Recommendations of the Coastal Pelagic Species Management Team (CPSMT) on Market Squid MSY, Market Squid ABC, and Bycatch Provisions for the CPS FMP

CPSMT met at the National Marine Fisheries Service (NMFS) Southwest Fisheries Science Center in La Jolla, California, at 10:00 a.m. on December 9, 1999. These topics were discussed briefly because the team had spent two days on the topics during the August 3-4, 1999 meeting. The team decided to offer a more complete evaluation of the options for MSY and bycatch and to complete the description via email.

I. Determination and designation of market squid MSY

CPSMT reviewed existing data (including fishery and biological) for the California market squid fishery to recommend an MSY value. We determined that there are not adequate data to make a mathematical MSY determination, therefore we looked for guidance 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 suggest that in data poor situations such as the California market squid fishery, a proxy may be used for MSY and it is reasonable to use recent average catch from a time period when there is no qualitative or quantitative evidence of declining abundance.

We reviewed historic market squid landings and noted that low landing periods seemed to correspond with El Niño events, when abundance and/or availability of squid to the fishery was greatly reduced. Those events are generally followed by periods of apparent increasing abundance/availability and increasing annual landings until the next El Niño. As with many other fisheries, landings of market squid are greatly influenced by conditions in international market and, therefore, availability of substitutes from other squid fisheries. In the four-year 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 which kindled rapid development of fishing and expansion of processing for export from California. Average annual landings (April through March fishing season) for that four-year period was 75,570 mt and included the highest landings on record with 113,320 mt (1996-97). 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.

This fishing season (1999-00) which is the first year following the two-year El Niño event, squid landings already are the third highest on record with the season only 3/4 complete. Additionally, nearly all of this year's landings are from the southern portion of the fishery (Southern California) with almost no landings to the north (Monterey area). This disparity would probably not have been predicted or accounted for given current understanding of market squid abundance nor accounted for in temperature inclusive models which are being considered for harvest guidelines and have been recommended by the Council's Scientific and Statistical Committee.

The ability of the California market squid fishery to support landings of 113,320 mt followed by a strong two-year El Niño and then sustain the relatively high landings this year, suggest that the stock was not being overfished and that the 113,000 level is sustainable. Therefore, following Restrepo et. al. (1998) to select an MSY proxy, the Council could use some treatment of landings from that four-year time period as the MSY proxy. Another important consideration is that this MSY designation can be changed by the Council with relative ease under the framework process when more data are available.

OPTIONS:

1. Assume that 113,320 mt was a sustainable harvest level and select it as the MSY proxy. Given current market conditions, this value is not likely to be exceeded in the near future, it is defensible as discussed above, and it does allow for the State of California to complete its research and plan development (scheduled for completion in 2001) without moving this CPS FMP monitored species into the actively managed category. Setting MSY too low could restrict landings unnecessarily, reducing the exvessel value of the fishery. Setting MSY too low could also effect/restrict testing of

data necessary for development of some harvest models such as a depletion model. This is the CPSMT preferred option.

2. Choose a more precautionary quantity at 75% of the 113,320 mt value and set the MSY proxy at 85,000 mt. This value will be exceeded this season. Even if the Council changes ABC for market squid to be equal to MSY, and the value is exceeded next season, the Council would have to consider the possibility that the stock be considered overfished, which may require moving squid to actively managed.

3. Choose the average of the two highest years in this time period: 97,675 mt. This value is less likely to be exceeded depending on market conditions.

4. Choose the average of the four years in this time period: 75,570 mt. This value has already been exceeded this year.

5. Assume that the squid fishery is totally market driven, that squid stocks are underutilized, and set MSY at a relatively high value such as 4-5 times the highest recorded landings (450,000 mt to 570,000 mt). This would be more in line with current small pelagic biomass and MSY estimates and allow squid to remain a monitored species within the FMP with monitoring of the fishery as likely the only Council activity in the near future.

II. ABC definition for market squid

The CPS FMP defines the default ABC for monitored species as 25% of MSY and defines over fishing as exceeding ABC during any two years. When the FMP was written, we did not foresee this technical definition as a potential problem with market squid because we expected to defer to State management for market squid and 25% of MSY is a reasonable ABC value for other small pelagics (i.e., sardine, mackerel, or anchovy). However, we do not have a biomass estimate for market squid nor an accurate estimate of MSY. We are recommending an MSY value based only on landings which are quite variable and subject to oceanic conditions. Market squid is an invertebrate species that lives less than one year and traditional fisheries models may not apply. The State of California has an extensive research program underway leading to a legislatively mandated management plan for April 1, 2001. We suggest that the Council establish an MSY value and ABC definition based on past landings from the fishery as suggested by the Technical Guidelines. The Team also suggests that the Council should re-evaluate squid management in 2002 when the results of the current California research program are available.

