Preliminary Summary of the 2021 West Coast Pelagic Conservation Group Collaborative Nearshore Coastal Pelagic Species Surveys

This preliminary summary is intended to lead to fulfilling the reporting requirements of the exempted fishing permit (EFP-07/08-2021-2022) issued by NOAA/NMFS to the West Coast Pelagic Conservation Group (WCP) in 2021. The F/V *Lisa Marie* in summer 2021 collected the data summarized here during two separate projects, including Part 1, a collaborative coastal pelagic species (CPS) survey by the WCP, NOAA/Southwest Fisheries Science Center (SWFSC), and the Washington Department of Fish and Wildlife (WDFW) from Cape Flattery, WA nearly to Bodega Bay, CA; and Part 2, a CPS survey by the WCP and the WDFW of Washington only. The work accomplished in 2021 under Part 1 was a continuation of a study initiated by industry in 2017 to extend acoustic surveying and sampling of the CPS assemblage to the nearshore, to complement the offshore NOAA/SWFSC survey. Part 2 surveyed nearshore CPS assemblage off Washington to address WCP interest in survey timing in the Pacific Northwest and to test some alternative surveying and sampling strategies and protocols. The EFP exempted the WCP from the prohibition on direct harvest of Pacific sardine.

The WCP 2021 EFP proposal estimated a need for a maximum of 10 mt of Pacific sardine (and no more than 10 mt for all other CPS and non-target species combined) to accomplish purse seine set sampling. The EFP authorized no more than 10 mt of Pacific sardine. Total retention of Pacific sardine by the *Lisa Marie* in 2021, including parts 1 and 2 of the project, was 0.046 mt. The combined weight of all other CPS and non-target species totaled 0.92 mt.

Part 1 – Complimentary Nearshore Survey with NOAA RSV *Reuben Lasker*

The F/V *Lisa Marie* completed complimentary acoustic surveys of the nearshore distribution of CPS biomass off Washington, Oregon, and northern California (nearly to Bodega Bay) between July 16, 2021 and August 5, 2021. During this period, the *Lisa Marie* completed a total of 121 transects (25 transects off Washington, 52 off Oregon and 44 off California) as well as 30 purse seine sets. WDFW biologists were onboard for the duration of the project to collect species composition and biological data, as well as monitor the acoustic equipment and maintain a log of seining operations. All project data were submitted to NOAA/SWFSC. Age structures were submitted to WDFW age readers for analysis.

Transect lines were completed in either direction and as near to shore as safely navigable following the planned transect lines in Table 1, starting with line number 351 at Cape Flattery and ending with line 228 in California, just north of Bodega Bay. Transects lines were nominally 4 nautical miles long and spaced 5 nautical miles apart for Part 1. For Part 2, intermediate lines (i.e., at 2.5 nmi intervals) were added. Acoustic surveying began most mornings around 0630 PST (sunrise) and ended around 1900 PST (sunset). Sets were made after the completion of the transect and in proximity to the transect line if fish were observed. Schools of fish observed while transiting to the next transect line were also set on. For all sets, the date, time, latitude, longitude, hail weight, and general species composition were recorded. Set locations are provided in Table 2. Bottom depth associated with sets ranged from 8.8 to 101 meters. Of the 30 completed sets, one was only partially successful due to skiff operational challenges which allowed fish to escape while setting. Sets were accomplished on each day of the survey.

Three dip net samples of approximately 4.5 kg (10 pounds) each were collected per set from the seine for biological information and species composition. Table 3 presents all retained fish. For each species per set, a total weight in grams and total number were reported. For Pacific sardine, northern anchovy, Pacific mackerel, jack mackerel, and Pacific herring, a 50 fish sample was randomly collected from the total combined dip netted sample and weighed. Then each of the 50 fish were sampled for length and weight, with 25 of the fish also being sampled for sex, macroscopic maturity, and age structures.

