

WDFW Puget Sound Sampling Program

Monthly Progress Report for February 2006: **Areas 8-1 and 8-2 Selective Chinook Fishery Monitoring**

1. Introduction

On October 1, 2005 the Puget Sound Sampling Program began intensively monitoring the selective chinook fishery in Areas 8-1 and 8-2. We are generating estimates of salmon catch (including total chinook and coho landed and released) and angler effort (total boats and anglers) and reporting these estimates on a monthly basis, for the period from October 1, 2005 through April 30, 2006.

During the month of February, as in the previous months of the fishery, sampling was implemented as planned in our sample design document. The study design was based on Murthy's estimator (Cochran 1977) to obtain daily estimates of total catch and effort. Two ramp samplers were stationed at selected sampled sites in Area 8-1, and two ramp samplers were stationed at selected sampled sites in Area 8-2. Permanent sampling staff conducted four boat surveys in Area 8-1 and four boat surveys in Area 8-2 during February, to estimate the percent of effort from sampled sites (versus non-sampled sites) and the proportion of angler effort at each sampled site.

We operated two test boats, one in Area 8-1 and the other in Area 8-2. The crew consisted of two WDFW technicians per boat. These test boats fished approximately four to five days per week during February, but less days during weeks when adverse weather and unsafe conditions on the water precluded fishing. For each hook-up, the encounter number, time sampled, species, mark status, and DNA vial number (if applicable) was recorded. Samplers collected scales, fork lengths, and total lengths on all chinook brought on board. All fish were immediately released.

In this progress report we include in-season preliminary estimates of catch, effort, and encounter rates with accompanying variance estimates for the month of February 2006. In addition, we present cumulative estimates to date for the months of October 2005 through February 2006 combined. We also include preliminary test fishing results, documentation of how the fishery is going to date, progress of implementing the sampling plan, and any adjustments needed.

2. Dockside Sampling Methods

Sampling Strata and Shifts

Sampling strata were divided into weekday (Monday through Thursday) and 'weekend' (Friday, Saturday, and Sunday) strata. Each week we randomly selected two days from the Monday through Thursday stratum for dockside sampling. Selected sample days within weekday strata included February 2nd, 8th, 9th, 14th, 15th, and 23rd. In addition, we sampled every Friday, Saturday, and Sunday during the month. We did not sample on the President's Day holiday, which was on Monday, February 20th. We assumed fishing behavior on this holiday would be similar to that of a typical weekend day, thus we included President's Day in a 'weekend' stratum definition for the period from February 18th through 20th. Dockside sampling shifts lasted from approximately dawn until dark in order to intercept all boats.

Sampled Sites

Sites to be sampled were selected as follows: Access sites in Areas 8-1 and 8-2 were divided into sampled and non-sampled sites. Access sites with low effort, as determined from boat survey data (see section 3 below) were excluded in the sample. All anglers and fish exiting the fishery

through the sampled sites were counted. Any boats that were missed at sampled sites were counted and recorded on the sampling forms.

Area 8-1 Sites

In Area 8-1, for each scheduled sampling day, two sites were randomly selected for sampling based on a weighted random site selection process. We calculated the “weights” (or “size measures”) of Area 8-1 sites based on the most recently available boat survey data. We conducted four boat surveys in Area 8-1 during February to update the size measures, as documented in section 3 below.

The ‘sampled sites’ for Area 8-1 included Camano Island State Park Ramp, Cornet Bay Public Ramp, Freeland Ramp (also called Holmes Harbor Ramp), Oak Harbor Public Ramp, Maple Grove Ramp, Utsalady Ramp, LaConner Ramp, and Coupeville Ramp (Table 1). Table 1 also lists the dates that these ramps were randomly selected for sampling during February.

Table 1. List of possible ‘sampled sites’ for the Area 8-1 selective chinook fishery and dates that the sites were actually sampled during February 2006.

