Pacific Spiny Dogfish (*Squalus suckleyi*) Longline Survey in the Strait of Georgia, October 2 – 13, 2014

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V9T 6N7

2022

Canadian Manuscript Report of Fisheries and Aquatic Sciences 3246

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PACIFIC SPINY DOGFISH (*SQUALUS SUCKLEYI*) LONGLINE SURVEY IN THE STRAIT OF GEORGIA, OCTOBER 2 – 13, 2014

by

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Cat. No. Fs97-4/3246E-PDF ISBN 978-0-660-44237-2 ISSN 1488-5387

Correct citation for this publication:

Cornthwaite, A.M., King, J.R., Bresch, M.J., and Granum, L.J. 2022. Pacific Spiny Dogfish (*Squalus suckleyi*) Longline Survey in the Strait of Georgia, October 2-13, 2014. Can. Manuscr. Rep. Fish. Aquat. Sci. 3246: v + 19 p.

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A longline survey for Pacific Spiny Dogfish (*Squalus suckleyi*) was conducted in the Strait of Georgia aboard the CCGS *Neocaligus* from October 2-13, 2014. A total of 46 longline sets were completed at 12 index sites, within four depth strata where possible. A total of 7,009 Pacific Spiny Dogfish were caught, dominating the catch and accounting for over 97% of the total catch. A total of 6,946 Pacific Spiny Dogfish were biologically sampled. The Pacific Spiny Dogfish catch was predominately male (63%). Most male Pacific Spiny Dogfish were in the range of 60 to 85 cm in total length, with a minimum size of 42 cm and maximum size of 93 cm. Most female Pacific Spiny Dogfish were in the range of 55 to 75 cm, with a minimum size of 46 cm and maximum size of 116 cm. An additional 19 fish species were caught on the survey and measured for length.

RÉSUMÉ

Cornthwaite, A.M., King, J.R., Bresch, M.J., and Granum, L.J. 2022. Pacific Spiny Dogfish (*Squalus suckleyi*) Longline Survey in the Strait of Georgia, October 2-13, 2014. Can. Manuscr. Rep. Fish. Aquat. Sci. 3246: v + 19 p.

Un relevé à la palangre de l'aiguillat commun du Pacifique (*Squalus suckleyi*) a été effectué dans le détroit de Georgia à bord du NGCC *Neocaligus* du 2 au 13 octobre 2014. Au total, 46 poses de palangres ont été effectuées à 12 sites index, dans quatre strates de profondeur lorsque cela était possible. Au total, 7,009 aiguillats communs du Pacifique ont été capturés, et cette espèce a dominé les prises, représentant plus de 97% des prises totales. Au total, 6,946 aiguillats communs du Pacifique ont été échantillonnés biologiquement. Les prises d'aiguillat commun du Pacifique étaient dominées par les mâles (63 %). La plupart des aiguillats communs mâles mesuraient entre 60 et 85 cm de longueur totale, avec une taille minimale de 42 cm et une taille maximale de 93 cm. La plupart des femelles d'aiguillat commun mesuraient entre 55 et 75 cm, avec une taille minimale de 46 cm et une taille maximale de 116 cm. Dix-neuf autres espèces de poissons ont été capturées lors de l'enquête et leur longueur a été mesurée.

1 INTRODUCTION

Pacific Spiny Dogfish (*Squalus suckleyi*) are distributed throughout the North Pacific Ocean, from Baja California to the Bering Sea. Pacific Spiny Dogfish are present in all coastal waters of British Columbia, including the Strait of Georgia. Tagging studies have shown that Pacific Spiny Dogfish in the Strait of Georgia should be considered a discrete stock from offshore Pacific Spiny Dogfish (McFarlane and King 2002).

From the late 1800s to the mid-1950s, Pacific Spiny Dogfish were an important component of Canada's commercial fishery on the British Columbia coast (King et al. 2017). In the late 1970's, a resurgence of interest in the fishery led to increases in catch, particularly in the Strait of Georgia, prompting the initiation of an assessment program for Pacific Spiny Dogfish. At the start of the program, two longline surveys were conducted in the Strait of Georgia in 1986 and 1989 (McFarlane et al. 2005a). These surveys were used to develop survey methodology and to provide baseline biological data and catch rates for fishing sites throughout the Strait of Georgia.

In the early 2000s, concerns regarding the exploitation of elasmobranch species highlighted the need to resume surveying Pacific Spiny Dogfish in the Strait of Georgia. During the mid-1990s, the standard gear used in the commercial longline fishery for Pacific Spiny Dogfish changed from J-hooks to Circle-hooks (King and McFarlane 2009). Therefore, a longline calibration survey was conducted in 2004 to assess potential changes in commercial catch rates and to calibrate catch rates from previous surveys (J-hooks) to future surveys (circle-hooks) (McFarlane et al. 2005b). Three longline assessment surveys for Pacific Spiny Dogfish in the Strait of Georgia subsequently occurred using circle hooks in 2005 (McFarlane et al. 2006), 2008 (King and McFarlane 2009), and 2011 (King et al. 2012), using methodology and fishing sites consistent with previous surveys. This report documents the 2014 Strait of Georgia longline assessment survey for Pacific Spiny Dogfish.