OPTIONS:

1. Set ABC equal to MSY for market squid thus reducing the likelihood that ABC will be exceeded and trigger overfishing considerations. <u>This is the CPSMT preferred option.</u>

2. Set ABC at 75% of MSY and choose one of the higher values when setting MSY.

3. Leave the default ABC at 25% of MSY and set MSY relatively high. . .perhaps four or five times the highest recorded landings (450,000 mt to 570,000 mt). See Option 5 MSY considerations above.

III. CPS FMP bycatch provisions

The Magnuson-Stevens Act includes provisions for national standard guidelines. National Standard 9 specifies for "BYCATCH: 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."

Bycatch includes "discard of whole fish at sea or elsewhere...and mortality due to encounter with fishing gear that does not result in capture.**"**

CPS vessels fish mainly with roundhaul gear (purse seine or lampara nets of about ½ mile in total length). They are large encircling type nets which are drawn to the fishing vessel after surrounding a school or part of a fish school with the net. When most of the net is back on board and 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 roundhaul net with netted scoops (brail). Roundhaul fishing results in little unintentionally caught fish because the fishermen target a specific fish school, which usually consists of one species of fish. If another species is present in the school, it is nearly the same size and is not sorted at sea. If larger fish are in the net, they can be released alive before pumping or brailing. The load is pumped out of the hold at the landing dock where incidentally caught fish can be observed and sorted. Often these few (see Appendix A) incidental fish are taken home for personal use or processed with the rest of the load.

Approximately 200 vessels participated in the sardine fishery during the 1940s and 1950s. Some present day CPS fishermen are remnants of that sardine fleet. Other remnants of the fleet can be found among fishermen that fish for market squid and land very small amounts of CPS finfish. The roundhaul fleet's 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 these vessels fish for market squid, Pacific bonito, bluefin tuna, and Pacific herring.

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

a. Approximately 18 live bait vessels in southern California and two vessels in Oregon and Washington that take about 5,000 mt per year of CPS finfish (mostly anchovy and sardine) for sale to recreational anglers.

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

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

Anecdotal information from at-sea CDFG observations and conversations with CPS fishery personnel suggest that bycatch is and has been insignificant within the limited entry area of the CPS FMP (south of 39 degrees north latitude). Some individuals have expressed concern that sportfish and salmon might constitute significant bycatch in this fishery, but there are no data confirming this. Previous and current fishing closures of nearshore areas where bycatch is more likely to occur probably have helped to prevent that bycatch.

Reports of bycatch by California dock samplers confirm small and insignificant landings of bycatch at California CPS off loading sites (see Appendix A). These data are likely representative of actual bycatch because of the methodology used to fish CPS. The CPS are caught by purse seine and pumped from the sea into fish holds aboard the fishing vessel; fishermen don't sort bycatch at sea, they land whatever is caught and pumped into the hold.

The Council issued EFP's for District 10 just outside San Francisco, California and required a 100% industry sponsored observer program, which would have documented any bycatch. But the fishermen did not use the EFP's and they expired. It seems prudent to recommend that any new fisheries established north of the limited entry area implement observer program sponsored by industry or taxes derived from the new fishery. Also the Council may want to recommend or require grates on the hold opening that would prevent large/adult salmon and sportfish from entering the hold. North of the limited entry area, we may need observer programs, grates, logbooks, or other means to enumerate bycatch. The Council may want to provide for cessation of fishing activities when a threshold level of bycatch is reached (e.g., 1-5 fish or some other significant number for small fishes of concern such as smelt or salmon in Washington).

The California Department of Fish and Game Commission has authorized logbooks in the squid fishery. The data to be collected includes bycatch. In Oregon, Pacific sardine is regarded as a developmental fishery. If permits are issued for this fishery, there is an opportunity for the State to require observers.

As stated in the CPS FMP fishery description most bycatch in the coastal pelagics fishery is incidental harvest that is sold; therefore, there is little or no bycatch (discards or at sea dumping of catch) as defined in the Magnuson-Stevens Act. A number of circumstances in the fishery that tend to reduce bycatch 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 or, due to area closures, are specifically prohibited from fishing.

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

- A portion of the sardine caught incidentally by squid or anchovy fishermen can now be sold for reduction thus reducing discard (bycatch).

- ♦ The 5 tons or less allowable landing by vessels without permits under the CPS FMP should reduce discard (bycatch) because those finfish can be landed.

This fishery has traditionally operated off San Francisco, 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 (catch is not landed in Washington). In California where the majority of the CPS fishery operates, the State and the CPS FMP restricts roundhaul fishing and fishing for reduction in many nearshore areas to protect sportfish and reduce the possibility of bycatch (see FIGURE 2.2.2.2-4 in the CPS FMP. Existing California area closures). The CPS FMP also lists applicable State regulations in section 2.2.5.2.