Area 8-1 Sampled Sites	Dates Sampled in February 2006
Camano Island State Park Ramp	2 nd , 4 th , 5 th , 9 th , 10 th , 11 th , 12 th , 14 th , 23 rd , 24 th , 25 th
Cornet Bay Public Ramp	--
Freeland Ramp (Holmes Harbor)	8 th , 19 th
Oak Harbor Public Ramp	2 nd , 4 th , 5 th , 9 th , 11 th , 12 th , 14 th , 17 th , 18 th , 25 th
Maple Grove Ramp	3 rd , 10 th , 15 th , 19 th , 26 th
Utsalady Ramp	8 th , 17 th , 18 th , 23 rd , 24 th , 26 th
LaConner Ramp	15 th
Coupeville Ramp	3 rd

Area 8-2 Sites

In Area 8-2, for each scheduled sampling day, two samplers were stationed at the Everett Ramp. In addition, during each week, one day in the weekday stratum and one day in the weekend stratum was randomly selected for sampling at an additional site in order to compute a variance between sites. A third sampler (existing permanent staff based in Central Sound) was stationed at the alternate site on the randomly selected days in each stratum. We sampled an alternate site on the following randomly selected days in February: 3rd, 8th, 12th, 14th, 19th, and 26th.

In addition to Everett Ramp, the possible alternate ‘sampled sites’ are listed in Table 2, as well as the dates that the ramps were randomly selected for sampling during February. We calculated the weights of Area 8-2 sites based on the most recently available boat survey data. We conducted four boat surveys in Area 8-2 during February to update the weights, as documented in section 3 below.

Table 2. List of possible ‘sampled sites’ for the Area 8-2 selective chinook fishery and dates that the sites were actually sampled during February 2006.

Area 8-2 Sampled Sites	Dates Sampled in February 2006
Everett Ramp	2 nd , 3 rd , 4 th , 5 th , 8 th , 9 th , 10 th , 11 th , 12 th , 14 th , 15 th , 17 th , 18 th , 19 th , 23 rd , 24 th , 25 th , 26 th
Camano Island State Park Ramp	3 rd , 8 th , 12 th , 26 th
Dagmars Landing	19 th
Langley Ramp	14 th
Mukilteo Public Ramp	--
Kayak Point Ramp	--

3. Boat Surveys

Methods

Boat surveys were used to estimate the percent of effort from sampled sites (versus non-sampled sites) and the proportion of angler effort at each sampled site. Boat surveys covered the entire area to pick up effort from all launch sites. We asked boat occupants where they intended to tie up or exit the fishery rather than where they launched. We excluded non-fishing vessels and charter boats from the boat survey data. Charter boats were treated separately and excluded from our Murthy estimate due to their significantly higher CPUE compared to kicker boats, and because charter vessels were not necessarily exiting the fishery via our “sampled sites,” which precluded sampling their catch (see the subheading “Charter Boats” within Section 4: Estimated Harvest and Effort).

Results

Area 8-1

In Area 8-1, we conducted boat surveys on February 3rd, 8th, 11th, and 19th (two week days and two weekend days). For these four boat surveys combined, and including the four boat surveys conducted in January, a total of 109 boats and 208 anglers were surveyed. Of these anglers, 85% exited the fishery via sampled sites.

Area 8-2

In Area 8-2, we conducted boat surveys on February 11th, 15th, 24th and 25th (two week days and two weekend days). For these four boat surveys combined, plus the four boat surveys conducted in January, a total of 143 boats and 273 anglers were surveyed. Of these anglers, 79% exited the fishery via sampled sites.

As of statistical week 9, we added Mukilteo Public Ramp back into our pool of possible “sampled sites” for our site selection process, because this site was once again showing up regularly in our boat survey data. Apparently, even though the docks are not yet re-installed at the Mukilteo Ramp, some boats are able to operate from this site on days when the weather is favorable enough for launching and exiting.

4. Harvest and Effort Estimates

The catch and effort (excluding charter vessels) observed at sampled sites was expanded to all access sites, based on their “size measure”, to estimate total daily catch and effort in Areas 8-1 and 8-2. Sample data were combined and expanded to create stratum estimates of harvest and effort with variances (Tables 3 through 6).

Area 8-1

We estimated that a total of 121 chinook (118 marked and 3 unmarked) were landed in 640 angler trips during the month of February, with a catch per unit effort (CPUE) of 0.19 chinook per angler trip (Table 3). For the months of October through February combined, we estimated that a total of 292 chinook (289 marked and 3 unmarked) were landed in 2,866 angler trips, with an overall CPUE of 0.10 chinook per angler trip (Table 4).

In addition, we estimated that 238 chinook were released during February (44 marked, 122 unmarked, and 72 unknown mark status). The total number of chinook encountered (retained plus released) in Area 8-1 during February was estimated at 359 (Table 3).

From October 1 through February 26, we estimated that a total of 934 chinook were released (304 marked, 351 unmarked, and 279 unknown mark status) (Table 4). The total number of chinook encountered (retained plus released) in Area 8-1 during the five months of the fishery was estimated at 1,226.

