COASTAL PELAGIC SPECIES FMP AMENDMENT 9: BYCATCH, SQUID MAXIMUM SUSTAINABLE YIELD, TRIBAL FISHING RIGHTS

Situation: In June 1999, the National Marine Fisheries Service (NMFS) disapproved portions of the coastal pelagic species (CPS) fishery management plan (FMP). Optimum yield for market squid was disapproved because there was no estimate of maximum sustainable yield (MSY). The bycatch provisions were disapproved because there was no standardized reporting method for CPS fishery bycatch, and no explanation as to the practicality of additional measures to minimize bycatch and the mortality of unavoidable bycatch. Amendment 9 (Attachment 1) to the CPS FMP was developed to address these disapproved portions of the FMP. Specifically, Amendment 9 describes alternatives for: minimizing and accounting for bycatch in CPS fisheries; determining MSY and acceptable biological catch (ABC) for market squid; and addressing tribal fishing rights.

At the June 2000 Council meeting, NMFS and the Coastal Pelagic Species Management Team (CPSMT) briefed the Council on Amendment 9 to the CPS FMP. Based upon their review and the advice of the Scientific and Statistical Committee, the Council adopted Amendment 9 for public review.

At this meeting, Council staff will summarize written public comment, and the CPSMT will be available to discuss specific details of the plan amendment. In the draft plan, the Council has specified preferred options for the alternatives pertaining to bycatch. However, preferred options have not been identified for determining market squid MSY and ABC, nor for the alternatives proposed to address tribal fishing rights. The Council will need to select options for final recommendation to NMFS.

Council Action:

1. Consider Final Adoption of FMP Amendment 9.

Reference Materials:

1. Draft CPS FMP Plan Amendment (Exhibit I.1, Attachment 1).
2. Washington Department of Fish and Wildlife comments on Amendment 9 (Exhibit I.1.b, WDFW Comment).
3. Public Comment (Exhibit I.1.c, Public Comment).
4. Supplemental CPSAS Report on Amendment 9 (Exhibit I.1.b, Supplemental CPSAS Report).

PFMC
08/24/00

Exhibit I.1.b
Supplemental CDFG Comment
September 2000

CALIFORNIA DEPARTMENT OF FISH AND GAME
PROPOSED CHANGES TO THE COASTAL PELAGIC SPECIES (CPS)
FISHERY MANAGEMENT PLAN
ENVIRONMENTAL ASSESSMENT/REGULATORY IMPACT REVIEW FOR AMENDMENT 9

The California Department of Fish and Game (CDFG) proposes the following changes to the draft EA/RIR for Amendment 9:

APPENDIX C - STATE APPROACHES FOR DETERMINING BYCATCH (page 27)

California Work Plan for the 2000 Sardine Fishery

Planned Work

Replace this paragraph with:

Most fishing for sardines occurs out of the ports of San Pedro and Monterey. Scientific aides will be hired to routinely monitor landings and sample fish from the purse seine fleet.

Fish aging

Replace this paragraph with:

After age data has been added to the sample database, sample data will be summarized in reports for use in assessing the current sardine population and determining the quota for the next year.

Quota monitoring

Replace this paragraph with:

Staff will monitor quota landings and distribute landing summaries on a quarterly basis.

COASTAL PELAGIC SPECIES ADVISORY SUBPANEL STATEMENT ON COASTAL PELAGIC SPECIES FMP AMENDMENT 9: BYCATCH, SQUID MAXIMUM SUSTAINABLE YIELD, TRIBAL FISHING RIGHTS

The Coastal Pelagic Species Advisory Subpanel (CPSAS) has discussed proposed changes to Amendment 9 regarding bycatch, squid maximum sustainable yield (MSY), and tribal fishing rights language. The CPSAS has the following recommendations:

1. Bycatch: The CPSAS voted unanimously to support option 3 (recommend dockside monitoring programs) and option 4 (evaluate the use of grates). The CPSAS was evenly divided on option 2 (recommending observers on all new fisheries north of Pigeon Point).

2. Squid MSY: The CPSAS voted unanimously to defer establishing an MSY for squid until the State of California completes their ongoing research.

3. Tribal Treaty Fishing Rights Language: The CPSAS voted unanimously to include language in Amendment 9 regarding tribal treaty rights that mirrors the language adopted by the Council for Amendment 11 to the Groundfish Fishery Management Plan. The language is attached.

The CPSAS also discussed extending term limits for advisory panel members which comes up later today on the agenda. The CPSAS supports extending term limits from two years to three years.

SCIENTIFIC AND STATISTICAL COMMITTEE COMMENTS ON COASTAL PELAGIC SPECIES FMP AMENDMENT 9: BYCATCH, SQUID MAXIMUM SUSTAINABLE YIELD, TRIBAL FISHING RIGHTS

The Scientific and Statistical Committee (SSC) reviewed the calculation of squid maximum sustainable yield (MSY) contained in amendment 9 to the coastal pelagic species fishery management plan. The approach extrapolates historic California landings to the entire West Coast based on percentages of area fished and the coastwide distribution of squid in trawl samples. We are concerned about the accuracy of this approach. On the one hand, the extrapolation method used for California may overestimate the amount of squid, because it assumes occasionally fished areas are as productive as heavily fished areas. On the other hand, this method may underestimate the amount of squid, because it assumes that no squid occurs in areas where no fishing occurs. We also do not know how well the incidental catch of squid in various trawl surveys represents the actual distribution of squid coastwide. Because of the uncertainties surrounding these extrapolations and our ongoing concern regarding the appropriateness of defining MSY for this species, we cannot recommend an MSY value at this time.

Fortunately, research being conducted on squid life history, abundance, and distribution in California is expected to provide significant new information within the next year. We recommend that the SSC work with the National Marine Fisheries Service and California Department of Fish and Game to organize a stock assessment workshop next year to integrate the ongoing squid research in California into the Council's management plan. This workshop should also address how the concept of MSY relates to a species that is short lived and whose abundance/availability is largely environmentally determined.

For near term management purposes, the SSC discussed the known characteristics of the squid fishery with members of the Coastal Pelagic Species Management Team. We made three observations about the fishery. First, it has taken place in the same areas near Monterey and in Southern California for decades. Second, catch is dramatically reduced by the occurrence of El Niños, but catches rebound rapidly from very low levels. Third, significant spawning activity takes place in areas that are not fished. Given these characteristics, we believe the resource will not be adversely affected by a delay in setting MSY until after the recommended workshop is completed.

PFMC
09/14/00

Washington Department of Fish and Wildlife Comments on Amendment 9 – August, 2000

6.0 Treaty Indian Fishing Rights

Oregon fishermen began harvesting Pacific sardine during the summer of 1999, when the FMP was implemented. Oregon fishermen continued fishing in 2000, and Washington fishermen also entered the fishery. The coastal pelagic species fishery now extends to the usual and accustomed fishing grounds of Indian tribes that have treaties with the U.S. involving certain fishing rights. This issue was not addressed in the FMP.

6.1 Legal Considerations

Treaties between the United States and numerous Pacific Northwest Indian tribes reserve to these tribes the right of taking fish at usual and accustomed grounds and stations ("u & a grounds") in common with ~~other~~ all citizens of the United States. See U.S. v. Washington, 384 F. Supp. 312, 349-350 (W.D. Wash. 1974).

The National Marine Fisheries Service recognizes the tribes that have u & a grounds in the marine areas managed by this FMP are the Makah, Hoh, and Quileute tribes, and the Quinault Indian Nation. The Makah Tribe is a party to the Treaty of Neah Bay, Jan. 31, 1855, 12 Stat. 939. See 384 F. Supp. at 349, 363. The Hoh and Quileute tribes and the Quinault Indian Nation are successors in interest to tribes that signed the Treaty with the Quinaeilt, et al. (Treaty of Olympia), July 1, 1855, 12 Stat. 971. See 384 F. Supp. at 349, 359 (Hoh), 371 (Quileute), 374 (Quinault). The tribes' u&a grounds do not vary by species of fish. U.S. v. Washington, 157 F. 3d 630, 645 (9th Cir. 1998).

The treaty fishing right is generally described as the opportunity to take a fair share of the fish, which is interpreted as up to 50 percent of the harvestable surplus of fish that pass through the tribes' u&a grounds. Washington v. Washington State Commercial Passenger Fishing Vessel Association, 443 U.S. 658, 685-687 (1979) (salmon); U.S. v. Washington, 459 F. Supp. 1020, 1065 (1978) (herring); Makah v. Brown, No. C85-160R, and U.S. v. Washington, Civil No. 9213 - Phase I, Subproceeding No. 92-1 (W.D. Wash., Order on Five Motions Relating to Treaty Halibut Fishing, at 6, Dec. 29, 1993) (halibut); U.S. v. Washington, 873 F. Supp. 1422, 1445 and n. 30 (W.D. Wash. 1994), aff'd in part and rev'd in part, 157 F. 3d 630, 651-652 (9th Cir. 1998), cert. denied, 119 S.Ct. 1376 (1999) (shellfish); U.S. v. Washington, Subproceeding 96-2 (Order Granting Makah's Motion for Summary Judgment, etc. at 4, November 5, 1996) (Pacific whiting). The harvestable surplus is the number of fish that can be taken without diminishing the number in future years, which is consistent with the conservation necessity principle. Puyallup Tribe v. Washington Game Dep't, 433 U.S. 165, 177 (1977); United States v. Washington, 520 F.2d 676, 686 n.3 (9th Cir. 1975), cert. denied, 423 U.S. 1086 (1976). ~~The harvestable surplus must be determined according to the conservation necessity principle, which holds that the amount of fish available for harvest must be based solely on resource conservation needs. Passenger Fishing Vessel, 443 U.S. at 682; Antoine v. Washington, 420 U.S. 194, 207-208 (1975); Puyallup Tribe v. Washington Game Dept., 391 U.S. 392, 402 n. 14 (1968) Puyallup I); Tulee v. Washington, 315 U.S. 681, 684 (1942).~~ The court applied the conservation necessity principle to federal determinations of harvestable surplus in Makah v. Brown, No. C85-160R/United States v. Washington, Civil No. 9213 - Phase 1, Subproceeding No. 92-1, Order on Five Motions Relating to Treaty Halibut Fishing, at 6-7 (W.D. Wash. Dec. 29, 1993). ~~The conservation necessity standard applies to federal as well as state regulation. Makah v. Brown, No. C85-160R, and United States v. Washington, Civil No. 9213 - Phase I, Subproceeding No. 92-1 (W.D. Wash., Order on Five Motions Relating to Treaty Halibut Fishing, at 6, Dec. 29, 1993).~~

The treaty right was originally adjudicated with respect to salmon and steelhead. However, it is now

recognized as applying to all species of fish and shellfish within the tribes' u&a grounds. As stated in U.S. v. Washington, 873 F.Supp. 1422, 1430, aff'd 157 F. 3d 630, 644-645 (9th Cir. 1998), cert. denied, 119 S.Ct. 1376:

> The fact that some species were not taken before treaty time - either because they were inaccessible or the Indians chose not to take them - does not mean that their right to take such fish was limited. Because the 'right of taking fish' must be read as a reservation of the Indians' pre-existing rights, and because the right to take any species, without limit, pre-existed the Stevens Treaties, the Court must read the 'right of taking fish' without any species limitation.

The original 1974 District Court decision in U.S. v. Washington specifically references Quileute tribal fishing for sardines at treaty times. U.S. v. Washington, 384 F.Supp. 312, 372 (W.D. Wash. 1974).

The National Marine Fisheries Service recognizes the areas set forth in the framework below as marine u&a grounds of the four Washington coastal tribes. The Makah u&a grounds were adjudicated in U.S. v. Washington, 626 F.Supp. 1405, 1466 (W.D. Wash. 1985), aff'd 730 F.2d 1314 (9th Cir. 1984). The u&a grounds of the Quileute, Hoh, and Quinault tribes have been recognized administratively by NMFS. See, e.g., 64 Fed. Reg. 24087-24088 (May 5, 1999) (u&a grounds for salmon); 50 C.F.R. 660.324(c) (u&a grounds for groundfish); 50 C.F.R. 300.64(i) (u&a grounds for halibut). The u&a grounds recognized by NMFS may be revised as ordered by a federal court.

The legal principles described above support the conclusion that treaty Indian fishing rights apply to coastal pelagic species that pass through the coastal tribes' ocean u&a grounds. The quantity of this right has not yet been determined or adjudicated.

6.2 Prospective Tribal Fisheries for CPS

With the resurgence of Pacific sardines, and their movement north along the West Coast, it is likely that some of the Pacific Northwest ocean fishing tribes may wish to exercise their treaty fishing rights on CPS in their u&a grounds. Currently, no regulatory impediment to tribal fisheries exists because the tribes' u&a grounds are in CPS Subarea A, which is an open access area with its own allocation of one-third of the coast wide harvest guideline (65 Fed. Reg. 3890-3892, January 25, 2000). However, it is possible that specific treaty Indian allocations may be necessary in the future. To anticipate this eventuality, and to establish an orderly process for implementing treaty fisheries, it is proposed to include a treaty Indian fishing rights framework in the FMP.

Two alternatives are described below. Both options are designed to give the Council prior notice of proposed treaty fisheries so that allocation and other issues can be addressed before fisheries commence. In addition, both options would recognize the Indians' treaty rights; describe the u&a grounds of the four ocean fishing tribes; provide an orderly procedure, through the Council process, for implementation of treaty rights; and contain various measures related to the exercise of treaty rights.

> Alternative 1: Adopt and include in the FMP a framework process similar to that used for treaty Indian fisheries under the Pacific Coast Groundfish Fishery Management Plan. Specifics of the proposed framework are as follows:
>
> > (a) Pacific Coast treaty Indian tribes have treaty rights to harvest CPS in their usual and accustomed fishing areas in U.S. waters.
> >
> > (b) Pacific Coast treaty Indian tribes means the Hoh, Makah, and Quileute Indian Tribes and the Quinault Indian Nation.

(c) The Pacific Coast treaty Indian tribes' usual and accustomed fishing areas within the fishery management area (FMA) are set out below. Boundaries of a tribe's fishing area may be revised as ordered by a Federal court.

(1) Makah – That portion of the FMA north of 48 degrees 02'15" N. lat. (Norwegian Memorial) and east of 125 degrees 44'00" W. long.

(2) Quileute – That portion of the FMA between 48 degrees 07'36" N. lat. (Sand Point) and 47 degrees 31'42" N. lat. (Queets River) and east of 125 degrees 44' 00" W. long.

(3) Hoh – That portion of the FMA between 47 degrees 54'18" N. lat. (Quillayute River) and 47 degrees 21'00" N. lat. (Quinault River) and east of 125 degrees 44' 00" W. long.

(4) Quinault – That portion of the FMA between 47 degrees 40'06" N. lat. (Destruction Island) and 46 degrees 53'18" N. lat. (Point Chehalis) and east of 125 degrees 44'00" W. long.

(d) Procedures. The rights referred to in paragraph (a) will be implemented by the Secretary of Commerce, after consideration of the tribal request, the recommendation of the Council, and the comments of the public. The rights will be implemented either through an allocation of fish that will be managed by the tribes, or through regulations that will apply specifically to the tribal fisheries. An allocation or a regulation specific to the tribes shall be initiated by a written request from a Pacific Coast treaty Indian tribe to the NMFS Southwest Regional Administrator, at least 120 days prior to the start of the fishing season as specified at 50 C.F.R. 660.510, and will be subject to public review according to the procedures in 50 C.F.R. 660.508(d). The Regional Administrator generally will announce the annual tribal allocation at the same time as the annual specifications. The Secretary recognizes the sovereign status and co-manager role of Indian tribes over shared Federal and tribal fishery resources. Accordingly, the Secretary will develop tribal allocations and regulations in consultation with the affected tribe(s) and, insofar as possible, with tribal consensus.

(e) Identification. A valid treaty Indian identification card issued pursuant to 25 CFR Part 249, Subpart A, is prima facie evidence that the holder is a member of the Pacific Coast treaty Indian tribe named on the card.

(f) Fishing (on a tribal allocation or under a federal regulation applicable to tribal fisheries) by a member of a Pacific Coast treaty Indian tribe within that tribe's usual and accustomed fishing area is not subject to provisions of the CPS regulations applicable to non-treaty fisheries.

(g) Any member of a Pacific Coast treaty Indian tribe must comply with any applicable federal and tribal laws and regulations, when participating in a tribal CPS fishery implemented under paragraph (d) above.

(h) Fishing by a member of a Pacific Coast treaty Indian tribe outside that tribe's usual and accustomed fishing area, or for a species of CPS not covered by a treaty allocation or applicable federal regulation, is subject to the CPS regulations applicable to non-treaty fisheries.

Any revision to the framework would require an FMP amendment. Implementing regulations would refer

to the framework in the FMP.

Alternative 2: Authorize adoption of the framework to accommodate treaty fishing rights in the implementing regulations. The initial proposed regulations would be as set out in the framework described above.

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE
PROPOSED CHANGES TO THE COASTAL PELAGIC SPECIES (CPS)
FISHERY MANAGEMENT PLAN
ENVIRONMENTAL ASSESSMENT/REGULATORY IMPACT REVIEW FOR AMENDMENT 9

The Washington Department of Fish and Wildlife (WDFW) has the following proposed changes to the draft EA/RIR for Amendment 9:

APPENDIX C - STATE APPROACHES FOR DETERMINING BYCATCH (p. 27)

Washington Work Plan for the 2000 Sardine Fishery

Replace the first paragraph with:

In Washington, sardines are managed under the Emerging Commercial Fishery provisions as a trial commercial fishery. An Emerging Commercial Fishery permit and a Trial Sardine Fishery permit are required and are non-transferable. The total sardine harvest taken in 2000 cannot exceed 4,000 metric tons (mt) in a fishery beginning May 15 and continuing through October 15, or until the quota is achieved, whichever occurs first. The fishery is open to purse seine gear only.

