84	152	33
SPECIES	36	34	30	22
IND./ SAMPLE	49	51	31	26
H'	1,13	1,12	1,20	1,12

In the Svalbard area the dominant species were the same in 1987 as in 1988, Ophiopholis aculeata, Strongylocentrotus droebachiensis and Chlamys islandica representing 70 % of the fauna. The Decapod Lebbeus polaris, which was common in 1987, has been reduced due to the dredging. On the other hand, Pagurus pubescens becomes more common. Polychaetes also become more common, probably because of their opportunistic abilities.

Off the Jan Mayen, where the fisheries stopped in 1987, Ophiura robusta has increased. Probably this increase is also caused by opportunistic behaviour. The sea urchin Strongylosentrotus droebachiensis, which that probably withstands dredging better than other species, dominated in 1987. However, it was less dominant in 1989 when the more opportunistic species recovered. The Chlamys islandica does not show any increase since the fisheries stopped. Astarte shows a decrease as does fish.

Dredge samples from areas recently fished had higher numbers of fin-fish (e.g. Myxochepalus scorpius) than samples taken during intense fishing of the area or during the months after dredging. This indicates that fish invade when the "noisy" vessels have left and feed on the dead organisms, only to disappear again when the dead organic material has been eaten.

The Scallop population

red Corallina cover. That means that there are bottoms where over 50 % of the bottom substrate has, at some time, gone through the processing factory of a scallop vessel, and is thus more or less sterile. When the area had been dredged commercially within the last month the samples often smelled of dead organic material. Dredge tracks edged with ridges, could easily be observed during video recording. In the Moffen area the bottom substrate changed from shell-sand in 1987 to clay and big stones in 1990. This is a result of the dredges digging up the stones from the substrate and then dropping them on its surface. Other signs of dredging activity were high numbers of scallops in the catch which appeared as cluckers or cracked shells. In the Svalbard area where the scallop is encrusted by Balanus the shells are scraped clean in the process on board the vessels. Organisms that are caught by the commercial dredge will probably be killed during processing when they are crushed by stones or are heated.

The diversity in the Jan Mayen area (1.12-1.21) is lower than in neighbouring hardbottom communities (1.20-2.20) sudied by Gulliksen et al.(1980). This can be explaned by the dredging, as can the decrease in species number and abundance in the Moffen area.

The data from 1988-89 have not been fully analysed but it seems as if there has been no drastic changes in the Jan Mayen area since November 1987, when the area was closed for fishing. In the Svalbard area the biomass and number of individuals have reduced especially in the Moffen area, where there has been heavy fishing during the last season. However, deep ice has probably caused reduction of species and individuals at shallow stations (< 40m).

Strongylocentrotus droebachiensis and Pagurus pubescens seem to be physically better able to stand dredging as they dominate in areas which have been recently dredged heavily. No obvious opportunistic species have yet been discovered as a consequence of scallop exploitation. Ophiura robusta and polychetes seem to thrive in the exploited areas. The increasing number of polychaetes can be explaned by the change in sediment qualiy referred to above.

It is still difficult to tell what the long term effects of the scallop fishery will be for the macrobenthic communities of

the scallop fields. Further studies are required to determine possible patterns of succession for recolonisation and commmunity recovery in heavily exploited areas.

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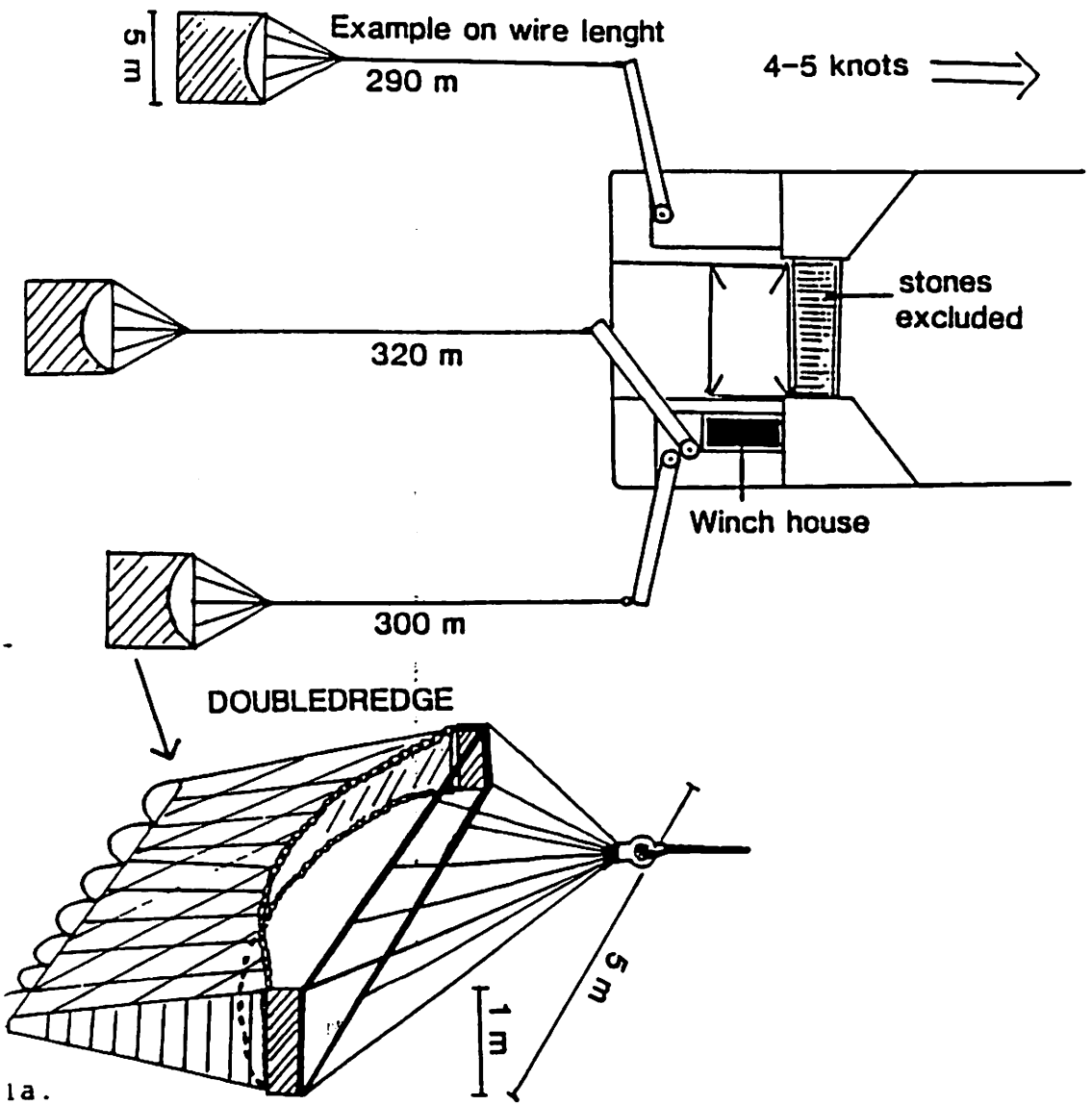

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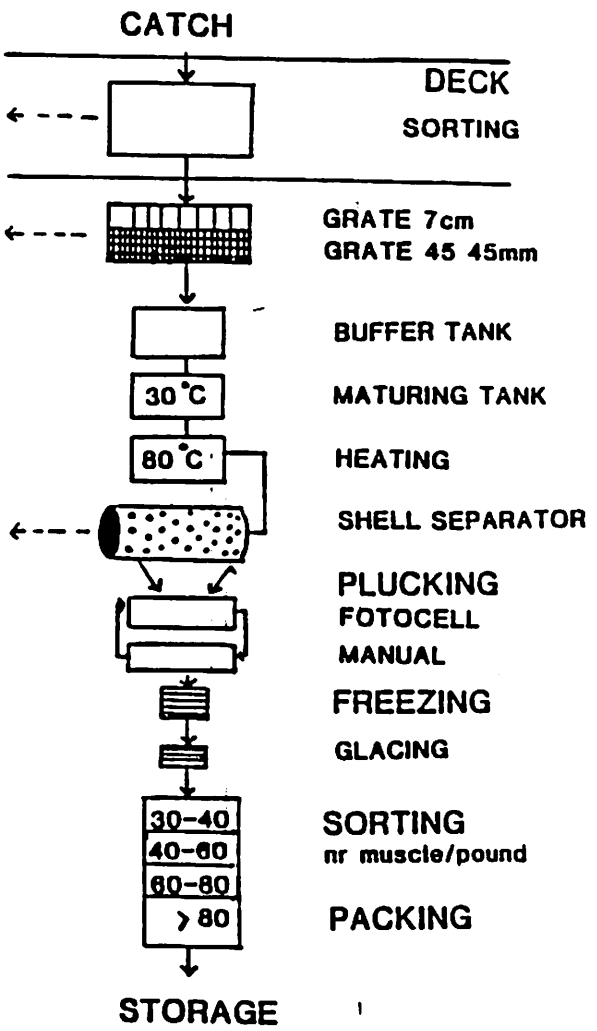
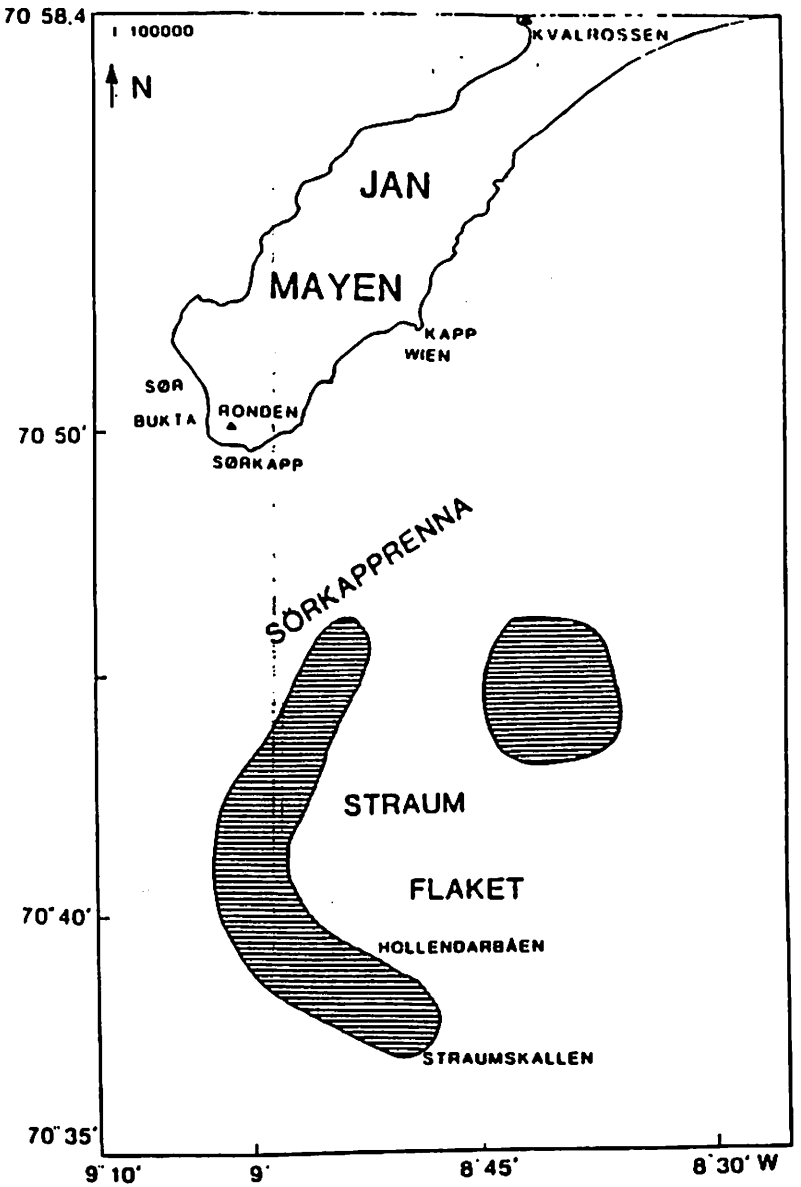


1b.

