California Marine Life Protection Act Initiative
Draft Shorefishing Data Summaries
(revised January 2, 2008)

Two attachments include a summary of shorefishing catch from two sources. The first data summary is a long term data set (1973- 2003) from angler surveys at the Fitzgerald Marine reserve. This summary report provides catch statistics from a number of nearshore species. The summary provides statistics for surf fishing and poke-pole fishing.

The second data summary is from the California Recreational Fisheries Surveys (CRFS) for shore based fishing modes in the Wine (Sonoma and Mendocino counties) and San Francisco (San Mateo – Marin Counties) districts. These data summaries include catch information from “ocean only” catch using hook-and-line fishing methods. The summaries are divided into two categories 1) rock associated fishing and 2) sand associated fishing. Both categories present estimate data that has been expanded for effort for the CRFS category “beach and bank”.

Fitzgerald Marine Reserve Finfish Fishing Records 1973 to 2003
Draft Analysis Prepared by Bob Breen
December 17, 2007

The following is an analysis of fishing records collected at the Fitzgerald Marine Reserve from 1973 to 2003 by San Mateo County Park Rangers, Park Naturalists and Park Aides. This analysis is divided up into two parts 1) surf fishing records and 2) eel or poke poling records. Surf fishing and eel fishing differ considerably in technique and fishing strategies. Surf fishers were counted if they casting into the surf with rod and reel equipment either from the beach or from intertidal rocks at low tide. Eel fishers were counted if they had no such gear, but instead relied upon a single, flexible wooden or bamboo pole equipped with an 18" heavy wire tip and a short baited leader. In contrast to surf fishing, poke poling is a strictly intertidal fishery.

Surf fishing results

1. there was a significant decline in the estimated number of surf fishers at FMR from 1976 to 2003 (ANOVA, F=20.25, df=26, P<0.0001).
2. there was no significant change in **cabezon** landings from 1976 to 2003 (ANOVA, F=0.026, df =26, P<0.8). However, there was a significant increase in **cabezon** landings from 1976 to 1990 (ANOVA, F=15.68,df=13, P<0.002) followed by a significant decline from 1990 to 2003 ((ANOVA, F=33.55, df=12, P< 0.0000).
3. there was a significant decline in **lingcod** landings from 1976 to 2003 (ANOVA, F= 4.228, df= 26, P< 0.049).
4. there was significant decline in all species of **surfperch** from 1976 to 2003 (ANOVA, F= 5.74, df= 26, P< 0.024). Common surfperch species (Embiotocidae) caught at FMR are striped, rainbow, redtail, pile, rubberlip and walleye surfperch.
5. there was no significant decline in landings of other species caught at FMR, these include; **rock and kelp greenling** (which were more than 50% of the catch), black rockfish, brown rockfish, blue rockfish, copper rockfish, olive rockfish, leopard shark and starry flounder (ANOVA, F= 0.074, df= 26, P< 0.78). However, there was a significant increase in the catch of these fishes from 1976 to 1990 (ANOVA, F= 23.50, df= 13, P< 0.0005). This was followed by a significant and sharp decline from 1991 to 2003 (ANOVA, F= 14.21, df =12, P< 0.003).
6. there was a significant decline in the **CPUE** at FMR from 1976 to 2003 (ANOVA, F= 6.68, df= 26, P< 0.015).

7. there was no significant decline in the **creel census** from 1976 to 2003 (ANOVA, F= 3.43, df= 26, P< 0.075).
8. there was a significant decline in the **creel census** from 1990 to 2003 (ANOVA, F= 6.01, df= 12, P< 0.030).

Eel fishing (poke poling) results

1. there was a significant decline in the estimated number of persons eel fishing at FMR from 1973 to 2003 (ANOVA, F= 110.21, df = 29, P< 0.0000).
2. there was a significant decline in the landings of **monkeyface prickleback eel,** *Cebidichthys violaceus*, from 1973 to 2003 (ANOVA, F= 47,04, df= 29, P< 0.0000).
3. there was a significant decline in the landings of **rock prickleback eel**, *Xiphister mucosus*, from 1973 to 2003 (ANOVA, F= 53.12, df= 29, P< 0.0000).
4. there was a significant decline in **all eel** landings in this intertidal fishery from 1973 to 2003 (ANOVA, F= 63.53, df= 29, P< 0.0000).
5. there was no significant decline in eel **CPUE** from 1973 to 2003 (ANOVA, F= 0.56, df = 29, P< 0.46).
6. There was a significant decline in the **eel creel census** from 1973 to 2003 (ANOVA, F= 14.76, df = 29, P< 0.0006).