Other than chinook, we estimated that there were 3 unmarked coho landed and 3 coho of unknown mark status released during February in Area 8-1. In comparison, during the months of November through January we estimated that no species of salmon other than chinook were landed or released. During October we estimated that 55 coho (24 marked and 31 unmarked) and 7 chum were landed, while 8 unknown species of salmon were released (Table 4).

Area 8-2

We estimated that a total of 216 chinook (205 marked and 11 unmarked) were landed in 1,280 angler trips in Area 8-2 during the month of February, with a CPUE of 0.17 chinook per angler trip (Table 5). For October through February combined, we estimated that a total of 504 chinook (480 marked and 24 unmarked) were landed in 5,570 angler trips, with an overall CPUE of 0.09 chinook per angler trip (Table 6).

In addition, we estimated that 578 chinook were released during February (150 marked, 201 unmarked and 227 unknown mark status). The total number of chinook encountered (retained plus released) during the month was estimated at 794.

From October through February, we estimated that a total of 1,647 chinook were released (279 marked, 491 unmarked, and 877 unknown mark status) in Area 8-2. Thus, the total number of chinook encountered (retained plus released) in this area during the five months of the fishery was estimated at 2,151 (Table 6).

In addition to chinook, we estimated that anglers landed 404 coho (105 marked and 299 unmarked), 8 chum, and one pink salmon during the months of October through February. Total estimates of released salmon other than chinook for the five months included 149 coho (5 marked, 16 unmarked, and 128 unknown mark status), 4 chum, 1 pink, and 148 unknown species of salmon (Table 6).

Charter Boats

Methods

After consulting with the WDFW biometrician early in the study, we elected to separate charter vessels from kicker boats in generating the catch estimates for Areas 8-1 and 8-2, to reduce potential bias and improve the precision in our estimates. Charter boats were treated separately and excluded from our Murthy estimate due to their high catch per unit of effort compared to kicker boats. In addition, charter boats were not necessarily exiting the fishery via our “sampled sites”, and the landed catch from these vessels was not being sampled.

This stratification of charter and kicker vessels was an adjustment compared to our initial study design due to the unique situation of this fall/winter fishery in which the fishery is very slow and sample sizes are extremely low (unlike high effort summer fisheries, such as the chinook selective fishery in Areas 5 and 6). We modified our approach to include a census of catch from the charter boats operating in the fishery. We relied on the Murthy estimator method to estimate total salmon encounters for kicker boats in Areas 8-1 and 8-2, while a complete census approach was used for charter boats.

We contacted all possible charter boat operators that fished in Areas 8-1 or 8-2 during the months of October through February. The charter operators reported complete counts of salmon encounters and number of trips via Voluntary Trip Report (VTR) forms. VTR data included the date of the fishing trip, number of anglers, target species, CRC Area, each chinook or coho hooked, whether the fish was kept or released, species (if they positively identified the fish), total length to the nearest 1/8th inch, and whether the fish was adipose fin-clipped or not clipped.

Results

Two charter boat operators fished in Area 8-2 during February and reported a total of 10 chinook encounters in 11 angler trips. These 10 encounters included 2 ad-marked retained chinook and 8 released chinook (7 ad-marked and 1 unmarked) (Table 7).

The CPUE for charter boats was 0.19 chinook per angler trip in Area 8-2 during February. In comparison, the CPUE for kicker boats was estimated at 0.17 chinook per angler trip for the month, nearly the same as that for charter boats. In contrast, in previous months of the Area 8-2 fishery, the CPUE for charter boats was four to six times higher than that of kicker boats.

For the months of October through February combined, the CPUE for kicker boats fishing in Area 8-2 was 0.09 chinook per angler trip, while that for charter boats was 0.50 chinook per angler trip. Thus, over the five months of the fishery, anglers were nearly six times more successful in landing chinook on charter vessels compared to kicker vessels under the particular circumstances of this fishery (Table 7).

Total Estimates: Areas 8-1 and 8-2 Combined

Adding the estimated chinook encounters in Area 8-2 for kicker boats (794) to the counts of chinook encounters reported from charter boats (10), estimates that a total of 804 chinook were encountered in Area 8-2 during February (218 retained and 586 released) (Table 7).

Combining the Area 8-1 and Area 8-2 estimates results in a **total of 1,163 estimated chinook encounters (339 retained and 824 released) for the two areas during the month of February. To date, for the months of October through February, we estimated a total of 3,549 chinook encounters in Areas 8-1 and 8-2 combined** (Table 7).