Fig. 1a. The fishing procedure of M. S. Concordia. After Oterhals (1988).
Fig. 1b. The processing procedure onboard M. S. Concordia.



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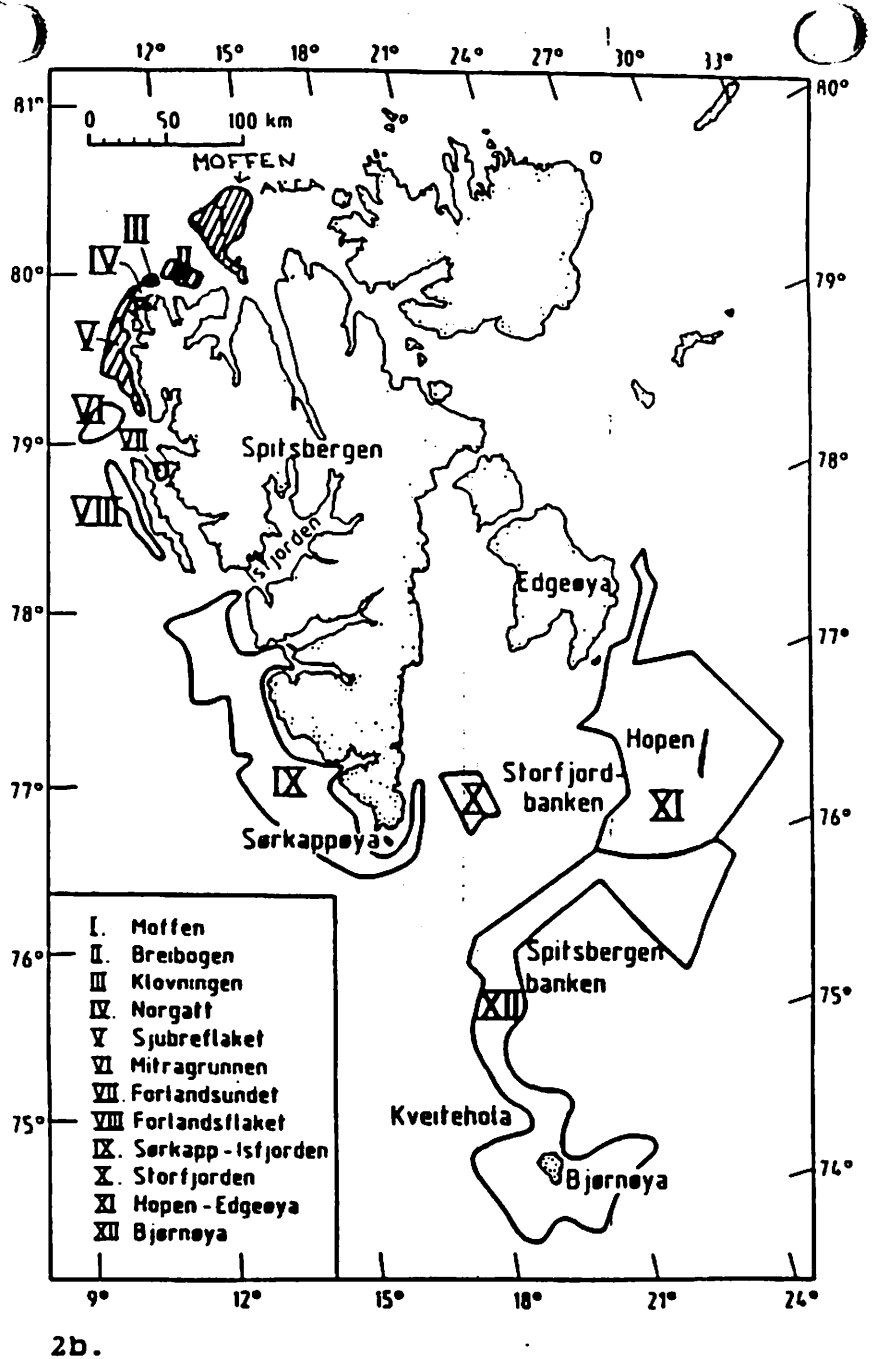
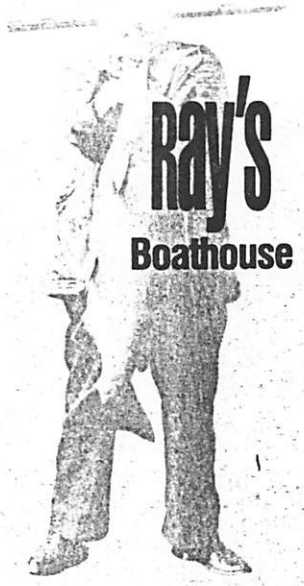


2b.

Fig. 2a. The Study area close to Jan Mayen. Scattered areas have been studied.
Fig. 2b. The study area close to Svalbard. After Rubach & Sundet (1987)



Jan 16, 1993

To who it may concern,

Ray's Boathouse is committed to serving only the finest quality Northwest seafood products. We are proud to serve Nova brand weathervane scallops. Nova Fisheries consistently deliver top quality scallops because they freeze them at sea and refuse to add phosphates or sulfites to "enhance" their product. It is of great importance to me that they continue their current method of production.

Sincerely,

Christopher J. O'Brien
acting chef

Ray's Boathouse, Inc.
6049 Seaview Avenue N.W. Seattle, WA 98107
(206) 789-3770 Fax: (206) 781-1960

RESTAURANTS UNLIMITED

January 19, 1993

Mr. Blair Culter
Nova Fisheries
4507 Shilshole Ave N.W.
Seattle, WA 98107

Dear Blair:

We have specified exclusively Alaska Frozen-at-Sea Scallops for eight years for our twenty-four restaurants (previously we specified Australian Scallops).

We find the product to be of excellent quality. Since excellent quality is our standard, we have used Alaska Scallops because of continuity of supply, consistent pricing and great marketing allure. It would be a shame if unlimited harvest caused stocks to be reduced, upsetting the current balance. It would force us to alternative products from Australia or Canada.

Sincerely,

RESTAURANTS UNLIMITED, INC.

David M. Johnson
Vice President–Purchasing and Distribution

DJ/kt

Agenda item C-5

PROPOSED INTERIM MANAGEMENT MEASURES FOR COMMERCIAL SCALLOP FISHERIES IN ALASKA

By

Gordon H. Kruse

Paul R. Larson

and

Margaret C. Murphy

Regional Information Report[1] No. 5J92-08
Alaska Department of Fish & Game
Division of Commercial Fisheries
P.O. Box 25526
Juneau, Alaska 99802-5526

July 27, 1992

[1]The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished divisional reports. These reports frequently serve diverse ad hoc informational purposes or archive basic uninterpreted data. To accommodate timely reporting of recently collected information, reports in this series undergo only limited internal review and may contain preliminary data; this information may be subsequently finalized and published in the formal literature. Consequently, these reports should not be cited without prior approval of the author or the Division of Commercial Fisheries.

EXECUTIVE SUMMARY

The commercial fishery for weathervane scallops *(Patinopecten caurinus* Gould, 1850) in Alaska began in 1967. Since then, harvests of scallops have ranged from 1,850,187 pounds of shucked meats in 1969 to zero in 1978. Currently, maximum sustainable yield may be exceeded. Recent harvests are the highest since early exploitation on virgin stocks and shifts in effort to new fishing areas have occurred to achieve these harvests. Worldwide, scallops are vulnerable to overharvest, and recovery of depressed stocks may be very slow.

To address conservation concerns, the Alaska Department of Fish and Game is considering adoption of an interim management plan and associated regulations to manage the scallop fisheries in Alaska. To date, no comprehensive set of regulations exists to address issues of conservation, allocation, and conduct of an orderly fishery. If approved, the interim plan will be implemented, and the Alaska Board of Fisheries will be petitioned to consider adoption of a permanent management plan and regulations at its meeting in February 1993. Also, with the approval of the Alaska Board of Fisheries, the department is considering an option to submit a petition to the Commercial Fisheries Entry Commission to establish a four-year moratorium on new entrants into the Alaska scallop fishery.

The purpose of this document is to provide a profile of the proposed scallop management strategy and associated regulations for public review. Although these management provisions are intended for all scallop species, most discussion focusses on weathervane scallops, the species of greatest commercial importance. The document provides a summary of the management goal and objectives, commercial fishery and existing regulations, biology and life history of the species, outlook for future fishery yields, conservation concerns, proposed management alternatives and regulations, evaluation of potential effects on users, and a note on subsistence use. The department is soliciting comments on management alternatives and proposed regulations, including the possibility of a moratorium on new fishery participants.

The management goal for scallop fisheries is to maximize the overall long-term benefit of scallop resources to residents of the State of Alaska and the nation, while providing for conservation of scallop populations and their habitats. Within the scope of this goal, there are five specific objectives that address: (1) biological conservation of scallop stocks; (2) bycatch of other species and gear-induced habitat alteration; (3) sustainable and orderly fisheries that promote long-term economic and social benefits; (4) maintenance of resource availability to subsistence users; and (5) conduct of fishery research to increase the information base for future management decisions.

The draft interim management plan is designed to attain the management goal and objectives. Although a wide range of management approaches and regulations are being considered, at a minimum, the department is favoring the adoption of four new regulations in addition to those already in place: (1) closure of the commercial fishing season during the spawning period; (2) establishment of a minimum size for retention of scallops; (3) requirement for onboard observers; and (4) establishment of guideline harvest levels or optimum yields from each stock. Agency staff analyses and public comments on the proposed interim management plan and

regulations will be thoroughly considered by the department before adoption of a final interim management plan and implementation of associated fishing regulations.

INTRODUCTION

The Alaska Department of Fish and Game (ADF&G) is considering adoption of an interim management plan and associated regulations for the scallop fisheries in the State of Alaska until such time that the Alaska Board of Fisheries (BOF) can adopt permanent regulations. The interim management plan and regulations may be adopted under authority of the Alaska Administrative Code (AAC): 5 AAC 39.210 (ADF&G 1992), Management Plan for High Impact Emerging Fisheries (See chapter 39: "general provisions" in Appendix 1).

The purpose of this document is to provide a draft framework of the proposed interim management plan and associated regulations for public review. Although most discussion focusses on the weathervane scallop *(Patinopecten caurinus* Gould, 1850), the management framework is intended to apply to all scallop species in Alaska. Specifically, the following are reviewed in this report: (1) goal of the interim fishery management plan; (2) management objectives; (3) brief description of the Alaskan scallop fishery and current regulations; (4) overview of biology and life history of weathervane scallops; (5) outlook of future fishery productivity and sustained yield; (6) possible fishery impacts and resource conservation concerns; (7) proposed management alternatives and regulations; (8) evaluation of potential effects on existing users; and (9) customary and traditional subsistence use patterns.

The department is soliciting comments and suggestions on the interim management plan and regulations described in this document. Interested persons may present written comments relevant to the proposed actions in this document and legal notice (see Appendix 2) no later than 5:00 p.m. September 4, 1992. Written comments should be addressed to: Commissioner Carl L. Rosier, Alaska Department of Fish and Game, P.O. Box 25526, Juneau, Alaska 99802-5526.

GOAL OF FISHERY MANAGEMENT PLAN

The management goal for scallop fisheries is to maximize the overall long-term benefit of scallop resources to residents of the State of Alaska and the nation, while providing for conservation of scallop populations and their habitats.

MANAGEMENT OBJECTIVES

Within the scope of the management goal, five specific objectives have been identified. These objectives concern biological conservation, habitat, sustainable and orderly fisheries, subsistence, and fishery research.

