

COMMERCIAL FISHERIES FOR DEMERSAL SHELF ROCKFISH
IN SOUTHEAST ALASKA

A REVIEW OF MANAGEMENT OPTIONS

By

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A REVIEW OF MANAGEMENT OPTIONS

INTRODUCTION

Demersal shelf rockfish, a near shore bottom dwelling component of the Sebastes rockfish complex, have been landed incidental to target commercial fisheries for halibut, sablefish, and salmon since the early 1900's. It was not until 1979, however, that a small shore-based target rockfish fishery began in Southeast Alaska. Southeast Alaska rockfish landings increased dramatically from approximately 350,000 pounds of all rockfish in 1982 to nearly 2.7 million pounds of demersal shelf rockfish alone in 1987. There is strong evidence that the current high levels of harvest cannot be sustained.

Many of the other commercial longline fisheries in the area, such as the halibut and sablefish fisheries, have become progressively shorter as more participants entered the fisheries, the individual fishermen have become more effective, and/or it has become necessary to limit the amount of fish harvested. The current market for demersal shelf rockfish mandates that the product must be delivered fresh over much of the year. Therefore, the fishery must be managed in such a way that it is not truncated into very short open periods or those markets may be lost. This presents a unique management challenge because utilizing conventional management tools such as time and area closures or harvest limits normally results in progressively shorter seasons.

Funding to develop a demersal shelf rockfish management plan for Southeast Alaska was requested and received from the federal Interjurisdictional Fisheries Fund in April, 1988. The money is administered through the Pacific Marine Fisheries Commission.

A large portion of the first year funding was used to formulate an industry working group to consider management options for this fishery, to establish management goals and objectives, and to recommend preferred regulatory changes to meet those objectives. The group was comprised of representatives from the processing sector and the commercial harvesting sector from the region's primary rockfish ports with staff support from the Alaska Department of Fish and Game (ADF&G) and the Commercial Fisheries Entry Commission (CFEC). The local Fish and Game Advisory Committees helped select the participants from each community. The first meeting of the group was held on June 1, 1988. A second meeting will be scheduled for later in the year.

This report presents an overview of rockfish biology, a history of the Southeast rockfish fisheries, a summary of port sampling and biological data collection, and a description of the current approach to commercial rockfish management. Goals and objectives for rockfish

management which were endorsed by the working group are presented. A series of options for regulating the rockfish fishery to meet those goals and objectives are listed and evaluated. A proposal and time line for specific action to develop a comprehensive management plan for demersal shelf rockfish in S. E. Alaska are also included.

BIOLOGY OF DEMERSAL SHELF ROCKFISH

Biological data is incomplete for all rockfish in the North Pacific Ocean. The demersal shelf rockfish fishery has developed so rapidly that no extensive time series of biological or fisheries performance data exists. The limited available information on demersal shelf rockfish is from Alaska Department of Fish and Game (ADF&G) port sampling, fisheries monitoring, and other research programs since 1981. This section contains a brief summary of the available data.

Species included

Ten species of Sebastes rockfishes are currently included in the demersal shelf rockfish management category. They are, in alphabetical order by common name:

Bocaccio (Sebastes paucispinis),
Canary rockfish (S. pinniger),
China rockfish (S. nebulosus),
Copper rockfish (S. caurinus),
Quillback rockfish (S. maliger),
Redstripe rockfish (S. proriger),
Rosethorn rockfish (S. helvomaculatus),
Silvergray rockfish (S. brevispinis),
Tiger rockfish (S. nigrocinctus),
Yelloweye rockfish (S. ruberrimus).

Age distribution

Aging of nearshore rockfish from Alaska has not yet been validated. However, the currently accepted methods for aging similar species indicate extreme ages for some S. E. Alaska rockfish. Some individual yelloweye rockfish have been aged in excess of 100 years and samples from commercial landings in some Southeast fisheries have an average age of over 50 years. Preliminary aging data indicates that the two primary species represented in the catch, yelloweye rockfish and quillback rockfish, do not attain sexual maturity until they are at least 12 to 15 years of age.

Available data indicates that the instantaneous rate of natural mortality is less than 0.04 for yelloweye rockfish. For long-lived species such as rockfish, managers normally attempt to set the harvest level at an amount which does not greatly exceed the natural mortality rate. This is done to minimize the risk of significant declines in the population. The rate of the population decline depends to a large

extent on the level of additional mortality induced by fishing. With these low natural mortality characteristics, sustainable annual yield levels are assumed to be extremely low.