5. Observed versus Predicted Mortalities

In a preliminary analysis, we compared observed versus predicted mortalities for unmarked chinook encountered in the fishery during the months of October through February, for Areas 8-1 and 8-2 combined (Table 8). The observed unmarked chinook mortalities were determined based on preliminary estimates of chinook encounters from creel surveys and an assumed mortality rate of 20% for released chinook.

The Fishery Regulation Assessment Model (FRAM) predicted a total of 2,608 impacts on unmarked chinook encountered in the fishery from October through April, for Areas 8-1 and 8-2 combined. We applied the monthly proportions of effort used in FRAM to the total number of modeled impacts for the fishery in order to determine the predicted monthly impacts shown in Table 8.

Results of our comparison showed that the observed unmarked mortalities were far below the mortalities predicted from FRAM. The modeled cumulative mortalities totaled 1,995 through February, whereas cumulative observed impacts totaled 343 (Table 8). In this preliminary analysis we did not separate out legal versus sub-legal sized chinook to estimate the mortalities; we applied an assumed mortality rate of 20% (mortality rate assumed for sub-legal chinook) for all released fish. Therefore, the estimate of observed impacts is considered a high estimate.

Table 3. Preliminary Area 8-1 Recreational Fishery In-season Catch Estimates (Extrapolated Numbers), Based on Dockside Angler Interviews, January 30 through February 26, 2006.

Start Date	End Date	Est. Effort		Est. Retained Catch						Est. Releases											
				Chinook		Coho		Chum	Pink	Chinook			Coho			Chum	Pink	Unk. Salmon			
				Marked	Unmark	Marked	Unmark			Total	Mark	Unmark	Unk.	Total	Mark				Unmark	Unk.	
30-Jan	2-Feb	13	26	6	0	0	0	0	0	6	0	3	3	0	0	0	0	0	0	0	
3-Feb	3-Feb	5	10	7	0	0	0	0	0	6	2	2	2	0	0	0	0	0	0	0	
4-Feb	4-Feb	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5-Feb	5-Feb	6	11	3	0	0	0	0	0	4	2	2	0	0	0	0	0	0	0	0	
6-Feb	9-Feb	74	110	22	0	0	0	0	0	41	0	32	9	0	0	0	0	0	0	0	
10-Feb	10-Feb	19	44	5	0	0	0	0	0	9	2	6	1	1	0	1	0	0	0	0	
11-Feb	11-Feb	35	61	13	0	0	0	0	0	34	3	14	17	2	0	0	2	0	0	0	
12-Feb	12-Feb	45	77	11	3	0	3	0	0	32	12	14	6	0	0	0	0	0	0	0	
13-Feb	16-Feb	14	24	6	0	0	0	0	0	11	0	7	4	0	0	0	0	0	0	0	
17-Feb	17-Feb	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
18-Feb	20-Feb	68	147	23	0	0	0	0	0	51	13	16	22	0	0	0	0	0	0	0	
21-Feb	23-Feb	5	10	0	0	0	0	0	0	10	0	10	0	0	0	0	0	0	0	0	
24-Feb	24-Feb	5	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
25-Feb	25-Feb	36	64	7	0	0	0	0	0	28	7	16	5	0	0	0	0	0	0	0	
26-Feb	26-Feb	19	46	15	0	0	0	0	0	6	3	0	3	0	0	0	0	0	0	0	
TOTAL		347	640	118	3	0	3	0	0	238	44	122	72	3	0	1	2	0	0	0	
Statistics for Grand Total Estimates:																					
Standard Error	54	110	24	3		3				36	11	26	22	1		1	1				
CV	15.46%	17.16%	20.31%	90.42%		90.42%				14.98%	25.22%	21.27%	30.27%	31.16%		57.65%	36.79%				
Upper 95% CI	453	856	165	37		37				308	66	173	115	15		8	11				
Lower 95% CI	241	424	71	1		1				168	22	71	29	2		1	1				

Table 4. Total Area 8-1 Recreational Fishery In-season Catch Estimates (Extrapolated Numbers), Based on Dockside Angler Interviews, October 1 2005 through February 26 2006.