Biological Conservation Objective

The biological conservation objective is to ensure the long-term reproductive viability of scallop populations. The maintenance of adequate reproductive potential in each scallop population takes precedence over other economic, social, management and research considerations. To ensure continued reproductive viability of scallop stocks, management measures will be designed to prevent recruitment overfishing by preventing the spawning stock from being reduced to too low a level to ensure adequate production of recruits to future fisheries. Management measures that could be used to attain the biological conservation objective include: (1) closures during spawning seasons; (2) minimum shell height; (3) size limits on dredge rings; and (4) guideline harvest levels (GHLs) or optimum yields (OYs).

Bycatch and Habitat Objective

The impacts of scallop dredges on other fish and shellfish populations and the quality and availability of habitat supporting populations of scallops and other species are of concern. The bycatch and habitat objective is to minimize adverse effects of this gear on incidental harvest of other species and on bottom habitat needed for recruitment and survival of scallops and other bottom-dwelling organisms, particularly those of commercial importance. Management measures that could be used to attain this objective may include onboard observers and closed areas. Research studies on bycatch and habitat may promote this objective, as well.

Sustainable and Orderly Fishery Objective

The sustainable and orderly fishery objective is to ensure the conduct of manageable, steady-paced scallop fisheries that provide stable employment opportunities and maintain supplies of high quality scallops to seafood markets. Toward this end, populations of large scallops will be perpetuated to enhance product marketability, favorable prices, and stability in landings, personal income, and employment. It is recognized that this objective will promote long-term economic and social benefits over and above short-term gains associated with "boom-and-bust" fisheries. Therefore, management measures will be designed to sustain scallop fisheries over the long-term despite sporadic recruitment events. Applicable management measures may include: (1) GHLs; (2) time/area closures; (3) observers; (4) trip limits; (5) rotational harvest areas; (6) quarterly fishing periods with separate quotas; (7) moratorium on new entrants; and (8) measures that reduce harvest/processing rates, such as minimum dredge width or crew size limits.

Subsistence Objective

Where appropriate, the subsistence objective is to ensure that scallop harvest requirements by traditional users in coastal communities are met, as required by law. Abundance and availability of local scallop stocks to subsistence users must be protected from deleterious effects of

commercial fisheries. Management must assure that traditional subsistence users are not adversely impacted by commercial harvest of scallops. This objective could be attained by closing subsistence harvest areas to commercial harvest.

Research Objective

The research objective is to gather and analyze data relevant to attaining fishery management objectives and to ensure that management plans are adjusted to reflect this new knowledge. Priority research topics may include: (1) new gear designs to increase efficiency, reduce bycatch, and minimize adverse effects on bottom habitat; (2) estimation of comparative mortality associated with regulations for minimum dredge ring size or minimum shell height; (3) estimation of population abundance and size/age structure; (4) scallop biology, life history, and stock production parameters; (5) analyses of reproductive potential, population thresholds, and recruitment overfishing; (6) investigations into exploitation rates and alternative management strategies; (7) genetic stock structure; and others. This objective may be attained by the institution of an observer program and the conduct of scallop research, perhaps paid by test fishing receipts, State of Alaska general fund appropriations, federal aid funds, or research grants.

THE ALASKA SCALLOP FISHERY AND CURRENT REGULATIONS

Interest in an Alaskan scallop fishery has existed since the early 1950's when the Bureau of Commercial Fisheries began systematic surveys to determine if commercial quantities were available. It was not until 1967 that the first commercial deliveries were made. The numbers of vessels, numbers of landings and harvest (weight of shucked meats) have varied annually (Table 1). Generally, approximately two-thirds of the harvest has been taken off Kodiak Island and about one-third has come from the area between Cape Spencer to Cape St. Elias; other areas have made minor contributions to overall landings. Total commercial harvest of scallops has fluctuated from a high of 157 landings totalling 1,850,187 pounds of shucked meats by 19 vessels in 1969 to no landings in 1978. Harvests in 1990 and 1991 were the highest on record since the early 1970's.

Economic trends of the fishery depend upon the performance measures considered. For example, vessels averaged 212,000 pounds each during the early "fishing-up period" (1970-1973) of the fishery. During 1974-1986, landings per vessel averaged only about one-third (66,000 pounds) of the 1970-1973 average, but increased to about one-half (114,000 pounds) of the original level during the 1987-1991 period (Table 1). On the other hand, average gross receipts (exvessel value) per vessel reveal a different trend due to price effects during these same three time periods: $234,000, $178,000, and $400,000, respectively (Table 1).

The department's current scallop fishery management efforts are very minimal and passive in nature. In general, area specific regulations have been designed to address crab bycatch issues and not scallop fishery management directly. With the exception of recent actions that closed a portion of Prince William Sound (PWS), the department has not taken an active role in

inseason management of scallop resources. In the long term, more active scallop fishery management may be needed to ensure resource conservation.

The Alaskan commercial scallop fishery is currently being managed under miscellaneous shellfish regulations, contained in Chapter 38 of the Alaska Administrative Code; these regulations (Appendix 1) authorize management within five statistical areas (5 AAC 38.005). The state extends its management authority beyond Alaska's territorial sea to include the adjoining waters of the Exclusive Economic Zone (EEZ, 5 AAC 38.010). Because there is no federal fishery management plan, clearly the state has authority to regulate the scallop fishery in the EEZ.

For miscellaneous shellfish, the entire State of Alaska is considered as a single registration area (5 AAC 38.020). Therefore, an individual can fish scallops in all areas under a single Commercial Fishery Entry Commission (CFEC) Permit (commercial fishing license). However, in addition to an entry permit, a commissioner's permit is needed to take scallops commercially (5 AAC 38.062). The commissioner's permit may:

(1) stipulate location and duration of harvests;

(2) limit gear and other harvest procedures; and

(3) require periodic or annual reporting.

The allowable commercial gear is limited to scallop dredges (5 AAC 38.055). Scallop dredges are required to have rings with minimum inside diameters of four inches; except for vessels fishing west of Sanak Island (in the Aleutian Islands), where three inch rings may be used. The department is authorized to require observers aboard vessels fishing dredges with less than four inch rings. However, no existing regulations authorize the department to require observers aboard vessels operating dredges with standard four inch rings.

The current regulations in the Southeastern Alaska and PWS areas specify that there is no closed season for scallops (5 AAC 38.120 and 38.220). In the Yakutat area, the waters of Yakutat Bay are closed to scallop fishing (5 AAC 38.180). In these three areas, the scallop fishery is generally managed under the authorities provided in the existing statewide miscellaneous shellfish regulations, discussed above.

In the Cook Inlet and Westward areas, limited area-specific regulations are stipulated in addition to existing statewide regulations. These include fishing seasons (5 AAC 38.400) and area closures (5 AAC 38.424) in the Westward area and fishing seasons (5 AAC 38.280), area closures (5 AAC 38.324), a six foot wide dredge restriction (5 AAC 38.322), and a guideline harvest range (5 AAC 38.330) for portions of the Cook Inlet area.

MORATORIUM ON NEW ENTRANTS

In 1991, the Alaska Statutes were amended by the Alaska Legislature to authorize the Commercial Fisheries Entry Commission to establish a four-year moratorium on new entrants into new and emerging commercial fisheries. The statute [AS 16.43.325 (a)] allows a moratorium in a new and emerging commercial fishery:

> 1) that has experienced recent increases in fishing effort that are beyond a low, sporadic level of effort;
>
> 2) that has achieved a level of harvest that may be approaching or exceeding the maximum sustainable level for the fishery; and
>
> 3) for which there is insufficient biological and resource management information necessary to promote the conservation and sustained yield management of the fishery.

The enabling statutes (see Appendix 1) require the Commissioner of the Department of Fish and Game to petition the Commercial Fisheries Entry Commission to establish a moratorium before CFEC can take any action. Further, the statutes specify that the Board of Fisheries needs to approve the petition in a public meeting prior to submission to CFEC.

A moratorium on new entrants would stabilize fishing effort while the scallop fishery management plan is being developed and implemented. Additional increases in fishing effort could adversely impact the health of the resources, and could lead to a complete closure of the fishery by ADF&G. Rather, a moratorium would promote the orderly development of the state's scallop fishery, may be necessary to protect Alaska's scallop stocks from over-exploitation, and could preserve the economic health and stability of the commercial fishery. ADF&G is considering the possibility of seeking approval of the BOF to petition the CFEC to establish such a moratorium on new entrants.

REVIEW OF SCALLOP BIOLOGY AND LIFE HISTORY

Weathervane scallops are distributed from Point Reyes, California, to the Pribilof Islands, Alaska. The highest known densities in Alaska occur off Kodiak Island and along the eastern gulf coast from Cape Spencer to Cape St. Elias (Foster 1991). Scallops are found from intertidal waters to depths of 300 m (Foster 1991), but abundance tends to be greatest between depths of 45-130 m on beds of mud, clay, sand, and gravel (Hennick 1973). Similar to patterns documented for other scallop species (Caddy 1989; Robert and Jamieson 1986), beds are elongated along the direction of current flow, and aggregations often represent different age or size groups.

Mature males and females are distinguishable: female gonads are pink or orange-red whereas gonads of males are creamy white (Haynes and Powell 1968; Robinson and Breese 1984). Although spawning time varies with latitude and depth (Robinson and Breese 1984; MacDonald

and Bourne 1987), in Alaska weathervane scallops appear to mature in mid-December to late January and spawn in May to July depending on location (Hennick 1970a).

Scallops develop through egg, larval, juvenile, and adult life stages (Hennick 1973). Eggs and spermatozoa are released into the water, and fertilized eggs settle and become fixed to the bottom. After a few days, eggs hatch, and larvae rise into the water column and drift with ocean currents for about 3 weeks. Then, the larvae transform, and "post-larvae" settle and attach to a hard surface on the bottom with strings called "byssal threads." Young juveniles may remain attached, or they may become mobile by use of a "foot," or they may swim. Within a few months the shell develops pigmentation, and juveniles then resemble the adult in appearance.

Weathervane scallops are long-lived and natural mortality rates are low; individuals may live 28 years old or more (Hennick 1973). Generally, many juvenile scallops mature by age 3 at about 7.6 cm (3 inches) in shell height (SH), and virtually all scallops are mature by age 4 (Haynes and Powell 1968; Hennick 1973). Growth is most rapid during the first 10-11 years (Hennick 1973). However, growth, maximum size, and size at maturity vary significantly within and between beds and geographic areas. For example, on average, maximum size tends to be about 190 mm (7.5 inches) SH for Marmot Flats off Kodiak Island and only 144 mm (5.7 inches) SH for the Cape Fairweather - Cape St. Elias area (Kaiser 1986). The largest recorded specimen measured 250 mm (9.8 inches) SH and weighed 340 g (12 ounces, Hennick 1973). Although increasing with age and size, weight varies seasonally; meat yield declines during the spawning season and increases during the growing season.

OUTLOOK OF FISHERY PRODUCTIVITY AND SUSTAINED YIELD

Only limited information on biological productivity is available for weathervane scallops to promote the conservation of stocks and sustained yield of the fishery. Much of this information (Haynes and Powell 1968; Hennick 1970b, 1973) was collected during the early years of the fishery, but has been summarized more recently by Kaiser (1986). Although the fishery has been prosecuted every year since 1967 except 1978, the only assessment survey since 1972 was conducted in 1984 in lower Cook Inlet (Hammarstrom and Merritt 1985). Likewise, there have been no routine biological or fishery sampling programs conducted on weathervane scallops. The distribution of scallops in Alaskan waters is rather well-known, but insufficient information on abundance, exploitation rates, recruitment, mortality, and other key population dynamics parameters hampers fishery management.

It is widely accepted that fishery harvest levels should be prescribed in ways to prevent "recruitment overfishing" -- the condition that occurs when stocks are reduced to levels too low to produce adequate numbers of young scallops -- the future recruits to the fishery (Gulland 1983). Recruitment is a prerequisite for maintenance of viable populations, and is needed for sustainable harvests that support long-term economic benefits from the fishery.