Northern anchovy and Pacific herring comprised most of the retained specimens for sampling by number and weight. One Pacific sardine was collected on 07/22/2021 in set 1.

Part 2. Survey of Washington Nearshore CPS Assemblage, WCP and WDFW

The F/V *Lisa Marie* completed a second set of acoustic transects of the nearshore distribution of CPS biomass off Washington between August 18 and 26, 2021. The same transects planned for Part 1 were followed (Table 1) from lines 351 to 327, with the addition of 25 transect lines placed directly between the 5-mile distanced lines. During this period, the *Lisa Marie* completed a total of 50 transects and 25 purse seine sets (Table 4). A WDFW biologist was onboard for the duration to collect species composition and biological data, and to monitor the acoustic equipment and maintain a log of seining operations. All acoustic data were submitted to NOAA/SWFSC. Age structures were submitted to WDFW age readers for analysis.

Acoustic surveying of transects and purse seine methods followed the methods described for Part 1 except acoustic surveillance along several intermediate transects (i.e., 2.5 interval line) was paused to set on putative CPS schools observed on the line and resumed once gear was retrieved onboard. Dip net sampling was accomplished in the same manner as Part 1 except the number of dip net samples collected per set was increased from 3 to 10 to evaluate species composition

protocols for statistically valid sample size. Table 5 presents species observed and collected for species compositions.

Jack mackerel and jellyfish comprised most of the species collected from sets. Pacific sardine were collected from a single set (2) on August 21 approximately 10 miles offshore of Taholah, Washington which lies north of Grays Harbor. Mean weight and length of sampled Pacific sardine (n=50) were 276.6g (9.7 oz) and 257.6 mm (10 in), respectively. Figure 1 plots sardine length to weight, by sex. Notably, very few Northern anchovy were observed or sampled in sets.

Table 1. 2021 CPS Survey Transect Locations, *Lisa Marie*, Parts 1 and 2.

Transect	Waypoint	Latitude	Longitude	Type	Region
228	228.1N	38.366463	-123.096827	Nearshore	Central CA
228	228.2N	38.324221	-123.185683	Nearshore	Central CA
229	229.1N	38.434838	-123.133675	Nearshore	Central CA
229	229.2N	38.392812	-123.225998	Nearshore	Central CA
230	230.1N	38.49127	-123.239046	Nearshore	Central CA
230	230.2N	38.448615	-123.330082	Nearshore	Central CA
231	231.1N	38.549066	-123.314069	Nearshore	Central CA
231	231.2N	38.50594	-123.407921	Nearshore	Central CA
232	232.1N	38.622512	-123.384519	Nearshore	Central CA
232	232.2N	38.57921	-123.476049	Nearshore	Central CA
233	233.1N	38.688391	-123.445215	Nearshore	Central CA
233	233.2N	38.645901	-123.537471	Nearshore	Central CA
234	234.1N	38.747655	-123.522007	Nearshore	Central CA
234	234.2N	38.704709	-123.614627	Nearshore	Central CA
235	235.1N	38.806242	-123.606715	Nearshore	Central CA
235	235.2N	38.763231	-123.701239	Nearshore	Central CA
236	236.1N	38.872298	-123.682178	Nearshore	Central CA
236	236.2N	38.830201	-123.771904	Nearshore	Central CA
237	237.1N	38.937441	-123.738341	Nearshore	Central CA
237	237.2N	38.894938	-123.83103	Nearshore	Central CA
238	238.1N	39.053246	-123.70238	Nearshore	Central CA
238	238.2N	39.009931	-123.796555	Nearshore	Central CA
239	239.1N	39.130432	-123.738956	Nearshore	Central CA
239	239.2N	39.088206	-123.831431	Nearshore	Central CA
240	240.1N	39.211597	-123.781019	Nearshore	Central CA
240	240.2N	39.168686	-123.873842	Nearshore	Central CA
241	241.1N	39.295142	-123.807024	Nearshore	Central CA
241	241.2N	39.253322	-123.899054	Nearshore	Central CA
242	242.1N	39.38628	-123.823872	Nearshore	Central CA
242	242.2N	39.343195	-123.916443	Nearshore	Central CA