In California, CDFG samples wetfish landings in Monterey and ports to the south; biological samples are taken to monitor the fish stocks; and dock samplers report incidentally caught fish (see attachment A). Because the CPS fishery has not operated on a large scale during recent times north of San Francisco, little is known about incidental catch or bycatch that might occur in this area.

OPTIONS:

1. Require logbooks for the limited entry fishery, the live bait fishery, and the incidental fishery (those vessels landing less than 5 mt). There is currently no mechanism or funding for this option, but it might provide needed information on the occurrence of bycatch.

2. Require industry funded observers for all of the CPS limited entry fishery. Cost is a major consideration regardless of the size of the program.

3. Require State agencies to monitor and record non-CPS landings in the CPS fishery at the docks. Since sorting of the load does not take place at sea (fish pumps), all species caught should still be in the hold upon returning to the docks. If significant quantities of non-CPS species are in the load, then a sample could be taken. Submit annual report to CPSMT/Council. This is a CPSMT preferred option.

4. Require full retention of all species. Would entail significant coordination with State agencies and possibly legislative changes to State laws. For example, CPS fishers would be required to land salmon and report them to state agencies.

5. Require grates to cover openings of holds through which fish are pumped to screen out catch of larger non-CPS species and allow live release before going into the ship's hold.

6. Require logbooks and observers on any CPS fisheries north of the CPS FMP limited entry area (39 degrees north) or possibly north of 36 degrees north latitude. This is strongly supported by CPSMT.

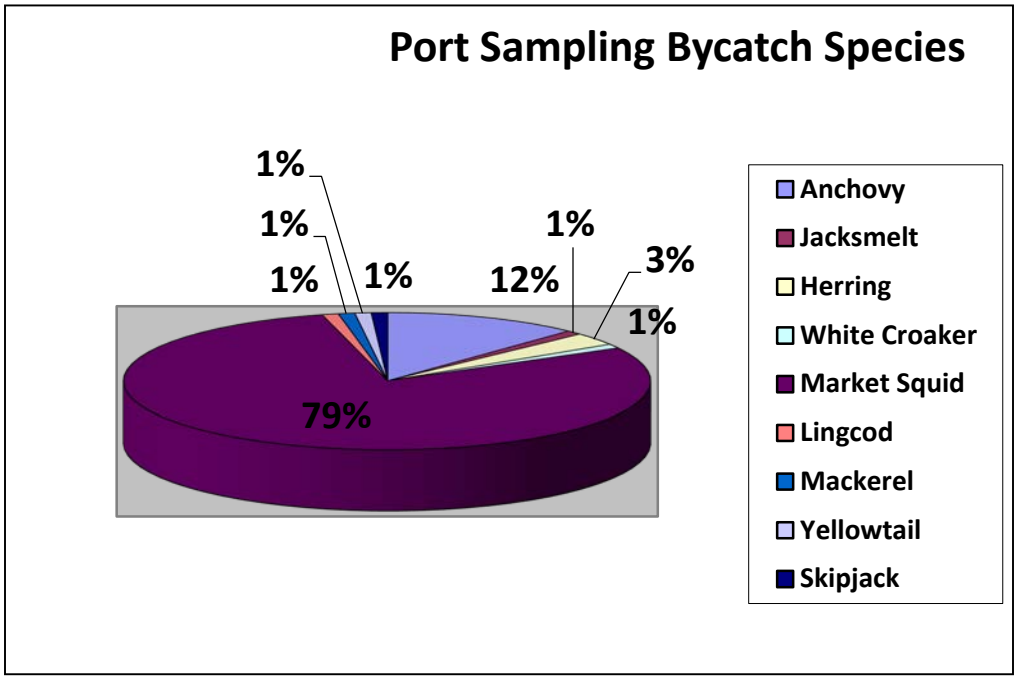
APPENDIX A. SUMMARY OF OBSERVED INCIDENTAL CATCH

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 reported. The reports of incidental catch were sparse, and prior to 1992, there was none reported.

The incidental catch species reported are primarily those that are marketable, and do not represent the definition of incidental catch by the Magnuson-Stevens Act. The samplers have noted, however, that unless a incidental catch species represents a significant portion of the load, at least a whole percentage point, they are not recorded. The two most prevalent incidental catch (or non-target) species were market squid, at 79%, and northern anchovy, at 12% incidence within samples (not by load composition).

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



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

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99	Anchovy	5	
	Jacksmelt	1	
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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	
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93	None reported		
92	Market Squid	1	
	Yellowfin Tuna	1	
	Skipjack Tuna	1	
			3
		Total	179

From 1996 to the partial year 1999, bycatch from the live bait logs was reported with an incidence of 10%. The primary species taken as incidental catch was barracuda. The following tables represent the incidence or occurrence of incidental catch only, not numbers or weights.

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

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

Live Bait Days Fished

Year	Days
99	187
98	812
97	778
96	131
Total	**1908**