The rate of natural mortality is one of the biological reference points commonly used in management of other fisheries to establish appropriate exploitation rates (Clark 1991). The longevity of weathervane scallops in Alaska implies that they experience very low natural mortality rates, and this requires that conservative commercial harvests of weathervane scallops may be necessary to maintain healthy stocks and sustainable fisheries. Unfortunately, other benchmarks that would bear on the choice of appropriate exploitation rates for weathervane scallops are not presently available; there is inadequate information on other biological production parameters, uncertainty in scallop population dynamics, and a lack of fishery yield models for Alaskan scallop fisheries.

Recent large variations in harvest (Table 1) and shifts in effort to new fishing areas may indicate that the maximum sustainable yield of the fishery is being exceeded. Further, it has been well-established that scallop populations worldwide are vulnerable to overharvest, and stock recovery may be slow (Aschan 1991; Bannister 1986; Bourne 1986; McLoughlin et al. 1991; Orensanz 1986). For these reasons, significant increases in scallop harvests in Alaska beyond historic levels should be avoided as they may jeopardize stock health and sustained fishery yield.

POSSIBLE FISHERY IMPACTS AND RESOURCE CONSERVATION CONCERNS

The Alaska Department of Fish and Game has a mandate to *manage, protect, maintain, improve, and extend the fish ... resources of the state in the interest of the economy and general well-being of the state* (State of Alaska 1987). Therefore, the impact of scallop fisheries on resource conservation is an important issue to the department, and fishery management plans must address these concerns.

Although not thoroughly investigated in Alaska, numerous studies elsewhere have examined the impacts of dredges on scallop stocks, other bottom-dwelling species, and habitat. Aside from appropriate levels of directed harvest discussed earlier, incidental mortality is another area of concern about fishery impacts with respect to scallop populations. Both direct and indirect sources of mortality must be considered in the fishery management plans that ensure long-term maintenance of healthy scallop stocks and productive fisheries.

Incidental mortality may occur by two mechanisms. The first is associated with the capture of small scallops that are handled and discarded at sea due to size regulations or economic considerations. Although many undamaged sea scallops that are quickly returned to the sea may experience no side effects (Naidu 1988), mortality may be significant when scallop catches containing rocks are dumped on a vessel's deck (Naidu 1988) or when scallops experience prolonged exposure to unfavorable onboard conditions (Medcof and Bourne 1964), such as extreme air temperatures or prolonged desiccation.

The second source of mortality is associated with "inefficiency" of scallop dredges. This type of fishing gear typically harvests only 5-35% of the scallops in their path, depending on dredge design, target species, bottom type, and other factors (McLoughlin et al. 1991). Of those 65-95%

that come in contact with the dredge but are not captured, some elude the passing dredge and recover completely from the gear interaction. But, others experience injuries that lead to immediate or subsequent mortality (Caddy 1968; Naidu 1988). Some scallops experience damage and death due to crushing by the dredge (Naidu 1988), the body cavities of others become impacted with sediment or shell fragments (Naidu 1988), and others may experience increased vulnerability to disease (McLoughlin et al. 1991) or predators (Elner and Jamieson 1979).

Not all injuries lead to subsequent death. Sublethal injuries occur, as evidenced by occurrences of shell deformities on live specimens (Naidu 1988; Caddy 1989). These injuries may occur during onboard handling of undersized scallops that are returned to the sea or during gear interactions on the sea floor.

Scallop dredges may adversely affect other organisms comprising benthic communities and these effects must be considered in the fishery management plan. Effects of scallop dredges on benthic communities in Alaska are not known, but limited data are available on incidental catches. In some areas, the catches of king and Tanner crabs may be high, and many captured crabs may be lethally damaged (Haynes and Powell 1968; Hennick 1973; Kaiser 1986). Some catches contain other species of crabs, shrimps, octopi, and fishes such as flatfishes, cod, and others (Hennick 1973). Seasonal and area-specific differences in bycatch rates exist. For example, in some areas incidental catches of king crabs may increase in spring as adult crabs migrate inshore for molting and mating, whereas other areas of dense scallop concentrations may possess few king crabs (Hennick 1973) and bycatch may be of little concern in these locations.

The last area of conservation concern is the alteration of bottom habitat by dredges. Dredging places fine sediments into suspension, buries gravel below the surface and overturns large rocks that are embedded in the substrate (NEFMC 1982). For some scallop species, it has been demonstrated that dredges may adversely affect substrate required for settlement of young to the bottom (Fonseca et al. 1984; Orensanz 1986). In fact, dredges have been banned in some parts of the world for these reasons (Orensanz 1986).

Conservation impacts of the scallop fishery in Alaska depend upon the particular suite of management measures adopted. An active management strategy may include stock assessment surveys, calculation of optimal exploitation rates, estimation of key biological production parameters (e.g., growth, mortality, recruitment, etc.), an observer program to monitor the incidental catches of other species, use of exploratory fisheries as a research tool to refine time/area closures, a catch sampling program, and evaluations of gear effects on habitat. As knowledge accrues from such an active program and conservation concerns are dealt with fittingly, new areas could be opened to fishing, higher exploitation rates may be specified, and overall fishery productivity may increase.

On the other hand, a passive management strategy may not contain a program to increase knowledge through data-gathering and analysis. A passive management program may be designed with a limited set of restrictive regulations to try to ensure resource conservation despite uncertainty about stock status and fishing effects. For example, grounds may be closed to scallop

fishing due to the possibility of crab bycatch, other areas may be closed to create scallop refuges that serve as "seed" stock, conservative minimum dredge ring sizes may be chosen in an attempt to ensure adequate escapement of juvenile and adult scallops for future growth and reproduction, and broad summer seasonal closures may be selected to cover the range of possible spawning seasons in Alaska. In addition, conservative estimates of OY based on historic catch may be prescribed to cap the harvest in an attempt to prevent boom-bust fisheries, recruitment overfishing, and stock collapses.

An optimal management plan strives to achieve a balance of factors, such as cost-effectiveness, enforceability, resource conservation, and positive economic benefits that accrue from commercial harvests. Ideally, the plan would provide mechanisms to gain information that can be used to improve the management plan without being too costly, and would provide for resource conservation without being overly restrictive to the fishery. Management alternatives and measures, articulated as follows, are being considered by the department in an attempt to achieve this balance.

PROPOSED MANAGEMENT ALTERNATIVES AND REGULATIONS

Management Alternatives

Management options for the scallop fishery cover a wide spectrum from very passive ("hands off") regulations to an active inseason management program. Passive regulatory measures require a minimum of inseason management activities while active regulatory measures require maximum inseason attention. The department is considering both active and passive measures to improve scallop management capabilities.

At one end of the spectrum, a passive management plan may consist of basic elements that include limited open seasons, closures of high bycatch areas, conservative minimum size limits to provide for near-maximal growth and high reproductive potential, and restrictive gear configurations. These elements would require very limited monitoring, and could be accomplished with minimal annual operating expenditures. However, to protect the health of scallop resources while lacking adequate data on stock status and fishery biology, management measures must be conservative.

On the other end of the spectrum, an active management program may permit more liberal management measures and higher harvest levels, but would require an increase in annual and inseason management activities. For example, an active management program may include such elements as a stock assessment survey, perhaps funded through a test fishing program; management to obtain a GHL based on a fixed exploitation rate strategy; inseason adjustments based on fishery-based assessments of local stock status; annual adjustments to time/area closures to minimize bycatch and to increase the numbers of scallop beds available to harvest; and

onboard observers to monitor fishery performance, enumerate bycatch, and to collect biological data, such as size, age, and spawning condition.

The examples of passive and active management, just provided, can be considered as "bookends" of the spectrum of possible management strategies. Obviously, a fully active management program may be very costly and may be unwarranted, given the present economic value of the scallop fishery in Alaska. Conversely, a fully passive management program designed to satisfy resource conservation concerns, given limited data, may be too restrictive to conduct a viable fishery. Therefore, it is likely that a blend of active and passive management measures are necessary to build a cost-effective program that attempts to maximize long-term benefits to the extent possible, while achieving resource conservation requirements.

Regulatory Options

The following are potential regulations that could be implemented by ADF&G in association with an interim fishery management plan:

1. registration requirements for scallop fishing vessels to identify and monitor fishing effort;
2. closure of the commercial season during the spawning season, which occurs approximately from May through July;
3. establishment of fishing periods to allow inseason monitoring of catch and effort by area;
4. establishment of an OY that caps annual harvest or a specification of annual GHLs;
5. measures to curtail harvesting/processing rates, such as specification of maximum size for scallop dredges or maximum crew sizes;
6. an increase in the legal minimum size for scallop dredge rings;
7. specification of a minimum size limit for scallops, as measured by shell height;
8. establishment of closed waters to minimize bycatch or establishment of new closed areas to create scallop refuges for seed stocks;
9. establishment of a rotational harvest system;
10. requirement of onboard observers;
11. establishment of trip limits; and
12. establishment of crew size limits.

In addition, the department is considering submitting a petition, with the approval of the Alaska Board of Fisheries, to the Commercial Fisheries Entry Commission to establish a four-year moratorium on new entrants to the Alaskan scallop fishery.

Preferred Actions

Agency staff analyses and public comments on the proposed interim management plan and regulations will be thoroughly considered by the department before adoption of a final interim management plan and implementation of associated fishing regulations. However, to meet the stated objectives, it should be noted that at the present time the department is favoring the adoption of at least four new regulations in addition to those already in place: (1) closure of the commercial fishing season during the spawning period; (2) institution of a minimum size for retention of scallops; (3) requirement for onboard observers funded by the industry; and (4) establishment of GHLs or OYs. Regardless of the regulations included in the interim management plan (assuming one is adopted by the commissioner of ADF&G), other regulations could be proposed for adoption at subsequent meetings of the BOF. For example, analyses of observer data on size composition of the catch may reveal that a need for greater ring sizes to increase yield per recruit by minimizing discard mortality of sublegal-sized scallops.

Once an interim management plan is adopted by the commissioner of ADF&G, the BOF will be notified that the scallop fishery is being managed as a high impact emerging fishery. Also, the department will petition the board to consider formal adoption of the scallop management plan and associated regulations at its next scheduled meeting (probably February 1993). Thereafter, the next planned BOF meeting to address scallops regulations will occur during spring 1994.

EVALUATION OF EFFECTS ON EXISTING USERS

Effects of an interim fishery management plan on existing users depends upon the particular suite of management measures and regulations adopted. Because this document only provides a mechanism for public comments and subsequent board evaluation, the exact set of regulations to be adopted cannot be specified at this time. For these reasons, it is not possible to estimate precise impacts of the management plan and regulations on existing users. However, insights are provided into potential impacts of the four new management measures currently favored by the department.

Potential *closures during the scallop spawning season* may impose costs to those vessels that would have otherwise fished during closed periods. Marginal costs will be nil for vessels fishing in those areas (e.g., Kamishak district of lower Cook Inlet) where fishing is not permitted currently during the spawning season, whereas costs may be greater for areas (e.g., Southeast Alaska, Yakutat, etc.) where there are no closed seasons at present. However, given available fishing effort during the balance of the year, it is unlikely that total harvest will be significantly affected by seasonal closures alone.

Establishment of a minimum size limit will reduce catch rates. Increased costs will occur due to avoidance of high density areas of undersized scallops or due to additional onboard sorting of sublegal scallops. On the other hand, catch rates of larger scallops may increase in the future as more young scallops survive and grow to legal size. Additionally, to the extent that a minimum size limit acts to prevent recruitment overfishing, long-term fishery productivity may be higher than levels that would occur without this regulation.

New *requirements for onboard observers* would impose a cost to existing users. As a benchmark, it was recently estimated that observers in the ADF&G shellfish observer program cost an average of about $7,400 per month. This estimate includes salary, benefits, insurance, travel, and other taxes and fees. In the crab and groundfish fisheries in the EEZ off Alaska, such costs have been widely accepted as necessary to enumerate harvests, discards, and bycatches and for enforcement considerations.