243	243.1N	39.490667	-123.811266	Nearshore	Central CA
243	243.2N	39.446758	-123.904126	Nearshore	Central CA
244	244.1N	39.591102	-123.795302	Nearshore	Central CA
244	244.2N	39.549175	-123.886923	Nearshore	Central CA
245	245.1N	39.685187	-123.805904	Nearshore	Central CA
245	245.2N	39.642525	-123.898882	Nearshore	Central CA
246	246.1N	39.766253	-123.843031	Nearshore	Central CA
246	246.2N	39.723218	-123.937259	Nearshore	Central CA
247	247.1N	39.842626	-123.891659	Nearshore	Central CA
247	247.2N	39.80037	-123.984541	Nearshore	Central CA
248	248.1N	39.915141	-123.956058	Nearshore	Central CA
248	248.2N	39.871737	-124.04863	Nearshore	Central CA
249	249.1N	39.983026	-124.013957	Nearshore	Central CA
249	249.2N	39.941114	-124.107413	Nearshore	Central CA
250	250.1N	40.043548	-124.08597	Nearshore	Central CA
250	250.2N	40.000803	-124.179047	Nearshore	Central CA
251	251.1N	40.108858	-124.146896	Nearshore	Central CA
251	251.2N	40.058772	-124.255921	Nearshore	Central CA
252	252.1N	40.163499	-124.241684	Nearshore	Central CA
252	252.1N	40.118693	-124.339309	Nearshore	Central CA
253	253.1N	40.220878	-124.330645	Nearshore	Central CA
253	253.1N	40.179101	-124.421759	Nearshore	Central CA
254	254.1N	40.302887	-124.365971	Nearshore	Central CA
254	254.2N	40.258241	-124.463437	Nearshore	Central CA
255	255.1N	40.389448	-124.391382	Nearshore	Central CA
255	255.2N	40.35138	-124.474568	Nearshore	Central CA
256	256.1N	40.482934	-124.401656	Nearshore	Central CA
256	256.2N	40.434002	-124.508687	Nearshore	Central CA
257	257.1N	40.520401	-124.391169	Nearshore	Central CA
257	257.2N	40.520226	-124.485245	Nearshore	Central CA
258	258.1N	40.603162	-124.34501	Nearshore	Central CA
258	258.2N	40.60296	-124.449697	Nearshore	Central CA
259	259.1N	40.685953	-124.291323	Nearshore	Central CA
259	259.2N	40.685727	-124.403472	Nearshore	Central CA
260	260.1N	40.768763	-124.235248	Nearshore	Central CA
260	260.2N	40.768524	-124.349174	Nearshore	Central CA
261	261.1N	40.851582	-124.182316	Nearshore	Central CA
261	261.2N	40.851339	-124.293853	Nearshore	Central CA
262	262.1N	40.934384	-124.143682	Nearshore	Central CA
262	262.2N	40.934153	-124.245897	Nearshore	Central CA
263	263.1N	41.015298	-124.134583	Nearshore	Central CA
263	263.2N	41.015012	-124.237004	Nearshore	Central CA
264	264.1N	41.09977	-124.173173	Nearshore	Central CA