Before “Requirements,” insert:

Goals and Objectives

The goal for this trial fishery is to provide fishing opportunity consistent with the Pacific Fishery Management Council’s CPS fishery management plan and WDFW policy; collect information on sardines off Washington to improve the coastwide stock assessment; and document the extent of bycatch occurring in the fishery. Objectives include:

- Collect size, age, sex, and maturity data from the catch landed into Washington
- Document bycatch, in terms of species, amount, and condition. Recommend management measures to reduce bycatch, as necessary.
- Document harvest methods, distribution of harvest, and CPUE.

After “Agency Action,” add:

Planned Work

Washington sardine fishing activities occur out of the ports of Ilwaco and Westport. WDFW has hired two additional full-time observers and is utilizing existing port sampling staff to augment our observer program and conduct dockside sampling. The observers work onboard commercial fishing trips to document bycatch, determine catch composition, and collect market samples. Port samplers monitor unloading at processing plants for incidental catch data, weigh sub-samples of the sardine catch, and collect logbooks to determine harvest distribution, CPUE, and unobserved bycatch information.

Additional staff time is spent extracting otoliths (to be sent to the California Department of Fish and Game for age analysis), determining sex and maturity of samples, and summarizing observer and logbook information.

WDFW will provide a summary of the 2000 trial sardine fishery to the Council following the conclusion of the fishery.

Public Comment on Draft Amendment 9 to the CPS FMP

Jon Brodziak, 6/29/00.

CALCULATING AREA-BASED MARKET SQUID MSY PROXY - ALTERNATIVES AND ANALYSES

The Council has directed the Coastal Pelagic Species Management Team (CPSMT) to provide alternatives for determining and designating a Maximum Sustainable Yield (MSY) proxy for squid for Amendment 9 of the Coastal Pelagic Species Fishery Management Plan (CPS-FMP). As biological information is lacking, the CPSMT followed federal guidelines for determining MSY in data poor situations by using landings data as an indicator of abundance, and put forth three options for consideration. The Council then directed the team to provide an option which expands those values to account for areas that are unfished. The following series of options presented provide several alternatives that employ an area-based approach for calculating an MSY proxy, all which show an increased MSY value over using catch information alone.

Given the lack of information on market squid abundance along the west coast, it is imperative that you provide measures of uncertainty for long-term potential yield calculations (LTPY - I would not recommend using the term 'maximum sustainable yield', it's a perjorative term and has been roundly criticized in the fisheries literature. It would be more accurate to use 'maximum expected yield' or LTPY, IMO). Providing a probability distribution for LTPY, with a mean (or median or mode) and measure of dispersion, is the best way to give an indication of the reality of what bounds can be provided for this target. Providing a single value will only be misleading and will misrepresent the true uncertainty that exists. It will also downplay the importance of continued research and monitoring, which is essential if the uncertainty is to be reduced.

1. Inflate catch values to account for all potential *fishing* areas that are not fished each year but have been fished historically. Currently, CDFG commercial catch information is available by location for the time period 1981 through 1999. Location information is recorded by fishing block, which encompasses a 10 by 10 nm area. Over that time period, 262 unique blocks have been recorded on Department landing receipts. This number may be used to represent the total available fishing area in the range of the California fishery. In keeping with expansion of the fishery over this time period, the number of blocks fished has generally increased since 1981. By scaling the catch in any given season to account for what might have been caught in that season were all the blocks utilized, a proxy MSY for that year may be determined.

This approach requires that squid density is equal in each block and that fishery catchability is equal in each block, through time. The 1st part, equal density across blocks through time seems very unlikely to be even approximately true. The 2nd part, that the fishery can operate similarly across blocks, is also probably not true. The available information I am aware of on squid spatial densities indicates that squid distribution can shift dramatically in space and time in response to squid population density, environmental change, and prey availability (note: these are not mutually exclusive and likely operate in concert). Regardless of the cause, the assumption of areal expansion at this broad spatial aggregation seems too broad brush. It would be more useful to look at the productivity of individual blocks and their variability in production through time. More on this below.

Table 1

Fishing Season (Apr-Mar)	Landings (ST)	Blocks Utilized	% Fishing Area Utilized	MSY Proxy
1980	5768	26	0.10	58126
1981	25851	52	0.20	130251
1982	13213	43	0.16	80507
1983	1087	27	0.10	10549
1984	1354	33	0.13	10746
1985	14376	41	0.16	91863
1986	25603	40	0.15	167696
1987	25214	36	0.14	183498
1988	48195	31	0.12	407327
1989	33051	30	0.11	288648
1990	32472	38	0.15	223888
1991	38666	56	0.21	180902
1992	18793	45	0.17	109419
1993	54452	67	0.26	212933
1994	63592	114	0.44	146149
1995	93833	105	0.40	234137
1996	124309	105	0.40	310181
1997	10898	47	0.18	60750
1998	11727	67	0.26	45858
1999	91065	95	0.36	251147

The data in Table 1 exclude information on market conditions. The fishery system for market squid has apparently changed substaintially since 1980. The point is made in Voykavich (1998) that the fishery switched from brail to roundhaul gear during 1976-1984. The information on potential yield should be logically split if these gears operate differently, e.g., brail gear is substantially less effective/efficient. This is a judgment call, however, for the CPSMT. I believe that the information prior to 1984 provides useful information on what a lower bound on LTPY from the areas fished may be, taking into account inter-annual variability, and also shows the effect of a very strong El Nino on production per block. A key piece of information missing from Table 1 is the price incentive for fishers. To understand the amount of potential yield from this system, one is going to need to have an understanding of the market dynamics, and this should relate to the inflation-adjusted price for the yield through time. Add the column of average price adjusted for CPI-U, or CPI-P, to give an indication of how the market changed, if at all. Also add in the number of vessels participating.

The approach in option 1 can be modified to account for lack of knowledge of what potential yields may be possible from unfished blocks. In the attached Excel spreadsheet, I have outlined a way to use the variability in production per block, given the data in table 1, to provide scenarios for long-term sustainable yields. This is not the best way to do it, IMO, but it does account for some of the apparent variability in productivity per block, whether this is due to inherent variability in the distribution and abundance of squid or the fishers' choices or market effects or El Nino perturbations. Regardless, of how you go forward with the LTPY calculation excercise, it is very important that the fishers and managers be shown the productivity drop-off during El Nino (Of course, this is already known) and the frequency of these low production periods, e.g. 5 out of 20 years. This El Nino frequency is unknown, of course, but we have a short-term estimate of about 1/4. This empirical frequency can be used to divide the long-term potential yield calculation into high and low productivity parts, with high productivity 3/4 of the time and low productivity 1/4 of the time.

Using this approach also emphasizes the need to consider maximizing expected yield versus the static MSY concept. The California Current is a dynamic system and LTPY calculations should account for this behavior, else they are misleading.

2. Inflate catch values to account for all potential fishing areas that are not fished each year but have been fished historically, as well as inflate values to reflect spawning that has occured beyond the range of the fishery. As the above estimates represent only information available in California waters, scale up the MSY values calculated above in Table 1 to reflect additional unfished areas based on observed midwater trawl tow data. This analysis can be performed in several ways which involve several assumptions, resulting in highly variable results. Using information on squid density and proportion positive in the Pacific northwest, California and Mexico (assuming all tows are equal and not accounting for year effects), the portion of squid found in California to the coastwide total equals approximately 71 percent. Scaling the above MSY proxy values upward accordingly, coastwide MSY proxy values may be estimated.

I would recommend using the data source separately to give a categorization of density by broad geographic region. Then use the categories (high, medium, low based on third quartiles, or perhaps based on quintiles) to map relative density by data source. If summaries of several years can be made breaking out the El Nino events, this would be more informative as well. Then make some assumption (e.g. a distribution, perhaps uniform or lognormal) about the productivity of each broad region relative to your regions where you have data (from Table 1 or better yet more detailed spatial summaries). One rational basis for stratification would be the differences in upwelling by broad-scale regions along the Pacific coast. GLOBEC has put forward a number of publications that classify the California Current system into 4 broad regions. It may be possible to use these, with the help of some oceanographic insight, to give relative measures of upwelling and potential squid productivity. This is, of course, one idea that focuses on energy flow of prey and not other important features of habitat, like the potential for larval retention and suitable bottom-type. There may be some hints of preferred bottom type in the triennial survey data and this provides another way to attempt to stratify the unfished portions of the Pacific coast. In the absence of stratification, the uncertainty bounds in any expansion from the California fishery to the rest of the coast must logically be wide. One can account for the lack of knowledge of relative productivities of other unfished regions by using potential habitat expasion factors below, e.g., 71% for California, along with a distributional assumption about the scalar for relative productivity outside California. For example. If the mean of the LTPY distribution was 100 kt for California, the mean for the whole coast could be calculated as (100 kt/0.71)*the expected ratio of productivity outside of California waters to within California waters.

Table 2

Location	Tows	Positive Tows	Total Squid Caught	Squid per Positive Tow	PropPos	Ratio	**Portion in Range**
Pacific Northwest	419	111	4955	44.64	0.265	11.826	**0.19**
California	6009	1553	270837	174.40	0.258	45.072	**0.71**
Mexico	1410	152	8697	57.22	0.108	6.168	**0.10**
Total	7838	1816	284489			63.066	

Year	Landings (mt)	Area Fished (km2)	Productivity (mt) Per Unit Area	Blocks	Productivity (mt) Per Block
1980	5232.6	8918	0.59	26	201.3
1981	23451.5	17836	1.31	52	451.0
1982	11986.6	14749	0.81	43	278.8
1983	986.1	9261	0.11	27	36.5
1984	1228.3	11319	0.11	33	37.2
1985	13041.6	14063	0.93	41	318.1
1986	23226.5	13720	1.69	40	580.7
1987	22873.6	12348	1.85	36	635.4
1988	43721.5	10633	4.11	31	1410.4
1989	29983.2	10290	2.91	30	999.4
1990	29457.9	13034	2.26	38	775.2
1991	35077.0	19208	1.83	56	626.4
1992	17048.6	15435	1.10	45	378.9
1993	49397.8	22981	2.15	67	737.3
1994	57689.4	39102	1.48	114	506.0
1995	85123.4	36015	2.36	105	810.7
1996	112770.6	36015	3.13	105	1074.0
1997	9886.4	16121	0.61	47	210.3
1998	10638.5	22981	0.46	67	158.8
1999	82612.3	32585	2.54	95	869.6

	Landings (mt)	Area Fished (km2)	Productivity (mt) Per Unit Area	Blocks	Productivity (mt) Per Block	Crude Bounds for Fished Areas	Mean Relative Productivity of Unfished Areas		Lower Bound Relative Productivity of Unfished Areas	Upper Bound Relative Productivity of Unfished Areas
MAX	112771	39102	4.11	114	1410.4	160782	0.2		0.01	0.99
MIN	986	8918	0.11	26	36.5	950				

Time Period Scenario for Fishery System						Fished Areas Potential Yield (mt)	Unfished Areas Potential Yield (mt)	Longterm Potential Yield All Areas (mt)	Lower Bound Unfished Areas Potential Yield (mt)	Upper Bound Unfished Areas Potential Yield (mt)
MEAN 1980-99	33272	18831	1.62	55	554.8	30458	22980	53438	1149	113749
STDERR					82.3	4516				
MEDIAN 1980-99	23339	15092	1.58	44	543.4	23908	23690	47598	1185	117267
MEAN 1995-99	60206	28743	1.82	84	624.7	52349	22264	74613	1113	110206
STDERR					185.1	15511				
MEAN 1990-99	48970	25348	1.79	74	614.7	45428	23126	68554	1156	114473
STDERR					93.9	6941				
MEAN 1985-99	41503	20969	1.96	61	672.7	41127	27026	68153	1351	133780
STDERR					87.7	5360				
MEAN EL NINO YEARS	6945	14886	0.42	43	144.3	6264	6310	12574	315	31234
STDERR					47.8	2075				
MEAN NON-EL NINO	42047	20146	2.02	59	691.6	40621	28117	68738	1406	139177
STDERR					70.8	4157				

Farallon Island Station
In Cooperation with
U.S. Fish and Wildlife Service

PRBO
CONSERVATION THROUGH SCIENCE

Palomarin Field Station
Point Reyes Bird Observatory

August 22, 2000

Donald O. McIsaac, Executive Director
Jim Lone, Chairman
Pacific Fishery Management Council
2130 SW Fifth Avenue, Suite 224
Portland, Oregon 97201

Dear Mr. McIsaac & Mr. Lone:

We are writing regarding the review draft of Amendment 9 to the Coastal Pelagic Species (CPS) Fishery Management Plan (FMP). We would like to comment on the first two sections of the amendment, namely, the alternatives for minimizing and accounting for bycatch in CPS fisheries, and the alternatives for determining a maximum sustainable yield (MSY) proxy and allowable biological catch (ABC) for market squid.

The definition of bycatch includes "fishing mortality resulting from the encounter with fishing gear that does not result in capture." Techniques employed for squid capture include bright night lighting which may negatively impact seabirds and marine mammals. Even if not labeled "bycatch", regulations of the squid fishery should address effects on seabirds and pinnipeds breeding and feeding on and around islands or other coastal locations where squid fishing is regularly practiced. In particular, breeding colonies of endangered Brown Pelicans and a candidate for the endangered species list, Xantus' Murrelets, on Santa Barbara and other Channel Islands are regularly affected by squid boats' bright night lighting. This could result in increased predation, altered behavior such as reduced parental provisioning or colony attendance, or nest abandonment.

Amendment 9 states that the attempt to establish a scientifically sound MSY for squid has failed for lack of data. Furthermore, regarding alternative calculations of proxy MSY and ABC for squid, the council has admitted that the sole use of historic squid landings off the coast of California for these calculations is inadequate, given that the fishery is volatile and reliant on the market. As squid abundance and distribution appear to be highly variable between years, we believe that environmental and seasonal variability should be incorporated into the quota system for squid harvest. Additionally, most upper trophic level predators in the California Current marine ecosystem depend on squid for all or some portion of their diet, which should also be addressed when calculating the proxy MSY. Data on diet of certain seabird and pinniped species exists and needs to be compiled and summarized. Where data does not exist, efforts need to be made to extend our understanding of the effects of this fishery on top predators in the food chain.

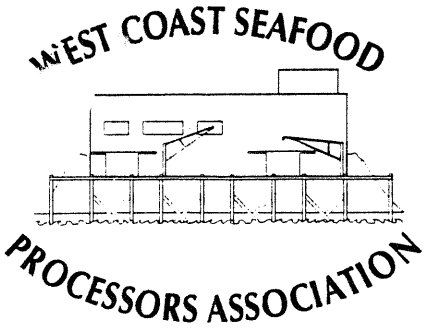
In terms of environmental consequences, the present harvest strategy and expansion of the squid fishery does appear to have a direct effect on certain ocean and coastal or island habitat, and may pose significant threats to populations of endangered Brown Pelicans, Xantus' Murrelets, and other sensitive seabirds and marine mammals occurring in the vicinity of the fishery. Please contact us at the phone number below with any questions.

Sincerely,

Julie A. Thayer, Marine Division Biologist

Ellie Cohen, Executive Director

Arctic Alaska Antarctic Eastern Pacific Ocean All Western States Mexico Mono Lake
4990 SHORELINE HIGHWAY, STINSON BEACH, CA 94970-9701 TEL: (415) 868-1221 FAX (415) 868-1946
WEB: http://www.prbo.org/prbo.html EMAIL: prbo@prbo.org



West Coast Seafood Processors Association
P.O. Box 1477, Portland, OR 97207-1477
503-227-5076 / 503-227-0237 (fax)
www.wcspa.com

Serving the shore-based seafood processing industry in California, Oregon and Washington

August 25, 2000

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AUG 3 0 2000
PFMC

Mr. Jim Lone, Chair
Pacific Fishery Management Council
2130 SW 5th Avenue, Suite 224
Portland, OR 97201

Dear Mr. Lone:

I would like to take this opportunity to comment on Amendment 9 to the Coastal Pelagic Species Fishery Management Plan. While I serve as the vice-Chairman of the Coastal Pelagic Species Advisory Subpanel, these comments are presented on behalf of the West Coast Seafood Processors Association (WCSPA). WCSPA represents shore-based seafood processors in Washington, Oregon and California. Members of WCSPA process a major portion of the CPS landed on the West Coast.

1. Bycatch Provisions

4.2.1 Effects of Management Measures
Federal regulations presently include numerous areas closed to reduction fishing with purse seines (Appendix B), which greatly reduces the potential for incurring incidental harvest, thus reducing potential bycatch.

The disposition of landings has nothing to do with whether or not incidental harvest and / or bycatch is happening. Fishing for live and dead bait is currently occurring in these "closed" areas with purse seine and round haul nets- it is only the disposition of the landings which is different. These areas were originally closed to reduce perceived conflicts between recreational and commercial fishermen. It is a dangerous precedent to associate "reduction fishing" with bycatch. We believe this language should be amended to avoid making this false association. In fact, the authors contradict themselves with the last sentence of the same paragraph by stating that management areas are neutral with regard to bycatch.

Furthermore, these closed areas may actually contribute to increased bycatch. If a fisherman can not sell all of his catch for live or dead bait, it is illegal for him to sell the remainder for reduction and the remaining catch must to be discarded. These discarded fish fall under the Magnuson-Stevens Act definition of bycatch.

4.3 Alternative Considered, Including Proposed Action

WCSPA supports Option 4: Recommendation that state agencies monitor and record CPS bycatch at the docks.

All three states currently have dock-side monitoring programs in place. If implemented correctly, these monitoring programs are sufficient tools for determining and recording bycatch in the coastal pelagic fishery. The monitoring programs also allow for biological testing to be completed simultaneously with the dock-side inspections. The biological samples are a critical part of an accurate stock assessment process.

WCSPA does NOT support Option 3: Recommend that either state or federal observers be placed on all new fisheries for coastal pelagic species north of Pigeon Point Lighthouse.

At this point, regulations for fisheries prosecuted north of 37° 10.9' N. latitude are left up to the individual states - as dictated by the CPS FMP. This practice should be continued. It is inappropriate for the FMP to dictate that observers must be present in all new fisheries north of Pigeon Point Lighthouse, when all other management decisions are left up to the states. Currently, both Oregon and Washington are utilizing some form of observer coverage in their respective fisheries.

