

## **Landed Rockfish Bycatch in the Commercial Salmon Fishery**

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We conducted a cursory examination of California commercial salmon fishing operations to determine how many rockfish are caught and landed incidental to trolling. To perform this examination, we used the landing receipts from 1997 to 2005 (the last year for which we had complete data). We supplemented this data with port sample data from the California Cooperative Survey to get a better idea of what the actual species composition of the rockfish landings were.

We defined a trip as all landings by a boat on a specific day. This should have reduced the problem of split landings (rockfish landed on one receipt, salmon on a different one). However, it is likely that some split trips were not fully accounted for since occasionally the dates on different receipts for the same trip can be different. After examining the salmon landings, we restricted the examination to the port complexes of Crescent City, Eureka, Fort Bragg, Bodega Bay, San Francisco, Monterey, Morro Bay and Santa Barbara. To determine if a trip was a salmon trip, we initially included all line gear types. However, we found that even though some salmon were landed by hook and line and set line, more than 99% of the salmon landings occurred using the salmon troll gear code so we eliminated all other gear types. Initially we also examined all the market category codes used for salmon landings since California has five salmon market categories. More than 99.9% of all salmon landed were reported in the Chinook salmon market category (302) so we eliminated the landings from the other market categories.

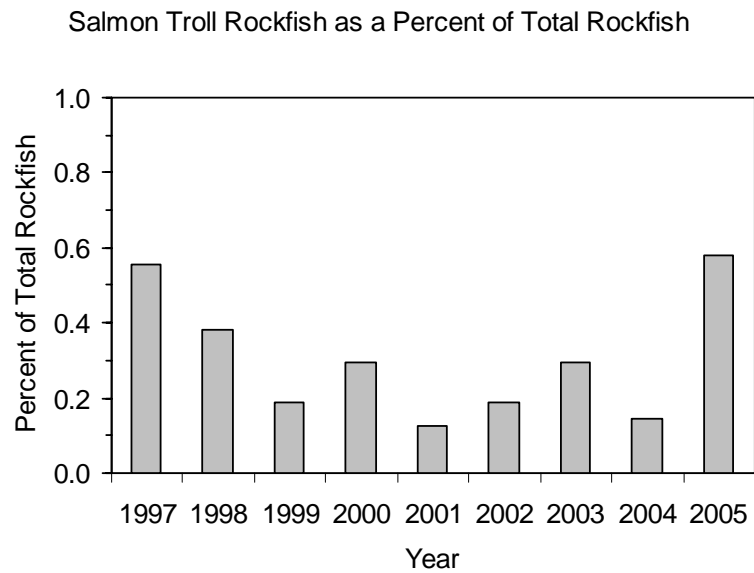
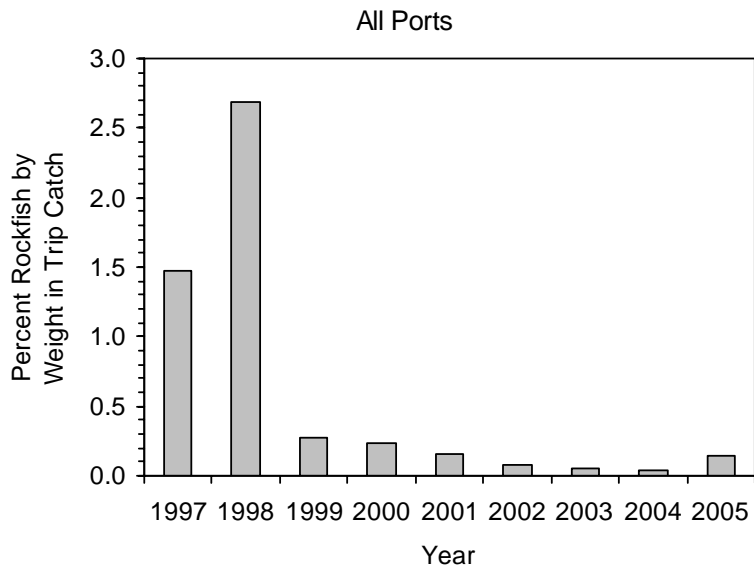
### **RESULTS**

We found that, on average, less than 2.5 pounds of rockfish were landed on each salmon trip coastwide (Table 1). The northern port complexes had the lowest bycatch rates and the southern ports had the highest rates. Moreover, rates have generally declined over time (Fig. 1). More detailed examination of vessel catch histories between 1997 and 1999 shows that 5% of the boats caught 58.8% of the rockfish and yet landed less than 0.2% of the salmon. This suggests a either a miscoding of gear type, or targeting on rockfish for some of these trips.