Establishment of an optimum yield or annual guideline harvest levels may have differential effects on existing users, depending on the level of yield specified, productivity of scallop stocks, and future changes in numbers of participants. If the number of participants exhibits historic patterns in the future, then total harvest per vessel may reflect historical values, as well. In such case, higher exvessel value would be realized only through increases in exvessel price. On the other hand, if more vessels participate in the fishery in the future, then existing users will capture smaller harvest shares. Establishment of OYs or GHLs may increase long-term future harvest above those levels that would occur in the absence of these management measures, if OYs and GHLs help prevent overharvest and promote sustainable fisheries, as planned.

CUSTOMARY AND TRADITIONAL SUBSISTENCE USE PATTERNS

Scallops do not comprise a major component of subsistence harvest. However, under the current management system, commercial fishing permits for weathervane scallops have not been issued for inside waters of Southeast Alaska (Statistical Area A), because these stocks are considered too limited to sustain a commercial fishery in addition to existing harvests by subsistence, personal use and sport fishermen.

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Table 1. Historic number of vessels, number of landings, landed weight of shucked meats, price per pound, exvessel value, landings per vessel, and exvessel value per vessel for the weathervane scallop fishery in Alaska during 1967-1991. All data for 1967-1968, and prices and exvessel values for 1967-1975 and 1979 were taken from Kaiser (1986); all other data were summarized from fish tickets. The 1991 data are preliminary. In years when only one or two vessels participated in a fishery, the harvest statistics are confidential.

Year	No. of Vessels	No. of Landings	Landings Wt. (lbs)	Price ($/lb)	Exvessel Value ($)	Landings (lbs) per Vessel	Value ($) per Vessel
1967	<----------Confidential---------->						
1968	19	125	1,677,268	0.85	1,425,678	88,277	75,036
1969	19	157	1,850,187	0.85	1,572,659	97,378	82,772
1970	7	137	1,440,338	1.00	1,440,338	205,763	205,763
1971	5	60	931,151	1.05	977,709	186,230	195,542
1972	5	65	1,167,034	1.15	1,342,089	233,407	268,418
1973	5	45	1,109,405	1.20	1,331,286	221,881	266,257
1974	3	29	504,438	1.30	655,769	168,146	218,590
1975	4	56	435,672	1.40	609,941	108,918	152,485
1976	<----------Confidential---------->						
1977	<----------Confidential---------->						
1978	0	0	0	-	0	0	0
1979	<----------Confidential---------->						
1980	8	56	632,535	4.32	2,732,551	79,067	341,569
1981	18	101	924,441	4.05	3,743,986	51,358	207,999
1982	13	120	913,996	3.77	3,445,765	70,307	265,059
1983	6	31	194,116	4.88	947,286	32,353	157,881
1984	10	61	389,817	4.47	1,742,482	38,982	174,248
1985	9	54	647,292	3.12	2,019,551	71,921	224,395
1986	9	86	682,622	3.66	2,498,397	75,847	277,600
1987	4	55	583,043	3.38	1,970,685	145,761	492,671
1988	4	47	341,070	3.49	1,190,334	85,268	297,584
1989	7	54	525,598	3.68	1,934,201	75,085	276,314
1990	9	144	1,488,642	3.37	5,016,724	165,405	557,414
1991	10	125	1,006,332	3.75	3,773,745	100,633	377,375

APPENDIX 1. SCALLOP FISHING REGULATIONS AND SELECTED STATUTES

ALASKA COMMERCIAL SCALLOP FISHING REGULATIONS (IN EFFECT FOR 1992)

MISCELLANEOUS SHELLFISH
CHAPTER 38 - MISCELLANEOUS SHELLFISH

5 AAC 38.005. STATISTICAL AREAS ESTABLISHED. (a) For the miscellaneous shellfish fishery, there are established the following statistical areas with the following code letters:

Code Letter

A - Southeastern Alaska Area. (5 AAC 38.100)

D - Yakutat Area. (5 AAC 38.160)

E - Prince William Sound Area. (5 AAC 38.200)

H - Cook Inlet Area. (5 AAC 38.300)

J - Westward Area. (5 AAC 38.400)

(b) Statistical areas are areas which the department shall utilize to obtain biological and fishing effort data and other information necessary for the formulation of comprehensive and effective conservation and management regulations governing miscellaneous shellfish resources inhabiting territorial waters of Alaska. However, regulations governing territorial waters will be applied to the remainder of the Statistical Area consistent with 5 AAC 38.010.

(c) The seaward boundary of a statistical area is a line drawn in such a manner that each point on it is 200 nautical miles from the baseline from which the territorial sea is measured.

5 AAC 38.010. APPLICATION OF REGULATIONS. (a) Notwithstanding any other provision of this chapter, all regulations in this chapter applicable to territorial waters of Alaska shall be applicable also to the remainder of the Statistical Area or areas encompassing the territorial waters.

(b) Persons on a vessel navigating within a statistical area shall conduct their operations and activities in full compliance with the regulations applicable to the territorial waters of Alaska encompassed by the statistical area.

(c) The commissioner may suspend the application of this section wholly or partially in any statistical area if he finds that such application:

(1) does not tend to facilitate enforcement of regulations applicable to territorial waters of Alaska;

(2) does not tend to protect or conserve miscellaneous shellfish inhabiting the territorial waters of Alaska; or

(3) that the state has an insufficient interest in the miscellaneous shellfish inhabiting the statistical area to warrant extension of the jurisdiction of the state throughout the area.

5 AAC 38.020. REGISTRATION. (a) For the miscellaneous shellfish fishery, all territorial waters of Alaska shall be considered one registration area. All miscellaneous shellfish gear shall be registered, and all miscellaneous shellfish vessels shall be licensed and registered prior to fishing for any miscellaneous shellfish during a registration year.

(b) The registration year shall be January 1 through December 31.

5 AAC 38.035. AREA CLOSURES. (a) The commissioner shall monitor the condition of miscellaneous shellfish stocks in all statistical areas through the use of such data and information as are practically available.

(b) When the commissioner finds that continued fishing effort would jeopardize the viability of miscellaneous shellfish resources in territorial waters of Alaska within any statistical area, he shall close such waters by emergency order.

(c) In determining whether to close territorial waters of Alaska, the commissioner shall consider all appropriate factors to the extent there is information available on such factors. Factors which may be considered include:

(1) the effect of overall fishing effort within the Statistical Area encompassing the territorial waters of Alaska;

(2) catch per unit of effort and rate of harvest;

(3) relative abundance of miscellaneous shellfish resources in the area in comparison with preseason expectations of the department;

(4) such guideline harvest levels as may be promulgated by regulation;

(5) the proportion of immature shellfish being handled;

(6) general information on the condition of miscellaneous shellfish within the area;

(7) information pertaining to the maximum sustainable yield of miscellaneous shellfish within the area;

(8) timeliness and accuracy of catch reporting by buyers, fishermen or vessel operators within the registration area to the extent that such timeliness or accuracy may reasonably be expected to affect proper management; and

(9) adequacy of subsistence harvest within the areas.

(d) Within five days after the closure of any territorial waters of Alaska, the owner of any vessel registered for miscellaneous shellfish may formally request the commissioner to reopen such waters. The commissioner shall personally review pertinent information on the condition of the species within the area, and shall formally announce his decision within 14 days of the receipt of the request.

ARTICLE 2
GENERAL SPECIFICATIONS AND RESTRICTIONS

5 AAC 38.055. GEAR FOR SCALLOPS. (a) Scallops may be taken only by scallop dredges.

(b) Scallop dredge rings with less than four inch inside diameter may not be used or carried aboard scallop fishing vessels except as follows:

(1) scallop dredges with rings of three inches or greater inside diameter may be used from vessels fishing west of the longitude of the westernmost point of Sanak Island;

(2) a permit issued by the department is required for the use or transport of scallop dredges with rings of three inches or greater inside diameter; the permit may require a department observer aboard the vessel during periods or in locations as may be specified by the department; the permit may also specify conditions for transporting scallop dredges with rings of three inches or greater inside diameter to or from the area west of the longitude of the westernmost point of Sanak Island.

5 AAC 38.062. PERMITS FOR SCALLOPS, OCTOPI, SQUID, KOREAN HAIR CRAB, SEA URCHINS, SEA CUCUMBERS, SEA SNAILS, CORAL, AND OTHER MARINE INVERTEBRATES. (a) Unless otherwise specified in 5 AAC 03-
5 AAC 38, marine invertebrates, except king crab, Tanner crab, Dungeness crab, clams and spot, coonstripe, sidestripe and pink shrimp, may be taken only under the authority of a permit issued by the commissioner or his authorized designee.

(b) The permit may:

(1) stipulate location and duration of harvests;

(2) limit gear and other harvest procedures; and

(3) require periodic or annual reporting.

(c) The commissioner will in his or her discretion, require an application for a permit. The commissioner will, in his or her discretion refuse or terminate a permit if he finds that the terms of the permit have been violated or that the harvest operations jeopardize the sustained viability of the resource.

5 AAC 38.070. REGISTRATION AND INSPECTION DOCUMENTS. A vessel being registered for a registration area pursuant to 5 AAC 38.020, if the necessary information is provided, if properly licensed, and if the vessel is otherwise in compliance with the regulations of this title, shall be issued a registration certificate after the applicant completes a registration form available from the local representative of the department. The registration certificate shall be signed by the registrant, kept immediately available at all times during fishing operations by the vessel operator and shall be shown upon request to any authorized representative of the department.

ARTICLE 5
STATISTICAL AREA A (SOUTHEASTERN ALASKA)

5 AAC 38.120. FISHING SEASON FOR SCALLOPS IN AREA A. There is no closed season on scallops.

STATISTICAL AREA D (YAKUTAT)

5 AAC 38.167. FISHING SEASONS FOR SCALLOPS IN AREA D. There is no closed season on scallops.

5 AAC 38.180. CLOSED WATERS IN AREA D. The waters of Yakutat Bay east of a line from the easternmost tip of Ocean Cape to the southernmost tip of Point Manby are closed to the taking of scallops.

ARTICLE 6.
STATISTICAL AREA E (PRINCE WILLIAM SOUND)

5 AAC 38.220. FISHING SEASON FOR SCALLOPS. There is no closed season on scallops.

ARTICLE 7.
STATISTICAL AREA H (COOK INLET)

5 AAC 38.320. FISHING SEASONS FOR SCALLOPS. Scallops may be taken or possessed in

(1) the Kamishak District from August 15 through October 31, and

(2) in all other districts from January 1 through December 31.

5 AAC 38.322. GEAR FOR SCALLOPS. In the Kamishak, Southern, and Central districts, scallops may be taken only with a single dredge. The opening of a dredge may not be more than six feet in width.

5 AAC 38.324. CLOSED WATERS FOR SCALLOPS. Scallops may not be taken in the following waters:

(1) Cook Inlet north of a line from Cape Douglas to Point Adam, except for the Kamishak district;

(2) inshore from a line from Point Adam to Cape Elizabeth, then to the southwestern point of Perl Island, then to the southern point of East Chugach Island, then to Gore Point;

(3) Nuka Bay inside a line from Yalik Point to 59°27'30" N. lat., 150°22'50" W. long.

5 AAC 38.330. GUIDELINE HARVEST RANGE. The guideline harvest range for the taking of scallops from the Kamishak District is 10,000 to 20,000 pounds of shucked meat.

ARTICLE 8.
STATISTICAL AREA J (WESTWARD)

5 AAC 38.420. FISHING SEASONS FOR SCALLOPS. Scallops may be taken:

(1) from June 1 through March 31 in the Pacific Ocean waters north of 57°37'07" N. lat., and east of 152°09'01" W. long. (Cape Chiniak Light) and the waters of Shelikof Strait north of 57°17'20" N. lat. (the latitude of Cape Ikolik);

(2) from July 15 through March 31 in the Pacific Ocean waters south of the latitude of Cape Chiniak Light and waters east of the longitude of Cape Barnabas, excluding those waters northwest of a line from Cape Barnabas to Narrow Cape;

(3) there is no closed season for scallops in the remainder of Statistical Area J except as provided in Sec. 425 of this chapter.