Reproduction

All rockfish in the genus Sebastes are ovoviviparous, extruding live larva after an extended reproductive cycle which begins with internal fertilization, usually several months prior to larva release. Thus, the reproductive cycle for each species occurs over several months. Not all species have concurrent cycles and so some portion of the reproductive cycle, either copulation, fertilization, maturation, or parturition, occurs for some rockfish species over much of the year.

Habitat

Most of the demersal shelf species are found associated with rocky substrate, normally with high bottom relief such as pinnacles and reefs, and all species are very habitat specific. It has been noted that a longline set 50 meters or less from the desired location will often result in a substantial change in number of fish caught and species composition of the catch. These fishes inhabit depths from 5 fathoms to over 100 fathoms with the greatest abundance between 20 and 80 fathoms.

Physiology

All Sebastes rockfishes have gas bladders. The bottom-dwelling demersal shelf rockfish are particularly susceptible to extensive soft tissue damage or death from decompression when they are brought to the surface. This decompression damage results in the "bug eyed" appearance and the everted stomachs often observed when these fishes are caught.

HISTORY OF THE FISHERY

The directed near shore rockfish fishery began in 1979 in the Sitka area as a small, family-run, fresh fish business. Automatic jigging machines were utilized and most of the fish landed at that time were from the pelagic shelf assemblage. By 1982 several vessels were participating in the rockfish fishery and longline gear had largely replaced jigging machines as the preferred gear type. With the change of gear, the catch composition also changed from primarily pelagic shelf species to primarily demersal shelf species.

By 1986 the fishery was well established throughout Southeast Alaska and total rockfish production increased to over 2 million pounds. By that time there were signs that the resource was being rapidly depleted in some areas. The fishery continued to expand into 1987 with landings of nearly 2.7 million pounds of demersal shelf rockfish reported.

Description of the Area

Southeast Alaska has been divided by ADF&G into five areas for commercial groundfish catch monitoring and rockfish management (Figure 1). These areas represent the general geographic separation of the fleets from the various communities where rockfish are landed. The two internal areas are entirely within state territorial waters, while the three outside areas contain both state waters and waters of the federal Exclusive Economic Zone (EEZ).

Distribution of the Commercial Harvest

Through 1985 well over 50 percent of the total Southeast commercial rockfish landings were reported from the Central Southeast Outside (CSEO) management area with Sitka as the primary port of landing. By 1986, however, the percent of total Southeast landings from the CSEO area dropped to 37 percent of the Southeast total. In 1986 the Southern Southeast Inside (SSEI) area assumed the lead as the primary producer of rockfish in the region with over 41 percent of the total Southeast rockfish harvest reported from that management area.

Not only did the percentage of the total Southeast rockfish harvest taken in the CSEO area decline between 1984 and 1986, but the actual harvest from that area decreased as well. The fishery peaked at 521 mt in 1984 and declined to 349 mt in 1986, a decline of 33 percent. It is important to note that there were no management restrictions on the fishery during that time period and rockfish markets remained strong throughout the region.

During the period between 1984 and 1986 the Sitka fleet moved progressively further from their home port to maintain productive fishing. Through 1984 over 75 percent of all CSEO area rockfish landings were reported from grounds within 20 miles (32 km) of Sitka. By 1986, however, less than 45 percent of the fish landed were from grounds within 20 miles (32 km) of Sitka and the majority of landings were from grounds 20 to 80 miles (32 to 130 km) or more from port.

A similar shift of effort outward from grounds near Ketchikan to other portions of the SSEI area was also noted between 1985 and 1987. The amount of the total SSEI area landings harvested within a 20 mile radius of Ketchikan decreased by 40 percent during that time period.

While the harvest in the CSEO area declined, the total Southeast Alaska harvest continued to increase. By 1986 much of the effort had shifted into the SSEI management area with Ketchikan replacing Sitka as the major port of landing. During the 1986-87 season the fishery expanded further into the Southern Southeast Outside (SSEO) area. The 1986-87 season harvest was evenly divided between the three primary fishing areas with 30% from the SSEI area, 29% from the SSEO area while the CSEO area dropped to third place with only 27% of the harvest reported from that management area. The remaining two areas,

the Northern Southeast Inside (NSEI) and Northern Southeast Outside (NSEO) areas have relatively limited rockfish resources and landings from those areas are expected to remain small.

Significance of Changes in the Distribution of Harvest

These shifts in effort, both away from the primary port of landing within a geographical area and into new geographical areas, are considered noteworthy. As the fisheries move further away from a port of landing, the ratio of travel time to fishing time and the cost of fuel are increased substantially. New markets and/or transportation links must be established each time the fishery transfers into a new area. Therefore, these shifts to new fishing grounds are considered to be strong evidence that the productivity near the original ports has declined to the point that continued fishing in these areas is no longer profitable for many fishermen.