Month	Dates	Est. Effort		Est. Retained Catch						Est. Releases							
		Boats	Anglers	Chinook		Coho		Chum	Pink	Total	Chinook			Coho	Chum	Pink	Unk. Salmon
				Marked	Unmark	Marked	Unmark				Mark	Unmark	Unk.				
OCT	Oct 1 - Oct 30	637	1,154	41	0	24	31	7	0	305	130	88	87	0	0	0	8
NOV	Oct 31 - Dec 1	200	350	44	0	0	0	0	0	100	26	49	25	0	0	0	0
DEC	Dec 2 - Dec 31	236	427	49	0	0	0	0	0	169	65	68	36	0	0	0	0
JAN	Jan 1 - Jan 29	161	295	37	0	0	0	0	0	122	39	24	59	0	0	0	0
FEB	Jan 30 - Feb 26	347	640	118	3	0	3	0	0	238	44	122	72	3	0	0	0
TOTAL Oct-Feb		1,581	2,866	289	3	24	34	7	0	934	304	351	279	3	0	0	8
Statistics for Grand Total Estimates:																	
Standard Error		194	348	49	3	15	18	6		105	73	56	51	1			8
CV		12.25%	12.16%	17.12%	90.42%	61.01%	52.46%	85.67%		11.21%	23.97%	15.84%	18.12%	31.16%			94.04%
Upper 95% CI		1,961	3,549	386	37	54	70	22		1,139	447	460	378	15			26
Lower 95% CI		1,201	2,183	192	1	4	7	1		729	161	242	180	2			1

Table 5. Preliminary Area 8-2 Recreational Fishery In-season Catch Estimate (Extrapolated Numbers), Based on Dockside Angler Interviews, January 30 through February 26, 2006.

Start Date	End Date	Est. Effort		Est. Retained Catch						Est. Releases											
		Boats	Anglers	Chinook		Coho		Chum	Pink	Chinook				Coho				Chum	Pink	Unk. Salmon	
				Marked	Unmark	Marked	Unmark			Total	Mark	Unmark	Unk.	Total	Mark	Unmark	Unk.				
30-Jan	2-Feb	21	54	9	4	0	0	0	0	48	13	31	4	0	0	0	0	0	0	0	0
3-Feb	3-Feb	8	12	2	0	0	0	0	0	23	4	11	8	0	0	0	0	0	0	0	0
4-Feb	4-Feb	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5-Feb	5-Feb	13	22	0	0	0	0	0	0	20	4	7	9	0	0	0	0	0	0	0	0
6-Feb	9-Feb	117	225	72	4	0	0	0	0	110	32	59	19	0	0	0	0	0	0	0	0
10-Feb	10-Feb	33	59	9	0	0	0	0	0	18	2	7	9	0	0	0	0	0	0	0	0
11-Feb	11-Feb	127	234	24	0	0	0	0	0	116	31	15	70	2	0	0	2	0	0	0	0
12-Feb	12-Feb	105	208	19	3	0	0	0	0	64	21	20	23	1	1	0	0	0	0	0	0
13-Feb	16-Feb	11	17	3	0	0	0	0	0	6	3	3	0	0	0	0	0	0	0	0	0
17-Feb	17-Feb	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18-Feb	20-Feb	92	185	34	0	0	0	0	0	92	31	21	40	2	0	2	0	0	0	0	0
21-Feb	23-Feb	7	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24-Feb	24-Feb	12	23	2	0	0	0	0	0	7	0	0	7	0	0	0	0	0	0	0	0
25-Feb	25-Feb	65	134	17	0	0	0	0	0	31	5	12	14	0	0	0	0	0	0	0	0
26-Feb	26-Feb	44	89	14	0	0	0	0	0	43	4	15	24	0	0	0	0	0	0	0	0
TOTAL		657	1,280	205	11	0	0	0	0	578	150	201	227	5	1	2	2	0	0	0	0
Statistics for Grand Total Estimates:																					
Standard Error	32	67	25	5						37	20	27	15	1	1	0	0				
CV	4.92%	5.24%	11.99%	43.93%						6.38%	13.12%	13.57%	6.65%	12.48%	62.40%	0.00%	0.00%				
Upper 95% CI	720	1,411	253	22						650	189	255	257	7	9	2	2				
Lower 95% CI	594	1,149	157	5						506	111	147	197	3	1	2	2				

Table 6. Total Area 8-2 Recreational Fishery In-season Catch Estimates (Extrapolated Numbers), Based on Dockside Angler Interviews, October 1 2005 through February 26 2006.