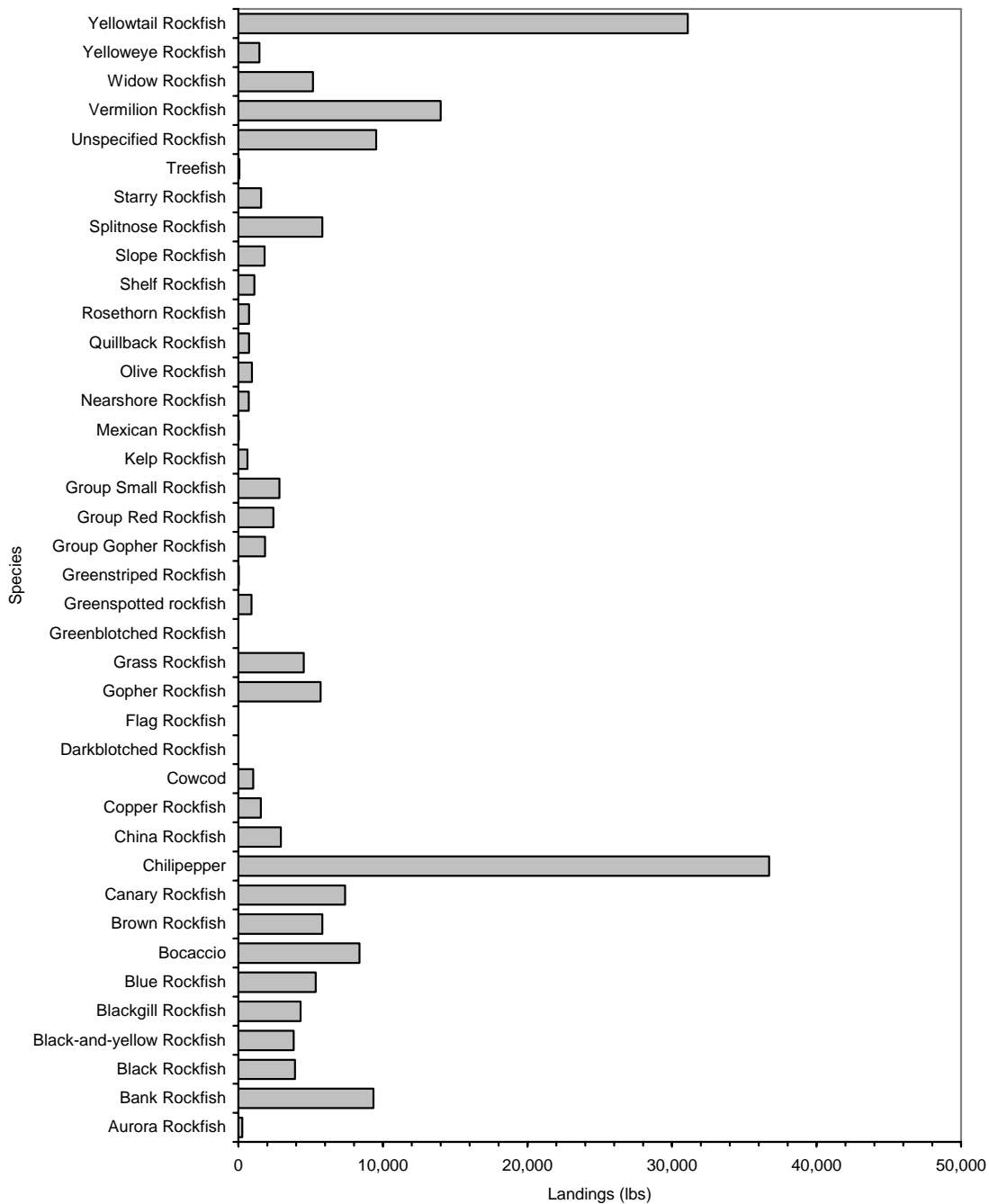
Rockfish caught by salmon troll have constituted a small percentage of total rockfish landed, averaging less than 1% of total rockfish landings (Fig. 2). There was no clear pattern to their relative abundance over time.