Harvest Rates

A sharp decline in catch per unit of effort (CPUE) was observed in the SSEI and CSEO management areas between 1984 and 1986. Those declines have been tested and found to be significant at the .05 level. Preliminary data indicates that the CPUE continued to decline through 1987 in both management areas.

It should be noted that fisheries CPUE alone is not considered to be a valid indicator of stock abundance. The dynamic nature of the fishery, including changes in gear technology and markets, gained proficiency of skippers over time, and the high mobility of the fleets, tend to keep CPUE levels high even as the stocks are declining. Therefore, using fisheries performance data as an indicator of stock condition often tends to substantially underestimate the actual level of stock decline. This is particularly true of habitat specific species such as rockfish.

Fleet Composition

Over 99 percent of the 1987 demersal shelf rockfish harvest was landed on longline gear with a total of 465 longline vessels reporting rockfish landings during 1987. It is difficult, however, to determine directed effort from the fish ticket database. The number of participants who make multiple landings or rely upon rockfish fishing for a major portion of their fishing income is assumed to be a small percentage of the total number of participants. Regardless, the large number of fishermen impacted by rockfish regulations makes rockfish management difficult and limits the management options.

Rockfish are also landed incidental to fisheries for other species. This incidental harvest has been occurring since the commercial fisheries first started in the Southeast area nearly 100 years ago and the amount landed has depended to a large extent upon the rockfish market and the intensity of the target fisheries for other species.

Discards in Commercial Fisheries

Besides the directed commercial harvest and retained incidental harvest, a considerable amount of unreported discard likely occurs in fisheries for other species. Much of the incidental harvest is unavoidable and the vast majority of the discarded fish do not survive when brought to the surface. Therefore, this source of mortality must be taken into account when rockfish regulations are established. Methods to minimize unwanted rockfish catch and to encourage the utilization of all harvested rockfish should also be considered.

CURRENT MANAGEMENT

The ADF&G currently has no set policy regarding the regulation of developing commercial groundfish fisheries. Generally, developing fisheries are not regulated until enough data has been accumulated to justify management action. The result of this practice is that fisheries are often left unregulated at the onset and, as in the case with Southeast rockfish fisheries, by the time enough information is collected to justify management action, the fishery is fully developed and signs of stock depletion are apparent.

Regulatory Authority

The demersal shelf rockfish fishery in Southeast Alaska is unique in that it is the only Alaskan groundfish fishery over which the state has regulatory authority in both state waters and the adjacent EEZ. Authority over the rockfish fisheries in federal waters is in accordance with a provision in the Gulf of Alaska Groundfish Fisheries Management Plan. The state's management authority in federal waters is somewhat limited, however, as it only applies to state licensed or registered vessels. It also requires that state regulations must be at least as restrictive as and may not conflict with the federal regulations. Therefore, the state cannot initiate management action which is inconsistent with federal regulations for this fishery. This is an important consideration since, under the current system, any successful management plan for demersal shelf rockfish must meet with both state and federal approval.

The independent regulatory authority of ADF&G in federal waters is limited to setting harvest levels and implementing time and/or area closures based upon biological information. Any in-season management action must be justified as being necessary to conserve the resource.

Any management decisions which are allocative in nature, such as setting seasons outside of biological considerations, gear restrictions, weekly fishing periods, trip limits, etc., must be approved by the Alaska Board of Fisheries and, as stated earlier, must be consistent with federal regulations .

Federal regulations are set by the North Pacific Fisheries Management Council (NPFMC) with approval by the Secretary of Commerce and are enforced by the National Marine Fisheries Service (NMFS). The general management guidelines are included in the Gulf of Alaska Groundfish Fisheries Management Plan (FMP). Specific provisions such as seasons, gear, harvest levels, etc. may be addressed annually through an amendment proposal process similar to that used by the Board of Fisheries. A proposal to remove the demersal shelf rockfish from the federal groundfish FMP has been submitted by the state to the NPFMC for consideration. Unless that proposal is approved, all state regulations must be consistent with federal regulations before they can be applied to vessels fishing in federal waters.

Neither ADF&G or the Board of Fisheries have the authority to limit participation in a fishery. All limited entry considerations for state waters are regulated by the Commercial Fisheries Entry Commission (CFEC) under specific legislative authority. The NPFMC can recommend effort limitation programs for federal waters subject to review and approval by the Secretary of Commerce.