264	264.2N	41.099558	-124.260599	Nearshore	Central CA
265	265.1N	41.182602	-124.134983	Nearshore	Central CA
265	265.2N	41.182307	-124.25303	Nearshore	Central CA
266	266.1N	41.265429	-124.104096	Nearshore	Central CA
266	266.2N	41.265171	-124.204093	Nearshore	Central CA
267	267.1N	41.3464	-124.093291	Nearshore	Central CA
267	267.2N	41.346541	-124.183257	Nearshore	Central CA
268	268.1N	41.431029	-124.076291	Nearshore	Central CA
268	268.2N	41.430788	-124.164105	Nearshore	Central CA
269	269.1N	41.513759	-124.092337	Nearshore	Central CA
269	269.2N	41.51349	-124.187838	Nearshore	Central CA
270	270.1N	41.596469	-124.117581	Nearshore	Central CA
270	270.2N	41.596183	-124.216557	Nearshore	Central CA
271	271.1N	41.679159	-124.151254	Nearshore	Central CA
271	271.2N	41.678746	-124.289853	Nearshore	Central CA
272	272.1N	41.76166	-124.247474	Nearshore	Central CA
272	272.2N	41.761311	-124.36171	Nearshore	Central CA
273	273.1N	41.8445	-124.23398	Nearshore	Central CA
273	273.2N	41.844155	-124.343693	Nearshore	Central CA
274	274.1N	41.927365	-124.216024	Nearshore	Central CA
274	274.2N	41.927072	-124.307206	Nearshore	Central CA
275	275.1N	42.010092	-124.243536	Nearshore	WA/OR
275	275.2N	42.009586	-124.397197	Nearshore	WA/OR
276	276.1N	42.092551	-124.352121	Nearshore	WA/OR
276	276.2N	42.092196	-124.457334	Nearshore	WA/OR
277	277.1N	42.175309	-124.372052	Nearshore	WA/OR
277	277.2N	42.174937	-124.479687	Nearshore	WA/OR
278	278.1N	42.257974	-124.420286	Nearshore	WA/OR
278	278.2N	42.257649	-124.512051	Nearshore	WA/OR
279	279.1N	42.340735	-124.442481	Nearshore	WA/OR
279	279.2N	42.34041	-124.532197	Nearshore	WA/OR
280	280.1N	42.423579	-124.444159	Nearshore	WA/OR
280	280.2N	42.42323	-124.538475	Nearshore	WA/OR
281	281.1N	42.506498	-124.428944	Nearshore	WA/OR
281	281.2N	42.506155	-124.519506	Nearshore	WA/OR
282	282.1N	42.589439	-124.411387	Nearshore	WA/OR
282	282.2N	42.589084	-124.503164	Nearshore	WA/OR
283	283.1N	42.671226	-124.459204	Nearshore	WA/OR
283	283.2N	42.67113	-124.581413	Nearshore	WA/OR
284	284.1N	42.754758	-124.526713	Nearshore	WA/OR
284	284.2N	42.754354	-124.627235	Nearshore	WA/OR
285	285.1N	42.83747	-124.572362	Nearshore	WA/OR
285	285.2N	42.837083	-124.666711	Nearshore	WA/OR