Discussion

These records have focused on the status of the recreational shore fishery at the Fitzgerald Marine Park from 1973 to 2003. During this time there were conservatively estimated to be 18,000 fishing visits to this MPA. Of these 18,000 visits, 46.3% were interviewed by Park Rangers stationed at the park. In addition, there were an estimated 10,500 eel fishing visits, of who 4,255 (40.5%) were contacted. In all, more than 11,000 interviews were conducted by San Mateo County Parks personnel.

Surfperch (Embiotocidae) dominated the catch for many years at FMP until the 1997 – 1998 ENSO event when populations (chart 6) apparently collapsed. Surfperch showed an abrupt decline after the 1991-92 ENSO. From 1991-92 surfperch landings declined 89.4% to 2002-03. A smaller, (49.4%) but still significant decline occurred again after the 1997-98 ENSO.

Kelp greenling, rock greenling and rockfishes, (chart 7) lumped together in this survey, showed significant declines throughout the survey period, and most significantly following the 1991-92 El Nino when there was a 93.2% decline by 2002-2003. Another, almost as steep decline, followed the 1997-98 ENSO with landings declining further from an already low take to 91.6% from 1997 to 2003.

Cabezon, (chart 4) one of the most sought after fishes at Moss Beach, (Pers Obs.) experienced a 93.6% declined after the 1991-92 El Nino and a further 88.5% from 1997 to 2003. Historically, cabezon have been targeted by surf fishers at Moss Beach; with surf fishermen stating to Park Rangers that the reason that they fished at Moss Beach was that they were almost guaranteed of catching a cabezon (Pers. Comms.)

Catches of lingcod, (chart 5) a trophy species of importance, but not commonly found at Moss Beach, showed an oscillating pattern that is indicative of the low sample size of lingcod in this study. However, landings of lingcod declined significantly over a 27 year period and during the 1991-92 ENSO. Lingcod rebounded in the most recent period, 2002 and 2003.

Chart 8 shows landings for all species caught at FMR; surfperch, cabezon, greenlings, rockfish, lingcod, leopard shark and starry flounder. During the life of this study (1976 to 2003) there was a significant decline in all species caught. Of interest is the period from the 1991-92 El Nino to 2002-2003 when there was an 82.2% decline in landings and a further 46.5% decline in an already low population base from 1997-98 to 2002 -2003.

Eel fishing at the Moss Beach has also shown similar declines. A five year average of eel landings (1973 to 1977) compared against the last five years of the study (1999 to 2003) showed an 83.3% decline in the landings of monkeyface prickleback eel, *Cebidichthys violaceus*, with sharp declines following both ENSO events (chart 9). Rock prickleback, *Xiphister mucosus*, has the distinction of showing the greatest decline of any finfish species, a 94.4% decline from 1973-77 to 1999-2003.

The decline in fish landings has only matched by a similar decline in the number of fishing trips to FMP. For example, in 1992 there was an estimated 1000 surf fishing visits to Moss Beach, this declined 87% to an estimated 130 visits in 2003. This decline has been more than matched by eel fishing visits that declined 88.9% from 362 in 1992 to 40 in all of 2003.

This study represents only those fishers that access FMR from the shore and does not include skiff fishers that launch from Pillar Point harbor on calmer days. Here they fish in or adjacent to FMR over rocky ridges, pinnacles and near to bull kelp beds on the years when bull kelp is common. An observer on the shore can see where these rock ridges are by the way boats are lined up above them over a ~ 2 mile reach. The number of skiff based fishers would at least equal the numbers of shore based fishers during the same time period (Pers Obs.).

There was an overall decline in surf fishing CPUE during this period, with no significant decline in the creel census. However, looking just at the years 1990 to 2003 there was also a significant decline in surf fishing creel censuses. Eel fishers showed almost an opposite trend with no significant decline in CPUE, but with a significant decline in the creel census from 1973 to 2003. This may reflect differences between the two groups in fishing strategies, gear, skill levels and fishing techniques. In addition, eel fishermen tend to be more skilled fishers and patient when locating their prey (Pers Obs.).

The most interesting result of this study was strong evidence of a link between the ENSO events of 1991-92 and 1997-98 and the decline of fishing at Moss Beach (charts 4 -10) (there was no such link during or after the 1982-83 ENSO). Both El Nino events were watershed years for nearshore fish species. It can be argued that the effects of fishing pressure magnified the effects of ENSO and that synergistic interactions occurred between environmental changes and mortalities caused by exploitation. Almost without exception there was as increase in the catch of all fish species at Moss beach during ENSO years followed by a sharp decrease. The only species not to response in 1997 -98 was the rock prickleback, X. *mucosus*. By that time populations were probably so low that there would be no measurable response.