Formulation of Current Commercial Regulations

At the fall 1984 Board of Fisheries meetings a number of rockfish management proposals were considered and several regulations were approved. A 600 metric ton quota was set for demersal shelf rockfish in the CSEO area and an October 1 opening date for the rockfish season was established for that area. Also at that meeting the Board passed a regulation limiting the harvest of rockfish to hook and line gear only throughout Southeast. The Board has not considered Southeast rockfish proposals since 1984.

Management Guidelines for the 1986-87 Season

By early 1987 it became apparent that the unregulated rockfish harvest was declining dramatically in the CSEO area. Because of concern for the resource, ADF&G groundfish biologists placed a high priority on establishing a preliminary rockfish management strategy. To do this the staff thoroughly reviewed all available information on the biology of demersal shelf rockfish and fisheries performance observed through 1986. As a result of that review, a preliminary management plan was completed and interim regulations were established for the 1986-87 season which extended from October 1, 1986 until the fisheries were closed by Emergency Order in 1987.

The preliminary plan established harvest limits for each management area and the October 1 opening date originally set for the CSEO area was extended to all Southeast management areas. An Emergency Regulation was adopted which allows for a bycatch of up to 10 percent of demersal shelf rockfish by weight in fisheries for other species after the directed rockfish fisheries are closed. Later in 1987, after a series of public meetings, an emergency order was issued closing a portion of Sitka Sound to directed fishing for demersal

shelf rockfish indefinitely. Those regulations are also being used as the basis for management in the 1987-88 season.

Preliminary Commercial Harvest Limits

The preliminary harvest limits set for all areas totaled 940 metric tons and were apportioned to each management area according to the best available information on the rockfish resource. The preliminary harvest levels, the actual 1986-87 season harvests, and closing dates for each management area are shown in table 1. The harvests in the more productive SSEI, SSEO, and CSEO areas had already exceeded the preliminary limits before the management plan was implemented. As a result, the total Southeast area demersal shelf rockfish harvest for the 1986-87 season harvest of 1,219 metric tons exceeded the recommended 940 metric ton harvest limit by 30 percent.

Stock Assessment

A rockfish stock assessment survey was conducted in the CSEO area during 1987 and is planned again for 1988. The methods of determining relative biomass and other biological characteristics from surveys holds some promise as a rockfish management tool. It is, however, a long-term project and is not likely to be used as a principal basis for management until the methodology can be refined and a time series is developed to show annual comparisons.

MANAGEMENT GOALS AND OBJECTIVES

Management goals and objectives had not previously been established for the Southeast demersal shelf rockfish fishery. The following goals and objectives which were endorsed by the rockfish working group during the June meeting appear to meet both the biological and industry needs for this fishery. Future regulations implemented for rockfish management should fall within these guidelines.

Principal Management Goal

The Southeast Alaska demersal shelf rockfish fishery will be managed to provide positive economic and other benefits to the region while supporting a sustainable annual harvest of this resource. The benefits include, but are not limited to, profits to the fishing industry, benefits to consumers, income, employment, and recreational and subsistence use.

Management Objectives

1. Establish annual harvest guidelines within known biological constraints for the demersal shelf rockfish fishery by management area for Southeast Alaska.

2. Manage the fisheries to minimize waste by encouraging the use of appropriate gear and setting the seasons to minimize the capture and discard of unwanted rockfish in all fisheries.
3. Develop methods to regulate the fishery to assure a continuous supply of high quality rockfish to the consumers throughout most of the year.
4. Maintain an economically viable fishery for the individuals involved.

MANAGEMENT CONSIDERATIONS

Need for Conservative Management

Indications of rapidly declining rockfish abundance in the major harvest areas cannot be ignored. Because of their habitat specificity, slow growth, old age, low natural mortality, and complex reproductive habits, demersal shelf rockfish are considered to be extremely vulnerable to over harvest. The general vulnerability of these fishes to over fishing and the observed decline in fisheries performance indicators that have been observed at relatively low levels of annual harvest indicate that sustainable yield levels are very low. Therefore, a conservative management approach is required.

Effectiveness of Current Regulations

The harvest limits set by ADF&G in the 1987 draft management plan were based upon a review of all information available at the time and represented the best current estimates of demersal shelf rockfish yield in Southeast Alaska. There is, however, concern that current harvest levels are not sustainable. Analysis of new information is an on-going process and future harvest adjustments are likely as new information becomes available.

It is probable that managing the shelf rockfish fisheries by broad management areas, as is currently being done, will not halt the decline of the rockfish resource, even at substantially reduced harvest levels. Fishermen will continue to harvest fish from the productive areas closest to their ports of landing first before moving to more distant grounds. As a result, localized depletion is likely to continue. In the past two years increased levels of overlapping effort have been observed as the fleets from the various ports of landing spread out to maintain productive fishing. This has resulted in increased harvest pressure even on areas farther away from the ports. As management areas are closed when harvest limits are reached, a large component of the fleet is apt to move to other management areas, thus concentrating additional effort in those areas.