286	286.1N	42.920658	-124.505217	Nearshore	WA/OR
286	286.2N	42.920186	-124.618307	Nearshore	WA/OR
287	287.1N	43.003746	-124.46696	Nearshore	WA/OR
287	287.2N	43.003312	-124.568872	Nearshore	WA/OR
288	288.1N	43.08678	-124.445486	Nearshore	WA/OR
288	288.2N	43.086395	-124.534093	Nearshore	WA/OR
289	289.1N	43.169849	-124.419528	Nearshore	WA/OR
289	289.2N	43.169429	-124.514711	Nearshore	WA/OR
290	290.1N	43.252905	-124.400412	Nearshore	WA/OR
290	290.2N	43.252489	-124.492822	Nearshore	WA/OR
291	291.1N	43.335966	-124.383456	Nearshore	WA/OR
291	291.2N	43.336057	-124.498101	Nearshore	WA/OR
292	292.1N	43.419357	-124.299363	Nearshore	WA/OR
292	292.2N	43.418709	-124.438425	Nearshore	WA/OR
293	293.1N	43.502534	-124.265867	Nearshore	WA/OR
293	293.2N	43.502045	-124.369179	Nearshore	WA/OR
294	294.1N	43.585719	-124.234754	Nearshore	WA/OR
294	294.2N	43.585258	-124.330451	Nearshore	WA/OR
295	295.1N	43.668822	-124.224354	Nearshore	WA/OR
295	295.2N	43.668405	-124.309427	Nearshore	WA/OR
296	296.1N	43.752041	-124.193641	Nearshore	WA/OR
296	296.2N	43.751583	-124.285698	Nearshore	WA/OR
297	297.1N	43.835217	-124.175449	Nearshore	WA/OR
297	297.2N	43.834773	-124.263043	Nearshore	WA/OR
298	298.1N	43.91839	-124.160927	Nearshore	WA/OR
298	298.2N	43.917944	-124.247851	Nearshore	WA/OR
299	299.1N	44.001569	-124.148921	Nearshore	WA/OR
299	299.2N	44.001103	-124.238014	Nearshore	WA/OR
300	300.1N	44.084766	-124.136421	Nearshore	WA/OR
300	300.2N	44.084275	-124.229071	Nearshore	WA/OR
301	301.1N	44.167956	-124.128517	Nearshore	WA/OR
301	301.2N	44.167475	-124.21793	Nearshore	WA/OR
302	302.1N	44.251157	-124.121845	Nearshore	WA/OR
302	302.2N	44.250653	-124.214045	Nearshore	WA/OR
303	303.1N	44.334391	-124.11218	Nearshore	WA/OR
303	303.2N	44.333846	-124.210476	Nearshore	WA/OR
304	304.1N	44.417709	-124.090588	Nearshore	WA/OR
304	304.2N	44.417179	-124.184907	Nearshore	WA/OR
305	305.1N	44.500905	-124.094069	Nearshore	WA/OR
305	305.2N	44.50039	-124.184318	Nearshore	WA/OR
306	306.1N	44.58421	-124.081368	Nearshore	WA/OR
306	306.2N	44.583698	-124.169882	Nearshore	WA/OR
307	307.1N	44.667458	-124.081462	Nearshore	WA/OR

307	307.2N	44.666895	-124.177636	Nearshore	WA/OR
308	308.1N	44.750757	-124.076093	Nearshore	WA/OR
308	308.2N	44.750202	-124.169517	Nearshore	WA/OR
309	309.1N	44.834088	-124.068279	Nearshore	WA/OR
309	309.2N	44.833508	-124.16463	Nearshore	WA/OR
310	310.1N	44.917585	-124.03636	Nearshore	WA/OR
310	310.2N	44.917007	-124.13109	Nearshore	WA/OR
311	311.1N	45.000993	-124.022697	Nearshore	WA/OR
311	311.2N	45.000442	-124.111751	Nearshore	WA/OR
312	312.1N	45.084373	-124.016542	Nearshore	WA/OR
312	312.2N	45.083774	-124.112194	Nearshore	WA/OR
313	313.1N	45.167982	-123.977398	Nearshore	WA/OR
313	313.2N	45.167391	-124.070657	Nearshore	WA/OR
314	314.1N	45.251364	-123.977493	Nearshore	WA/OR
314	314.2N	45.250763	-124.071067	Nearshore	WA/OR
315	315.1N	45.33454	-124.012299	Nearshore	WA/OR
315	315.2N	45.333958	-124.101683	Nearshore	WA/OR
316	316.1N	45.418227	-123.971326	Nearshore	WA/OR
316	316.2N	45.417578	-124.069957	Nearshore	WA/OR
317	317.1N	45.501645	-123.974711	Nearshore	WA/OR
317	317.2N	45.501008	-124.070309	Nearshore	WA/OR
318	318.1N	45.585174	-123.964486	Nearshore	WA/OR
318	318.2N	45.584547	-124.057492	Nearshore	WA/OR
319	319.1N	45.668783	-123.945706	Nearshore	WA/OR
319	319.2N	45.66814	-124.039916	Nearshore	WA/OR
320	320.1N	45.752036	-123.981946	Nearshore	WA/OR
320	320.2N	45.751353	-124.080841	Nearshore	WA/OR
321	321.1N	45.835615	-123.973464	Nearshore	WA/OR
321	321.2N	45.835019	-124.058793	Nearshore	WA/OR
322	322.1N	45.919027	-123.991874	Nearshore	WA/OR
322	322.2N	45.918343	-124.088604	Nearshore	WA/OR
323	323.1N	46.002946	-123.941661	Nearshore	WA/OR
323	323.2N	46.002049	-124.067304	Nearshore	WA/OR
324	324.1N	46.086462	-123.951421	Nearshore	WA/OR
324	324.2N	46.085784	-124.045275	Nearshore	WA/OR
325	325.1N	46.169778	-123.991379	Nearshore	WA/OR
325	325.2N	46.168976	-124.101206	Nearshore	WA/OR
326	326.1N	46.252937	-124.05462	Nearshore	WA/OR
326	326.2N	46.252024	-124.178205	Nearshore	WA/OR
327	327.1N	46.33641	-124.077414	Nearshore	WA/OR
327	327.2N	46.335727	-124.168858	Nearshore	WA/OR
328	328.1N	46.420128	-124.070273	Nearshore	WA/OR
328	328.2N	46.41944	-124.161358	Nearshore	WA/OR