The 1991-92 ENSO event was a warm water event (Hayward, CalCOFI Report, V. 34 1993) that lasted a short period (eight months) and ended abruptly in April, 1992. However, warm water SST’s were still being recorded in the Southern California bight throughout the remainder of the year. This ENSO event was characterized by low Chlorophyll *a* concentrations, low phytoplankton and macrozooplankton biomass (Hayward, 1993).

Higher SST’s would increase fish metabolism, and low zooplankton biomass would increase their need for food. This could result in higher catches as fish would be more actively searching for prey and would more readily take a baited hook. These same conditions would result in high larvae and juvenile mortality and low recruitment through lower water oxygen levels and lack of prey.

The magnitude of shore based recreation fishing is not well understood. It would appear from this data set that recreational fishing is a primary source of mortality at Moss Beach. Many of the species shown here with the greatest declines are also those that are found close to shore, and have low mobility or have home territories as adults. For nearshore finfish with low turn over rates, slow growth, and low larval and adult mobility, ENSO fluctuations may reduce populations quickly and unexpectedly. Recovery maybe non existent, since populations are pushed below a certain threshold from which they will never recover (Harley & Rogers-Bennett, 2004). It can be seen from this data set that a combination of ENSO phenomenon and exploitation from the shore and nearshore can result in severe effects on rocky habitats.