Even if it is determined that the current harvest limits are sustainable, the seasons are likely to become progressively shorter as more effort enters the fisheries. That does not meet the objectives of maximizing the economic benefit to the industry or of providing a high quality product to the consumers. For example, as seasons become shorter, processors require more capital expenditures to handle and store the product when it is landed over a shorter time span. Also, fishermen must invest more in vessels and gear to remain competitive, marketing opportunities are lost, and product quality often suffers.

MANAGEMENT OPTIONS

In order to manage the shelf rockfish resource to meet the management goals and objectives proposed for this fishery, a number of management options should be considered. The following section lists some of the many possible management alternatives along with a brief explanation of the benefits and disadvantages of the various alternatives presented. The working group considered the various options presented here and will discuss them with the fishermen and processors in their respective communities prior to recommending preferred alternatives.

Maintain Status Quo

Under this option rockfish management would remain the same. The staff will propose changes to the Board of Fisheries at the winter 1989 meeting. The proposals will include applying the October 1 opening date originally established only for the CSEO area to the remainder of the Southeast management areas, approve the division of Southeast into five management units, and adopt guideline harvest ranges for each management area.

Besides problems described in the section on the effectiveness of the current regulations, the probable need to further reduce the current harvest limits, and the other problems listed above, there are several additional flaws with the existing management program. The harvest is not being uniformly distributed over the entire management areas and so some stocks are being fished very hard while other stocks are being fished at very low levels or not fished at all. This effects both the resource and the industry. For example, under the current system, the entire SSEI area harvest is being taken by the Ketchikan fleet in the lower Clarence Strait, Dixon Entrance, and Cordova Bay areas. The harvest limit is intended for the entire management area and the limited portion of the area being fished most likely cannot withstand the concentrated level of harvest. In addition, fishermen in other Southeast communities are being put at a disadvantage because of the ambitious fishing effort of the Ketchikan fleet. Under the current system, if the entire SSEI area harvest is taken in the Ketchikan area, the whole management area will be closed. This would preclude the fishermen from the other communities from fishing grounds in portions of the SSEI area closer to their home ports regardless if those areas had been fished or not.

Enforcement can also be a problem if one area is closed while another adjacent area remains open. It is doubtful that there is adequate protection to assure that no fish are taken from any of the management areas after they are closed as long as rockfish may be legally landed from other open areas.

Control Effort Levels

Usually when effort limitation is suggested for commercial fisheries in Alaska, one tends to focus on the current State of Alaska Limited Entry Program. The existing limited entry program which was designed for salmon fisheries may not work for the Southeast rockfish fishery. The primary reason that it may not work is that too many vessels are currently involved in the fishery. The total number of vessels that would be eligible to participate if the current limited entry program were implemented immediately has not yet been determined, but it is likely that over 1,000 vessels would be initially qualified to fish. Current legislation sets the initial target level for permanent participation at the previous years participation level. That would automatically include 465 vessels (the 1987 level) as an initial target level for the fishery. It is likely that the resource cannot support that level of effort and still meet the management objectives proposed for this fishery.

That leaves us to consider other limited access alternatives. The most likely candidate for consideration appears to be some form of share quota system. The mechanisms of this type of program would need to be developed and legislative changes would be required to allow this approach to be implemented. A share quota program may, however, be a viable management tool for this fishery and should be given serious consideration.

If this type of program is adopted, management effort would shift from monitoring seasonal harvest to monitoring individual harvests. That would require substantial changes in the current operation of the groundfish program. Benefits and costs associated with that change would need to be evaluated. Enforcement could also become a problem, particularly if allocated shares are area specific.

Control Seasons

Both weekly fishing periods and split seasons have been suggested as management tools for the commercial rockfish fishery. These methods could help spread out the fisheries over a longer time period. It may be very difficult, however, to select seasons which accommodate the needs of all elements of the industry. Openings and closures could be staggered by management area, but that would likely result in confusion and possibly promote fleet movement back and forth between management areas. That would tend to concentrate larger amounts of effort in the open areas at any given point in time.

"Spawning closures" have also been suggested for rockfish, but would

be largely ineffective because of the complex reproductive strategy and the overlap in the cycles of the various species involved. Closures which coincide with "soft market" periods have also been suggested. This could help to assure that rockfish are available during the time that the product is most valuable to the market.