Month	Dates	Est. Effort		Est. Retained Catch						Est. Releases										
		Boats	Anglers	Chinook		Coho		Chum	Pink	Chinook				Coho				Chum	Pink	Unk. Salmon
				Marked	Unmark	Marked	Unmark			Total	Mark	Unmark	Unk.	Total	Mark	Unmark	Unk.			
OCT	Oct 1 - Oct 30	1,486	2,911	27	2	104	299	7	1	330	15	17	298	141	4	14	123	2	1	144
NOV	Oct 31 - Dec 1	187	343	21	2	0	0	1	0	63	0	14	49	0	0	0	0	2	0	4
DEC	Dec 2 - Dec 31	249	461	90	4	1	0	0	0	246	26	76	144	1	0	0	1	0	0	0
JAN	Jan 1 - Jan 29	306	575	137	5	0	0	0	0	430	88	183	159	2	0	0	2	0	0	0
FEB	Jan 30 - Feb 26	657	1,280	205	11	0	0	0	0	578	150	201	227	5	1	2	2	0	0	0
Total Oct-Feb		2,885	5,570	480	24	105	299	8	1	1,647	279	491	877	149	5	16	128	4	1	148
Statistics for Grand Total Estimates																				
Standard Error		146	284	41	6	16	27	2	0.43	86	23	40	72	17	2	4	16	1	0.43	25
CV		5.04%	5.10%	8.50%	27.06%	15.11%	9.04%	22.22%	42.74%	5.22%	8.10%	8.24%	8.26%	11.34%	34.79%	22.13%	12.83%	27.80%	42.74%	17.08%
Upper 95% CI		3,170	6,127	560	37	136	352	12	6	1,816	324	571	1,019	182	11	24	160	9	6	198
Lower 95% CI		2,600	5,013	400	11	74	246	4	1	1,478	234	411	735	116	2	8	96	2	1	98

Table 7. Total Chinook Encounters Estimated for Kicker Vessels in Areas 8-1 and 8-2, and Censused from Charter Vessels in Area 8-2, October 1 2005 through February 26 2006.

Area	Month	Fishing Method ^{1/}	Angler Trips	CHINOOK ENCOUNTERS						Total Encounters (Retained + Released)
				Retained		Released				
				Marked	Unmark	Total	Mark	Unmark	Unk.	
8-2	OCT	Kicker	2,911	27	2	330	15	17	298	359
		Charter	56	14	0	11	2	9	0	25
	Total Oct.		2,967	41	2	341	17	26	298	384
	NOV	Kicker	343	21	2	63	0	14	49	86
		Charter	19	8	0	17	12	5	0	25
	Total Nov.		362	29	2	80	12	19	49	111
	DEC	Kicker	461	90	4	246	26	76	144	340
		Charter	22	16	0	42	22	20	0	58
	Total Dec.		483	106	4	288	48	96	144	398
	JAN	Kicker	575	137	5	430	88	183	159	572
		Charter	15	21	0	27	14	13	0	48
Total Jan.		590	158	5	457	102	196	159	620	
FEB	Kicker	1,280	205	11	578	150	201	227	794	
	Charter	11	2	0	8	7	1	0	10	
Total Feb.		1,291	207	11	586	157	202	227	804	
Area 8-2 Total Oct-Feb		5,693	541	24	1,752	336	539	877	2,317	
8-1	OCT	Kicker	1,154	41	0	305	130	88	87	346
		Charter	0	0	0	0	0	0	0	0
	Total Oct.		1,154	41	0	305	130	88	87	346
	NOV	Kicker	350	44	0	100	26	49	25	144
		Charter	0	0	0	0	0	0	0	0
	Total Nov.		350	44	0	100	26	49	25	144
	DEC	Kicker	427	49	0	169	65	68	36	218
		Charter	0	0	0	0	0	0	0	0
	Total Dec.		427	49	0	169	65	68	36	218
	JAN	Kicker	295	37	0	122	39	24	59	159
		Charter	2	0	0	6	2	4	0	6
Total Jan.		297	37	0	128	41	28	59	165	
FEB	Kicker	640	118	3	238	44	122	72	359	
	Charter	0	0	0	0	0	0	0	0	
Total Feb.		640	118	3	238	44	122	72	359	
Area 8-1 Total Oct-Feb		2,868	289	3	940	306	355	279	1,232	
GRAND TOTAL (Areas 8-1 & 8-2)			8,561	830	27	2,692	642	894	1,156	3,549

^{1/} We applied the Murthy estimator method to estimate total salmon encounters for kicker boats in Area 8-2, while a complete census approach was used for charter boats.