2. Optimum Yield and Maximum Sustainable Yield (MSY) for Market Squid

WCSPA continues to echo the comments that scientists and managers have been making in recent years: there is not enough information currently available to determine an accurate MSY for squid. In fact, it has not been determined that managing squid with an MSY is the most appropriate strategy for this fishery. That having been said, we do understand that the law requires an MSY definition for species managed under a federal fishery management plan with few exceptions.

We appreciate the difficulty of determining an suitable MSY for squid with incomplete data. WCSPA applauds the CPS Management Team, and especially Marci Yaremko, on their hard work in determining an appropriate proxy.

WCSPA supports Option 2: Set coastwide MSY Proxy at 230,521 mt (page EA/RIR-9). This is also the preferred option of the CPS Management Team.

The WCSPA recommendation is based on the assumption that the Council will adopt an acceptable biological catch (ABC) alternative that sets ABC equal to MSY. (Option 2, Section 5.5, page EA/RIR 11, also the Management Team preferred alternative).

3. Treaty Indian Fishing Rights

Interest in sardine fishing has been displayed by some northwest tribes. We believe it is important to include language in the FMP that deals with potential tribal fisheries. We also believe that the language should mirror what was adopted with Amendment 11 to the Pacific Groundfish Fishery Management Plan.

Option 1 in Amendment 9 alleges it is similar to language in the Groundfish FMP, but in reality it is very different from what was adopted (Amendment 11) by the Council for implementation in 1999. **WCSPA does not support either Option 1 or 2 as presented, (in fact, it is unclear what the difference is between options 1 and 2) . We believe that the language in Amendment 9 should read as follows:**

"Treaties with a number of Pacific Northwest Indian tribes reserve to those tribes the right of taking fish at usual and accustomed grounds and stations (U & A) in common with other citizens of the United States.

NMFS has determined the tribes that have U & A in the area managed by this FMP are the Makah, Hoh, and Quileute tribes, and the Quinalt Indian Nation.

There is the potential for tribal fisheries to exist for species covered by the FMP. The federal government can accommodate these fisheries through a regulatory process. Until such time as tribal treaty rights are finally adjudicated or the regulatory process is modified or repealed, the Council will continue to operate under that regulatory process to provide recommendations to the Secretary on levels of tribal harvest."

The Groundfish FMP relies on the implementing regulations to include all regulatory processes for tribal fisheries. Because there are still pending law suits and current circumstances may change, it is inefficient to have the regulations listed in the FMP. A more effective process would include the regulatory processes in the implementing regulations instead of the FMP. For example, if a change were necessary to the language in Option 1 from Amendment 9 (as written), it would require a plan amendment to make those changes. The law does not require regulations to be included in the FMP, so the above language is sufficient to meet the legal requirements of the Magnuson-Stevens Act.

I will be available at the Council Meeting to provide further explanations regarding these recommendations. Thank you for your consideration.

Sincerely,

Heather Munro

Heather M. Munro
Deputy Director

United States Department of the Interior

NATIONAL PARK SERVICE
Channel Islands National Park
1901 Spinnaker Drive
Ventura, California 93001

IN REPLY REFER TO:

N1615-CHIS

August 31, 2000

Sent via fax 8/31/00

Mr. Donald O. McIsaac
Executive Director
Pacific Fishery Management Council
2130 SW Fifth Avenue, Suite 224
Portland, Oregon 97201

Dear Mr. McIsaac:

We are writing in response to the review draft of Amendment 9 to the Coastal Pelagic Species Fishery Management Plan (FMP). We recommend that the Secretary of Commerce and the National Marine Fisheries Service (NMFS) once again reject the alternatives put forth for determining a maximum sustainable yield (MSY) proxy and allowable biological catch (ABC) for market squid.

The proposed MSY proxy calculations for market squid are based on two unsupported beliefs:

a) "*The ability of the California market squid fishery to support landings of 112,771 mt in 1996-97 followed by a strong El Niño and then repeat landings of the same magnitude two seasons later suggest that the stock was not being overfished and that the 113,000 mt level achieved is sustainable.*" and

b) "*...262 unique blocks were recorded on landing receipts [over a period of 20 years]...This number may be used to represent the total available or potential fishing area in the range of the California fishery for any given season...If we assume that market squid had an equal chance of being caught in any of these potential blocks, we can expand the actual catch by the ratio of exploited to unexploited blocks and obtain the maximum catch that might have been caught in that year.*"

Regarding the first conclusion, above:
Numerous California fisheries (white abalone, pink abalone, green abalone, red abalone, black sea bass, rockfish, and Pacific sardines) and non-California fisheries (orange roughy, Chilean seabass, king mackerel in the Gulf of Mexico, Atlantic bluefin tuna) have produced two years of landings that were well above what was **truly** sustainable. It is untenable to choose the highest harvest year for California market squid and, based on

the fact that a similar level of harvest was achieved three years later, conclude that the harvest is "sustainable".

Regarding the second conclusion, above:
"*If we assume that market squid had an equal chance of being caught in any of these potential blocks, we can expand...*" is an important assertion that should not be part of the development of the MSY proxy if it is not grounded in reality. The catch and trawl data indicate that market squid is not evenly distributed throughout California. There is no known basis for stating that squid have an equal chance of being caught throughout the state, irrespective of squid concentrations, ocean conditions, distance from ports, or other factors. Additionally, it is not evident that summing the distribution of a mobile fish species over twenty years is a reliable indicator of the distribution of the species in a single year.

We suggest that the scientific information is not currently available to determine what level of market squid harvest is sustainable. Additionally, the process for determining an MSY proxy for squid in Amendment 9 does not take into account the requirements of marine mammals, seabirds, and other protected resources, as required by the Magnuson-Stevens Act.

We suggest that, given the substantial lack of knowledge regarding the life history, ecology, and distribution of market squid, the Pacific Fishery Management Council should take a precautionary approach to setting interim harvest limits for market squid while sufficient biological data are collected. As NMFS recognizes, market squid are forage to many fish, seabird, and marine mammal predators. The harvest of squid removes protein from the middle of the food chain. The ramifications of taking too much squid will be substantial if landings are not sustainable and if sufficient food for higher trophic level animals is not left in the sea. The difficulty of recovering overexploited fisheries once they have collapsed, many examples of which are unfortunately available (Hutchings, J.A., Nature. Vol. 406; pp. 882-885), argues for a precautionary approach.

Our points of contact for this issue are Gary Davis and Kate Faulkner who may be contacted at 805/658-5707 and 805/658-5709. Thank you for this opportunity to comment and please include us on your mailing list for notice of future fishery management plans or amendments that affect southern California marine ecosystems

Sincerely,

Kate Faulkner

for Tim J. Setnicka
Superintendent

Supplemental Public Comment I. 1.c
September 2000

CENTER FOR MARINE CONSERVATION

580 Market St., Suite 550
San Francisco, CA 94104

September 7, 2000

Pacific Fishery Management Council
2130 SW Fifth Avenue, Suite 224
Portland, OR 97201

Comments on September 2000 PFMC agenda item I. 1, Coastal Pelagic Species FMP Amendment 9: Squid MSY

Chairman Lone and Council members,

The Center for Marine Conservation (CMC) respectfully submits these comments on the issue of setting MSY for market squid (Loligo opalescens), in draft amendment 9 to the Coastal Pelagic Species (CPS) Fishery Management Plan. CMC represents over 20,000 members on the west coast with an interest in healthy ocean ecosystems. We have carefully tracked the development of squid MSY options through participation in the CPS advisory panel and other processes.

SUMMARY OF COMMENTS: The landings expansion (preferred option) should not be used in setting MSY for market squid because it relies on questionable assumptions and inadequate data. Instead, an average of landings over the most recent 5 or 10 years should be used as the MSY proxy in this data-poor situation.

COMMENTS: The scientists who worked on this task have done an admirable job of analyzing the available information and generating useful hypotheses, but the fundamental problem is that the available data are inadequate. It simply isn't possible to make a credible MSY estimate using such incomplete data. In particular, the preferred option relies on an expansion of landings data to estimate potential squid catch if fishing effort had occurred in unfished areas. Necessary data on squid abundance are lacking, so this estimate of potential landings is forced to rely on two questionable assumptions that lack scientific support:

Assumption 1: squid don't move away from spawning sites
Assumption 2: CPUE for squid is equal in all areas where squid have ever been caught

Regarding assumption 1, the landings expansion assumes that any recorded catch of squid is evidence of squid spawning in the same areas, essentially assuming that squid don't move. (draft EA/RIR page 10: "It is further assumed that there is little or no migration from spawning location to midwater trawl capture location.") However, there is evidence from California and elsewhere that market squid and other closely related species form spawning aggregations in particular areas and that squid populations do not necessarily inhabit these same areas when

they're not spawning. The squid fishery which targets spawning aggregations also suggests that this assumption is invalid.

Regarding assumption 2, the landings expansion assumes that unutilized areas could produce squid landings equal to areas targeted by the fishery. This approach uses a very crude measure of catch per unit effort (CPUE) in fished areas and applies it across larger unfished areas where no CPUE data are available. The CPUE data used in this analysis are total landings/blocks utilized (100 square mile blocks) which is not an accurate measure of CPUE. Despite this weakness, the crude CPUE data is applied across larger areas (56-90% of the total) where previous squid landings have been recorded but where no squid CPUE data are available. The MSY proxy obtained by this approach is simply a linear expansion of crude CPUE data to large areas where squid have been found. This is a risky approach with little scientific validation and it is contrary to generally accepted scientific standards on the use of CPUE data.

The two assumptions listed above are weakest for the coastwide expansion that relies on squid catch in midwater trawls throughout the range of squid along the US west coast. However, the same problems exist in using these assumptions for the California expansion that relies only on landings data. Some of the reported squid landings are from squid caught incidentally in other fisheries (such as trawl fisheries) and they are not from fisheries that specifically target spawning aggregations of squid. Thus, use of landings data for the California expansion also relies on the assumption that squid don't move from spawning sites to the locations of capture. Similarly, the use of landings data for the California expansion relies on the assumption that CPUE for squid fishing would be equal in all areas where squid have ever been landed, a questionable assumption without any scientific support.

Another concern with the preferred option for MSY is that squid from unfished areas are counted in developing an MSY for the existing fishery. Local depletion is likely if the entire MSY is taken from the few areas currently fished and squid don't move from spawning sites (as assumed in the analysis). Alternatively, if squid do move substantial distances from spawning sites, then the landings expansion is not scientifically valid because it may be double counting squid, once in landings data (at spawning sites) and again in trawl bycatch (when squid are not aggregated for spawning).

The most defensible option for squid MSY is an average of landings data over 5 or 10 years, which focuses on the modern fishery over a broad range of environmental conditions. While not a perfect solution, it makes the best use of the available data and is supported by NMFS' Technical Guidance on the Use of Precautionary Approaches to Implementing National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act (NOAA Technical Memo NMFS-F/SPO-31, August 1998, Restrepo, et al.).

Thank you for the opportunity to comment on these issues,

Mark Powell

Mark Powell, Ph.D.
Pacific Fisheries Project Manager

Supplemental
Public Comment
I.1.d

NATURAL RESOURCES DEFENSE COUNCIL

September 11, 2000

Donald O. McIsaac, Executive Director
Jim Lone, Chairman
Pacific Fishery Management Council
2130 SW Fifth Avenue, Suite 224
Portland, OR 97201

Re: Coastal Pelagic Species FMP Amendment 9: Review Draft

Dear Dr. McIsaac & Chairman Lone:

The Natural Resources Defense Council submits this letter as our comments on the market squid portions of the draft Coastal Pelagic Species FMP Amendment 9. NRDC is an environmental organization with over 125,000 members in the Pacific region. We serve on California's Squid Fishery Advisory Committee (SFAC) and helped develop the state laws now governing the market squid fishery. Based on our extensive involvement with this fishery, we have grave concerns about the methods used in the draft FMP to estimate an area-based MSY proxy for squid, and the resulting proposal to set MSY at over 245,000 metric tons (mt). We are also disturbed that the FMP gives minimal consideration to the vital ecosystem role squid play as forage for marine mammals, birds and fish, and to the potential impacts of the fishery on birds.

We agree with statements in the draft amendment that data are lacking to set a well-founded MSY, that an MSY proxy may not be practical for managing squid, and that other measures designed to ensure adequate spawning are more likely to protect squid from overfishing. Unfortunately, the only such measure now in place—a weekend closure—is under attack by squid processors and to a lesser extent by fishermen. Efforts to put long-term management in the hands of Fish and Game Commissioners who are equipped to make such decisions rather than leaving them to the legislature have been thwarted by lobbyists, and the future of state management is unpredictable at best. So, although we support and will continue to work toward sound state management of squid, we believe a proxy for MSY or long-term potential yield may be useful as a trigger for federal involvement in the event that state management efforts fail. It is critical, however, that such a proxy be based on a balanced consideration of risk—risk due to our lack of knowledge about squid populations and risk due to their dependence on ocean conditions. Likewise, the methodology used to set the proxy should minimize the introduction of unnecessary uncertainty. We believe the preferred MSY proxy in Amendment 9 fails these tests.

Our primary concern about the area-based methodology used to estimate the preferred MSY proxy is its dependence on a series of assumptions that appear to be unrealistic, given what we currently know about squid. The methodology first inflates squid landings data by taking all the blocks where squid were caught in the fishery from 1981 to 1999 and assuming that landings could have been as high in every one of those blocks in a single year as they were in the subset of blocks where squid were actually caught that year. For that assumption to be valid, squid would have to be equally dense and equally catchable in all the blocks where the fishery has operated over almost two decades. In fact, data on squid indicate that their distribution and population size shifts over time based on the availability of prey, ocean conditions,

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and other factors. Furthermore, if squid were equally dense and catchable over the entire historic range of fishing operations, squid boats would be unlikely to crowd together as they do, risking their safety and the potential for a clearer shot at their catch. In short, the first set of assumptions for expanding landings data is ill-founded.

The methodology then inflates landings data a second time by assuming that the presence of squid in midwater- and bottom-trawl survey tows provides an accurate indicator of squid spawning habitat all along the California coast. Similar assumptions are then used to expand that inflated estimate to a Pacific coast level. In fact, there appears to be little scientific basis for assuming that the presence of a squid (ranging in age from a few weeks to six months old) in a trawl survey indicates a squid spawning area. Available information suggests that squid aggregate in certain areas to spawn. The assumption that each of the 262 blocks where squid were found in a trawl tow has a productivity level equal to the blocks where squid are known to aggregate for spawning is unrealistic and could vastly overestimate the size of the squid population. Another source of data, the CalCOFI larval data base, may shed light on the difference in productivity in the trawl survey blocks where squid were found. This data should be analyzed to help develop more reasonable assumptions.

Because the assumptions used in this particular area-based methodology tend to overestimate squid populations at each stage of the process of inflating landings, the choice of this methodology as the preferred one implicitly leads to risk-prone choices without explicitly revealing the risks involved. To assist managers in making choices, the analysis in the review draft should instead aim to display the risks involved in the various options as clearly as possible.

Fishermen with many years of experience in the squid fishery find the assumptions of this specific area-based method untenable. After listening to a presentation on this method, the industry-dominated Squid Fishery Advisory Committee voted to recommend use of a landings-based approach instead of the area-based approach. A majority of the SFAC endorsed an MSY proxy of about 125,000 mt, about half the preferred 245,000 mt MSY proxy in the Amendment 9 draft. That fact that normally risk-prone fishermen are recommending a much smaller MSY proxy than that proposed in Amendment 9 should give Council members pause about the methodology.

NRDC is also very concerned that the discussion of allowable biological catch (ABC) and environmental effects contained virtually no consideration of the need to sustain the forage role of squid. According to Section 5.2.1, harvests in the realm of 113,000 mt occurring on either side of a two-year hiatus in the fishery suggests that harvests at that level are sustainable. That conclusion focuses only on the sustainability of the squid fishery itself, not on the sustainability of squid as part of a broader ecosystem. (Besides, an alternative conclusion might be that those levels are sustainable as long as a two-year rest period occurs in between). In our view, the critical role squid play as a source of food for marine mammals, fish and birds should receive more attention in the review draft, and ABC should incorporate a reduction from the MSY proxy in recognition of the crucial role squid play in ocean ecosystems.

The bycatch section of the draft should include a more complete discussion of the potential impacts of the squid fishery and lights on marine mammals and bird populations, including brown pelicans and Xantus' murrelets. We recognize and support the steps California has taken to require hoods and reduce wattage on squid lights. At the same time, the failure to even mention these issues except as part of a list of existing management measures downplays their importance and the need for monitoring to determine whether these measures are sufficient to address the problem.

NRDC is fully aware of the weak basis for setting an MSY proxy, and the desire to avoid triggering federal management based on insufficient data. MSY may never be a useful management tool in this fishery. Nonetheless, we believe there are ways to set a proxy using methods that rely less on unrealistic assumptions and that better display the risks involved in different choices (perhaps by providing a probability distribution rather than a single number for the proxy). We do not reject an area-based approach out of hand, but object to the way it has been applied. At a minimum, we recommend that the draft be expanded to incorporate the kind of analysis proposed by Jon Brodziak in his June 29 comments on the review draft. We also recommend that an MSY or long-term potential yield proxy be adopted with the understanding that it will be modified as more data or better management tools become available.

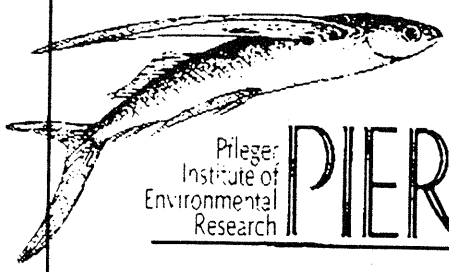
We appreciate the opportunity to comment on the draft amendment.