Seasonal management, if adopted, would probably best be used in conjunction with one or more of the other management options. Because of the allocative nature of this type of regulation, Board of Fisheries approval would be necessary.

Control or Limit Gear

No gear regulations other than the hook-and-line only restriction currently in effect for state waters in the Southeast area have been implemented for rockfish in Alaskan waters. Limiting the amount or type of gear used has been suggested as a method for spreading out the seasons.

There are, however, some defects with this type of management as well. Aside from the philosophical argument over whether it is proper to regulate for inefficiency in a fishing operation, this approach could also present a very difficult enforcement problem. That is because longline gear is difficult to measure, different standards are used to determine gear length, and hooks are difficult to count or check for conformity. Gear limits are also allocative since some segments of the fleet would be impacted more than others from this type of regulatory action. For that reason Board of Fisheries consideration would be necessary for implementation of any gear restriction.

Establish Trip Limits

Trip limits have been used with some success to extend the seasons in other west coast commercial rockfish fisheries. This management approach could help to spread out the harvest over a longer period of the year, but would probably be more successful if used in conjunction with a limit on total participation and/or seasonal restrictions. That is because the advantages of limiting individual landings could be quickly negated by increased numbers of landings per individual or by additional participation in the fishery if trip limits are used independent of other management measures.

One problem with using trip limits for management is that they tend to favor smaller vessels. Because trip limits favor certain elements of the fleet over others, this is an allocation issue which must be approved by the Board of Fisheries. Trip limits have been reported to promote waste if more fish than are allowed are legitimately caught, but must be discarded to stay below a specified limit. In addition, trip limits may promote deliberate "highgrading" of the more valuable species resulting in waste of less valuable species which could be discarded in order to stay under the limit.

Establish Permanently Closed Areas

This option would assure that "reservoirs" of mature fish remain available to repopulate adjacent areas if over harvest occurs. This is a viable management strategy which should be considered as part of any rockfish management plan. A major problem occurs with selecting the areas to be closed. There is little information available on larval or adult movement of rockfish, therefore the selection of any area for permanent closure would be somewhat arbitrary at this time. The size and frequency of closed areas needed to repopulate adjacent areas is not known. Also, invariably someone is negatively impacted by the closure regardless of what areas are selected. In addition, good information on rockfish distribution is needed to adjust the harvest levels in the remainder of the area to reflect the removal of the areas closed to fishing. Another consideration is the argument that without adequate enforcement, closed areas may quickly become "private reserves" for illegal fishing activity.

Closures to directed commercial harvest around population centers, such as the closure of Sitka Sound last year, would assure that subsistence, personal use, and recreational rockfish harvest needs of the local residents are met. There is good evidence that allowing multiple user participation in these fisheries to go unchecked speeds the rate of rockfish population decline considerably. User-specific area management should be given serious consideration as part of the final rockfish management strategy.

Implement a Rotational Harvest (Pulse Fishing) Strategy

This strategy has been suggested as a viable management tool for long lived fishes. It would have the desired effect of distributing the commercial effort more uniformly throughout the management areas over time. Considerable thought would be required to determine the optimum size of the areas and the appropriate time span for the rotational openings and closures. The harvest limits for the total management area would have to be reduced to reflect the portions of the areas which were closed at any given time.

Disadvantages of rotational harvest regulations include the confusion to the industry of having different areas opening and closing periodically and the increased costs of enforcing the closures. It is also likely that the rotation time needed to rebuild stocks once they are depleted may be too long for practical management.

Dramatically Reduce Directed Harvest Limits

The commercial harvest limits could conceivably be set so low that even a small portion of a given management area can support the harvest. This option would provide greater protection to the rockfish resource while still allowing for a limited directed commercial harvest. While there is little doubt that the harvest limits

currently in place will have to be reduced, the main problem with this option is that there is very little biological basis for determining what levels of harvest would guarantee a sustainable yield.

If effort levels remain high and the harvest limits are reduced substantially, the objective of spreading the harvest over an extended period could not be met with this option alone.

Eliminate Directed Commercial Fishing

It is conceivable that the shelf demersal rockfish resource is so limited that it cannot support a sustained target commercial fishery. Allowing rockfish to be harvested only as bycatch in other fisheries would offer maximum protection to the resource until appropriate harvest limits can be determined. This would also tend to spread out the harvest throughout much of the year as fish would be landed only in conjunction with other fisheries.

One major disadvantage to this approach is that if rockfish are only landed in conjunction with fisheries for other species, it is likely that the rockfish will not receive the attention they deserve either on board the vessels or at the processors resulting in a poorer quality product. In addition there would still be portions of the year when rockfish are not available to the market. Neither of those conditions would be totally consistent with the proposed management objectives.