Table 8. Observed unmarked chinook mortalities in the Areas 8-1 and 8-2 selective chinook fishery, based on preliminary estimates of chinook encounters from creel surveys, versus impacts predicted from the FRAM model, by month for Areas 8-1 and 8-2 combined.

Month	Proportion of Effort	Estimated Mortalities: Unmarked Chinook Encounters			
		Modeled Impacts	Modeled Cumulative	Observed ^{1/} Impacts	Observed Cumulative
October	0.1898	495	495	68	68
November	0.1181	308	803	25	93
December	0.1397	364	1,167	60	152
January	0.1189	310	1,477	76	228
February	0.1983	517	1,995	115	343
March	0.1204	314	2,309	TBD	TBD
April	0.1148	299	2,608	TBD	TBD

^{1/} For this preliminary analysis we did not separate out legal versus sub-legal sizes of chinook to estimate mortalities; we applied the mortality rate of 20% (assumed rate for sub-legal chinook) for all released fish. Therefore, the estimated observed impacts are considered a high estimate.

6. Dockside Fishing Method Question

Methods

During dockside interviews, samplers recorded the predominant (based on time) angling method employed by the boat being interviewed, for the boats that actually encountered chinook. Responses were recorded on the sampling form according to the following five fishing method categories:

1. Weight & Bait (W): Mooching or slow trolling with lead and herring/anchovy.
2. Downrigger Trolling (DR): Using either hardware or bait or any combination.
3. Jigging (J): Drifting, jerking pole up and down; for example using Buzz Bombs, Point Wilson Darts, or Crippled Herring.
4. Diver Trolling (DV): For example trolling with a Deep Six or a Pink Lady, using either hardware or bait or any combination.
5. Other (O): For example fly fishing, or trolling bucktails with or without weight.

The sampling supervisor summarized the above information for anglers encountering chinook and instructed test boat samplers on which method to employ in order to adequately represent the fishing methods used by the recreational fleet. We assigned proportions of time that the test boat should spend on the different fishing methods on weekly basis, based on the dockside fishing method summary from the previous statistical week. Fishing methods employed by the test boat were also scheduled in a way that made sense as far as the tides, what was happening in the fishery, and other environmental variables.

The test boat samplers recorded the fishing method that they implemented on their sampling form. At the end of a test fishing day, the test boat crew summarized the amount of time they spent on fishing each method (see section 6 below, "Test Fishing").

Results

As in previous months of the fishery, downriggers were the predominant fishing method employed by anglers in Areas 8-1 and 8-2 during February. In Area 8-1, out of 150 interviews with anglers that successfully encountered chinook, all 150 boats used downriggers as their predominant fishing method. In Area 8-2, out of 228 interviews with anglers that successfully encountered chinook, 226 (99.2%) boats employed downriggers as their predominant fishing method, while one boat (0.4%) used the weight and bait method, and another boat (0.4%) used the jigging method. Thus, for Areas 8-1 and 8-2 combined, 99.5% of the boats that successfully encountered chinook used downriggers as their predominant fishing method.

For the months of October through February combined, we recorded a total of 1,028 responses to the fishing method question for anglers that successfully encountered chinook (366 boats in Area 8-1 and 662 boats in Area 8-2). Of these, 1,024 boats (99.6%) used downriggers as the predominant fishing method, while 3 boats (0.3%) employed the weight and bait method, and one boat (0.1%) used the jigging method.

6. Test Fishing

Methods

We operated two test boats, one in Area 8-1 and the other in Area 8-2. The crew on each boat consisted of two WDFW technicians per boat. These test boats fished approximately four to five days per week (Monday through Friday) on average throughout February (weather permitting). If adverse weather conditions precluded test fishing on a scheduled fishing day, the sampling supervisors rescheduled test fishing to an alternate day on the weekend, or the crew worked on boat maintenance and other duties.

For each hook-up, the encounter number, time sampled, species, mark status, and DNA vial number (if applicable) was recorded. Care was taken to handle all fish as gently as possible. Chinook were brought on board in a cotton mesh net and measured while still in the net. Samplers collected three scales for each chinook brought on board. In addition, samplers recorded the fork length, total length, and mark status for each chinook on the scale card (legal size chinook were 22 inches and larger, while sub-legal size chinook were less than 22 inches total length). Samplers also used scissors to remove a 1 cm² piece of the caudal fin for DNA analysis. All fish were released carefully and as soon as possible.