Sincerely,

Karen Garrison

Karen Garrison
Co-Director, NRDC Oceans Program

CPS



Pfleger Institute of Environmental Research PIER

Exhibit I.1
Public Comments
September 2000

5 September 2000

Donald O. McIsaac, Executive Director
Jim Lone, Chairman
Pacific Fishery Management Council
2130 SW Fifth Avenue, Suite 224
Portland, OR 97201

Dear Mr. McIsaac & Mr. Lone,

I represent the Pfleger Institute of Environmental Research (PIER). PIER is a non-profit marine fisheries lab that conducts original research relative to important fisheries issues. PIER was among the first institutions to initiate an active California market squid research program. Representatives from PIER have played a role in developing management options through participation in advisory panels. Throughout our extensive field and laboratory experience we have worked closely with fishermen, giving us solid insight into the issues coming before the Pacific Fisheries Management Council (PFMC) with respect to this fishery.

The Coastal Pelagic Species (CPS) Fishery Management Plan (FMP) has included the California market squid (*Loligo opalescens*) as a monitored species. As such, it has become necessary to establish a level for Maximum Sustainable Yield (MSY) and a level of Allowable Biological Catch (ABC) for this species. Amendment 9 of the CPS FMP proposes several alternatives for MSY; the preferred option of the CPS Management Team (CPSMT) recommends setting MSY at over 245,000 mt. Furthermore, the CPSMT has recommended setting an ABC at 100% of MSY. I believe the model used to establish this MSY level to be based on poor assumptions and the rationale for setting ABC equal to MSY to be absent. This leaves us with an irresponsibly high ABC during a time when we should be using the precautionary approach.

The CPSMT presented three approaches for determining an MSY proxy. The preferred alternative combines data from several different trawl surveys that recorded market squid as bycatch. None of these surveys were designed to sample market squid and many different sampling techniques (gear, depth and tow times) were used. This model, called MSY Based on Coastwide Expansion from Midwater Trawl Data, is entirely dependent on two indefensible assumptions

1) Midwater and bottom trawl data provide a measure of coastwide spawning area
2) Market squid do not migrate away from the area they hatch

1400 North Pacific Street • Oceanside, CA 92054 • TEL (760) 721-1440 • FAX (760) 721-1475

Assuming that the presence of a squid in a fish trawl survey is evidence of squid spawning habitat has absolutely no scientific merit. Many of the squid collected during these trawl surveys had not yet reached sexual maturity. Landings data clearly demonstrate that market squid aggregate to spawn at specific locations. Commercial landings from these known spawning areas are orders of magnitude greater than any incidental landings that occur outside of the spawning areas.

The first assumption is entirely dependent on the second assumption: squid do not migrate from the region they originated (hatched). If this were the case, the waters around some of the Channel Islands would be writhing with squid! Everything we know about squid indicates that they are a highly mobile predator that goes wherever is necessary to find prey, and migrates back to traditional spawning grounds to complete their life cycle. Remember, squid were placed in the Coastal Pelagic Species plan; the word *pelagic* in itself is contrary to the assumption that these animals do not move. The CPSMT takes a further step by using this assumption to invalidate catch records as a reasonable basis for determining an MSY proxy. The review draft states that since high numbers of squid were found in trawl surveys far from the historic areas targeted by the fishery, that the fishery is an unreliable source of information. By simply accepting the fact that squid migrate, this argument becomes silly.

Another approach discussed in the review draft is also deeply entrenched in an ill-founded assumption:

1) Market squid have an equal chance of being caught in all blocks (California Department of Fish and Game area blocks) that have been documented as the source of a squid landing between 1981-1999.

This assumption also goes against everything we know about this species and its fishery. California Department of Fish and Game (CDFG) landings data clearly show very high density of squid caught at particular locations, again, due to the fact that this species aggregates to spawn at traditional sites. If the above assumption was true, light boats and seiners would not be battling for position over the best sites, instead they would spread themselves out over a huge area and stay out of each other's way. Fishermen sometimes incidentally catch small quantities of squid using a variety of gears targeting other species. These small landings add a little cash to the pockets of the fishermen, but do not lend themselves to be the basis of a biomass model.

At the most recent meeting of the Squid Fishery Advisory Committee (SFAC), a group of industry representatives appointed by the Director of CDFG, the topic of MSY was discussed. CDFG staff presented their preferred alternative, which is the same MSY Based on Coastwide Expansion from Midwater Trawl Data. The assumptions used were discussed and dismissed, and

an MSY proxy based on historic catch levels was recommended to the Director of CDFG. The MSY value recommended by the SFAC was far less than that proposed as the preferred alternative in the review draft. It should cause alarm in each and every PFMC member when the fishery participants are proposing an MSY less than half that proposed by the CDFG and CPSMT.

Both the CPSMT and the SFAC recommend setting ABC at 100% of MSY for their respective recommended levels of MSY. The fishery representatives argue that they have been harvesting squid at a repeatable level and therefore ABC should be 100% of the catch-based MSY proxy. This argument is simple and defensible. On what grounds can the CPSMT justify setting ABC to MSY? There are no scientific grounds for this action! Their preferred MSY alternative is based upon poor guesswork, and we have no historical comfort with harvesting squid at this inflated level. A proxy MSY based on catch records is the only responsible approach at this time. I have attached a copy of the letter from the SFAC to the Director of CDFG. This letter outlines a proposed MSY of the highest catch on record plus 10% and setting ABC equal to MSY. The Pfleger Institute of Environmental Research finds this acceptable at this time, with the caveat that the catches and biomass be monitored closely so that ABC can be adjusted as need be. The population level of market squid is very dynamic and cannot be viewed in a traditional mindset; flexibility will be a key to successful management of this species.

Time permitting I look forward to presenting some new squid data during Friday's PFMC CPS agenda item. These data were gathered from a preliminary examination of CalCOFI samples, and support the invalidation of some of the assumptions I discussed above.

Sincerely,

Michael L. Domeier

Michael L. Domeier, Ph.D. - President

1400 North Pacific Street • Oceanside, CA 92054 • TEL: 760/721-1140 • FAX: 760/721-1475

To: Robert C Hight, Director, Cal F&G
From: Squid Fishery Advisory Committee
Subject: Maximum Sustainable Yield
Date; 6/13/00

Dear Mr. Hight

At the June 13 meeting of the SFAC held at the offices of CDF&G in Long Beach we voted on the matter of Maximum Sustainable Yield(MSY) being considered for the Pacific Fishery Managment Council amendment 9, of the Coastal Palagic Species Plan for squid. We feel this may be the biggest issue we have dealt with in our advisory capacity. We are a well informed on the squid fishery and ask that you consider our proposal and advance our recommendation to the Pacific Fishery Management Council.

Because squid has many unknown qualifiers as to the size of the biomass available for harvest we are obliged to recommend the Allowable Biological Catch (ABC) be set at the highest catch on record plus 10% and be equal to the Maximum Sustainable Yield. This would take into consideration the fact that most in our industry and the majority of our committee believe that on any given year, considerable amounts of squid were available to harvest but due to market conditions and trip (boat) limits excess available squid were not harvested. This availability of squid above the catch records indicate that the MSY is larger than the harvest and has been the case for many of the past years. Therefore if the Federal regulations MUST implement an MSY and ABC, the volume be sufficient to recognize the harvest potential and allow the industry to realize its potential. For example it is widely believed that the fleet could have harvested twice as much squid this past season (Sept-April) had the boats not been subject to low limits based on unfavorable market conditions. The SFAC does not specify what amount we believe could have been harvested but does acknowledge that the MSY and the ABC should be set high and adjusted up or down as good science becomes available in the future. It is critical to the health of this industry and the thousands of people employed that we not allow the harvest to be unrealistically curtailed and the available healthy harvest of this resource go underutilized.

In closing, it is the request of the SFAC that the ABC be equal to the MSY and that the ABC be set at the highest catch plus 10%.

Sincerely, John Borman
Co-Chairman, Cal. Squid Fishery Advisory Committee

John Borman

CPS

NATURAL RESOURCES DEFENSE COUNCIL

September 11, 2000

Donald O. McIsaac, Executive Director
Jim Lone, Chairman
Pacific Fishery Management Council
2130 SW Fifth Avenue, Suite 224
Portland, OR 97201

Re: Coastal Pelagic Species FMP Amendment 9: Review Draft

Dear Dr. McIsaac & Chairman Lone:

The Natural Resources Defense Council submits this letter as our comments on the market squid portions of the draft Coastal Pelagic Species FMP Amendment 9. NRDC is an environmental organization with over 125,000 members in the Pacific region. We serve on California's Squid Fishery Advisory Committee (SFAC) and helped develop the state laws now governing the market squid fishery. Based on our extensive involvement with this fishery, we have grave concerns about the methods used in the draft FMP to estimate an area-based MSY proxy for squid, and the resulting proposal to set MSY at over 245,000 metric tons (mt). We are also disturbed that the FMP gives minimal consideration to the vital ecosystem role squid play as forage for marine mammals, birds and fish, and to the potential impacts of the fishery on birds.

We agree with statements in the draft amendment that data are lacking to set a well-founded MSY, that an MSY proxy may not be practical for managing squid, and that other measures designed to ensure adequate spawning are more likely to protect squid from overfishing. Unfortunately, the only such measure now in place—a weekend closure—is under attack by squid processors and to a lesser extent by fishermen. Efforts to put long-term management in the hands of Fish and Game Commissioners who are equipped to make such decisions rather than leaving them to the legislature have been thwarted by lobbyists, and the future of state management is unpredictable at best. So, although we support and will continue to work toward sound state management of squid, we believe a proxy for MSY or long-term potential yield may be useful as a trigger for federal involvement in the event that state management efforts fail. It is critical, however, that such a proxy be based on a balanced consideration of risk—risk due to our lack of knowledge about squid populations and risk due to their dependence on ocean conditions. Likewise, the methodology used to set the proxy should minimize the introduction of unnecessary uncertainty. We believe the preferred MSY proxy in Amendment 9 fails these tests.

Our primary concern about the area-based methodology used to estimate the preferred MSY proxy is its dependence on a series of assumptions that appear to be unrealistic, given what we currently know about squid. The methodology first inflates squid landings data by taking all the blocks where squid were caught in the fishery from 1981 to 1999 and assuming that landings could have been as high in every one of those blocks in a single year as they were in the subset of blocks where squid were actually caught that year. For that assumption to be valid, squid would have to be equally dense and equally catchable in all the blocks where the fishery has operated over almost two decades. In fact, data on squid indicate that their distribution and population size shifts over time based on the availability of prey, ocean conditions,

and other factors. Furthermore, if squid were equally dense and catchable over the entire historic range of fishing operations, squid boats would be unlikely to crowd together as they do, risking their safety and the potential for a clearer shot at their catch. In short, the first set of assumptions for expanding landings data is ill-founded.

The methodology then inflates landings data a second time by assuming that the presence of squid in midwater- and bottom-trawl survey tows provides an accurate indicator of squid spawning habitat all along the California coast. Similar assumptions are then used to expand that inflated estimate to a Pacific coast level. In fact, there appears to be little scientific basis for assuming that the presence of a squid (ranging in age from a few weeks to six months old) in a trawl survey indicates a squid spawning area. Available information suggests that squid aggregate in certain areas to spawn. The assumption that each of the 262 blocks where squid were found in a trawl tow has a productivity level equal to the blocks where squid are known to aggregate for spawning is unrealistic and could vastly overestimate the size of the squid population. Another source of data, the CalCOFI larval data base, may shed light on the difference in productivity in the trawl survey blocks where squid were found. This data should be analyzed to help develop more reasonable assumptions.

Because the assumptions used in this particular area-based methodology tend to overestimate squid populations at each stage of the process of inflating landings, the choice of this methodology as the preferred one implicitly leads to risk-prone choices without explicitly revealing the risks involved. To assist managers in making choices, the analysis in the review draft should instead aim to display the risks involved in the various options as clearly as possible.

Fishermen with many years of experience in the squid fishery find the assumptions of this specific area-based method untenable. After listening to a presentation on this method, the industry-dominated Squid Fishery Advisory Committee voted to recommend use of a landings-based approach instead of the area-based approach. A majority of the SFAC endorsed an MSY proxy of about 125,000 mt, about half the preferred 245,000 mt MSY proxy in the Amendment 9 draft. That fact that normally risk-prone fishermen are recommending a much smaller MSY proxy than that proposed in Amendment 9 should give Council members pause about the methodology.

NRDC is also very concerned that the discussion of allowable biological catch (ABC) and environmental effects contained virtually no consideration of the need to sustain the forage role of squid. According to Section 5.2.1, harvests in the realm of 113,000 mt occurring on either side of a two-year hiatus in the fishery suggests that harvests at that level are sustainable. That conclusion focuses only on the sustainability of the squid fishery itself, not on the sustainability of squid as part of a broader ecosystem. (Besides, an alternative conclusion might be that those levels are sustainable as long as a two-year rest period occurs in between). In our view, the critical role squid play as a source of food for marine mammals, fish and birds should receive more attention in the review draft, and ABC should incorporate a reduction from the MSY proxy in recognition of the crucial role squid play in ocean ecosystems.

The bycatch section of the draft should include a more complete discussion of the potential impacts of the squid fishery and lights on marine mammals and bird populations, including brown pelicans and Xantus' murrelets. We recognize and support the steps California has taken to require hoods and reduce wattage on squid lights. At the same time, the failure to even mention these issues except as part of a list of existing management measures downplays their importance and the need for monitoring to determine whether these measures are sufficient to address the problem.

NRDC is fully aware of the weak basis for setting an MSY proxy, and the desire to avoid triggering federal management based on insufficient data. MSY may never be a useful management tool in this fishery. Nonetheless, we believe there are ways to set a proxy using methods that rely less on unrealistic assumptions and that better display the risks involved in different choices (perhaps by providing a probability distribution rather than a single number for the proxy). We do not reject an area-based approach out of hand, but object to the way it has been applied. At a minimum, we recommend that the draft be expanded to incorporate the kind of analysis proposed by Jon Brodziak in his June 29 comments on the review draft. We also recommend that an MSY or long-term potential yield proxy be adopted with the understanding that it will be modified as more data or better management tools become available.

We appreciate the opportunity to comment on the draft amendment.

Sincerely,

Karen Garrison

Karen Garrison
Co-Director, NRDC Oceans Program

Exhibit I.1
Attachment 1
September 2000

Amendment 9

Coastal Pelagic Species Fishery Management Plan

Environmental Assessment (EA) / Regulatory Impact Review (RIR) and Determination of the Impact on Small Businesses

June 2000

REVIEW DRAFT

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1.0 Abstract

The proposed action is to implement Amendment 9 to the Coastal Pelagic Species Fishery Management Plan (FMP) under the provisions of the Magnuson-Stevens Fishery Conservation and Management Act of 1976 as amended (Magnuson-Stevens Act). Amendment 9 defines maximum sustainable yield (MSY) for market squid according to the requirements of the Magnuson-Stevens Act to ensure the attainment of optimum yield and to prevent overfishing. The inadequacy of MSY as a management tool for squid is discussed and alternatives are presented to protect the resource based on spawning habitat. Potential bycatch in the various fisheries is evaluated based on current information, and alternatives are presented to gather information on bycatch as the harvest of coastal pelagic species increases. The coastal pelagic species fishery (CPS) has expanded to Oregon and Washington, where Indian fishing rights must be met according to treaties between the U.S. and specific tribes. Indian fishing rights were not addressed in the FMP; therefore, this amendment addresses that issue.

2.0 Introduction

On June 10, 1999, Amendment 8 to the Northern Anchovy Fishery Management Plan was partially approved by the Secretary of Commerce. Amendment 8 added four species to the plan, implemented limited entry to prevent overcapitalization, and changed the name of the plan to the Coastal Pelagic Species Fishery Management Plan (FMP). Species included in the management unit of the FMP are Pacific sardine (*Sardinops sagax*), Pacific mackerel (*Scomber japonicus*), Northern anchovy (*Engraulis mordax*), Market squid (*Loligo opalescens*), and Jack mackerel (*Trachurus symmetricus*). Pacific sardine and Pacific mackerel are actively managed species in the FMP, that is, harvest guidelines are calculated based on current biomass estimates of each resource. Jack mackerel, northern anchovy, and market squid are monitored species; that is, no current biomass estimates are made. Jack mackerel and northern anchovy are underutilized species. Market squid is managed by the State of California. All species are significant economically to the coastal pelagic fishery.

Two of the topics required by the Magnuson-Stevens Act to be included in all fishery management plans were disapproved, which required action to correct these deficiencies. Optimum yield for squid was disapproved because Amendment 8 did not provide an estimate of maximum sustainable yield. Bycatch provisions were disapproved because Amendment 8 did not contain a standardized reporting methodology to assess the amount and type of bycatch in the fishery and because there was no explanation of whether additional management measures to minimize bycatch and the mortality of unavoidable bycatch were practicable. At its meeting in June 1999, the Pacific Fisheries Management Council (Council) directed its Coastal Pelagic Species Management Team (CPSMT) to develop a revision to the FMP and report to the Council in September. A public meeting of the CPSMT was held in La Jolla, California on August 3 and 4, 1999, and on August 24, 1999, a meeting was held between the CPSMT and the Coastal Pelagic Species Advisory Subpanel. At its September meeting, the Council gave further direction to the CPSMT. At its March 2000 meeting, the Council asked the CPSMT for a more thorough analysis of the alternatives proposed for establishing MSY for squid and for bycatch. At a public meeting in La Jolla, California on April 20 and 21, 2000, the CPSMT reviewed comments from the Council, the Council's Scientific and Statistical Committee (SSC) and prepared additional material for establishing MSY for squid based on spawning area.

3.0 Background

3.1 Contents of Fishery Management Plans

Any fishery management plan that is prepared by any fishery management Council or by the Secretary of Commerce must, among other things:

a. establish a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery, and include conservation and management measures that, to the extent practicable and in the following priority –

    1. minimize bycatch; and

2. minimize the mortality of bycatch that cannot be avoided

b. assess and specify the present and probable future condition of, and the maximum sustainable yield and optimum yield from, the fishery, and include a summary of the information utilized in making such specification.