This option may also have the effect of reallocating the rockfish harvest to other gear types or other fisheries depending on the length of time each fishery is in operation and the bycatch rates. For example, the salmon troll seasons are currently much longer than longline seasons for halibut or sablefish and thus the salmon troll fleet would have a greater opportunity to harvest rockfish incidental to their directed fishing effort.

Create Additional (Smaller) Management Units

This option would allow for management of rockfish by even smaller geographic areas. Harvest limits would be established based upon the best available information. This option could help spread the effort throughout the existing management areas, but, if applied independently, would probably not help prolong the seasons unless area openings were staggered.

One major problem with this option is that data needed to set harvest limits in the smaller geographical areas is currently lacking. In addition, enforcement of closures and in-season management would be more complex and costly if the region were divided into smaller management units, particularly if the openings were staggered to extend the season.

Other Management Options

There are a number of management alternatives which should be considered for this fishery. Some may work independently and some may work better in conjunction with other regulatory measures. Regardless of which options are selected, the regulations which are adopted should fit within the framework of the management goals and objectives established for the rockfish fishery.

PROPOSAL FOR FUTURE ACTION

Because of the potential for continued over harvest of the rockfish resource, an acceptable management strategy should be developed without delay in order to maintain a viable rockfish fishery in the future. A proposed time line to implement such a strategy for rockfish management follows:

1. A report will be completed which outlines the management objectives and alternatives for this fishery based upon recommendations of the Rockfish Working Group during their first meeting in June. The report will be completed by July 1. (This report)
2. The report will be submitted for internal review and general distribution. Public comments on the proposed rockfish management goals and objectives will be obtained by the staff and Working Group members as quickly as possible.
3. The ADF&G Groundfish Project staff will continue to analyze data from the commercial fisheries and make recommendations for harvest level adjustments, area closures, seasons, and other biologically justifiable regulations based upon that analysis. Staff proposals based on these data will be presented to the Rockfish Working Group at a second meeting tentatively scheduled for early September. After Working Group review, the staff proposals will be submitted to the Board of Fisheries prior to the October proposal deadline.
4. The CFEC will create a preliminary report on fleet composition, history of participation, income dependence on the fishery, participation turnover, diversification, and residency so that these data can be incorporated into future discussions on rockfish management alternatives. This report should also be available for consideration during the second Working Group meeting in September.
5. Based upon the results of the first Working Group meeting, the ADF&G staff will draft a series of specific industry oriented management proposals for further consideration by the Working Group and the public.
6. These proposals will be made available to the public for

review during the summer. That will allow for consideration of public comment at the second Working Group meeting in September.

7. At their September meeting the Working Group will review and evaluate the public comments on their preliminary management proposals and on the draft goals and objectives suggested for management of this fishery. Final proposals will be drafted based upon the input received from the public.

8. ADF&G staff will transcribe the working group's final proposals into regulatory format and submit them to the Board of Fisheries prior to the October, 1988 deadline.

9. An interim progress report will be completed and submitted to the PMFC at their fall meeting. The report will outline the Working Group process established for reviewing management alternatives and will present the preliminary management recommendations of the Working Group.

10. A section on rockfish catch and effort, fisheries performance, and biological data will be included in the annual Groundfish Staff Report to the Board of Fisheries. A discussion of staff proposals will also be included. That report will be available by December 15, 1988.

11. A selected member of the Working Group will present the Group's proposals to the Board of Fisheries during the winter 1989 meeting.

12. The ADF&G groundfish staff will incorporate staff, working group, and public rockfish regulations which are adopted by the Board of Fisheries into a draft S.E. Alaska Demersal Shelf Rockfish Management Plan. The draft plan will be submitted to the Pacific Marine Fisheries Commission by April 30, 1989 as a completion report for the first year of funding.

13. The working group, in conjunction with CFEC, will consider legislative changes needed to initiate a share quota system and recommend language for a bill. According to the proposed schedule, a sponsor will be found and the bill submitted during the 1989 legislative session. The initial language should be left sufficiently broad to allow maximum flexibility to develop a workable program for this fishery.

This is an ambitious timetable, but the Board of Fisheries only considers Southeast groundfish proposals every other year. Therefore, proposals requiring Board action which are not submitted during 1988 for consideration at the 1989 winter meeting cannot be submitted again until the fall of 1990.

The recommendations for establishing an individual share quota program for the rockfish fishery will undoubtedly require considerable more time to implement. First, legislation must be passed which will allow for a more flexible limited entry system. Even after the necessary legislation is adopted, considerable additional time will be required to go through the public process necessary to develop and execute an effective program.