5 AAC 38.425. CLOSED WATERS FOR SCALLOPS. Scallops may not be taken:

(1) in the Pacific Ocean waters of the Alaska Peninsula area between the longitude of Scotch Cap and the longitude of Cape Pankof, and waters of king crab registration area M extending shoreward and three miles seaward of a line (the base line) beginning at the southernmost tip of Cape Kumlik to the easternmost tip of Unavikshak Island to the southernmost tip of Atkulik Island to the easternmost tip of Kak Island to the easternmost tip of Castle Cap (Tuliumnit Point) to the easternmost tip of Chankliut Island and from there along the seaward coast to the southernmost tip of Chankliut Island to the southernmost tip of Seal Cape to the easternmost tip of Mitrofania Island to the southernmost tip of Spitz Island to the southernmost tip of Chiachi

Island, and all waters west of the southernmost tip of Kupreanof Point which are depicted as Territorial Sea on NOAA Chart #16540 (10th Ed. Oct 10/81) entitled, "Shumagin Island to Sanak Island", and all waters east of the longitude of Scotch Cap Light and south of Unimak Island and the Alaska Peninsula which are depicted as Territorial Sea on NOAA Chart #16520 (20th Ed. July 10/82) entitled, "Unimak and Akutan Passes and Approaches";

(2) in waters south of the latitude of Cape Ikolik (57°17'20'N.lat.), west of the longitude of Cape Barnabas (152°52'W. long.), east of the longitude of Kilokak Rocks (126°19'W. long.) and in Old Harbor Narrows west of 153°16'W. long.;

(3) all waters of Sitkalidak Strait, Kiliuda Bay, and Ugak Bay east of 153° 16' W. long. in Sitkalidak Passage and enclosed by a line from Black Point (56° 59'30" N. Lat., 153°18' W. long.) to 56°57'30" N. Lat., 153° 13' W. long., then a line along the three mile contour to 57° 20' N. lat., 152° 23' W. long., then a straight line to the southernmost tip of Ugak Island (57° 22' N. lat., 152°18'30" W. long.) and west of a line from the northernmost tip of Ugak Island (57° 23'30" N. lat., 152° 17' W. long.) to Narrow Cape (57°26' N. lat., 152°19' W. long.):

(4) all waters enclosed by a line from Cape Chiniak (57°38' N. Lat., 152° 09' W. long.) to 57°38' N. lat., 151°47' W. long. then to Cape St. Hermogenes (58°15' N. lat., 151°47' W. long.) and from Marmot Cape (58°10' N. lat., 151°52' W. long) on Marmot Island to Pillar Cape on Afognak Island (58°09' N. lat., 152°07' W. long.)

(5) in waters of the Alaska Peninsula east of the longitude of Three Star Point (159°10' W. long.), west of the longitude of Seal Cape (158°25' W. long.), and north of the latitude of Kupreanof Point (55°34' N. lat.).

(6) in waters of Inanudak Bay enclosed by a line from Cape Kigunak to Cape Ilmalianuk on Umnak Island;

(7) all waters of Akutan Bay south of a line from Akun Head (54°18' N. lat., 165°38' W. long.) to North Head (54°14' N. lat., 165°56' W. long.),

(8) in waters of Kalekta Bay enclosed by a line from the tip of Erskine Point to the tip of Cape Kaletka on Unalaska Island.

(9) all waters of Akun Bay enclosed by a line from Billings Head (54°17'30" N. lat., 165°28'30" W. long.) to 54°13' N. lat., 165°24' 30" W. long. on the opposite shore; and

(10) all waters of Unalaska Bay enclosed by a line from Cape Cheerful (54°01' N. lat., 166°09'30" W. long.) to Cape Kalekta (54° 00'30" N. lat.),

(11) all waters of Makushin Bay enclosed by a line from Cape Kovrizhka (53°51'N. lat., 167°09'30" W. long.) to Cape Idak (53°31' 20" N. lat., 167°47' W. long.) to Konets Head (53°19'30" N. lat., 167°50'45" W. long.);

(12) all waters of Beaver Inlet south of a line from Brundage Head (53°56' N. lat., 166°12'30" W. long.) to Cape Sedanka (53°50'30" N. lat., 166°05'20" W. long.) and north of 53°42' N. lat.: and

(13) all waters of Uyak Bay, Uganik Bay, Viekoda Bay, Kupreanof Strait, Raspberry Strait, Malina Bay, Paramanof Bay, Foul Bay, and Shuyak Strait east of a line from Cape Uyak (57°38'20" N. lat., 154°20'50" W. long.) to Cape Ugat (57°52'20" N. lat., 153°50'40" W. long.) to Raspberry Cape (58°03'35" N. lat., 153°25' W. long.) to Black Cape (58°24' 30" N. lat., 152°53' W. long) to Party Cape on Shuyak Island (58°31"N. lat., 152°34"W. long.) west of 152°30' W. long. in Shuyak Strait and west of 152°50' W. long. in Whale Pass and Afognak Strait.

GENERAL PROVISIONS
CHAPTER 39. - GENERAL PROVISIONS
ARTICLE 1. - GENERAL

5 AAC 39.105. TYPES OF LEGAL GEAR.

(d) Unless otherwise provided in this title, the following are legal types of gear;

(16) a "scallop dredge" is a dredge-like device designed specifically for and capable of taking scallops by being towed along the ocean floor;

5 AAC 39.210. MANAGEMENT PLAN FOR HIGH IMPACT EMERGING FISHERIES (a) To guide management of high impact emerging commercial fisheries a plan is needed that ensures resource conservation, minimizes impacts on existing users, and provides orderly development of new fishery resources.

(b) The department may regulate a commercial fishery as a high impact emerging fishery if the commissioner determines that any of the following conditions apply to a species or species group in an area or region:

(1) harvesting effort has recently increased beyond a low sporadic level;

(2) interest has been expressed in harvesting the resource by more than a single user group;

(3) the level of harvest might be approaching that might not be sustainable on a local or regional level;

(4) the board has not developed comprehensive regulations to address issues of conservation, allocation, and conduct of an orderly fishery.

(c) The commissioner shall notify the board when a determination is made to manage a fishery as a high impact emerging fishery.

(d) The department shall close a high impact emerging fishery once it is designated as such by the commissioner and may not reopen the fishery until an interim management plan and associated regulations have been developed. If an interim management plan and regulations have been adopted, the commissioner may allow the fishery to continue.

(e) The department shall develop an interim management plan for each high impact emerging commercial fishery. An interim management plan shall contain at least the following information:

(1) a review of the history of commercial exploitation of the species in Alaska and other relevant jurisdictions;

(2) a review of the life history of the organism;

(3) identification of specific management goals and objectives;

(4) an evaluation of potential impacts on existing users;

(5) designation and justification of the preferred management measures;

(6) an evaluation of the conservation impacts of the preferred management approach on non-target species and on non-target individuals of the same species;

(7) a plan for determining the productivity of the species and impact of the fishery;

(8) a listing of proposed interim regulations;

(9) a cost estimate for plan implementation;

(10) an analysis of customary and tradition subsistence use patterns.

(f) The commissioner may adopt regulations and open the fishery consistent with measures identified in the interim management plan. The regulations will remain in effect until the board adopts regulations under (g) of this section.

(g) Upon completion of an interim plan, the department shall petition the board under 5 AAC 96.625 to consider adoption of the management plan and associated regulations at its next regularly scheduled meeting.

(h) The department may require onboard observes as specified in 5 AAC 39.141 and 5 AAC 39.645, on fishing vessels, catcher/processor, and floating processors that participate in high impact emerging fisheries.

SELECTED ALASKA STATUTES

SEC. 16.05.050. POWERS AND DUTIES OF THE COMMISSIONER. The commissioner has, but not by way of limitation, the following powers and duties:

(20) to petition the Alaska Commercial Fisheries Entry Commission, unless the Board of Fisheries disapproves the petition under AS 16.05.251(g), to establish a moratorium on new entrants into commercial fisheries

(A) that have experienced recent increases in fishing effort that are beyond a low, sporadic level of effort;

(B) that have achieved a level of harvest that may be approaching or exceeding the maximum sustainable level for the fishery; and

(C) for which there is insufficient biological and resource management information necessary to promote the conservation and sustained yield management of the fishery.

SEC. 16.05.251. REGULATIONS OF THE BOARD OF FISHERIES.

(g) The Board of Fisheries shall consider a request of the commissioner for approval of a petition to the Alaska Commercial Fisheries Entry Commission to establish a moratorium on new entrants into a commercial fishery under AS 16.43.225 at the board's next regular or special meeting that follows the receipt by the board of the request for approval of the petition and that allows time for the notice required under this subsection. The board may consider the request of the commissioner for approval of the petition only after 15 days' public notice of the board's intention to consider whether the commissioner, in support of the request for approval of the petition, has adequately shown that the fishery meets requirements for a moratorium on new entrants under AS 16.05.050. The board by a majority vote of its members at the meeting when the petition must be considered shall approve or disapprove the petition.

SEC. 16.43.225. MORATORIUM ON NEW ENTRANTS INTO CERTAIN FISHERIES. (a) Subject to (b) of this section, the commission may establish a moratorium on new entrants into a fishery

(1) that has experienced recent increases in fishing effort that are beyond a low, sporadic level of effort;

(2) that has achieved a level of harvest that may be approaching or exceeding the maximum sustainable level for the fishery; and

(3) for which there is insufficient biological and resource management information necessary to promote the conservation and sustained yield management of the fishery.

(b) The commission may establish a moratorium on new entrants into a fishery described in (a) of this section if

(1) the commissioner of fish and game, subject to AS 16.05.251(g), petitions the commission under AS 44.62.220 to establish a moratorium on new entrants into the fishery; and

(2) the commission finds that

(A) the fishery has readched a level of participation that may threaten the conservation and sustained yield managment of the fishery resource and the economic health and stability of commercial fishing; and

(B) the commission has insufficient information to conclude that the establishment of a maximum number of entry permits under AS 16.43.240 would further the purposes of this chapter.

(c) The commission may establish a moratorium under this section for a continuous period of up to four years. A fishery that has been subject to a moratorium under this section may not be subjected to subsequent moratorium under this section unless five years have elapsed since the previous moratorium expired.

(d) While a moratorium is in effect, the commission shall conduct investigations to determine whether a maximum number of entry permits should be established under AS 16.43.240 by

(1) conducting research into conditions in the fishery;

(2) consulting with the Department of Fish and Game and the Board of Fisheries, and

(3) consulting with participants in the fishery.

(e) The commission shall establish by regulation the qualifications for applicants for an interim-use permit for a fishery subject to a moratorium under this section. The qualifications must include the minimum requirements for past or present participation and harvest in the fishery. The commission may not issue an interim-use permit fo a fishery subject to a moratorium under this section unless the applicant can sitisfy the qualifications established under this subsection and establish the present ability and intent to participate actively in the fishery.

APPENDIX 2. NOTICE OF PROPOSED CHANGES IN THE REGULATIONS OF THE ALASKA DEPARTMENT OF FISH AND GAME

Notice is given that the Alaska Department of Fish and Game, under authority of AS 16.05.050, AS 16.05.251, AS 16.05.270 and 5 AAC 39.210, proposes to adopt regulations in Title 5, of the Alaska Administrative Code, Chapter 38, Miscellaneous Shellfish Fishery.

Specifically, the department proposes to adopt an interim management plan and associated regulations to manage the scallop fisheries of the state until the Board of Fisheries adopts permanent regulations.

The interim management plan and regulations may be adopted by the commissioner under authority of 5 AAC 39.210, Management Plan for High Impact Emerging Fisheries.