Chart 4. Cabezon landings 1976 to 2003

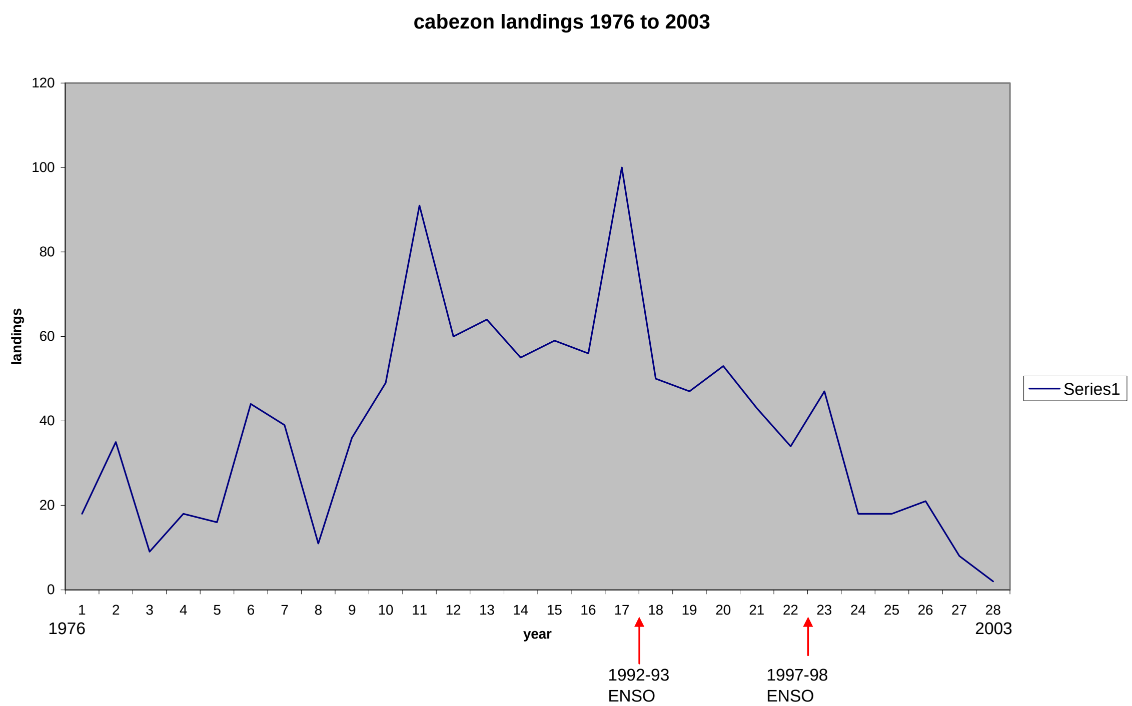


Chart 5. Lingcod landings 1976 to 2003

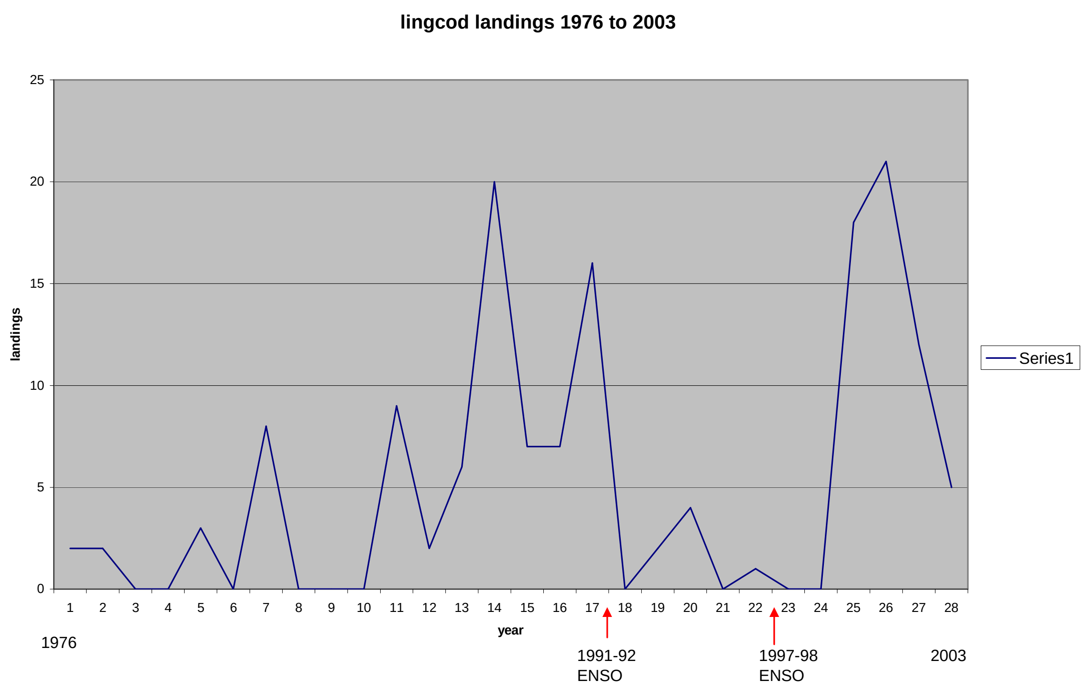


Chart 6. Surfperch landings 1976 to 2003