329	329.1N	46.503803	-124.071837	Nearshore	WA/OR
329	329.2N	46.503119	-124.161574	Nearshore	WA/OR
330	330.1N	46.587442	-124.080992	Nearshore	WA/OR
330	330.2N	46.586811	-124.162904	Nearshore	WA/OR
331	331.1N	46.670485	-124.101442	Nearshore	WA/OR
331	331.2N	46.669721	-124.206255	Nearshore	WA/OR
332	332.1N	46.754593	-124.123971	Nearshore	WA/OR
332	332.2N	46.753993	-124.200301	Nearshore	WA/OR
333	333.1N	46.838368	-124.124185	Nearshore	WA/OR
333	333.2N	46.837559	-124.22605	Nearshore	WA/OR
334	334.1N	46.921686	-124.184418	Nearshore	WA/OR
334	334.2N	46.920932	-124.278337	Nearshore	WA/OR
335	335.1N	47.005495	-124.185776	Nearshore	WA/OR
335	335.2N	47.004795	-124.272136	Nearshore	WA/OR
336	336.1N	47.089259	-124.195772	Nearshore	WA/OR
336	336.2N	47.088587	-124.277807	Nearshore	WA/OR
337	337.1N	47.172975	-124.214299	Nearshore	WA/OR
337	337.2N	47.172269	-124.299718	Nearshore	WA/OR
338	338.1N	47.256629	-124.243024	Nearshore	WA/OR
338	338.2N	47.255617	-124.364218	Nearshore	WA/OR
339	339.1N	47.339954	-124.3132	Nearshore	WA/OR
339	339.2N	47.339087	-124.416172	Nearshore	WA/OR
340	340.1N	47.423594	-124.348134	Nearshore	WA/OR
340	340.2N	47.422861	-124.434343	Nearshore	WA/OR
341	341.1N	47.507425	-124.363321	Nearshore	WA/OR
341	341.2N	47.506688	-124.449111	Nearshore	WA/OR
342	342.1N	47.591207	-124.386839	Nearshore	WA/OR
342	342.2N	47.59045	-124.474211	Nearshore	WA/OR
343	343.1N	47.674926	-124.420301	Nearshore	WA/OR
343	343.2N	47.674129	-124.511408	Nearshore	WA/OR
344	344.1N	47.758471	-124.475953	Nearshore	WA/OR
344	344.2N	47.757328	-124.605361	Nearshore	WA/OR
345	345.1N	47.841793	-124.558723	Nearshore	WA/OR
345	345.2N	47.840427	-124.712013	Nearshore	WA/OR
346	346.1N	47.925022	-124.65344	Nearshore	WA/OR
346	346.2N	47.924134	-124.752178	Nearshore	WA/OR
347	347.1N	48.008748	-124.694755	Nearshore	WA/OR
347	347.2N	48.007964	-124.781255	Nearshore	WA/OR
348	348.1N	48.092793	-124.703629	Nearshore	WA/OR
348	348.2N	48.091872	-124.80433	Nearshore	WA/OR
349	349.1N	48.176669	-124.733852	Nearshore	WA/OR
349	349.2N	48.17574	-124.834461	Nearshore	WA/OR
350	350.1N	48.261231	-124.692959	Nearshore	WA/OR