Subjects and topic areas that may be addressed include registration of vessels, fishing season closures, fishing periods, guideline harvest levels, maximum size of dredges, minimum size for dredge rings, minimum scallop size, closed waters, rotational harvest system, onboard observers, trip limits, and crew size limits.

In addition to the above proposed regulatory options, the department, under AS 16.05.050(20), may petition the Commercial Fisheries Entry Commission to establish a moratorium on new entrants to the scallop fishery.

This action is not expected to require an increased appropriation.

Copies of the proposed interim management plan and regulations may be obtained from the Alaska Department of Fish and Game, Division of Commercial Fisheries, P.O. Box 25526, Juneau, Alaska, 99802-5526. (907) 465-4210

The department is soliciting comments and suggestions on the proposed interim management plan, potential regulations, and the advisability of petitioning for a moratorium. Notice is also given that anyone interested may present written comments or arguments relevant to the proposed actions in this notice. Written comments must be received by the department at the above address no later than 5:00 p.m. September 4, 1992.

Anyone interested in or affected by these proposed changes is hereby informed that, by publishing this legal notice, the commissioner may consider all of the subjects covered by the proposed changes contained in this notice. The commissioner is not limited by the specific language of the proposed regulations. The commissioner's actions are limited to the subject matter given in this legal notice, but pursuant to AS 44.62.200(b), the full range of activities appropriate to any of the subjects listed may be reviewed.

The commissioner may adopt regulations that fall within the range of subjects and topic areas identified in this legal notice. Unless otherwise specified, references to such topics as areas,

seasons, species, gear, and harvest levels apply to all or portions of the specific topic. The commissioner may adopt regulations that apply to all gear types used in a fishery or to selected gear types. On his own motion, after considering all relevant matter presented by the public, the commissioner may adopt, amend, reject, supplement, or take no action on these matters. In addition, the commissioner may adopt other regulations necessary to implement, administer, or enforce the regulations adopted. Anyone interested in or affected by the subject matter contained in this legal notice should make written comments if they wish to have their views considered by the commissioner.

Date: 7/27/92
Juneau, Alaska

Ron Somerville, Deputy Commissioner
Alaska Department of Fish and Game

EXECUTIVE SUMMARY
OF THE
DRAFT INTERIM MANAGEMENT PLAN FOR COMMERCIAL SCALLOP FISHERIES IN ALASKA

JANUARY 14, 1993

Weathervane scallop *(Patinopecten caurinus)* resources in Alaska were explored by a few vessels in 1967. A major fishery soon developed when 19 vessels made 125 landings totalling 1.7 million pounds of shucked meats in 1968 and 144 landings totalling 1.9 million pounds in 1969. Landings from the early fishery were predominated by old scallops (7^+ years of age), but by the early 1970s the age composition began to shift toward younger ages (2-6 year olds) as the largest scallops were cropped from previously unexploited stocks. During 1970-1989, participation and catches fluctuated at much lower levels than during the initial years of the fishery. On average, six vessels contributed 52 landings totalling 587,000 pounds annually during this 20 year period. More recently, significant increases in deliveries and total landings occurred. In 1990-1991, an average of 10 vessels made 135 landings weighing 1.2 million pounds annually. From preliminary data, it appears that harvests increased beyond 1990-1991 levels to 1.7 million pounds in 1992. Further, limited catch reports indicate that small scallops are constituting a greater portion of regional landings from some vessels. Participation is expected to increase in 1993, given the level of interest by potential new entrants from the east coast.

The recent increase of scallop harvests and fishing effort have led to serious concerns about conservation of scallop resources in Alaska. Unfortunately, due to a three year meeting cycle, scallop management is not scheduled for deliberation by the Alaska Board of Fisheries (BOF) until spring 1994. However, regulation 5 AAC 39.210 permits the Alaska Department of Fish and Game (ADF&G) to develop interim management plans and associated regulations for fisheries that meet at least one of four conditions of a *high impact emerging fishery.* ADF&G believes that most or all of these conditions are met for the scallop fishery: (1) harvesting effort has recently increased beyond a low sporadic level, (2) the resource is harvested by more than a single user group, (3) harvests approach levels that might not be sustainable on a local or regional level, and (4) the BOF has not developed comprehensive regulations to address issues of conservation, allocation, and conduct of an orderly fishery.

In July 1992, ADF&G published a report that provided scallop management options for public review. Valuable comments were received from members of the fishing and scientific communities during the ensuing two month review period. These comments, plus ADF&G staff analyses, have been carefully considered, and the department has developed a draft interim management plan and associated fishing regulations for implementation.

The goal of the interim management plan for scallop fisheries is to maximize the overall long-term benefit of scallop resources to residents of the State of Alaska and the nation,

while providing for conservation of scallop populations and their habitats. Within the scope of this goal, there are five specific objectives that address: (1) biological conservation of scallop stocks; (2) bycatch of other species and gear-induced habitat alteration; (3) sustainable and orderly fisheries that promote long-term economic and social benefits; (4) maintenance of resource availability to subsistence users; and (5) conduct of fishery research to increase the information base for future management decisions.

The department proposes a three step process to meet this goal. First, in January 1993 the department will declare a *high impact emerging fishery* for scallops, and it will formally announce plans to implement all elements of its draft interim management plan, except for one measure (onboard observers) that will be implemented after additional consultation with industry and other agencies. Second, soon after the details are resolved in mid-1993, ADF&G will institute a scallop observer program as specified in 5 AAC 39.141 and 5 AAC 39.645. This observer program will be modelled after the crab and groundfish observer programs in Alaska. Under 5 AAC 96.625 the department will petition the board to consider adoption of the scallop management plan and associated regulations. This petition will initiate the third step: development of a BOF-approved fishery management plan for scallop fisheries in Alaska. A draft of the comprehensive plan will become available prior to the spring 1994 BOF meeting where potential allocation issues will be addressed. The final plan will benefit from experience gained from the interim plan during the first year of implementation, new data from the observer program, and additional analyses. Therefore, it may include elements of the interim plan plus additional management measures and regulatory changes.

In developing this interim management plan, the department attempted to provide for collection of much needed biological and fishery data for improved management without being too costly, and to provide for resource conservation while minimizing impacts on existing users. Major new management measures and associated regulations of the plan address the following: (1) establishment of scallop fishery registration areas and registration requirements, (2) gear specifications, (3) area-specific guideline harvest ranges (GHRs) for traditional fishing grounds, (4) split fishing seasons, and (5) an industry-funded observer program. Many of the accompanying regulations have been carried over from existing scallop fishery regulations, some existing regulations have been modified, and some new regulations have been developed. These regulations are primarily directed toward fisheries for the weathervane scallop. Management for other scallop species is accomplished through the terms of special exploratory harvest permits; general guidelines for these permits are specified in the interim regulations.

Registration requirements. A total of eight scallop fishery registration areas are being established, corresponding to the Southeastern, Yakutat, Prince William Sound, Cook Inlet, Kodiak, Alaska Peninsula, Dutch Harbor, and Bering Sea portions of the state. Scallop fishing vessels will be required to register for each specific area prior to fishing, and vessels cannot be registered for scallop fishing in more than one area at any given time.

Gear specifications. The existing scallop gear regulations are modified to specify a maximum dredge width of 15 feet with rings not less than four inches inside diameter, and possible restrictions on chafing gear, liners and ring modifications. No scallop vessels may operate more than two dredges at one time. The existing and more limited gear restrictions, previously approved by the Alaska Board of Fisheries, are maintained for portions of the Cook Inlet Registration Area.

Guideline harvest ranges. Annual guideline harvest ranges (see attachment for methodology) are established for each of the traditional weathervane scallop fishing grounds as follows:

Traditional Area	GHR (pounds shucked meat)
Yakutat	0 - 215,000
Prince William Sound	0 - 50,000
Kamishak District of Cook Inlet	0 - 20,000
Kodiak	0 - 385,000
Dutch Harbor	0 - 170,000
Statewide Total	0 - 840,000

For 1993, ADF&G intends to manage the harvest from each traditional fishing area toward the upper end of the GHR. Fishing for weathervane scallops in the remaining portions of the state (Southeast Alaska, Alaska Peninsula, Bering Sea-Bristol Bay-Adak, and other non-traditional scallop fishing grounds) is allowed under the terms of a special exploratory harvest permit, similar to the permit needed to fish for scallop species other than weathervane scallops.

Fishing Seasons. Annual harvest guidelines are apportioned equally between two fishing periods: January 1 - June 30 and July 1 - December 31. Within each registration area, if one-half of the upper end of the GHR is caught prior July 1, that fishery is closed until it reopens on July 1. Each scallop fishery closes for the calendar year when the total annual GHR for the registration area has been landed.

Observer requirements. Currently, ADF&G believes that an observer program is required to assess status of stocks and to provide the data necessary for inseason management to attain management goals and objectives. The department will be discussing details of a scallop observer program with members of the industry over the next 3-4 months prior to implementation by July 1, 1993.

ADF&G has set a January 22, 1993 deadline for public comment on these proposed scallop fishery management actions.

ATTACHMENT

TO THE EXECUTIVE SUMMARY OF THE DRAFT INTERIM MANAGEMENT PLAN
FOR COMMERCIAL SCALLOP FISHERIES IN ALASKA
JANUARY 14, 1993

GUIDELINE HARVEST RANGE JUSTIFICATION

Guideline harvest ranges (GHRs) will be implemented to insure biological conservation of scallops by preventing recruitment overfishing and to achieve sustainable and orderly fisheries. Under Title 16 of the State of Alaska statutes, ADF&G functions to manage, protect, maintain, improve and extend the fish, game and aquatic plant resources of the state in the interest of the economy and general well-being of the state. Additionally, the Magnuson Fishery Conservation and Management Act (MFCMA) places high priority on preventing overfishing while achieving on a continuous basis, the optimum yield from each fishery for the United States fishing industry. State and Federal law provide justification for establishing GHRs for scallop fisheries statewide. The following GHRs are estimated with the best available scientific information. All GHRs are in pounds shucked meats.

In the absence of surveys, the upper end of GHRs for Yakutat, Kodiak and Dutch Harbor have been estimated as the average of the historic catch from 1969 to 1992 minus years when no fishery and 'fishing up effect' occurs. The term 'fishing up effect' is used to describe the initial exploitation phase of a new fishery or 'removal of accumulated stock' (Gulland 1977). Catches much larger than equilibrium levels are taken for a few years immediately after substantial increases in fishing mortality rates on previously unfished stocks (Baranov 1918). Catches during this developmental period are greater than subsequent catches taken at the same rate of fishing (Ricker 1973). This cropping off of a population is evident in Kaiser's (1986) comparison of percentage age composition of the commercially caught weathervane scallops in Yakutat and the westside of Kodiak Island during fishery inception. The percentage of age 12 or older scallops declined from 35% to 3.6% in Yakutat between 1969 and 1971. In Kodiak, age 12^{+} scallops declined from 27.3% to 2.6% between 1968 and 1971 and age 2-6 scallops increased from 13.3% to 53.8%. Dramatic declines in historic pounds landed in specific statistical areas during the first years of the fishery coupled with changes in age composition of the commercial catch indicate that a 'fishing up effect' occurred in the Yakutat, Kodiak and Dutch Harbor scallop fisheries. The first two years of catch data were excluded from calculation of the GHR for Kodiak. Years when zero catch occurred, 1977 and 1978, were also excluded from calculation of the GHR for Kodiak. The first year of catch data was excluded from the GHR calculation for Yakutat and Dutch Harbor to account for the 'fishing up effect'. The years 1978, 1979 and 1983 (0-30 lb catch) were excluded from calculation of GHR for Yakutat. Data from 1969 to 1981 and 1983 to 1984 were excluded from the estimation of the GHR for Dutch Harbor because no fishing occurred in those years.