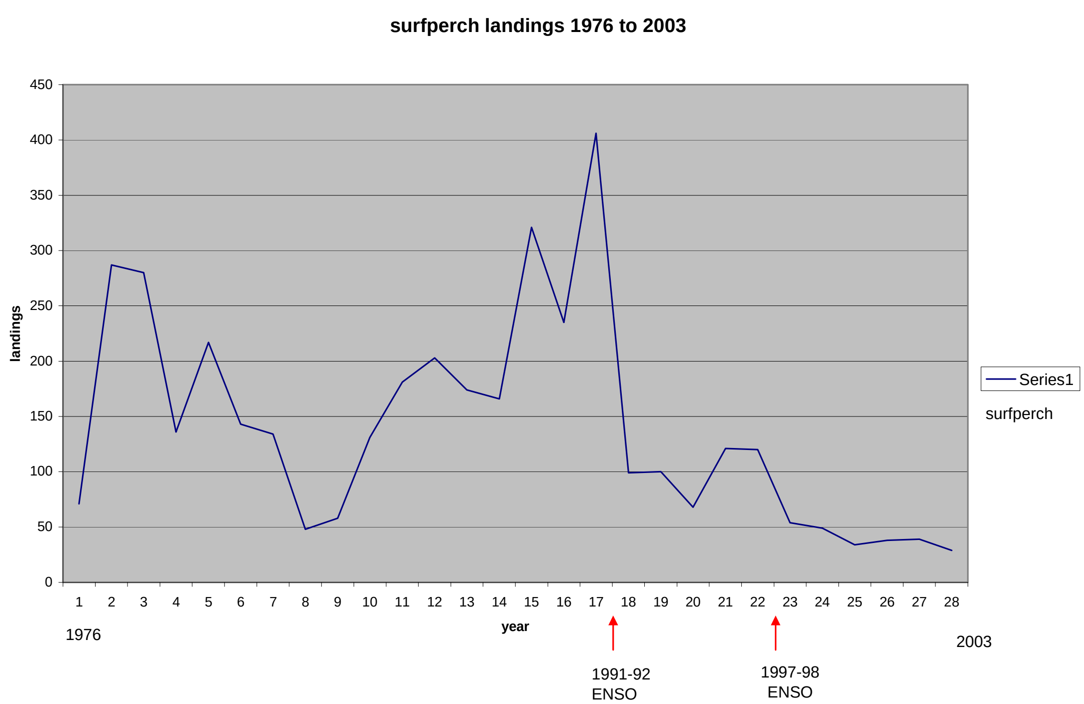


Chart 7. Greenling and rockfish landings 1976 to 2003

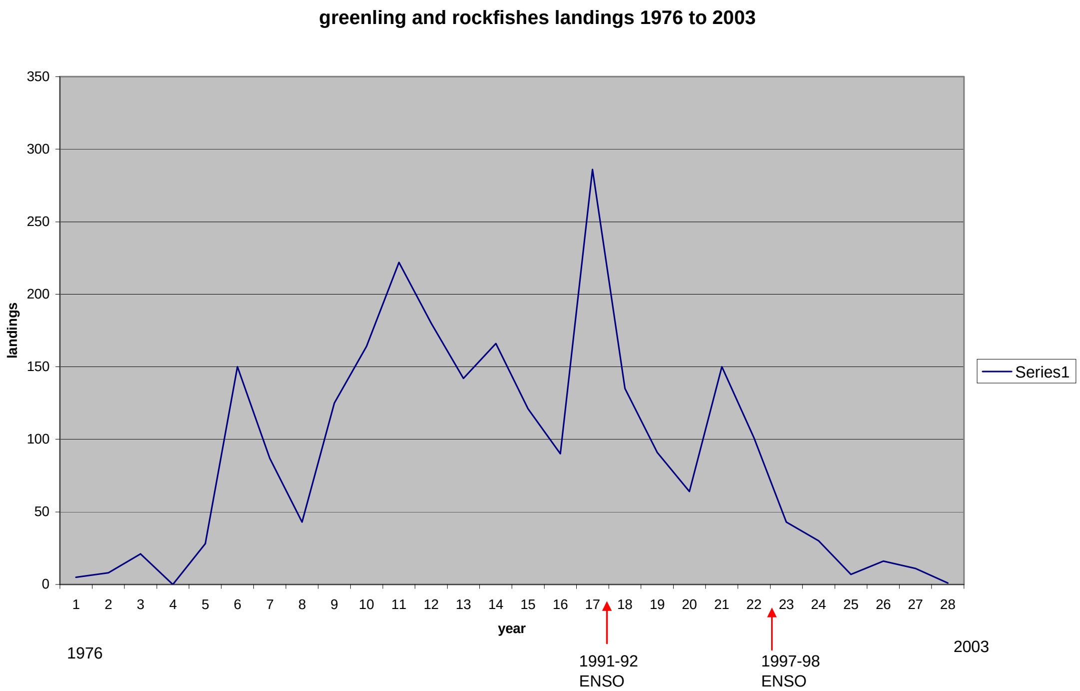


Chart 8. Landings for all species, 1976 to 2003