350	350.2N	48.260192	-124.8045	Nearshore	WA/OR
351	351.1N	48.345249	-124.713761	Nearshore	WA/OR
351	351.2N	48.344192	-124.826404	Nearshore	WA/OR

Table 1. Set date, time, and location, *Lisa Marie*, 2021, Part 1.

Leg	Cumulative Set Number	Date	Set Number	Local Time	State	Latitude	Longitude
1	1	7/16	1	1326	WA	48° 4.206	124° 45.533
1	2	7/17	1	1807	WA	46° 59.4942	124° 12.6362
1	3	7/18	1	1051	WA	46° 34.9930	124° 6.6378
1	4	7/18	2	1319	WA	46° 27.7050	124° 5.9970
1	5	7/19	1	897	OR	45° 59.8591	123° 57.4139
1	6	7/19	2	1520	OR	45° 39.8845	123° 57.9053
1	7	7/20	1	947	OR	45° 7.664	124° 1.8362
1	8	7/21	1	935	OR	44° 23.5070	124° 8.0808
1	9	7/21	2	1506	OR	44° 9.7223	124° 12.9207
1	10	7/21	3	1714	OR	44° 4.6715	124° 8.6815
1	11	7/22	1	1043	OR	43° 43.9608	124° 12.2981
1	12	7/22	2	1322	OR	43° 35.228	124° 14.3923
2	13	7/29	1	1613	OR	42° 0.6558	124° 16.2426
2	14	7/30	1	811	CA	41° 55.5881	124° 13.9461
2	15	7/30	2	1356	CA	41° 39.6532	124° 10.7353
2	16	7/30	3	1723	CA	41° 31.0249	124° 7.5986
2	17	7/31	1	921	CA	41° 14.6486	124° 8.2170
2	18	7/31	2	1500	CA	41° 0.6618	124° 8.4642
2	19	8/1	1	1033	CA	40° 41.0952	124° 19.3210
2	20	8/2	1	1200	CA	40° 6.1689	124° 7.9776

2	21	8/2	2	1555	CA	39° 58.1612	124° 1.0090
2	22	8/2	3	1816	CA	39° 54.2438	123° 58.7915
2	23	8/2	4	1903	CA	39° 53.9214	123° 58.7349
2	24	8/3	1	921	CA	39° 41.6146	123° 51.2034
2	25	8/3	2	1147	CA	39° 37.1762	123° 48.4487
2	26	8/3	3	1506	CA	39° 30.0500	123° 50.1551
2	27	8/4	1	1224	CA	39° 11.9191	123° 50.8528
2	28	8/4	2	1705	CA	39° 6.6576	123° 44.5616
2	29	8/4	3	1802	CA	39° 4.3480	123° 45.7131
2	30	8/5	1	810	CA	38° 54.811	123° 48.8413

Table 2. Species composition of sampled sets, weight (g) and count, all sets combined, ranked by weight (g), Part 1.