Recent development of scallop fisheries in Prince William Sound and Cook Inlet necessitate use of methods other than averaging historic catch data for estimating GHRs. The GHRs for Prince William Sound and Cook Inlet are based on estimates of exploitable biomass, a 10% harvest rate and a conversion factor of 10% average meat weight to total animal weight. Exploitable biomass for Prince William Sound is calculated using area swept methods with information from fishermen on bed size, average towing speed and pounds per tow. The GHR for Prince William Sound was outlined in Emergency Order 2-S-E-05-92 and has been adjusted down to account for more accurate estimate of exploitable biomass. Exploitable biomass for the Kamishak district in Cook Inlet is also calculated using area swept methods, however, input data are from a department survey conducted in 1984. The GHR for Cook Inlet, Kamishak district is specified in the 1992 Commercial Shellfish Regulations (5 ACC 38.330). The lower limit of the Kamishak district GHR has been changed to allow for fishery closures.

Areas exhibiting sporadic catch and effort preclude estimation of GHRs by the above methods. These areas will be open by special exploratory permit issued by the Commissioner. These areas include Southeast Area A, and Westward Areas M and Q.

Annual guideline harvest ranges for weathervane scallop fisheries are summarized as follows:

Region	Area	Guideline Harvest Range
Southeast	Area A	by exploratory permit
Southeast	Area D, Yakutat	0 - 215,000 pounds
Central	Area E, Prince William Sound	0 - 50,000 pounds
Central	Area H, Cook Inlet, Kamishak district	0 - 20,000 pounds
Central	Area H, Cook Inlet, Outer district	by exploratory permit
Central	Area H, Cook Inlet, Eastern district	by exploratory permit
Westward	Area K, Kodiak	0 - 385,000 pounds
Westward	Area M, Alaska Peninsula	by exploratory permit
Westward	Area O, Dutch Harbor	0 - 170,000 pounds
Westward	Area Q, Bering Sea	by exploratory permit

Total of upper range of GHR's statewide: 840,000 pounds.

For 1993, ADF&G intends to manage the harvest from each traditional fishing area toward the upper end of the GHR. In other years, as new biological and fishery data are collected on scallops under the interim management plan, GHRs will be reanalyzed for possible revision. Ideally, observer data could be used to estimate stock abundances and production parameters on which future guideline harvest levels could be based.

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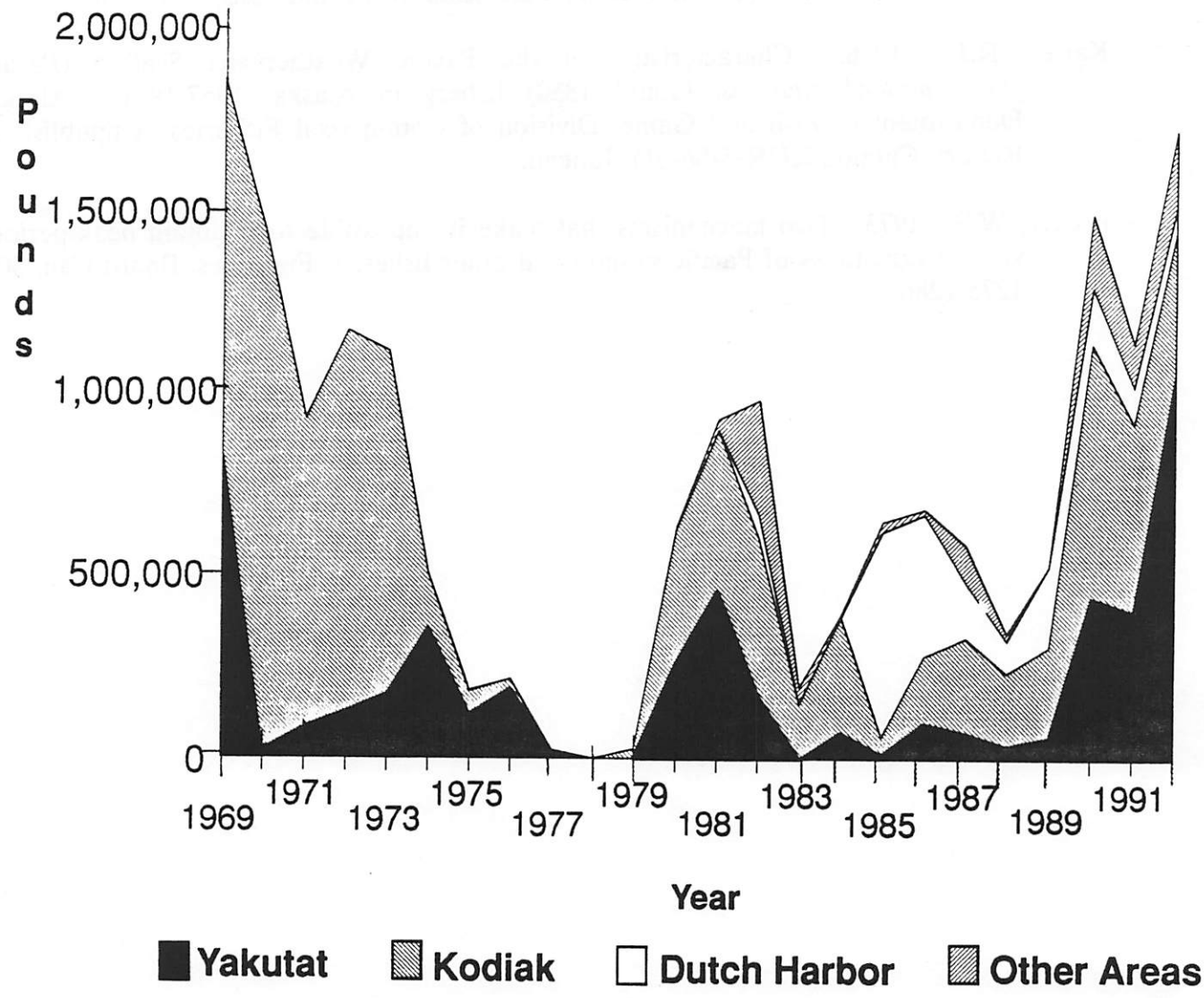
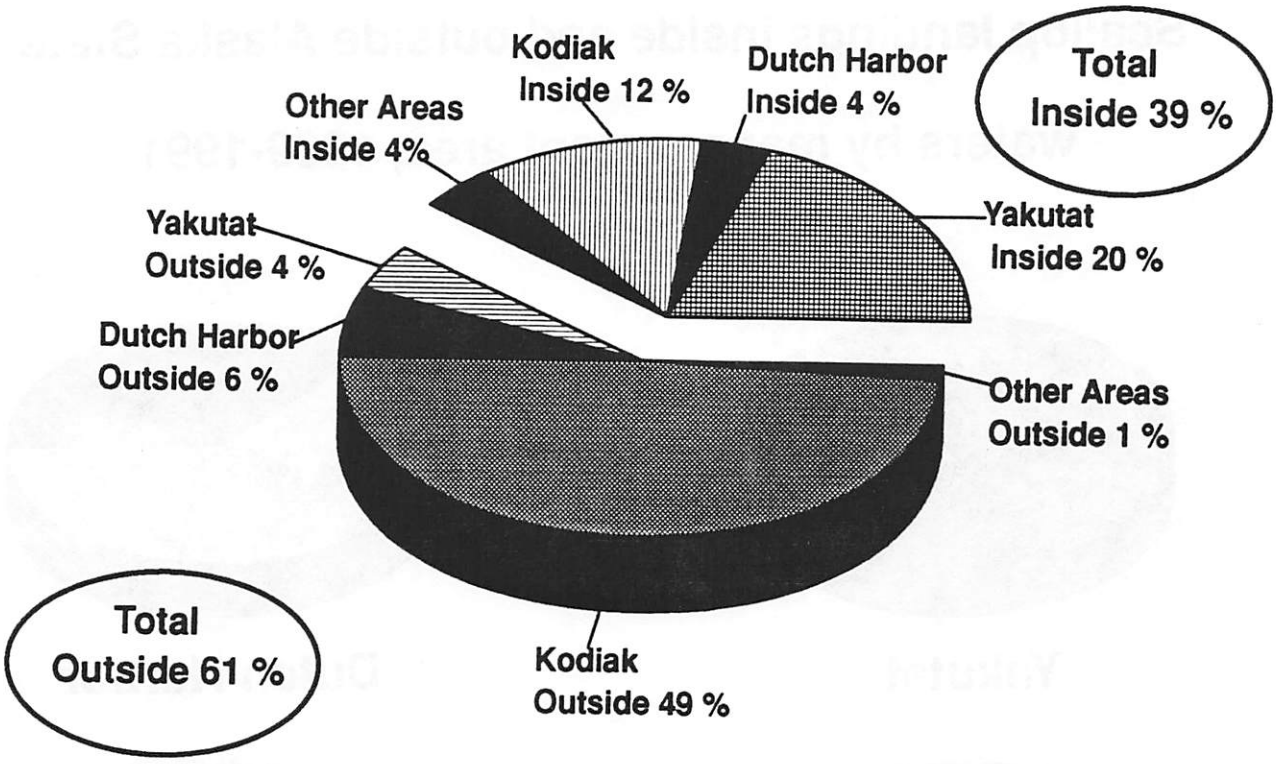
Kaiser, R.J. 1986. Characteristics of the Pacific Weathervane Scallop (*Pectin [Patinopecten] caurinus,* Gould 1850) fishery in Alaska, 1967-1981. Alaska Department of Fish and Game, Division of Commercial Fisheries (Unpublished Report, Catalog RUR-5J86-01), Juneau.

Ricker, W.E. 1973. Two mechanisms that make it impossible to maintain peak-period yields from stocks of Pacific salmon and other fishes. J. Fish. Res. Board Can. 30: 1275-1286.

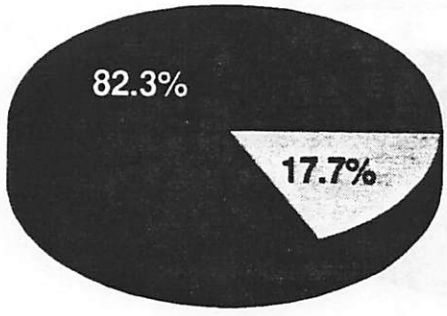
Scallop landings in Alaska, 1969-1992



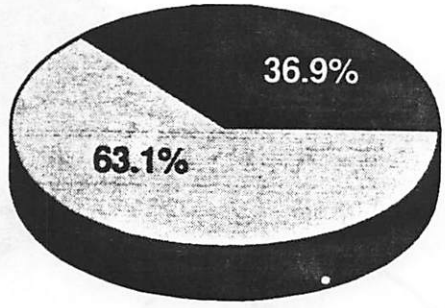
Scallop landings inside and outside Alaska State waters by management area, 1969-1991



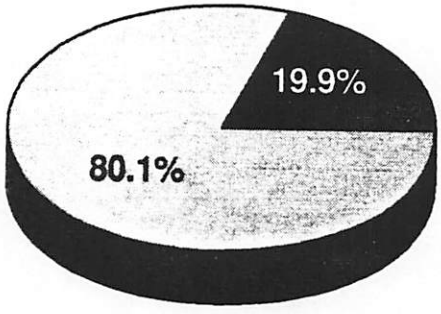
Scallop landings inside and outside Alaska State waters by management area, 1969-1991



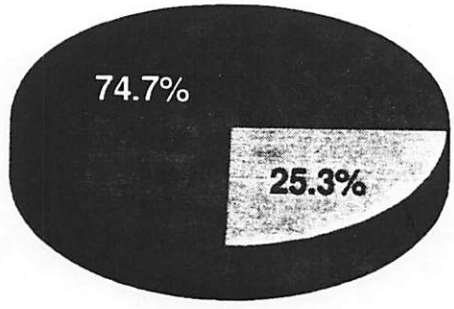
Yakutat



Dutch Harbor



Kodiak



Other Areas

Total 39 % Inside

Total 61 % Outside