3.2 Description of Coastal Pelagic Species Fishing Methods

CPS vessels fish with roundhaul gear (purse seine or lampara nets of about ½ mile in total length). These are encircling type nets, which are deployed around a school of fish or part of a school. When the school is surrounded, the bottom of the net may be closed, then the net drawn next to the boat. The area including the free-swimming fish is diminished by bringing one end of the net aboard the vessel. When the fish are crowded near the fishing vessel, pumps are lowered into the water to pump fish and water into the ship's hold. Another more traditional technique is to lift the fish out of the net with netted scoops (brail). This is a large dip-net type device. Roundhaul fishing results in little unintentionally caught fish, primarily because the fishermen target a specific school, which usually consists of one species. The tendency is for fish to school by size, so If another species is present in the school, it is usually nearly the same size. The most common incidental catch in the CPS fishery is another CPS species. If larger fish are in the net, they can be released alive before pumping or brailing by lowering a section of the cork-line or by using a dip-net . The load is pumped out of the hold at the dock, where the catch is weighed and incidentally caught fish can be observed and sorted. Because pumping is so common, any incidental catch of small fish would not be sorted at sea. Incidental harvest of non-prohibited larger fish are often taken home for personal use or processed. CPS finfish landings are sold as relatively high volume/low value products (e.g., mackerel canned for pet food, sardine frozen and shipped to Australia to feed penned tuna, and anchovy reduced to meal and oil). In addition to fishing for CPS finfish, many of the vessels fish for market squid, Pacific bonito, bluefin tuna, and Pacific herring.

Squid are fished at night with the use of powerful lights, which aggregate squid, where they can be pumped directly from the sea or encircled with a net.

There are other vessels that target CPS in small quantities and usually sell their landings to specialty markets for relatively high prices. During the period 1993-1997, these included:

- Approximately 18 live bait vessels in southern California and two vessels in Oregon and Washington that take about 5,000 metric tons (mt) per year of CPS finfish (mostly anchovy and sardine) for sale to recreational anglers. Squid are also used for bait. (live bait harvest is unrestricted except at very low levels of spawning biomass).

- Roundhaul vessels that take a maximum of 1,000 mt to 3,000 mt per year of anchovy that are sold as dead bait.

- Roundhaul and other mostly small vessels that target CPS finfish (particularly mackerel and sardine) for sale in local fresh fish markets or canneries.

4.0 Bycatch

4.1 Purpose and Need for Action

National Standard 9 states that "conservation and management measures shall, to the extent practicable: (1) minimize bycatch; and (2) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch." The guidelines require the Council to consider the bycatch effects of existing and planned conservation and management measures. Bycatch is defined as fish that are harvested in a fishery, but not sold or kept for personal use. Bycatch also includes the discard of fish at sea or elsewhere, including economic discards and regulatory discards, and fishing mortality resulting from the encounter with fishing gear that does not result in capture. Bycatch that cannot be avoided must, to the extent practicable, be returned to the sea alive. Any proposed conservation and management measures that do not give priority to avoiding the capture of bycatch must be supported by appropriate analysis. The Council must

promote the development of a database on bycatch and bycatch mortality in the fishery to the extent practicable. The Council must review and, where necessary, improve the data collection methods, data sources, and applications of data for each fishery to determine the amount, type, disposition, and other characteristics of bycatch and bycatch mortality in each fishery. The Council must, for each management measure, assess the effects on the amount and type of bycatch and bycatch mortality in the fishery. The Council must select measures that to the extent practicable will minimize bycatch and bycatch mortality.

4.2 Description and Documentation of Bycatch

For the purpose of this discussion, the fishery for CPS can be divided into two areas: north of Pigeon Point Lighthouse (37° 10.9' N. Latitude), and south of Pigeon Point Lighthouse. Virtually the entire commercial fishery for CPS finfish in recent history has taken place south of Pigeon Point. The potential for taking salmon exists in this area, but diminishes as one moves south of Monterey (37° N. latitude), California. The potential for taking salmon incidentally increases as one moves north from Monterey. There is increased interest in harvesting Pacific sardine in Oregon and Washington, but there is little information on the incidental catch with purse seine gear north of Monterey, California to the Canadian border.

4.2.1 Effects of Management Measures

Incidental catch increases in the coastal pelagic species fishery when purse seines are set in shallow water such that the seine comes in contact with the bottom or a rocky outcropping. These areas are almost entirely near land, as water depth increases dramatically with distance from shore. Federal regulations presently include numerous areas closed to reduction fishing with purse seines (Appendix B), which greatly reduces the potential for incurring incidental harvest, thus reducing potential bycatch. There also are regulations requiring specific mesh size on purse seines used for reduction fishing for anchovy. The mesh size was adopted to minimize the harvest of smaller anchovy, replacing a regulation on size limits. Other management measures such as limited entry, management areas, vessel markings, etc., are neutral with regard to bycatch.

4.2.2 South of Pigeon Point

Anecdotal information from at-sea observations of the California Department of Fish and Game (CDFG) and conversations with CPS fishermen suggest that bycatch has been and is insignificant. Some individuals have expressed concern that sportfish and salmon might constitute significant bycatch in this fishery. This is a reasonable concern because anchovy and sardine are forage for virtually all predators, but there are no data to confirm significant bycatch. The behavior of predators may have something to do with this. Predators tend to dart through a school of prey rather than linger in the school, and predators can more easily avoid encirclement with a coastal pelagic purse seine.

In California, CDFG samples coastal pelagic landings in Monterey and ports to the south with the help of a Federal grant from the National Marine Fisheries Service under the authority of the Interjurisdicitonal Fisheries Act. Biological samples are taken to monitor the fish stocks, and dock samplers report incidentally caught fish (see Appendix A). Reports of bycatch by California dock samplers confirm small and insignificant landings of bycatch at California off-loading sites. These data are likely representative of actual bycatch because fish are pumped from the sea into fish holds aboard the fishing vessel. Fishermen do not sort catch at sea that pass through the pump; they land whatever is caught and pumped into the hold. Between 1985 and the partial year of 1999, there were 5,306 CDFG port samples taken from the sardine and mackerel landings. From 1992 to 1999, incidental catch was reported on only 179 occasions, representing a 3.4% occurrence in which some incidental catch was noted. The reports of incidental catch were sparse, and prior to 1992 none was reported. Earlier incidents of bycatch may not have been noted because the harvest of anchovy and sardine was small, and only in recent years has the harvest of sardine increased. The incidental catch reported are primarily those species that are marketable and do not meet the definition of bycatch in the Magnuson-Stevens Act. Unless an incidental species represents a significant portion of the load, at least a whole percentage point, the amount of the incidental catch is not recorded. Of the incidental catch reported, the two most prevalent species were market squid at 79%, and northern anchovy at 12% incidence within samples (not by load composition).

As stated in the fishery description contained in Amendment 8, most bycatch in the CPS fishery is incidental harvest that is sold. A number of circumstances in the fishery that tend to reduce bycatch in the fishery are:

- Most of what would be called bycatch under the Magnuson-Stevens Act is caught when roundhaul nets fish in shallow water over rocky bottom, a practice that fishermen try to avoid to protect gear or are specifically prohibited to fish because of area closures.

- South of Pt. Buchon, California, many areas are closed to roundhaul nets under California law and the FMP, which reduces the chance for bycatch.

- In California, a portion of the sardine caught incidentally by squid or anchovy fishermen can now be sold for reduction, which reduces discard.

- The 5 tons or less allowable landing by vessels without limited entry permits under the FMP should reduce discard because those fish can be landed.

- This fishery has traditionally operated off Monterey and in the southern California bight, although the fishery extended to British Columbia during the peak of the sardine fishery early this century. There are currently small fisheries in Oregon waters, off Washington, and British Columbia.

- From 1996 to the partial year 1999, bycatch from the live bait logs was reported with an incidence of 10% (Appendix A). The primary species taken as incidental catch was barracuda. Virtually all fish caught incidentally in this fishery are either used for bait, for personal use, or released alive.

- The CDFG has implemented a logbook program for the squid fishery. The data to be collected includes bycatch.

4.2.3 North of Pigeon Point

The CPS fishery has not operated on a significant scale during recent times north of Monterey; therefore, little is known about incidental catch or bycatch that might occur in this area. There is increased interest in harvesting Pacific sardine off the coasts of Washington and Oregon. By the end of 1999, 775.7 mt of sardine had been landed in Oregon by 10 vessels making 31 landings. Most of the landings were made by purse seine gear. Less than 300 pounds were harvested by 6 vessels in the whiting fishery, and less than 500 pounds were harvested in Winchester Bay for a local bait fishery. In 22 directed landings by three vessels, incidental catch consisted of 3,100 pounds of mackerel, which was processed. On one observed trip, the incidental catch consisted of one blue shark and one salmon, which was released alive. Logbooks accounting for 99 percent of the landings indicate an incidental catch of one additional salmon and approximately 300 pounds of skipjack tuna (not verified). Logbooks also show that 64 percent of the harvest was off Oregon and 36 percent off southern Washington.

Oregon had a limit of 15 permits in 1999 and has issued 15 permits for the 2000 fishery. Oregon's work plan for 2000 (Appendix C) is aimed at analyzing bycatch in its fishery through logbooks, observers, port sampling, and grates over hatches to minimize retention of larger incidental species.

The Washington Department of Fish and Wildlife has adopted permit conditions for its sardine fishery in 2000 (Appendix C) that include logbooks and observers. The fishery must take place beyond three miles and north of the Columbia River.

In 1999, the National Marine Fisheries Service issued two exempted fishing permits to fishermen intending to harvest anchovy for reduction in a closed area off San Francisco, California. The permits required 100 percent industry sponsored observers, which would have documented any bycatch. However, the fishermen did not fish under the authority of the permits and the permits expired.

Canada reported minimal bycatch in its sardine fishery in 1999 (Dennis Chalmers, Department of

Fisheries and Oceans, BC, personal communication).

4.3 Alternatives Considered, Including Proposed Action

The following alternatives were considered. Regardless of what method is eventually used to obtain data on incidental harvest and bycatch, all collected information would be included in the annual Stock Assessment and Fishery Evaluation report.

1. No action.

2. Recommend that state agencies, federal agencies, and tribes develop an observer program for all new fisheries for CPS North of Pigeon Point lighthouse (37 10 N lat.) **Preferred option**.

3. Recommend that state agencies, federal agencies, and tribes develop programs to monitor and record CPS bycatch at the docks. **Preferred option**.

4. Evaluate use of grates to cover openings of holds through which fish are pumped, which would screen out any bycatch of larger to allow live release before going into the ship's hold. **Preferred option**.

5. Require logbooks for the limited entry fishery, the live bait fishery, and the incidental fishery (those vessels landing less than 5 mt).

6. Allow landing of all bycatch. This would require changes to state and federal laws.

7. Require industry funded observers for all of the CPS limited entry fishery.

4.4 Discussion of Alternatives

Based on the data available to date, there is insufficient justification to require observers for the limited entry fishery (alternative 7) or logbooks for all harvesters of coastal pelagic species (alternative 5). The cost of either program exceeds the likely benefit of any additional information about the amount and variety of bycatch. The landing of all bycatch (alternative 6) merely to make a note of its existence conflicts with the desire to release incidental species, and it contradicts existing State and Federal rules regarding prohibited species; therefore, this option may cause more harm than good.

Requiring grates to cover the hold of all commercial coastal pelagic vessels (alternative 4) would cost approximately $100 per vessel, although many of these grates already exist, as they have been used in the California herring fishery in the past, when purse seines were the primary gear. Since most of the incidental species in southern California are known to not meet the definition of bycatch, requiring grates could be implemented only in the northern areas of the fishery, where information on bycatch is lacking.

The Council recommends that state agencies, federal agencies, and tribes develop programs to monitor and record CPS bycatch at the docks. California, Oregon, and Washington have programs at this time, and there is no plan to discontinue them.

The Council also recommends that state agencies, federal agencies, and tribes develop an observer program for all new fisheries for CPS North of Pigeon Point Lighthouse (37° 10.9' N. Latitude). In one or two years, this approach would likely provide valuable information on the unknown extent of bycatch in the area.

4.5 Environmental Consequences

From the information available, there are no environmental consequences of any option considered, except alternative 5, which requires the landing of all incidental harvest. This alternative would increase bycatch. The amount of bycatch in the CPS fishery is low; therefore, whatever bycatch occurs would not affect any stock. All existing fisheries are being monitored to determine changes in bycatch as fishing for

coastal pelagic species expand. The greatest uncertainty about how purse seine fisheries affect bycatch exists north of Monterey. Although the gear, in and of itself, may have a minimal impact on bycatch, the areas fished at specific times of the year or under certain conditions could have differing effects. Logbooks that record time and area of sets would help define the situation, as would observers, which could determine the behavior of species in the net and the potential for releasing incidentally caught species alive. This approach has been adopted by Oregon and Washington.

4.6 Regulatory Action

Section 2.2.1.1 of the FMP authorizes the use of observers to obtain scientific data as needed; however, there is no authorization in Federal regulations implementing the FMP. The language in the FMP reads as follows:

> All fishing vessels operating in this management unit, including catcher/processors, at-sea processors, and vessels that harvest in Washington, Oregon, or California and land catch in another area, may be required to accommodate NMFS certified observers on board to collect scientific data. An observer program will be considered only for circumstances where other data collection methods are deemed insufficient for management of the fishery. Implementation of any observer program will be in accordance with appropriate procedures outlined under this framework.

The option of the Regional Administrator to require observers should be included in the implementing regulations. Amendment 9 sets a high priority to use this authority to obtain information on bycatch.

5.0 Optimum Yield and Maximum Sustainable Yield for Market Squid

5.1 Purpose and Need for Action

National Standard 1 requires that conservation and management measures prevent overfishing while achieving, on a continuing basis, the optimum yield (OY) from each fishery. OY is based on MSY, or on MSY as it may be reduced according to social, economic, or ecological factors. The most important limitation on the specifications of OY is that the choice of OY and the conservation and management measures proposed to achieve it must prevent overfishing. Each FMP should include an estimate of MSY for each managed species.

At the Council's March 2000 meeting, the SSC and the CPSMT noted that setting an MSY for market squid is impractical for several reasons: (1) fishery and biological data are scarce, (2) markets tend to influence fishing effort, thus landings data are not a reliable indicator of stock abundance; and (3) the short life span of squid combined with its vulnerability to oceanographic variation limits the practicality of the sustainable yield concept. Nevertheless, recent high harvests indicate that squid can be highly productive and have precipitated action by the California Legislature to implement a research and management program for this species.

5.2 Approaches for determining an MSY Proxy

5.2.1 MSY Based on Historical Landings

Because there are not adequate data to make a mathematical MSY determination, guidance was taken from the NMFS publication: Technical Guidelines on the Use of Precautionary Approaches to Implementing National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act (Restrepo et. al., 1998). Those guidelines propose that in data poor situations such as the California market squid fishery, a proxy may be used for MSY, and that it is reasonable to use recent average catch from a time period when there is no qualitative or quantitative evidence of declining abundance. Options for time periods warranting consideration are discussed in section 5.3.

Historic market squid landings suggest that low landing periods correspond with El Niño events when abundance and/or availability of squid to the fishery is greatly reduced. Those events are generally followed by periods of apparent increasing abundance/availability and increasing annual landings until the

next El Niño. The market squid fishery is volatile and reliant on the international market and availability of squid from other squid fisheries. In the time period between the last two El Niño events (1993-94 and 1996-97) there was nearly an unlimited demand for California market squid in the Republic of China, a situation that kindled rapid development of fishing and expansion of processing for export from California. The expansion ended with the onset of the two-year 1997-99 El Niño event during which market squid abundance/availability dropped to very low levels and landings plummeted.

The first fishing season following the two-year El Niño event (1999-00), squid landings for the season were the second highest on record. Nearly all of the landings were from the southern portion of the fishery (southern California) with almost no landings to the north (Monterey area). This disparity would not have been predicted given current understanding of market squid abundance and distribution nor in temperature inclusive models, which are being considered for harvest guidelines and have been recommended by the SSC.

The ability of the California market squid fishery to support landings of 112,771 mt in 1996-97 followed by a strong El Niño and then repeat landings of the same magnitude two seasons later suggest that the stock was not being overfished and that the 113,000 mt level achieved is sustainable.

5.2.2 MSY Based on Expanding California Catch Data

Analysis of CDFG landings databases can provide general information on where squid are harvested. The location of commercial catch is recorded by fishing block, each of which encompasses a 10 by 10 nautical mile area. During the time period 1981-1999, 262 unique blocks were recorded on landing receipts which have been submitted for the sale of California market squid. This number may be used to represent the total available or potential fishing area in the range of the California fishery for any given season. During the expansion of the fishery over this time period, the number of blocks fished has generally increased since 1981. If we assume that market squid had an equal chance of being caught in any of these potential blocks, we can expand the actual catch by the ratio of exploited to unexploited blocks and obtain the maximum catch that might have been caught in that year. Yearly maximums are averaged to obtain an MSY proxy.

Table 1.

Fishing Season (Apr-Mar)	Landings (mt)	Blocks Utilized	% Fishing Area	MSY Proxy
1980	5233	26	0.10	52730
1981	23452	52	0.20	118161
1982	11987	43	0.16	73035
1983	986	27	0.10	9570
1984	1228	33	0.13	9749
1985	13041	41	0.16	83336
1986	23226	40	0.15	152131
1987	22873	36	0.14	166466
1988	43722	31	0.12	369519
1989	29983	30	0.11	261856
1990	29458	38	0.15	203106
1991	35077	56	0.21	164110
1992	17049	45	0.17	99263
1993	49398	67	0.26	193169
1994	57689	114	0.44	132583
1995	85124	105	0.40	212404
1996	112771	105	0.40	281390
1997	9886	47	0.18	55111
1998	10639	67	0.26	41602
**1999	101700	95	0.36	280478

* Landings (mt)/ [blocks utilized/total blocks] = MSY proxy (numbers were transferred to the table from a spreadsheet and rounded).

** Preliminary data (likely to increase with final landings data).

5.2.3 MSY Based on Coastwide Expansion from Midwater Trawl Data

Midwater and trawl data are the only comprehensive source of coastwide information on squid distribution (See Appendix D). Using this information assumes that these surveys can provide a measure of

coastwide spawning area. Length information in these databases indicates a size range of 20 to 120 millimeters, which correlates to an age distribution of a few weeks to six months. It is further assumed that there is little or no migration from spawning location to midwater trawl capture location.