Table 1.--Preliminary demersal shelf rockfish harvest limits and harvest levels by Southeast Alaska rockfish management areas during the 1986-1987 fishing season.

MANAGEMENT AREA	PRELIMINARY HARVEST LIMITS		1986-87 SEASON HARVEST	
	METRIC TONS	PERCENT	METRIC TONS	PERCENT
CSEO	300	32	330.7	27
SSEO	250	27	349.4	29
SSEI	225	24	360.7	30
NSEI	90	10	75.4	6
NSEO	75	8	102.9	8
TOTAL	940	101	1,219.1	100

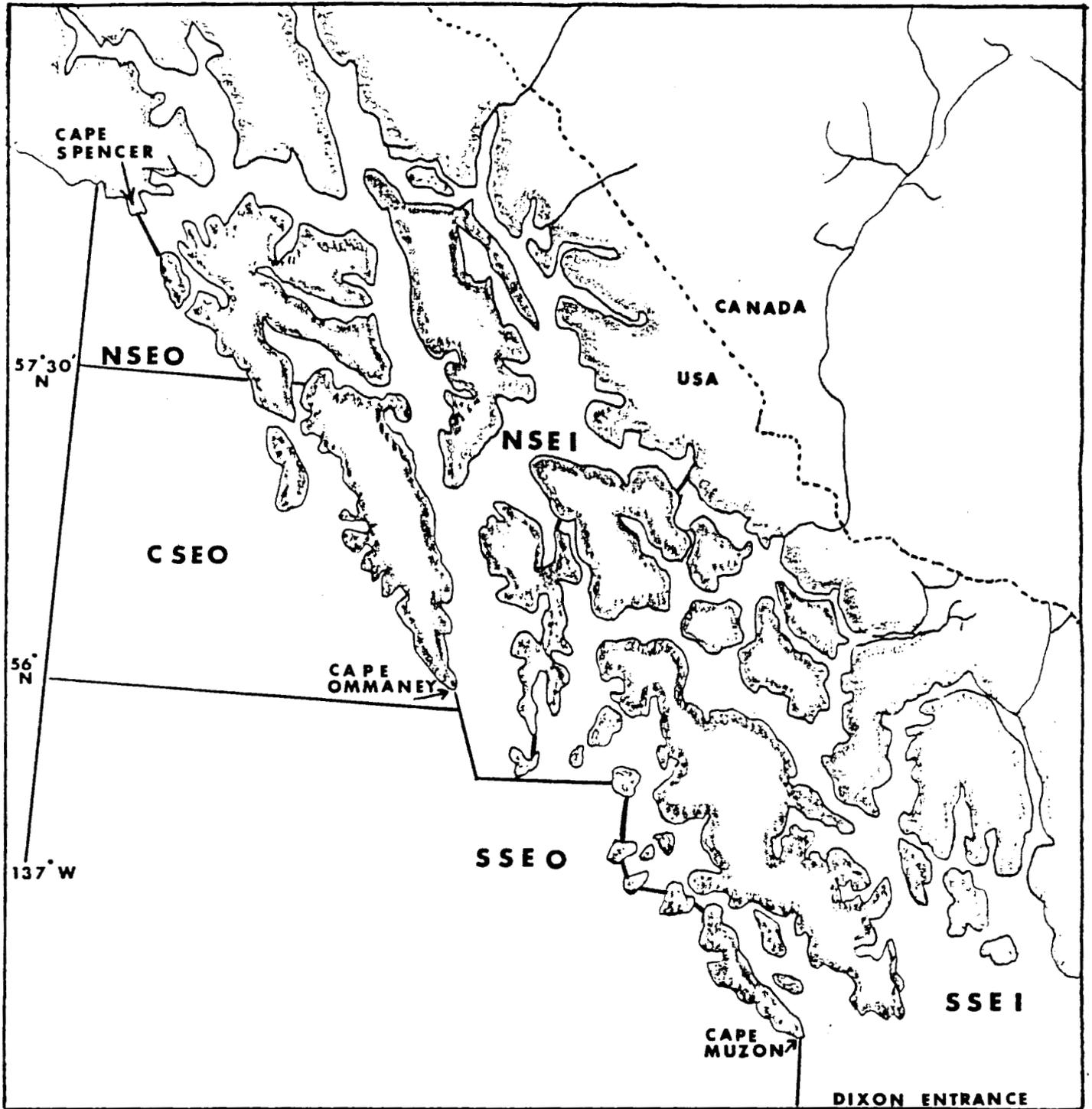


Figure 1. The Southeast Alaska coastline showing Alaska Department of Fish and Game groundfish management areas.