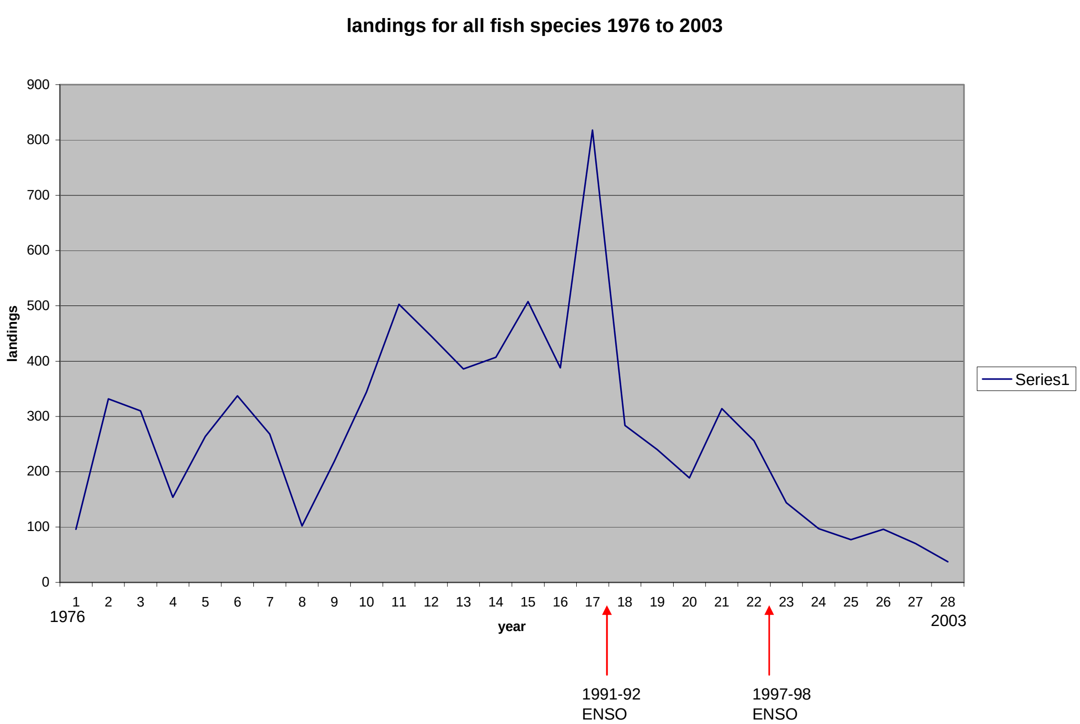


Chart 9. Monkeyface prickleback eel landings 1976 to 2003

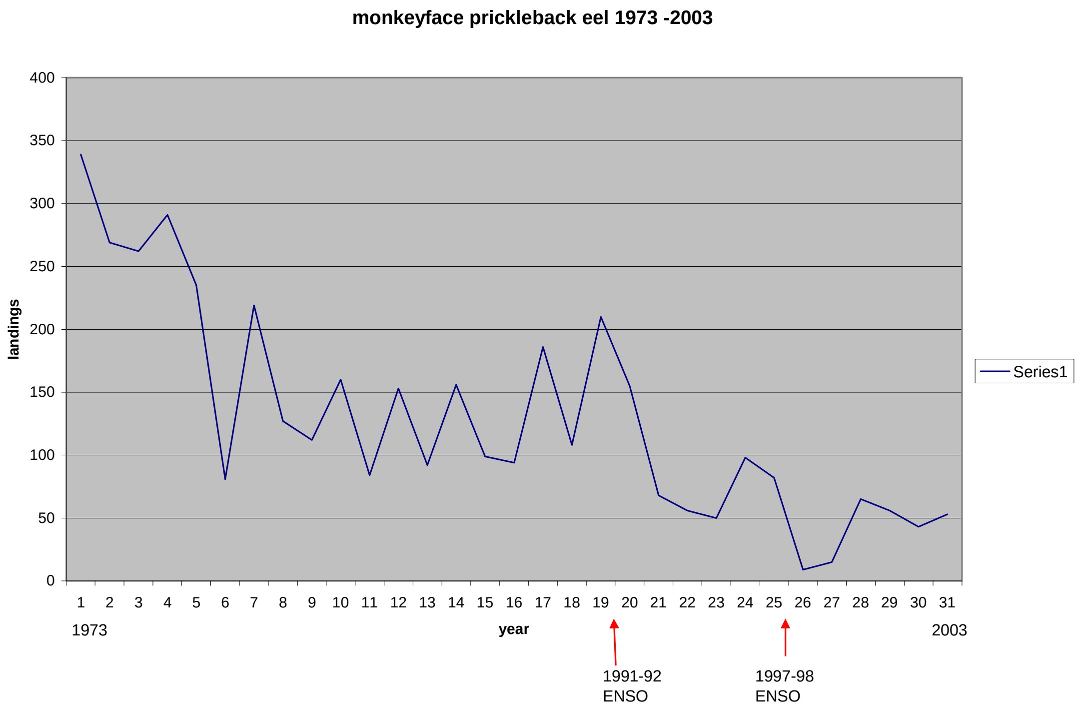
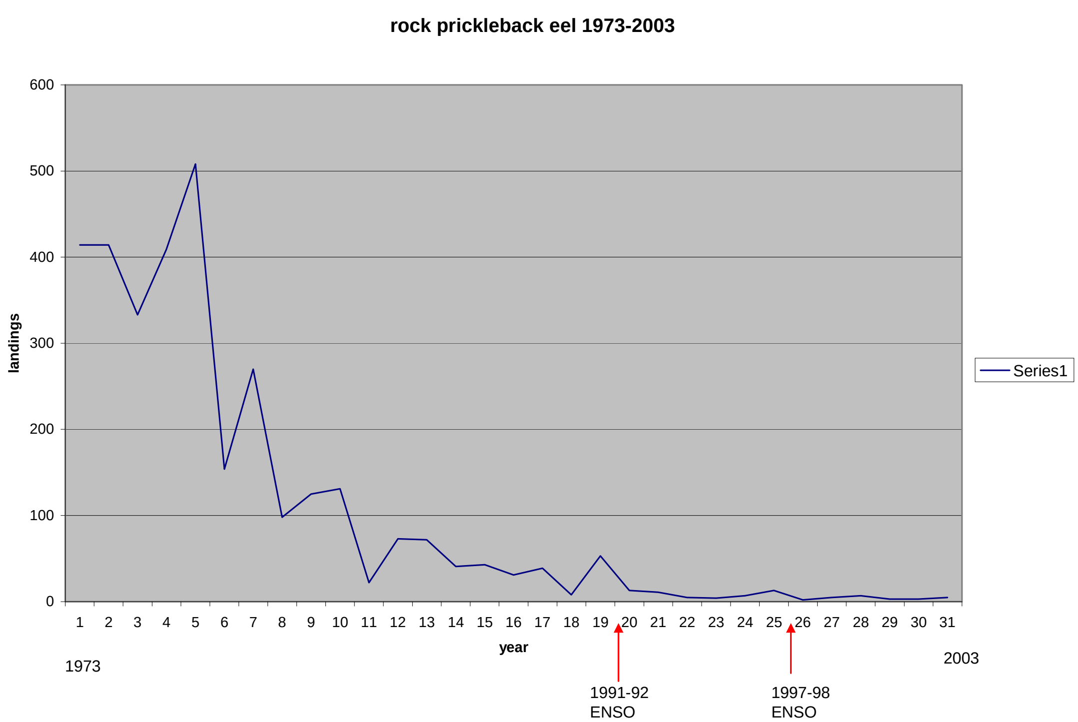