2 METHODS

2.1 Vessel and fishing gear

The fishing vessel for the survey was the Canadian Coast Guard Ship (CCGS) *Neocaligus*, an 18.8 m fisheries research vessel.

Fishing was conducted using demersal snap-type longlines. The groundline (Figure 1A) was 3/8 inch leaded polypropylene sectioned into 900 foot lengths (half skates) joined with "C" links. Three groundline half skates were connected from a surface buoy to approximately 75 lbs of chain anchor, followed by an 1800 foot groundline section on the substrate, with 300 hooks spaced approximately 6 feet apart, followed by a second anchor and buoy at the end. In addition, 5 lb lead sash weights were placed intermittently along the groundline section that was fishing.

Hook setup (Figure 1B) consisted of no. 72 stainless halibut snaps attached to gangions made from 18 inches of 250 lb test perlon crimped to approximately 15 inches length, attached with 4/0 swivels to size 14/0 Mustad circle hooks. Each hook was baited with a third of an approximately 6 inch herring.

2.2 Index sites and depth strata

The original (1986-1989) index sites were selected to be representative of commercial fishing in the Strait of Georgia. Subsequent longline surveys have fished a subset of the 14 original sites as vessel logistics and time has allowed. In 2014, fishing occurred at 12 of the original index sites: Active Pass, Cape Lazo, Cape Mudge, Epsom Point, French Creek, Grants Reef, Porlier Pass, Sinclair Bank, Sturgeon Bank, Hornby Island, Halibut Bank and Entrance Island (Figure 2). With the exception of Hornby Island, Halibut Bank and Entrance Island, these sites were fished in all previous longline surveys.

At each site, gear was set within four depth strata (where available):

- 56 to 110 m
- 111 to 165 m
- 166 to 220 m
- Greater than 220 m

2.3 Fishing operations

Longline sets were conducted at each index site in each available depth stratum. For each site, the depth strata were fished in random order to minimize a time of day bias. In order to minimize bias in catch rates due to differences in effective fishing time, all sets were fished for approximately two hours, based on the time between the last anchor entering the water during deployment and the first anchor exiting the water during retrieval.

2.4 Catch processing

For each set, fish and invertebrates other than those lost at the surface were removed from the hooks, identified to the lowest taxonomic group possible, and counted. All catch lost at the surface was recorded and included in the total catch numbers. The total catch of intact individuals of each species was weighed to the nearest 0.02 kg using a large capacity, motion-compensating electronic balance (Marel Model M1100, 30/60 kg capacity). Individuals which had been depredated on the line (e.g., “head only” catches) were not weighed. For catches less than 0.1 kg, “trace” was recorded instead of a weight.

Catch per unit effort (CPUE) for each set was calculated as the number in pieces (pcs) of Pacific Spiny Dogfish caught per 1000 hooks. The total CPUE was determined by depth stratum and index site for (1) all sets successfully fished, (2) sets successfully fished at index sites with all depth strata available, and (3) sets successfully fished in depth strata available at all index sites.

2.5 Biological sampling

Where possible, catch was released alive. Length and external sex were recorded from all captured Pacific Spiny Dogfish. Length was recorded for all other captured fishes, with internal or external sex recorded where possible. Body weights were recorded from Lingcod (*Ophiodon elongatus*), Pacific Cod (*Gadus microcephalus*), rockfishes (*Sebastes* sp.) and other sharks, skates and rays (chondrichthyians). Reproductive maturity and age structures were also collected from Pacific Cod and rockfishes. Genetic samples were collected from Canary Rockfish (*S. pinniger*), Copper Rockfish (*S. caurinus*), Quillback Rockfish (*S. maliger*), Yelloweye Rockfish (*S. ruberrimus*), and Bluntnose Sixgill Shark (*Hexanchus griseus*).

Body lengths were measured in mm to the nearest ½ cm using Scantrol electronic measuring boards. Total Length (http://vocab.nerc.ac.uk/collection/P01/current/TL01XX01) was measured for sharks (including Pacific Spiny Dogfish), skates, sculpins, and some flatfishes. Fork Length (http://vocab.nerc.ac.uk/collection/P01/current/FL01XX01/) was measured for rockfishes, Pacific Cod, Lingcod, and Pacific Halibut. Second Dorsal Length (http://vocab.nerc.ac.uk/collection/P01/current/SDL1XX01/) was measured for Spotted Ratfish (*Hydrolagus colliei*).

Body weights (http://vocab.nerc.ac.uk/collection/P01/current/SPWGXX01/) were measured in grams using a motion-compensating electronic benchtop scale (Marel Model M1100; capacity 6/15 kg; resolution 2/5g).

Sex was determined externally for chondrichthyans, Lingcod, and flatfishes. Male chondrichthyans were identified by the presence of claspers associated with the pelvic fin, while male lingcod were similarly identified by the presence of a papilla behind the anal vent. Female flatfishes were identified by their ovaries being externally visible through the skin.

Sex was determined internally for rockfishes and Pacific Cod by examining their gonads.