The test boat samplers recorded the fishing method that they implemented on their sampling form. At the end of a test fishing day, the test boat crew summarized the amount of time they spent on fishing each method.

Results

The test boat in Area 8-1 encountered a total of 71 chinook (30 legal and 41 sub-legal) during February, and the test boat in Area 8-2 encountered a total of 50 chinook (25 legal and 25 sub-legal) (Table 9). Samplers collected DNA samples from each of these fish, as well as scale samples, fork lengths, and total lengths.

The test boats in both areas employed downriggers 100% of the time during February. Adverse weather conditions precluded fishing five days per week during certain weeks in the month, with particularly rough conditions on the water in both areas during the third week of February (statistical week 8).

To date, for the months of October through February combined, the test boat in Area 8-1 has encountered a total of 340 chinook (105 legal and 235 sub-legal), while the test boat in Area 8-2 has encountered a total of 216 chinook (92 legal and 124 sub-legal) (Table 9).

Based on the combined test fishing data for October through February, the adipose mark rate in Area 8-1 was 61% for legal-sized chinook and 56% for sub-legal chinook. In Area 8-2, the adipose mark rate was 57% for legal-sized chinook and 65% for sub-legal chinook (Table 9).

Literature Cited

Cochran, W.G. 1977. Sampling Techniques. John Wiley.

Table 9. Total weekly chinook encounters and number of DNA samples collected in the Areas 8-1 and 8-2 test fishery from October 1 2005 through February 26 2006 (statistical weeks 41 through 9), by mark status (M=marked; UM=unmarked) and legal or sub-legal size^{1/}.

Month	Statistical Week	AREA 8-1						AREA 8-2					
		LEGAL ^{1/}			SUB-LEGAL ^{1/}			LEGAL ^{1/}			SUB-LEGAL ^{1/}		
		M	UM	Total	M	UM	Total	M	UM	Total	M	UM	Total
OCT	41	2	0	2	10	6	16	0	0	0	1	0	1
	42	0	0	0	5	2	7	0	1	1	4	3	7
	43	2	0	2	5	2	7	0	2	2	14	5	19
	44	0	0	0	8	4	12	1	0	1	5	6	11
OCT TOTAL		4	0	4	28	14	42	1	3	4	24	14	38
Percent		100%	0%		67%	33%		25%	75%		63%	37%	
NOV	45	0	0	0	2	2	4	0	1	1	3	1	4
	46	1	1	2	2	2	4	1	0	1	6	2	8
	47	2	6	8	8	5	13	2	0	2	5	3	8
	48	4	2	6	4	2	6	4	3	7	5	1	6
	49	4	3	7	11	8	19	1	4	5	3	3	6
NOV TOTAL		11	12	23	27	19	46	8	8	16	22	10	32
Percent		48%	52%		59%	41%		50%	50%		69%	31%	
DEC	50	4	0	4	4	10	14	4	5	9	1	4	5
	51	2	1	3	3	4	7	3	2	5	0	1	1
	52	0	0	0	1	2	3	1	0	1	2	2	4
	53-1	3	3	6	1	1	2	6	2	8	2	2	4
DEC TOTAL		9	4	13	9	17	26	14	9	23	5	9	14
Percent		69%	31%		35%	65%		61%	39%		36%	64%	
JAN	2	2	1	3	2	5	7	0	0	0	0	0	0
	3	1	4	5	12	10	22	0	0	0	0	0	0
	4	7	11	18	9	7	16	11	7	18	8	3	11
	5	7	2	9	20	15	35	4	2	6	2	2	4
JAN TOTAL		17	18	35	43	37	80	15	9	24	10	5	15
Percent		49%	51%		54%	46%		63%	38%		67%	33%	
FEB	6	8	0	9	8	5	13	5	6	11	5	1	6
	7	10	3	13	9	4	13	6	4	10	6	4	10
	8	1	2	3	4	4	8	1	0	1	2	0	2
	9	4	2	6	4	3	7	2	1	3	6	1	7
FEB TOTAL		23	7	30	25	16	41	14	11	25	19	6	25
Percent		77%	23%		61%	39%		56%	44%		76%	24%	
GRAND TOTAL		64	41	105	132	103	235	52	40	92	80	44	124
Percent		61%	39%		56%	44%		57%	43%		65%	35%	

^{1/} Legal size chinook were 22 inches and larger in total length, while sub-legal size chinook were less than 22 inches total length.