

Estimation of Bycatch in the Northern Salmon Troll Fishery

Washington Department of Fish and Wildlife (WDFW) deployed observers on the commercial salmon troll fleet during the 2003, 2004 and 2005 seasons. This effort resulted in a total of 165 observed vessel days aboard 12 different vessels over the 3 seasons (Table 1). The observed troll effort occurred along the entire Washington coast.

Table 1. Troll vessel days observed

	<u>May</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>Total</u>
2003	15	6	21	13	2	57
2004	10	3	6	10	0	29
2005	39	8	16	16	0	79
Total	64	17	43	39	2	165

While the primary focus of this effort was to collect salmon genetic samples, determine mark rates, and measure legal to sub-legal salmon encounter rates; observers also documented encounters with all species. Therefore, these data are also informative with respect to the catch of groundfish species that might be expected from the salmon troll fishery. Total observed catch for selected species across all three years is listed in Table 2.

Table 2. 2003 through 2005 Observed Catch Summary

	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>Total</u>
Yelloweye rockfish	5	16	0	21
Canary rockfish	68	55	72	195
Yellowtail rockfish	299	219	280	798
All Rockfish	425	296	423	1,144
Lingcod	85	51	232	368
Chinook (retained)	2,072	735	1,724	4,531
Coho (retained)	341	72	44	457

These catch data can be used to infer catches incidental to the northern salmon troll fishery as a whole, given certain caveats and assumptions. First, is that there has been an adequate level of sampling and that catches observed off the Washington coast are sufficiently representative of the broader troll fishery across Washington and Oregon to enable such inferences. Also, there is an assumption that fishing practices are not influenced by the presence of an observer. However, even given these assumptions, it is useful to explore these data since current bycatch estimates for the salmon troll fishery are largely based upon the best professional judgment of the Groundfish Management Team and are supported by little empirical data.

One approach to estimating total incidental catch is to assume that the ratio of bycatch to retained Chinook salmon landings in the observed data remains constant for all landed Chinook. Estimates can then be based directly on salmon landings. Any groundfish targeting in the troll

fishery could compromise this approach. Chinook salmon catches for the Washington and Oregon troll fisheries (excluding tribal catches) are presented in Table 3.

Table 3. Oregon and Washington Chinook Salmon Troll Catch* (excluding treaty troll catch)

	<u>OR</u>	<u>WA</u>	<u>TOTAL</u>
1997	149,759	6,418	156,177
1998	124,211	5,929	130,140
1999	62,533	17,456	79,989
2000	135,903	10,269	146,172
2001	274,963	21,229	296,192
2002	304,189	53,819	358,008
2003	329,678	56,202	385,880
2004	252,709	35,372	288,081
2005	250,730	35,066	285,796
9-yr average	209,408	26,862	236,271

*Review of 2005 Salmon Fisheries - PFMC

Applying the observed catch ratios of species of concern to retained Chinook across the 3 years of the study, and converting catch in numbers to total catch weight using information from the WDFW Biological Data System (BDS), produces the estimates listed in Table 4.

Table 4. Estimated Bycatch in the OR/WA Salmon Fishery Applying Observed 2003-05 Catch Ratios to Total Chinook Salmon Landings (mt)

(Numbers expanded to weight using the most recent 50 fish sampled in the WDFW BDS; Canary = 1.2 kg; Yelloweye = 2.6 kg, lingcod = 3.13 kg)

<u>Year</u>	<u>Canary</u>	<u>Yelloweye</u>	<u>Lingcod</u>
1997	2.8	0.9	18.0
1998	2.3	0.7	15.0
1999	1.4	0.4	9.2
2000	2.6	0.8	16.9
2001	5.3	1.6	34.2
2002	6.4	2.0	41.3
2003	6.9	2.1	44.5
2004	5.1	1.6	33.2
2005	5.1	1.6	33.0
9-yr average	4.2	1.3	27.2
			1.4

5% Mortality

Although prohibited from retaining groundfish in the non-trawl Rockfish Conservation Area (RCA), salmon trollers are allowed to retain yellowtail rockfish taken incidentally while trolling for salmon. Landed yellowtail provide another comparison point with respect to observed co-occurring catch by species in the salmon troll fishery. The ratio of incidental canary rockfish to yellowtail rockfish was very consistent across the three years of the study. Applying this ratio to the landed troll yellowtail catch in Oregon and results in the estimated catch values listed in Table 5. Since canary and yellowtail rockfish are almost exactly of equal weight in the most recent WDFW BDS data, the canary/yellowtail ratio can be applied directly to the total weight of

yellowtail landings. It should be noted, however, that some salmon trollers choose not to retain and land their yellowtail, which would make these values a minimal estimate. Additionally, yellowtail landings are constrained by a landing ratio (1 yellowtail for each 2 salmon).

Table 5. Canary Rockfish Landings (mt) in the Salmon Troll Fishery Esitimated by Applying the Observed Ratio of Canary to Landed Yellowtail Rockfish

	2003	2004	2005	3-yr Avg.
Canary	68	55	72	65
Yellowtail	299	219	280	266
Canary/Yellowtail	0.227	0.251	0.257	0.244
Total Troll Yellowtail	29.3	7.8	6.9	14.7
Estimated Canary	6.7	2.0	1.8	3.6

Additional at-sea observations of the salmon troll fishery across a broader area would be useful in refining estimates of bycatch. Further explorations of the existing data set with respect to time and area could also prove useful.