Chart 10. Rock prickleback eel landings 1976 to 2003



California Department of Fish and Game
Draft California Recreational Fisheries Survey Reported and Estimated Catch Data for Shore-Based Hook and Line Methods
Revised January 2, 2008

Table Xa: Reported and estimated catch of rock-associated fish using shore-based hook and line methods.

Common Name	# fish reported (2000-2007) kept and released*	percent of catch (2000-2007)*	Estimated # fish kept per year (2004-2007)**	max PSE (2004-2007)**
SHINER PERCH	5,935	44%	4,464	68%
STRIPED SEAPERCH	1,110	8%	8,074	26%
BLACK PERCH	913	7%	4,624	44%
ROCKFISH GENUS	720	5%	87	100%
SCULPIN FAMILY	586	4%	135	87%
SILVER SURFPERCH	550	4%	5,426	60%
WHITE SEAPERCH	449	3%	777	83%
GRASS ROCKFISH	412	3%	2,147	44%
KELP GREENLING	408	3%	3,573	30%
CABEZON	319	2%	2,070	53%
MONKEYFACE PRICKLEBACK	301	2%	685	75%
BROWN ROCKFISH	243	2%	204	59%
RAINBOW SEAPERCH	236	2%	867	93%
ROCK GREENLING	224	2%	1,600	42%
RUBBERLIP SEAPERCH	210	2%	899	72%
PILE PERCH	184	1%	112	59%
BLACK ROCKFISH	177	1%	2,958	70%
LINGCOD	175	1%	425	96%
SHARPNOSE SEAPERCH	143	1%		
BLUE ROCKFISH	88	1%	7,564	87%
BLACK AND YELLOW ROCKFISH	83	1%	568	61%
GREENLING GENUS	41	0%		
GOPHER ROCKFISH	24	0%	225	98%
CHINA ROCKFISH	8	0%		
COPPER ROCKFISH	8	0%		
KELP ROCKFISH	8	0%	207	100%
STRIPETAIL ROCKFISH	8	0%	476	67%
BULL SCULPIN	6	0%		
EEL ORDER	6	0%		
YELLOWFIN GOBY	5	0%		
RED IRISH LORD	5	0%		
VERMILION ROCKFISH	5	0%	413	74%
ONESPOT FRINGEHEAD	4	0%		
GREENLING FAMILY	3	0%		
PRICKLEBACK FAMILY	3	0%		
BUFFALO SCULPIN	3	0%		
STRIPED KELPFISH	3	0%		
BLUEBANDED RONQUIL	2	0%		
BROWN IRISH LORD	2	0%		
KELP BASS	2	0%		