Species	Count	Weight (g)
Northern Anchovy	2063	38390
Herring	1111	37626
Whitebait Smelt	1062	5781
Pacific Tomcod	740	3845
unidentified juvenile smelt	621	3494
Surf Smelt	590	10362
Water Jellies	420	35280
Market Squid	408	15774
Jacksmelt	272	34554
Ctenophores	250	5355
Small Bell Jelly	145	671
Gadidae unidentified	65	400
Chinook Salmon	55	1175

Salp	29	987
Sea Nettle	21	26587
Moon Jelly	10	11368
unidentified Jellyfish	3	499
English Sole	2	3
Lingcod	2	8
Starry Flounder	1	432
Medusafish	1	3.5
Shiner Perch	1	16
Isopod	1	0.5
unidentified juvenile rockfish	1	
Sea Elephant	1	4
Sanddab	1	2.5
Cabezon	1	657
Black Rockfish	1	1594
Pacific Sardine	1	41
unidentified eel larvae		1
Total	7879	234907

Table 4. Set date, time, and location, *Lisa Marie*, 2021; Part 2.

Leg	Cumulative Set Number	Date	Set Number	Local Time	State	Latitude	Longitude
3	1	8/18	1	1309	WA	48° 12.4332	124° 43.8623
3	2	8/20	1	1141	WA	47° 47.2434	124° 33.5982
3	3	8/21	1	955	WA	47° 30.7043	124° 37.1607
3	4	8/21	2	1612	WA	47° 19.6771	124° 33.3675
3	5	8/21	3	2009	WA	47° 15.1003	124° 30.5491
3	6	8/22	1	854	WA	47° 12.7456	124° 15.7547

3	7	8/23	1	932	WA	46° 56.8328	124° 13.2900
3	8	8/23	2	1127	WA	46° 55.1554	124° 24.5996
3	9	8/23	3	1529	WA	46° 50.0877	124° 21.8672
3	10	8/23	4	1642	WA	46° 48.7452	124° 21.4739
3	11	8/24	1	1030	WA	46° 35.7277	124° 7.9805
3	12	8/25	1	859	WA	46° 22.0610	124° 6.5993
3	13	8/25	2	123	WA	46° 20.4801	124° 11.0302
3	14	8/25	3	1239	WA	46° 17.7290	124° 7.6377
3	15	8/25	4	1451	WA	46° 17.7503	124° 9.0275
3	16	8/25	5	1549	WA	46° 19.2482	124° 7.4475
3	17	8/25	6	1652	WA	46° 20.1334	124° 7.4564
3	18	8/25	7	1735	WA	46° 21.0339	124° 6.5672
3	19	8/25	8	1902	WA	46° 27.1701	124° 7.1577
3	20	8/26	1	932	WA	46° 57.3645	124° 22.4833
3	21	8/26	2	1034	WA	46° 58.5336	124° 25.6360
3	22	8/26	3	1115	WA	46° 59.2684	124° 25.5925
3	23	8/26	4	1154	WA	46° 59.7630	124° 25.6528
3	24	8/26	5	1304	WA	47° 0.2760	124° 25.5717
3	25	8/26	6	1342	WA	47° 0.2537	124° 25.3228

Table 5. Species composition of sampled sets, weight (g) and count, all sets combined, ranked by weight (g), Part 2.

Species	Count	Weight (g)
Jack Mackerel	284	232253.0
Lionsmane Jelly	255	226977.5
Water Jellies	2267	102678.5
Pacific Herring	2034	58116.5

Pacific Sardine	167	46081.5
Unidentified Juvenile Smelt	3690	4912.5
Fried Egg Jelly	1	2341.0
Pacific Tomcod	101	1902.5
Unidentified Jellyfish parts		1799.5
Whitebait Smelt	294	1028.5
American Shad	15	927.0
Pacific Saury	54	810.5
Surf Smelt	13	369.0
Salp	40	293.0
Chinook Salmon	8	252.5
Northern Anchovy	5	155.0
Dungeness Crab	1	69.0
Unidentified Snailfish	2	18.5
Pacific Sanddab	1	18.0
Unidentified Gadid	1	1.5
Market Squid	1	1.0
Unidentified Larvae	1	0.5

Figure 1. Length to weight of sampled Pacific sardine, n= 50, from 10 miles offshore Taholah, WA.