MSY values calculated for the California fishery (above) could be expanded to reflect additional unfished areas based on market squid observed in trawl data for the US west coast. Using information on squid density and proportion positive in the Pacific northwest, California and Mexico (assuming all tows were equal and not accounting for year effects), the portion of squid observed in California to the coastwide total equals approximately 71 percent. Scaling the above MSY proxy values for California upward accordingly, coastwide MSY proxy values are estimated in Table 2.

Table 2.

Location	Tows	Positive Tows	Total Squid Caught	Squid per Positive Tow	Proportion Positive	Ratio	Portion in Range
Pacific Northwest	419	111	4955	44.64	0.265	11.826	0.19
California	6009	1553	270837	174.40	0.258	45.072	0.71
Mexico	1410	152	8697	57.22	0.108	6.168	0.10
Total	7838	1816	284489			63.066	

- Squid per positive tow = total squid caught/positive tows
- Proportion positive = positive tows/total tows
- Ratio of total squid caught = squid per positive tow x Proportion positive

5.3 Maximum Sustainable Yield Proxy Alternatives Considered

To determine a time period during which to evaluate catch data and provide alternative MSY proxy values, several factors may be considered, based on varying interpretations of the Restrepo et al. guidelines. A 20 year time span serves to cover the entire period during which the southern California fishery was expanding, as well as several El Nino periods. A ten-year time period spans the more recent expansion period and two El Nino periods. The most recent five-year period incorporates both a strong El Nino and the two highest seasons on record, one of which directly followed an El Nino event. The 1992-1996 time period is based on the Restrepo et al. guidelines in which there was no evidence of declining abundance, assuming that abundance is reflected by catch and nothing else. In 1996, the highest seasonal catch was attained, and using the rationale that no biological information was available to indicate that there was declining abundance, this level of harvest is sustainable. In 1988, the highest California catch expansion value was attained, and likewise there was no evidence of declining abundance.

Table 3 provides a matrix of values for each of the time periods described above using the three approaches outlined in section 5.2 for determining an MSY proxy.

Table 3. MSY Proxy Alternatives

	Landings Only	CA Catch Expansion	Coastwide Expansion (CA = 71%)
1. 20-YEAR (1980-1999)	34226	147988	208434
2. 10-YEAR (1990-1999)	50879	166322	234256
3. 5-YEAR (1995-1999)	64024	174197	245348
4. 1992-1996	64406	183762	258820
5. Highest Landings (1996)	112771	281390	396324
6. Highest Catch Expansion (1988)	N/A	369519	520449

5.4 Discussion of MSY Proxy Alternatives

Although there are occasional landings of market squid in Mexico, Oregon and Washington, there is no information at this time on volume or catch location. Because landings are poorly documented, very low and sporadic, the above calculations assume that there is no utilization of these areas for fishing activity, and therefore all proxy options are based only on landings data from California.

5.4.1 Using Historic Landings

The guidelines provided in Restrepo et al. were not generated with such short-lived species in mind. Current research indicates that squid live a maximum of approximately ten months, and the average age of squid taken in the commercial fishery are just over six months of age, which makes averaging the amount harvested over any period of time potentially ineffective as a way to determine sustainable harvest levels. Additionally, as no effort data is available but there were clearly changes in effort due to expansion of the fishery and El Nino conditions, landings information alone may be less precise to calculate an MSY proxy.

5.4.2 Using Expanded California Catch Data

A criticism of this option is that using a simple sum of all the blocks where catch has been reported is not an accurate method of calculating spawning area. There are vast differences in the productivity of the 262 blocks; therefore, giving each one an equal weighting on an area basis may be erroneous. However, there is no additional biological information at this time that refutes or supports either argument. Although the northern Channel Islands are clearly the most productive areas in terms of catch, this may only be a an effect of increased effort or one driven by market conditions. For example, there are reports that abundance of squid at San Nicholas Island is often very high (from participants in squid and crab fisheries), yet reported squid catch is low. The quality of squid delivered to processors is an important issue, and fishing areas are often limited based on proximity to processing facilities. San Nicholas Island is approximately 70 miles offshore and is generally considered too far from port to catch and deliver a good quality product to the processor.

Additionally, comparison of high-density squid catch areas with high-density squid trawl areas (discounting differences between the sources of midwater and bottom trawl survey data) shows that catch may not be the best indicator of abundance, as most of the high-density trawls occurred in the areas outside San Francisco Bay, Monterey, Cape Mendocino and southern Oregon, which are generally not the highest density areas for catch. If there were a high correlation between the catch and tow data, an MSY proxy value based on this relationship would warrant consideration.

5.4.3 Using Coastwide Expansion from Midwater Trawl Data

A criticism of this option is that the sources of survey data are different; therefore, lumping them together for treatment is erroneous. Several treatments of these data may be employed to improve the information, such as volume of water passing through the nets (not available at this time) or accounting for differences between the gear used. Seasonal and year effects were not considered in analysis of the trawl survey information, and were aggregated for the time period 1966 through 2000.

In determining a coastwide MSY, ignoring information on spawning area that is beyond the range of the fishery may be erroneous, although regional allocation issues may warrant attention if the resource moves to active management status or within state FMP's.

5.4.4 Other Alternatives Explored

The CPSMT derived catch information from CDFG block data to indicate the range of the California fishery as presented in Table 1, and calculated the portion of squid present in California waters (71%) relative to the entire Pacific coast from midwater trawl data as presented in Table 2. However, several additional methods of data treatment may be employed that could generate other alternatives to the MSY proxy value selected by the team. Following is a summary of other methods of evaluation that were considered; most of which would result in a greater range and much higher MSY proxy values.

1. When calculating the MSY proxy value for areas within California (Table 1), comparison of catch data with tow data reveals that positive tows occurred in areas beyond those ever recording commercial catch. Consequently, it would be possible to further expand the range of squid spawning activity (and thus increase the MSY proxy values) either by expanding the sum number of blocks to a number greater than 262, or by using a measure of area other than the 10x10 nautical mile block.

2. In looking at the midwater trawl data, both calculations of proportion positive and density were considered in determining the portion of distribution within the range of California waters. However, calculating the area of distribution (based on positive tows) would yield different results.

3. Since the CDFG block information spans an area of 10x10 nautical miles, it is unlikely that the entire block was utilized for squid fishing activity. It is known that directed fishing activity on spawning grounds occurs generally in depths shallower than 200 feet. It could therefore be said that any positive midwater trawl tow that occurred in any depth greater than 200 feet (assuming no migration or transport between hatch location and location of capture) would represent area that is unutilized by the fishery. There is anecdotal information to indicate that spawning activity or egg deposition does occur in depths greater than 200 feet, as there are reports of squid egg cases being taken incidentally to the Dover sole, thornyhead, and other bottom trawl fisheries. Consequently, based on the distribution of positive tows, if the bottom area within the 200 foot depth contour were calculated, MSY proxy values could be scaled up to account for additional areas beyond that 200 foot-depth where positive tows occurred and the fishery does not operate. Additionally, as there are shallow areas where positive tows for squid occurred within California waters and no records of catch has ever been made there since 1981, these areas would be included with the deep water as area not utilized by fishing activity but positive for squid occurrence.

5.5 Allowable Biological Catch Alternatives Considered

The purpose of setting an Allowable Biological Catch (ABC) in this case would be to establish a point where action would be taken to prevent exceeding MSY. Regardless of where this point is, the action or actions taken would be developed through the points of concern mechanism contained in the FMP. The following options were considered:

The FMP defines the default ABC for monitored species as 25% of MSY and defines overfishing as exceeding ABC during any two years. When the FMP was written, this was not foreseen as a potential problem with market squid because management was deferred to the State of California, although 25% of MSY is a reasonable ABC value for other small pelagic species (i.e., jack mackerel or anchovy). The proxy MSY is based on landings as supported by spawning area. There is no accurate estimate of MSY.

1. Status quo. Do not change the default ABC.

2. Set ABC equal to MSY.

3. Set ABC at 75 percent of MSY.

5.6 Environmental Consequences

The maximum long-term average yield of squid is likely to be of less use for managing squid than it is for other coastal pelagic species, which also respond dramatically to environmental conditions. Nevertheless, regardless of how catches are averaged, using MSY to obtain optimum yield is inadequate, as optimum harvest of an annual crop is likely to be highly variable from year to year, even when no harvesting occurs. Recent research indicates that Loligo opalescens taken in the fishery are approximately six months in age and are sexually mature and actively spawning. The maximum age of squid is approximately nine to ten months, and they are known to die following the spawning event.

In response to market demands beginning in 1993, squid landings began an unprecedented climb. From fishing seasons 1993 through 1996, landings were 49,398 mt, 57,690 mt, 85,124 mt, and 112,771 mt respectively (Table 1). The harvest during the 1997-98 season was 9,887 mt, which would naturally raise

fears that the high harvests in previous years had affected the resource. However, the harvest during the 1999-2000 fishery was 82,613 mt. There was an El Niño during 1997/98, which appears to have prevented squid from significant spawning in the area of the fishery, which has happened during all previous El Niños. If recent high harvests reflect excellent environmental conditions, then perhaps the average harvest of 23,000 mt between 1981 and 1992 reflects poor environmental conditions.

At this time, there is no way to determine how much squid should be harvested in any given year; however, squid are currently harvested only on the spawning grounds off Monterey, California, and in southern California, not on the open sea. Harvest in the remainder of the habitat has been minimal. Also, as noted above, not all areas where squid occur in the area of the fishery are exploited.

Whether large or small, any number picked that puts a limit on harvest is likely to be speculative. While it is true that a very small number will most likely prevent overfishing, it would shut down the fishery. Considering the history of landings in the fishery, this would not be justified and would not be optimal. The examination of habitat through midwater and bottom trawl data has been revealing. After looking at abundance in several different ways, there seems to be a good possibility that the resource may be capable of producing at least twice what has been recently harvested. At this time, the most that can be done for the resource to protect it while maintaining a productive fishery is to assure to the extent practicable that adequate spawning occurs. Ongoing research is likely to reveal other information that will improve on this approach, e.g., beginning the fishing season on a certain date after spawning begins or closing certain areas permanently or temporarily. One approach that might be useful would be to monitor (1) the amount of egg capsules deposited. Some kind of assessment would give managers assurance that spawning is successful, and (2) the amount of habitat exploited by the fishery. Areas where spawning occurs that are not exploited by the fishery would play the role of reserves and would provide a kind of insurance policy for protecting the resource. For the reasons stated above, the CPSMT recommends setting a proxy for MSY at 245,348 mt. This is a guide for the Council to monitor the fishery and does not preclude the Council from using information obtained from ongoing research to take action to protect the fishery as soon as it becomes available.

5.7 Status of State Management Action

Despite having a coastwide distribution, the California market squid resource is commercially landed only in the state of California, although many vessels that participate in the fishery have other home ports. Due to increased demand, the southern California fishery has expanded in recent years, prompting the California Legislature to enact a series of measures to assure sustainability of the resource, which is also an important forage item. In 1998, a permit requirement was established both for vessels landing and lighting squid for commercial purposes, and in order to renew the permit in subsequent years, the applicant must have been issued a permit the preceding year. By April 2001, recommendations for a market squid conservation and management plan will be submitted to the Legislature, which will include information on whether a limited access plan is necessary, whether time and or area closures are advisable, what research and monitoring is necessary to assure sustainable harvests, what gear restrictions or modifications may be necessary, what coordination may be necessary with the federal CPS FMP, and what regulations may be warranted for light boats.

Beginning in 1998, the Legislature provided authority to the California Fish and Game Commission to adopt interim regulations for the fishery prior to development of the state FMP. In 2000, four interim measures were adopted, including a) A logbook requirement was imposed on vessels participating in the fishery to provide better information on fishing effort; b) Closure of the fishery throughout the state on weekends to allow for periods of uninterrupted spawning activity; c) A maximum wattage requirement was established for vessels employing lights used to attract squid; d) A requirement that these lights must be shielded to prevent illumination of the light outward onto land.

Although not part of the process to develop a squid management plan, the state of California has existing regulations on round-haul activity and has designated other areas as closed to all fishing activity which may serve as additional reserve areas. Section 2.2.5.2 in Amendment 8 to the CPS FMP provides a summary of these specific closures for California, Oregon and Washington.

General Closure Areas for Ocean Fishing – California State Code – TITLE 14.

Duxbury Reef Reserve (Marin Co.).

In the Duxbury Reef area in Marin County no fish except abalone, Dungeness crabs, rock crabs, rockfish, lingcod, cabezon, surfperch, halibut, flounder, sole, turbot, salmon, kelp greenling, striped bass, monkeyface-eel, wolf-eel, smelt and silversides may be taken between the high tide mark and 1,000 feet beyond the low tide mark at any place on the coastline or any reef or rock situated between the westerly extension of the southerly boundary of the Pt. Reyes National Seashore and the southerly extension of the centerline of Kale Road in Bolinas Beach. All other fish and forms of aquatic life are protected and may not be taken without a written permit from the department issued pursuant to Section 650 of these regulations.

Gerstle Cove Reserve (Sonoma Co.).

No form of marine life may be taken within 600 feet of the high water line in the most northerly portion of Gerstle Cove, Sonoma Co., without a written permit from the department issued pursuant to Section 650 of these regulations.

Point Reyes Headlands Reserve (Marin Co.).

No form of marine life may be taken from the ocean area within 1,000 feet of the high tide mark in the Pt. Reyes Headlands bounded on the west by a line extending due west (true) from Pt. Reyes Lighthouse and on the east by a line extending due east (true) from Chimney Rock, without a written permit from the department issued pursuant to Section 650 of these regulations.

Estero de Limantour Reserve (Marin Co.).

No form of marine life may be taken below the high water mark in Estero de Limantour without a written permit from the department issued pursuant to Section 650 of these regulations. Estero de Limantour includes all tideland waters to high water mark in an easterly direction from a line drawn due north (true) from the extreme westerly point of Limantour Spit issued pursuant to Section 650 of these regulations.

Lover's Cove Reserve, Santa Catalina Island (Los Angeles Co.).

No form of marine life may be taken in those waters adjacent to Catalina Island beginning at the most southeasterly corner of the Cabrillo Wharf (the wharf for ocean-going vessels on the seaward side of the peninsula), then extending a line seaward, perpendicular to the seaward face of the wharf, to a point approximately 100 yards from the mean tide line, then turning in a southeasterly direction and following the alignment of the mean tide line at a distance of 100 yards from the mean tide line continuing through Lover's Cove, around Abalone Point, and continuing to a point approximately 430 feet easterly of Abalone Point, commonly known as "Ring Rock," then returning to shore on a line perpendicular to the Pebble Beach Road.

Pismo Invertebrate Reserve (San Luis Obispo Co.).

No invertebrate may be taken between the high tide mark and 1,000 feet beyond the low tide mark in that portion of a beach commonly known as Pismo-Ocean Beach lying between the Grand Avenue ramp and a point .3 mile north of the Grand Avenue ramp.

Point Cabrillo Reserve (Mendocino Co.).

No form of marine life may be taken from the ocean area within 1,000 feet of the high tide mark in the vicinity of Point Cabrillo U.S. Coast Guard Lighthouse, bounded by lines extending due west (magnetic) 2,500 feet north and 1,600 south of the lighthouse.

Point Loma Reserve (San Diego Co.).

Between a point approximately 300 yards easterly from the Point Loma Light and a point approximately ½ mile northwesterly of the light, no plant or invertebrate marine life may be taken between the high tide mark and 150 feet beyond the mean lower low tide mark.

Robert W. Crown Reserve (Alameda Co.).

No plant or invertebrate marine life may be taken between the high tide mark and 150 feet beyond the mean lower low tide mark in that portion of Robert W. Crown Memorial State Beach between the base of the jetty on the northwesterly corner of Crab Cove and a point approximately 2,800 feet southeasterly along the shoreline of Crab Cove opposite the bath house/restroom complex. Hook-and-line fishing is permitted in this area for fin fish only.

5.8 Proxy MSY Value and Risk of Overfishing

In addition to initial regulatory measures taken by the state of California as described above, there are additional constraints that may serve to protect squid from excessive harvest and may warrant consideration in determining an MSY proxy value.

Based on coastwide distribution and abundance of California market squid from midwater and bottom trawl surveys, the population is only utilized for commercial purposes over a fraction of its range. Over 90 percent of California landings occur in southern California, mostly in the vicinity of the Channel Islands. However, the survey data indicates squid are in greatest abundance off areas of northern California and southern Oregon, where little or no fishing activity occurs. Additionally, squid are only fished on spawning aggregations at depths traditionally shallower than 30 meters, yet mature individuals and egg cases have been collected in bottom trawls at significantly deeper depths. At this time, there is no biological or genetic information to indicate if there are geographically distinct stocks and what mixing may or may not occur over the range of the population. Within the scope of the state FMP process, area-specific MSY's could determined if warranted and additional biological information were available. Severe reductions in catch were observed during the 1983-84 and 1997-98 seasons as a result of El Nino events. If this temporary collapse in the fishery is due to a decline in stock size generated by poor environmental conditions, unavailability of the resource on the fishing grounds may offer protection against excessive harvest. Moreover, low availability of squid on the traditional fishing grounds does not precipitate fishing effort in non-traditional areas where squid may be abundant during these times.

Although little is known about vertical migration of squid and what portion of the stock may be vulnerable to fishing in shallow spawning areas at any given time, deep water areas may serve as an unexploited refuge, since the fishery operates by attracting squid with lights near the surface. Additionally, there are several known spawning areas for squid in southern California that are not utilized by the fishery due to proximity from port, such as Cortez Banks and San Nicholas Island. As the product quality can deteriorate rapidly, offloading quickly is essential, and fuel expenses make fishing these regions cost-prohibitive if the market price is not high. Although there appears to be a substantial portion of the biomass that is unutilized for fishing activity in Baja, northern California and Oregon, the likelihood is that these areas will continue to serve as reserves, as purse-seining is not practical much of the time in those northern areas due to weather, and large-scale processing facilities are not established in these locations.