Thirty six percent of the rockfish caught were chilipepper and yellowtail rockfish (Fig. 3). Sixteen percent of the catch were nearshore species. Other species of note were bocaccio, vermillion, bank, and canary rockfish; however, the overall quantity of these was small.

Port Complex	Rockfish (lbs)	Number of Salmon Trips	Bycatch Rate (lbs rockfish/trip)
Crescent City	579	516	1.12
Eureka	2,999	2,715	1.10
Fort Bragg	17,442	8,428	2.07
Bodega Bay	45,415	15,597	2.91
San Francisco	55,391	21,169	2.62
Monterey	27,041	25,742	1.05
Morro Bay	35,446	4,423	8.01
Santa Barbara	1,645	516	3.19
Combined	185,958	79,106	2.35



Species Composition from Troll Bycatch



Rockfish Lbs per trip

year	port_complex							
	Crescent City	Eureka	Fort Bragg	Bodega	Ba San Franci	Monterey	Morro Bay	Santa Barbara
1997	0.00E+00	9.38E+00	4.58E+00	1.00E+01	1.02E+01	1.31E+00	2.18E+01	1.27E+01
1998	0.00E+00	1.33E-01	2.41E+01	1.63E+01	4.73E+00	1.86E+00	8.31E+00	1.96E+00
1999	6.79E-01	9.01E-01	7.40E+00	6.27E-01	1.24E+00	1.39E+00	1.58E+00	0.00E+00
2000	8.96E+00	2.71E+00	1.53E+00	4.66E-01	1.27E+00	1.33E+00	2.15E+00	0.00E+00
2001	3.43E+00	2.12E-01	1.60E+00	2.58E-01	5.11E-01	7.19E-01	4.87E-01	0.00E+00
2002	4.94E-01	2.09E-01	1.73E+00	7.97E-02	2.87E-01	4.13E-01	7.74E-01	0.00E+00
2003	2.39E+00	2.23E+00	7.61E-01	2.34E-02	6.18E-01	1.56E-01	1.33E+00	0.00E+00
2004	1.04E-01	0.00E+00	3.26E-01	2.29E-01	3.53E-01	1.63E-01	4.70E-01	0.00E+00
2005	0.00E+00	0.00E+00	2.16E-02	1.49E-01	3.47E-01	1.83E+00	1.48E+00	0.00E+00

Rockfish lbs per salmon lbs

year	port_complex							
	Crescent City	Eureka	Fort Bragg	Bodega	Ba San Franci	Monterey	Morro Bay	Santa Barbara
1997	0.00E+00	5.90E-02	2.80E-02	4.08E-02	1.36E-02	2.27E-03	6.69E-02	8.55E-02
1998	0.00E+00	8.44E-04	1.99E-01	1.19E-01	1.23E-02	9.13E-03	3.49E-02	7.18E-03
1999	3.77E-03	6.00E-03	1.90E-02	1.91E-03	1.92E-03	3.06E-03	9.16E-03	0.00E+00
2000	7.21E-02	7.36E-03	1.89E-03	1.51E-03	1.87E-03	2.70E-03	3.09E-03	0.00E+00
2001	8.12E-03	7.79E-04	2.45E-03	6.86E-04	9.58E-04	3.22E-03	2.29E-03	0.00E+00
2002	1.62E-03	6.07E-04	1.64E-03	1.69E-04	2.60E-04	1.40E-03	2.23E-03	0.00E+00
2003	3.98E-03	3.95E-03	4.87E-04	2.54E-05	6.46E-04	5.25E-04	5.89E-03	0.00E+00
2004	3.99E-05	0.00E+00	4.29E-04	4.12E-04	3.10E-04	5.61E-04	1.51E-03	0.00E+00
2005	0.00E+00	0.00E+00	2.47E-05	3.49E-04	3.66E-04	5.12E-03	3.20E-03	0.00E+00