Common Name	# fish reported (2000-2007) kept and released*	percent of catch (2000-2007)*	Estimated # fish kept per year (2004-2007)**	max PSE (2004-2007)**
SCORPIONFISH FAMILY	2	0%		
CANARY ROCKFISH	2	0%		
OLIVE ROCKFISH	1	0%	402	77%
WHITESPOTTED GREENLING	1	0%	1	57%
BLACK PRICKLEBACK	1	0%		
ROCK PRICKLEBACK	1	0%		
BONEHEAD SCULPIN	1	0%		
ROCKWEED GUNNEL	1	0%	71	100%
WOLF-EEL	1	0%		
YELLOWFIN FRINGEHEAD	1	0%		
GREENSPOTTED ROCKFISH	1	0%		
SHORTBELLY ROCKFISH	1	0%		
YELLOWTAIL ROCKFISH	1	0%		

* data are from California Recreational Fisheries Survey (CRFS) surveys and include ocean only catches for all of the Wine and San Francisco districts using all hook and line shore-based fishing modes. These data are the total number of fish recorded by observers and anglers during the period 2000-2007 and include both kept and released fish. The Wine district includes portions of Mendocino County outside of the study region but does not include Tomales Bay.

**based on CRFS estimate of total number of individuals caught and landed (kept) in Wine and SF districts using "beach and bank" fishing mode during the period 2004-2007. These data are expanded for effort.

Table Xb: Reported and estimated catch of sand-associated fish using shore-based hook and line methods.

Common Name	# fish reported (2000-2007) kept and released*	percent of catch (2000-2007)*	Estimated # fish kept per year (2004-2007)**	max PSE (2004-2007)**
WHITE CROAKER	3,407	20%	1,048	90%
PACIFIC SANDDAB	2,102	12%	74	79%
STRIPED BASS	2,067	12%	16,227	74%
WALLEYE SURFPERCH	1,918	11%	3,196	43%
PACIFIC STAGHORN SCULPIN	1,755	10%	27	45%
LEOPARD SHARK	1,261	7%	1,647	100%
BAT RAY	1,019	6%	244	89%
BARRED SURFPERCH	1,008	6%	19,889	71%
REDTAIL SURFPERCH	527	3%	8,725	36%
SKATE AND RAY ORDER	314	2%	6	100%
BROWN SMOOTHHOUND	247	1%		
SMOOTHHOUND GENUS	238	1%		
SURF SMELT	199	1%	8,535	81%
UNIDENTIFIED (SHARKS)	193	1%		
CALIFORNIA HALIBUT	188	1%	210	73%

Common Name	# fish reported (2000-2007) kept and released*	percent of catch (2000-2007)*	Estimated # fish kept per year (2004-2007)**	max PSE (2004-2007)**
SPOTFIN SURFPERCH	164	1%		
SANDDAB GENUS	135	1%		
CALICO SURFPERCH	125	1%	2,585	71%
STARRY FLOUNDER	69	0%	1,038	77%
PACIFIC TOMCOD	57	0%		
FLATFISH ORDER	54	0%	63	68%
WHITE STURGEON	42	0%	10	100%
SEVEN GILL SHARK	41	0%		
SPINY DOGFISH SHARK	39	0%		
GRAY SMOOTHHOUND	14	0%		
LONGJAW MUDSUCKER	9	0%		
SPECKLED SANDDAB	8	0%		
BAY GOBY	8	0%		
STURGEON GENUS	7	0%		
LONGNOSE SKATE	6	0%		
THORNBACK	6	0%	163	100%
BIG SKATE	5	0%		
BLUNTNOSE SIXGILL SHARK	4	0%		
PACIFIC ANGEL SHARK	3	0%		
STINGRAY FAMILY	3	0%		
SHOVELNOSE GUITARFISH	2	0%		
CALIFORNIA SKATE	1	0%		
SKATE FAMILY	1	0%		
STINGRAY GENUS	1	0%		
BUTTER SOLE	1	0%		
DIAMOND TURBOT	1	0%		
RIGHTEYE FLOUNDER FAMILY	1	0%		
SAND SOLE	1	0%		
BARRED SANDBASS	1	0%	16	100%
QUEENFISH	1	0%		
DWARF PERCH	1	0%		

* data are from California Recreational Fisheries Survey (CRFS) surveys and include ocean only catches for all of the Wine and San Francisco districts using all hook and line shore-based fishing modes. These data are the total number of fish recorded by observers and anglers during the period 2000-2007 and include both kept and released fish. The Wine district includes portions of Mendocino County outside of the study region but does not include Tomales Bay.

**based on CRFS estimate of total number of individuals caught and landed (kept) in Wine and SF districts using “beach and bank” fishing mode during the period 2004-2007. These data are expanded for effort.