Considering the status of knowledge regarding market squid, establishing a number that purports to represent an MSY would be groundless. If the number were low, however that would be defined, an assumption might be made that the resource would be protected, but unless there were evidence that spawning was not occurring, closing the fishery based on present knowledge would also be groundless. Setting a high number, however that would be defined, may pose a greater risk of depleting the resource, but that number most likely depends on whatever environmental variables influence squid. The number itself is likely to vary widely from year to year. This FMP establishes, for want of a better term, a proxy MSY that is not regarded as a sustainable yield in any respect, but rather a benchmark to keep in mind while the fishery and the resource is observed. If the fishery expands to new areas as the benchmark is approached, that may be important information to take into account and could lead to some kind of management action. Likewise, the amount of spawning activity occurring as the benchmark is

approached may also be significant information to take into account.

This FMP will not establish any number that might be regarded as a harvest limit without other protections. There are area closures, regulated and de facto, that protect certain areas from harvest. The fishery is closed two days out of every week. Market squid are widely distributed along the Pacific coast, far beyond the historical fishery. As long as the range of the fishery is confined as it has been in the past and as long as the method of harvest does not change, there is good reason to believe that the recommended approach will protect the resource.

Other Considerations

1. Applying a definition of MSY to be 'the largest amount of catch that can be obtained on a continuing basis by applying a constant harvest rate' is ineffective for squid based on inadequate effort information. At this time, calculations of a harvest rate are not possible, although a logbook program has recently been implemented in the fishery for both light and purse seine vessels in order to attain better data for future management. Landing receipt information in CDFG databases can provide data on where, when and how much catch was taken by a particular vessel, but provides noting in terms of search time or area searched for no catch. Additionally, determining harvest rate proxies such as catch rates per boat, number of vessels participating, or number of days fished would be largely erroneous because of the impact that market conditions have upon landings information. For example, in recent years, markets have imposed trip limits on vessels, have restricted the number of vessels they will employ, and will often encourage vessels to switch target species to other coastal pelagics based on order demand. Additionally, because this fishery depends largely on the efforts of light boats, and no catch or effort information is available for these vessels, one landing made by a purse seiner could represent the efforts of zero to several light vessels on a given night. Based on these inadequacies, the CPSMT concluded that applying data-poor guidelines outlined in Restrepo, et al to use information on catch was the most appropriate method for developing proxy MSY values.

2. Regarding the assumption that all blocks are treated equally in the expansion calculation despite the fact that landings data clearly show that densities between positive blocks vary significantly, there is not adequate information to say that squid are more or less abundant in those areas. It is assumed that catch is more abundant, although taking using this information without knowledge of effort again would be problematic. On the contrary, information from tow data sources do not show that commercial catch is strongly correlated with local abundance. Therefore, it seems more accurate to assume a constant density given these conflicting sources of information.

6.0 Treaty Indian Fishing Rights

Oregon fishermen began harvesting Pacific sardine during the summer of 1999, when the FMP was implemented. Oregon fishermen continued fishing in 2000, and Washington fishermen also entered the fishery. The coastal pelagic species fishery now extends to the usual and accustomed fishing grounds of Indian tribes that have treaties with the U.S. involving certain fishing rights. This issue was not addressed in the FMP.

6.1 Legal Considerations

Treaties between the United States and numerous Pacific Northwest Indian tribes reserve to these tribes the right of taking fish at usual and accustomed grounds and stations ("u & a grounds") in common with other citizens of the United States. See U.S. v. Washington, 384 F. Supp. 312, 349-350 (W.D. Wash. 1974).

The tribes that have u & a grounds in the marine areas managed by this FMP are the Makah, Hoh, and Quileute tribes, and the Quinault Indian Nation. The Makah Tribe is a party to the Treaty of Neah Bay, Jan. 31, 1855, 12 Stat. 939. See 384 F. Supp. at 349, 363. The Hoh and Quileute tribes and the Quinault Indian Nation are successors in interest to tribes that signed the Treaty with the Quinaeilt, et al. (Treaty of Olympia), July 1, 1855, 12 Stat. 971. See 384 F. Supp. at 349, 359 (Hoh), 371 (Quileute), 374

(Quinault). The tribes' u&a grounds do not vary by species of fish. U.S. v. Washington, 157 F. 3d 630, 645 (9th Cir. 1998).

The treaty fishing right is generally described as the opportunity to take a fair share of the fish, which is interpreted as up to 50 percent of the harvestable surplus of fish that pass through the tribes' u&a grounds. Washington v. Washington State Commercial Passenger Fishing Vessel Association, 443 U.S. 658, 685-687 (1979) (salmon); U.S. v. Washington, 459 F. Supp. 1020, 1065 (1978) (herring); Makah v. Brown, No. C85-160R, and U.S. v. Washington, Civil No. 9213 - Phase I, Subproceeding No. 92-1 (W.D. Wash., Order on Five Motions Relating to Treaty Halibut Fishing, at 6, Dec. 29, 1993) (halibut); U.S. v. Washington, 873 F. Supp. 1422, 1445 and n. 30 (W.D. Wash. 1994), aff'd in part and rev'd in part, 157 F. 3d 630, 651-652 (9th Cir. 1998), cert. denied, 119 S.Ct. 1376 (1999) (shellfish); U.S. v. Washington, Subproceeding 96-2 (Order Granting Makah's Motion for Summary Judgment, etc. at 4, November 5, 1996) (Pacific whiting). The harvestable surplus must be determined according to the conservation necessity principle, which holds that the amount of fish available for harvest must be based solely on resource conservation needs. Passenger Fishing Vessel, 443 U.S. at 682; Antoine v. Washington, 420 U.S. 194, 207-208 (1975); Puyallup Tribe v. Washington Game Dept., 391 U.S. 392, 402 n. 14 (1968) Puyallup I); Tulee v. Washington, 315 U.S. 681, 684 (1942). The conservation necessity standard applies to federal as well as state regulation. Makah v. Brown, No. C85-160R, and United States v. Washington, Civil No. 9213 - Phase I, Subproceeding No. 92-1 (W.D. Wash., Order on Five Motions Relating to Treaty Halibut Fishing, at 6, Dec. 29, 1993).

The treaty right was originally adjudicated with respect to salmon and steelhead. However, it is now recognized as applying to all species of fish and shellfish within the tribes' u&a grounds. As stated in U.S. v. Washington, 873 F.Supp. 1422, 1430, aff'd 157 F. 3d 630, 644-645 (9th Cir. 1998), cert. denied, 119 S.Ct. 1376:

> The fact that some species were not taken before treaty time - either because they were inaccessible or the Indians chose not to take them - does not mean that their right to take such fish was limited. Because the 'right of taking fish' must be read as a reservation of the Indians' pre-existing rights, and because the right to take any species, without limit, pre-existed the Stevens Treaties, the Court must read the 'right of taking fish' without any species limitation.

The original 1974 District Court decision in U.S. v. Washington specifically references Quileute tribal fishing for sardines at treaty times. U.S. v. Washington, 384 F.Supp. 312, 372 (W.D. Wash. 1974).

The National Marine Fisheries Service recognizes the areas set forth in the framework below as marine u&a grounds of the four Washington coastal tribes. The Makah u&a grounds were adjudicated in U.S. v. Washington, 626 F.Supp. 1405, 1466 (W.D. Wash. 1985), aff'd 730 F.2d 1314 (9th Cir. 1984). The u&a grounds of the Quileute, Hoh, and Quinault tribes have been recognized administratively by NMFS. See, e.g., 64 Fed. Reg. 24087-24088 (May 5, 1999) (u&a grounds for salmon); 50 C.F.R. 660.324(c) (u&a grounds for groundfish); 50 C.F.R. 300.64(i) (u&a grounds for halibut). The u&a grounds recognized by NMFS may be revised as ordered by a federal court.

The legal principles described above support the conclusion that treaty Indian fishing rights apply to coastal pelagic species that pass through the coastal tribes' ocean u&a grounds. The quantity of this right has not yet been determined or adjudicated.

6.2 Prospective Tribal Fisheries for CPS

With the resurgence of Pacific sardines, and their movement north along the West Coast, it is likely that some of the Pacific Northwest ocean fishing tribes may wish to exercise their treaty fishing rights on CPS in their u&a grounds. Currently, no regulatory impediment to tribal fisheries exists because the tribes' u&a grounds are in CPS Subarea A, which is an open access area with its own allocation of one-third of the coast wide harvest guideline (65 Fed. Reg. 3890-3892, January 25, 2000). However, it is possible that specific treaty Indian allocations may be necessary in the future. To anticipate this eventuality, and to establish an orderly process for implementing treaty fisheries, it is proposed to include a treaty Indian fishing rights framework in the FMP.

Two alternatives are described below. Both options are designed to give the Council prior notice of proposed treaty fisheries so that allocation and other issues can be addressed before fisheries commence. In addition, both options would recognize the Indians' treaty rights; describe the u&a grounds of the four ocean fishing tribes; provide an orderly procedure, through the Council process, for implementation of treaty rights; and contain various measures related to the exercise of treaty rights.

Alternative 1: Adopt and include in the FMP a framework process similar to that used for treaty Indian fisheries under the Pacific Coast Groundfish Fishery Management Plan. Specifics of the proposed framework are as follows:

(a) Pacific Coast treaty Indian tribes have treaty rights to harvest CPS in their usual and accustomed fishing areas in U.S. waters.

(b) Pacific Coast treaty Indian tribes means the Hoh, Makah, and Quileute Indian Tribes and the Quinault Indian Nation.

(c) The Pacific Coast treaty Indian tribes' usual and accustomed fishing areas within the fishery management area (FMA) are set out below. Boundaries of a tribe's fishing area may be revised as ordered by a Federal court.

(1) Makah – That portion of the FMA north of 48 degrees 02'15" N. lat. (Norwegian Memorial) and east of 125 degrees 44'00" W. long.

(2) Quileute – That portion of the FMA between 48 degrees 07'36" N. lat. (Sand Point) and 47 degrees 31'42" N. lat. (Queets River) and east of 125 degrees 44' 00" W. long.

(3) Hoh – That portion of the FMA between 47 degrees 54'18" N. lat. (Quillayute River) and 47 degrees 21'00" N. lat. (Quinault River) and east of 125 degrees 44' 00" W. long.

(4) Quinault – That portion of the FMA between 47 degrees 40'06" N. lat. (Destruction Island) and 46 degrees 53'18" N. lat. (Point Chehalis) and east of 125 degrees 44'00" W. long.

(d) Procedures. The rights referred to in paragraph (a) will be implemented by the Secretary of Commerce, after consideration of the tribal request, the recommendation of the Council, and the comments of the public. The rights will be implemented either through an allocation of fish that will be managed by the tribes, or through regulations that will apply specifically to the tribal fisheries. An allocation or a regulation specific to the tribes shall be initiated by a written request from a Pacific Coast treaty Indian tribe to the NMFS Southwest Regional Administrator, at least 120 days prior to the start of the fishing season as specified at 50 C.F.R. 660.510, and will be subject to public review according to the procedures in 50 C.F.R. 660.508(d). The Regional Administrator generally will announce the annual tribal allocation at the same time as the annual specifications. The Secretary recognizes the sovereign status and co-manager role of Indian tribes over shared Federal and tribal fishery resources. Accordingly, the Secretary will develop tribal allocations and regulations in consultation with the affected tribe(s) and, insofar as possible, with tribal consensus.

(e) Identification. A valid treaty Indian identification card issued pursuant to 25 CFR Part 249, Subpart A, is prima facie evidence that the holder is a member of the Pacific Coast treaty Indian tribe named on the card.

(f) Fishing (on a tribal allocation or under a federal regulation applicable to tribal fisheries) by a member of a Pacific Coast treaty Indian tribe within that tribe's usual and accustomed fishing area is not subject to provisions of the CPS regulations applicable to non-treaty fisheries.

(g) Any member of a Pacific Coast treaty Indian tribe must comply with any applicable federal and tribal laws and regulations, when participating in a tribal CPS fishery implemented under paragraph (d) above.

(h) Fishing by a member of a Pacific Coast treaty Indian tribe outside that tribe's usual and accustomed fishing area, or for a species of CPS not covered by a treaty allocation or applicable federal regulation, is subject to the CPS regulations applicable to non-treaty fisheries.

Any revision to the framework would require an FMP amendment. Implementing regulations would refer to the framework in the FMP.

Alternative 2: Authorize adoption of the framework to accommodate treaty fishing rights in the implementing regulations. The initial proposed regulations would be as set out in the framework described above.

7.0 Summary of Environmental Consequences

7.1 Beneficial and Adverse Impacts

The only adverse economic impact of the proposed actions is the cost of placing observers aboard developing fisheries for coastal pelagic species north of Pigeon Point Lighthouse (37° 10.9' N. Latitude). At this time there are no developing fisheries in California north of Pigeon Point; however, there are developing fisheries in Oregon and Washington, and these states are requiring some observer coverage at the expense of the fishing industry. Section 2.2.1.1 of the FMP already requires observers for collecting scientific data as necessary.

The attempt to establish a scientifically sound MSY for market squid has failed, and a proxy for MSY based on landings is inadequate. However, a review of the information available on spawning area has provided some assurance that the resource is protected from excessive fishing pressure. This assertion is supported by landings data. Following an unprecedented expansion of the fishery that harvested an average of more than 85,000 mt during the 1994 through 1996 fishing seasons, harvests dropped during an El Niño during the 1997 and 1998 fishing seasons to an average of 10,000. However, landings rose to more than 82,000 mt in 1999. If fishing pressure had caused the decline, the resource would not have rebounded so quickly. Therefore, the harvest strategy employed in the present fishery is not expected to jeopardize the resource and should prevent overfishing and obtain optimum yield. Implementation of a process to address Indian fishing rights complies with treaties between the U.S. Government and specific Indian tribes.

7.2 Public Health and Safety

There are no proposed actions that would have any effect on public health and safety.

7.3 Unique Characteristics

The proposed actions are not expected to have any significant adverse impact on unique characteristics of the area such as historic or cultural resources, park lands, wetlands, or ecologically critical areas.

7.4 Controversial Effects

The proposed actions are not expected to involve significant controversial issues for the broader public. There is concern among environmental groups about the increasing harvest of squid. These same concerns in the State of California brought about legislation in 1998 that imposed a three-year moratorium on fishing vessels, a research program, and the development of a fishery management plan.

7.5 Uncertainty or Unique/Unknown Risks

The proposed actions are not expected to have any significant effects on the human environment that are highly uncertain or involve unique or unknown risks.

7.6 Precedent/Principle Setting

The proposed actions are not expected to have any significant effects in establishing a precedent and do not include actions that would represent a decision in principle about a future consideration.

7.7 Relationship/Cumulative Impact

The proposed actions are not expected to have any significant cumulative impacts that could have a substantial adverse effect on the fishery resources or any related resource.

7.8 Historical/Cultural Impacts

The proposed actions are not expected to have any significant effects on historical sites listed in the National register of Historic Places and will not result in any significant impacts on significant scientific, cultural, or historic resources.

7.9 Interaction with Existing Laws for Habitat Protection

The proposed actions are not expected to have any significant interaction that might threaten a violation of Federal, state, or local law or requirements imposed for the protection of the environment. The proposed actions have no direct effect on ocean or coastal habitat.

8.0 Other Applicable Law

8.1 Endangered Species Act (ESA)

An informal consultation was initiated with the Protected Resources Division, Southwest Region, on January 12, 1999, with regard to the effects of Amendment 8 on endangered and threatened marine mammals and salmon under the jurisdiction of the National Marine Fisheries Service. On June 3, 1999, a determination was made that Amendment 8 would not likely adversely affect listed species under NMFS jurisdiction. Consultation was reinitiated following the publication of additional listed species, and on September 2, 1999, a determination was made that the FMP was not likely to adversely affect Central Valley spring-run chinook and coastal California chinook. The fishery has since expanded to Oregon and Washington; therefore, according to the conditions established in the previous determination, consultation was reinitiated on April 19, 2000.

8.2 National Environmental Policy Act (NEPA)

NMFS initially has determined that implementation of any of the alternatives in this amendment would not significantly affect the quality of the human environment; therefore, preparation of an environmental impact statement is not required by Section 102(C) of NEPA or its implementing regulations.

8.3 Executive Order 12866 (E.O. 12866)

Based on the above analysis, the proposed rule has been determined to be not significant for purposes of E.O. 12866.

8.4 Regulatory Flexibility Act (RFA)

This RIR must determine whether the proposed rule is a significant economic impact on a substantial number of small entities" under the RFA. The purpose of the RFA is to relieve small businesses, small organizations, and small governmental entities from burdensome regulations and record keeping requirements. If the alternatives meet both the significant and substantial criteria, preparation of an Initial Regulatory Flexibility Analysis is required. The only potential rules proposed by the alternatives in Amendment 9 is to codify the Regional Administrator's authority to require observers on fishing vessels for scientific purposes, which is already included in the FMP, and the possible inclusion of a framework process to meet Indian fishing rights. Amendment 9 establishes the determination of bycatch as a priority for observers to be placed on vessels harvesting CPS north of 37° 10.9' N. Latitude. At this time, there

are only 63 vessels with limited entry permits that could harvest in the area as far north as 39° N. Latitude, the extent of the limited entry fishery. No fisheries have developed in this area. Any vessel can harvest CPS north of 39° N. Latitude; therefore, there is a potential for a large number of vessels to harvest CPS. There are purse seine vessels fishing in other fisheries in Oregon, Washington, and Alaska that could participate. The States of Oregon and Washington already have an observer requirement for developing fisheries for CPS, so there is no need for the Regional Administrator to require them for purposes of determining the amount of bycatch. The amount of CPS harvested depends on market demand, and most of the demand is expected to be met in the traditional areas of the fishery. Fishing trips are normally daily trips. An observer program would require from 10% to 20% of the trips covered to provide a reliable estimate of bycatch at sea. The cost of an observer would range from $100 to 350$ a day, depending on travel. Even if the costs were assumed by the industry, such a program would not likely have a significant impact; therefore, this amendment and any rules resulting from the alternatives are not likely to have a significant economic impact on a substantial number of small entities.

8.5 Paperwork Reduction Act (PRA)

This amendment does not require additional reporting requirements.

8.6 Coastal Zone Management Act (CZMA)

Any of the alternatives considered would be implemented in a manner that is consistent to the maximum extent practicable with applicable State coastal zone management programs. NMFS has requested concurrence with this finding with the responsible state agencies under Section 307 of the CZMA.

8.7 Executive Order 12612 (E.O. 12612)

This rule does not contain policies with federalism implications sufficient to warrant preparation of a federalism assessment under E.O. 12612.

9.0 Finding of No Significant Impact

For the reasons discussed in this document, neither implementation of the proposed actions nor the status quo would significantly affect the quality of the human environment, and the preparation of an environmental impact statement on the final action is not required by Section 102(2)(C) of NEPA or its implementing regulations.

10.0 List of Preparers

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Pacific Fishery Management Council

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California Department of Fish and Game

APPENDIX A – SUMMARY OF OBSERVED INCIDENTAL CATCH

Table 1. Number of landings sampled by California port samplers from 1985 to 1999.

Total Landings Sampled per Year

Year	Sardine	Mackerel	Total
99	61	--	61
98	97	97	194
97	113	116	229
96	96	85	181
95	254	215	469
94	119	167	286
93	85	183	268
92	231	113	344
91	169	42	211
90	99	233	332
89	149	451	600
88	190	385	575
87	128	510	638
86	105	440	545
85	40	333	373
		Total	5306

Table 2. Incidence of incidental documented by California port samplers.

Incidental catch from Port Sampling Records

Year	Species	Incidence	Totals
99	Anchovy	5	
	Jacksmelt	1	
	Herring	1	
			7
98	Herring	2	
	Anchovy	3	
	White Croaker	1	
	Market Squid	4	
			10
97	Market Squid	44	
	Anchovy	1	
	Herring	1	
			46
96	Market Squid	22	
	White Croaker	1	
	Anchovy	8	
	Lingcod	1	
			32
95	Market Squid	71	
	Jack Mackerel	1	
	Pacific Mackerel	1	
	Yellowtail	1	
	Anchovy	5	
	Herring	1	
			80
94	Herring	1	
			1
93	None reported		
92	Market Squid	1	
	Yellowfin Tuna	1	
	Skipjack Tuna	1	
			3
		Total	179

Table 3. Incidence of incidental catch from live bait logs.

	Live Bait Logs	
Year	Species	Incidence
99	Smelts, true	1
	Barracuda	4
98	Herring	1
	Shiner Surfperch	1
	Barracuda	84

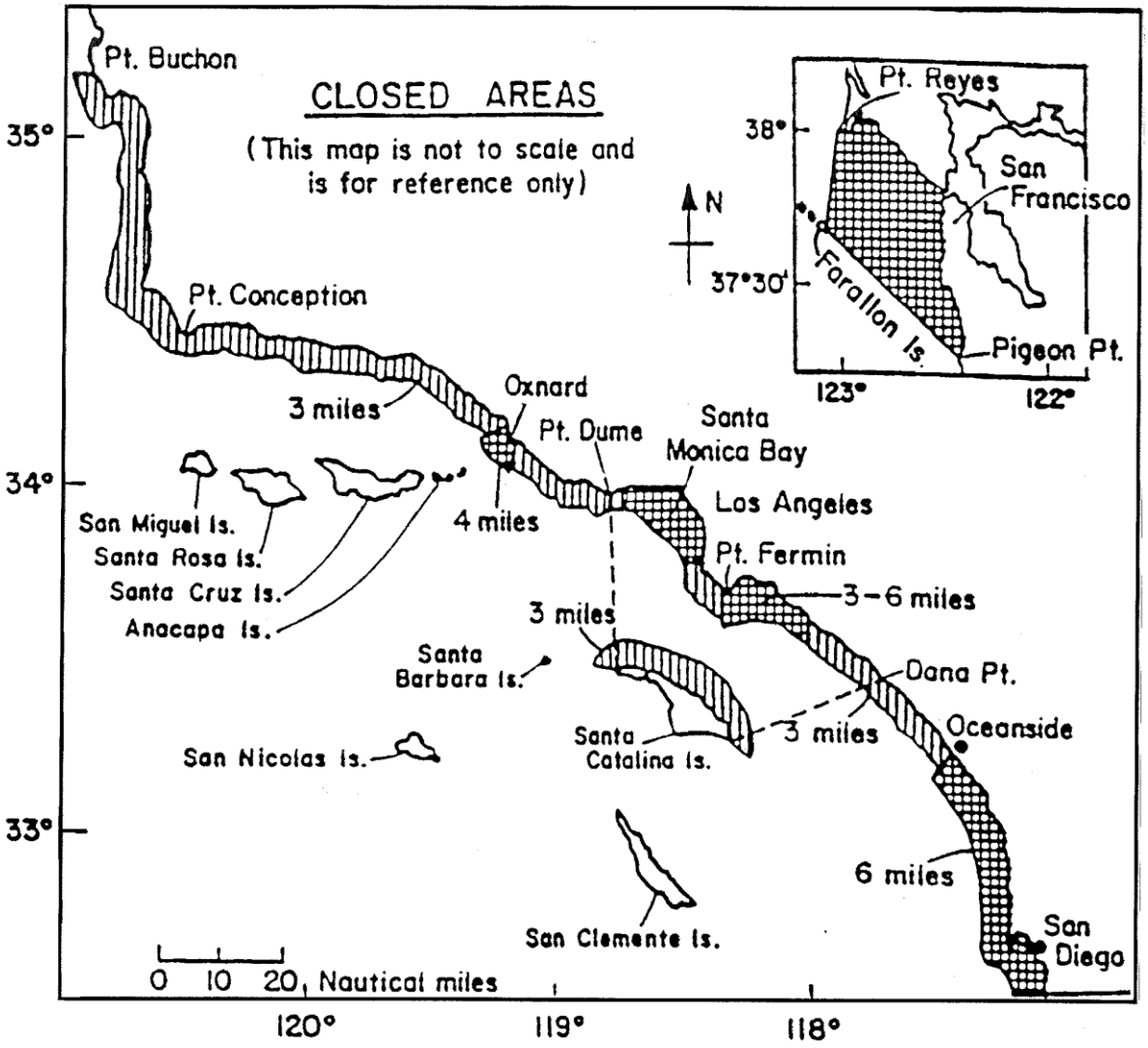
97	Shiner Surfperch	3
	Sea Star	1
	Barracuda	102
96	Barracuda	1
	Total Reports	198

Table 4. Summary of total incidental catch from live bait logs.

Live Bait Incidental Species	Incidence
Barracuda	191
Shiner Surfperch	4
Herring	1
Smelts, true	1
Sea Star	1
Total	198

Table 5. Summary of days fished in the live bait fishery.

Live Bait Days Fished	
Year	Days
99	187
98	812
97	778
96	131
Total	1908


CLOSED AREAS
(This map is not to scale and is for reference only)
Pt. Buchon
Pt. Conception
3 miles
Oxnard
Pt. Dume
Santa Monica Bay
Los Angeles
Pt. Fermin
3–6 miles
4 miles
San Miguel Is.
Santa Rosa Is.
Santa Cruz Is.
Anacapa Is.
3 miles
Santa Barbara Is.
San Nicolas Is.
Santa Catalina Is.
3 miles
Dana Pt.
Oceanside
6 miles
San Clemente Is.
San Diego
0 10 20 Nautical miles
35°
34°
33°
120°
119°
118°
N
38°
37°30'
123°
122°
Pt. Reyes
San Francisco
Farallon Is.
Pigeon Pt.

APPENDIX C – STATE APPROACHES FOR DETERMINING BYCATCH

Oregon Work Plan for the 2000 Sardine Fishery

In Oregon, sardines are managed under the Developmental Fishery Program which allows a limit to the number of participants. For sardines, a maximum of 15 permits can be issued. In 2000, ten permits were renewed from 1999. The remaining five permits were issued through a lottery in February that had 35 applications. Permits are not transferable.

Permit holders are required to make at least 5 landings of 500 pounds or one landing of at least 5000 pounds of sardines to renew their permit for the next year. Permit holders are also required to keep a logbook and allow observers on board the vessel. Seine gear vessels are required to place a grate over the hold of the vessel and trawl gear must use a fish excluding device to sort out larger species of fish.

Goals and Objectives

The goal for this year's work is to gather information on sardines off Oregon to improve the coast wide stock assessment of sardines; to document the extent of bycatch; and to monitor the size and age composition of the population. Objectives will be to:

Collect size, age, and distribution data of adult sardines off Oregon, from both the harvest areas and outside harvest areas.
Document bycatch, in terms of species and amount. Recommend additional gear modifications or time/area closures to reduce bycatch if necessary.
Document harvest methods, distribution of harvest, and CPUE.

Planned Work

We expect most of the harvest activity to occur out of Astoria, so will hire a seasonal sampler to work out of that port. This person will focus on ride-along trips on commercial vessels to document bycatch and collect market samples. Additional time will be spent working up samples and summarizing logbook information.

Ride-along trips on commercial vessels: to document harvest methods and bycatch (species & amounts).

Port sampling of commercial landings:

Market samples: collect samples for size, sex, and maturity data. Age structures will also be taken and sent to California for analysis.

Incidental catch: monitor unloading at processing plants for incidental catch data.

Collect logbooks from commercial vessels: to determine distribution of harvest, CPUE, and unobserved by-catch information.

Fishery independent data: Participate in NMFS cruises to collect additional size and age data from outside the harvest areas and collect distribution data of sardines off Oregon.

California Work Plan for the 2000 Sardine Fishery

In California, sardines are managed under the Federal Coastal Pelagic Species Management Plan, which also includes Pacific mackerel and northern anchovy. South of 39° (Point Arena, CA), limited entry is in effect. To qualify for a limited entry permit, vessels must have landed at least 100 metric tons of finfish between January 1, 1993 and November 5, 1997. Approximately 70 vessels have qualified for the permit. The permit can be transferred once during the year 2000, after which the permit becomes nontransferable.

Vessels fishing for live bait must submit logs when sardines are captured.

Goals and Objectives

The goal of this project is to collect fishery dependent biological data on sardine populations off California for use in population assessments, to determine species composition of purse seine landings, monitor the status of the quota, and assist in fish aging.

Planned Work

Most fishing for sardines occurs out of the ports of San Pedro and Monterey. Scientific aides will be hired by the Long Beach Ocean Fisheries Research Unit (OFRU) and the Monterey OFRU to routinely monitor landings and sample fish from the purse seine fleet.

Port sampling of commercial landings

Market samples: Samples taken from unloading boats will be returned to the office and processed for weight, length, sex and maturity data. Otoliths will be taken for aging. Samplers will also collect fishing information from each vessel sampled, such as tons landed, fishing location and species composition (percentage of sardines, Pacific mackerel and jack mackerel present in each observed landing). Bycatch will be noted but not enumerated.

Fish aging

Long Beach OFRU staff will also assist in aging from processed samples. After age data has been added to the sample database, sample data will be summarized in reports and forwarded to the Assessment Unit for use in assessing the current sardine population and determining the quota for the next year.

Quota monitoring

Long Beach OFRU staff will monitor quota landings and distribute landing summaries on a quarterly basis.

Washington Work Plan for the 2000 Sardine Fishery

The coastal sardine fishery has been designated an emerging commercial fishery. Permits are required and are nontransferable. The total sardine harvest taken in 2000 cannot exceed 4,000 metric tons (mt), divided into four monthly 1,000 mt increments beginning May 15. The fishery is open to purse seine gear only.

Requirements

Logbooks are required. Observers are required on at least 50 percent of all fishing trips at the owner's expense. Only sardine, mackerel, anchovy, and squid may be retained. All other species caught incidentally must be returned to the water immediately and care exercised to avoid any unnecessary injury. Notification of departure on a fishing trip must be made 24 hours before leaving port. Permits are valid in waters more than 3 miles from the shore and north of the mouth of the Columbia River, west of Cape Flattery and south of the border with British Columbia, Canada. No salmon may be landed on the boat's deck but must be released or dip netted directly from the net before the completion of each set.

Agency Action

At the option of the Department of Fish and Wildlife, agency personnel must be allowed aboard the vessel and be granted full access to the catch and to gather biological data as needed. Up to 500 sardine per day may be retained by WDFW for biological information. Consistent with standards in the offshore whiting fishery, a mortality greater than 1 chinook salmon per 20 mt of Pacific sardine would be sufficient to rescind a permit or close the trial commercial fishery.

APPENDIX D -- INFORMATION ON COASTWIDE DISTRIBUTION OF MARKET SQUID

I. Catch location information from California Fish and Game landing receipt data, 1981-1999.

II. Midwater Trawl Information

Several sources of midwater trawl survey data yielded information on market squid taken independently of the survey's target efforts. Summary information and comparison of these surveys is provided here. Market squid was considered a significant bycatch in all surveys included.

	Tiburon Groundfish Survey	Kenny Mais Sea Survey	CDFG Sea Survey 2000	Oregon Predator Survey	Oregon Salmon Survey
Target Species	chilipepper (Sebastes goodei) and widow rockfish (S. entomelas).	Northern Anchovy	Market Squid, Sardine, mackerel, Northern Anchovy	Salmonids consumed by predators: Pacific Hake, chub mackerel jack mackerel, herring, anchovy, sardines	Salmonids tagged and released
Significant Bycatch	Market Squid	Market Squid	Market Squid	Market Squid	Market Squid
Survey Type	Midwater Trawl	Midwater Trawl	Midwater Trawl	Midwater Trawl	Midwater Trawl
Amount of Wire Out	depth dependent	depth dependent	30-35 fm	100 fm	depth dependent
Tow Depth	~5 fm or 16 fm	10-50 fm	10 fm	surface to ~10 fm	< 3.2 fm
Tow Time	15 mins.	20 mins.	20 mins.	30 mins.	30 mins.
Tow Speed	2.5 knts	2.5-3.1 knts	2.5 knts	4 knts	4 knts
Gear Type	Stauffer Modified Cobb	Mais Anchovy Trawl Net	Mais Anchovy Trawl Net	nordic 264 rope trawl	nordic 264 rope trawl
Mesh Size	Variable along net	Variable along net	Variable along net	Variable along net	Variable along net
Cod End Liner size	9 mm	12.7 mm	12.7 mm	8 mm	8 mm
Cod End mesh size	unknown	38.1 mm	38.1 mm	89 mm	89 mm
Mouth Opening Width	12 m	13.72 m	13.72 m	30 m	30 m
Mouth Opening Depth	12 m	11.58 m	11.58 m	20 m	20 m
Survey Date(s)	1986-99	tri-annually 1966-1988	Feb-00	1997-1999	1998-1999
Survey Hours	Night	Night	Night	Day & Night	Day
Area of Operation	Farallons to Monterey Bay	Central CA into Baja Mexico	Pt. Conception to Mexican boarder	Mouth of Columbia River	Mouth of Columbia River

A. Tiburon Juvenile Rockfish (Groundfish) Survey

In order to develop a recruitment index for rockfish, in 1986 the Groundfish Analysis Branch began conducting standardized annual midwater trawl surveys to provide information on the abundance and distribution patterns of young-of-the-year (YOY) pelagic juvenile rockfish off central California. Since it takes several years for rockfish to reach catchable size, sufficient data are just becoming available from fishery statistics to examine correlations between the recruitment indices and actual recruitment to the fishery. The Branch has used the indices in the past in the assessment on bocaccio (Sebastes paucispinis) and found them to be an effective source of fishery independent information on recruitment.

B. CDFG Kenny Mais Sea Survey

The survey purpose was to make acoustic and midwater trawl surveys of the Northern Anchovy, Engraulis

mordax, population for estimation of biomass and age composition. Areas surveyed were northern Baja, southern California, and central California. Trawl surveys were done using a 14-meter mouth opening midwater trawl fished at night along acoustic positive transects conducted during daylight hours. Speed of trawls was between 2.5 – 3.1 knots. This technique yielded many bycatch species that were also recorded. (Taken from: Mais, K F. 1974. Pelagic Fish Surveys in the California Current. CDFG Fish Bull. 162. 1-79).

C. CDFG Sea Survey 2000

Similar procedures were followed as above, less the acoustic surveys. Survey location was limited to the southern California bight.

D. Oregon Predator Survey

To better understand the role of large marine fishes as a potential source of mortality of juvenile salmon, this survey used a Nordic 246 rope trawl to collect fish along the surface and midwater. From April through September several species of fish and their stomach contents were collected and analyzed. The survey area was directly in front of the mouth of the Columbia River and within the river plume. This study used several different trawl nets experimentally (commercial hake trawl, rock hopper, #4 rope trawl, and Nordic 246) before selecting the Nordic net as the optimal gear type. Both the Oregon Predator Survey and the Oregon Salmon Survey differ from the other midwater surveys in the size of the area swept, as the nets used for these two surveys have a larger mouth opening (20m x 30m) than the others.

E. Oregon Salmon Survey

Similar in scope to above survey, but designed to be long term (10 years) and to also evaluate oceanographic factors such as food availability, coastal circulation regime, temperature, salinity, and smolt movement. Specific methodology and gear details are the same as the predator survey except that this survey targets salmonids rather than their predators.

III. Bottom Trawl Information

A. Groundfish Triennial Survey

The Resource Assessment and Conservation Engineering (RACE) Groundfish Assessment Program conducts and reports results of triennial surveys designed to establish time series estimates of the distribution and abundance of groundfish resources in waters off the coast of California north to the Bering Sea. Results of the surveys are used to support NMFS fishery management responsibilities for the fishery resources in the U.S. EEZ and to meet U.S. international fishery management commitments for the Convention on the Conservation and Management of Pollock in the Central Bering Sea and for transboundary management with Canada. This survey targets three depth zones, 55-183 m, 184-366 m, and 367-500 m over an area of operation from Alaska to Pt. Conception, California. The time series spans 1977-1998.

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