3 RESULTS

3.1 Fishing

From October 2 – 13, 2014, 13,800 hooks were fished on 46 longline sets at the 12 index sites (Table 1, Appendix A). Four sets were completed at each site with one set per depth stratum, except for Hornby Island and Entrance Island where only three sets were completed. At Hornby Island there were no fishing grounds in the deepest stratum (>220 metres), and at Entrance Island suitable fishing grounds in the deepest stratum were unfishable due to proximity to ferry traffic. The mean fishing time for each set (based on the time between the last anchor entering the water during deployment and the first anchor exiting the water during retrieval) was 120 minutes (Table 1).

3.2 Catch

A total of 7,009 Pacific Spiny Dogfish were caught, of which 21 were partially depredated ("head only") and 42 were lost at the surface (Table 1). Pacific Spiny Dogfish were caught on 45 of the 46 sets and were the dominant species caught, accounting for over 97% of the total catch (Table 2, Appendix B).

An additional 151 fishes representing 19 species and 10 invertebrates representing 4 taxa were caught on the survey (Table 2, Appendix B): the most numerous species were Quillback Rockfish (n=63); followed by Yelloweye Rockfish (n=31) and Longnose Skate (n=16).

Catch Per Unit Effort

Pacific Spiny Dogfish CPUE for the whole survey was 508 pieces/1000 hooks; male CPUE was 319 pieces /1000 hooks and female CPUE was 184 pieces/1000 hooks (Table 3).

CPUE by index site was greatest at Epsom Point, Cape Lazo, Halibut Bank, and Active Pass and lowest at French Creek regardless of whether the deepest stratum (>220m) was included (Table 3).

CPUE by depth stratum showed the same trend regardless of whether sites without the deepest stratum (>220m) were included (Table 4): CPUE increased with increasing depth and was highest in the deepest stratum (>220 m, 659 pieces/1000 hooks). Female CPUE was highest in

the deepest stratum (> 220 m; 290 pieces/1000 hooks, Table 4), and male CPUE was highest in the 166 – 220 m depth stratum (401 pieces/1000 hooks, Table 4).

3.3 Biological Sampling

Length and sex were recorded for 6,946 Pacific Spiny Dogfish (Table 2). Detailed Pacific Spiny Dogfish length frequency data are presented in Table 5, Table 6, Figure 3, and Figure 4. Most male Pacific Spiny Dogfish were in the range of 60 to 85 cm (Table 5); the smallest male was 42 cm and the largest was 94 cm (Table 5). Most female Pacific Spiny Dogfish were in the range of 55 to 75 cm (Table 5); the smallest female was 46 cm and the largest was 116 cm (Table 4). Larger males and females were encountered in the two shallowest depth strata (Table 5, Figure 4). Across fishing sites, the modal size for males was approximately 75 cm, with the exception of Epsom Point, Halibut Bank, Hornby Island and Sinclair Bank where the males were smaller (Table 4, Figure 3). These four sites were the only locations where large females were caught.

The catch of Pacific Spiny Dogfish was dominated by males (Table 1, Figure 5, Figure 6). This was consistent across depth strata (Figure 6) and fishing sites, with the exception of Epsom Point, Halibut Bank and Sinclair Bank where more females were caught (Table 1, Figure 5).

Biological data were recorded for 17 of the other fish species caught, including lengths, weights, and maturities and collection of otoliths and genetic samples depending on species (Table 2).

4 DISCUSSION

This is the sixth longline survey conducted in the Strait of Georgia designed to monitor the status, and collect biological samples of Pacific Spiny Dogfish. A total of 46 longline sets were completed at 12 index sites, within four depth strata where possible. While an additional 19 fish species were caught on the survey, Pacific Spiny Dogfish dominated the catch, accounting for over 97% of the total catch. The Pacific Spiny Dogfish catch was dominated by males, but ratio of males: females declined with increasing depth. The information from these surveys will provide the basis for examining current and future spiny dogfish dynamics and abundance trends in the Strait of Georgia.

5 ACKNOWLEDGEMENTS

We would like to thank Captain Jordan Roche and the crew of the *CCGS Neocaligus*, as well as DFO staff Brian Krishka and Dr. Jean-Baptiste Lecomte, for their assistance in completing this survey. Daniel Williams and Malcolm Wyeth provided Figures 1 and 2, respectively. Jonathan Martin, Daniel Williams, and John Holmes reviewed the document and provided helpful feedback.

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Table 1. Number of sets fished, mean fishing time (duration in minutes), number of hooks, total catch of Pacific Spiny Dogfish, number of dogfish lost at the surface and partially depredated, number of intact dogfish sampled, and proportion of females for each index site during the 2014 Pacific Spiny Dogfish Longline Survey.

Index Site	No. sets	Mean duration	No. Hooks	Total catch	Lost at surface	Depredated	Sampled	Prop. Female
Active Pass	4	120.8	1200	744	6	3	735	0.2
Cape Lazo	4	118.8	1200	781	6	2	773	0.1
Cape Mudge	4	120.0	1200	612	3	0	609	0.3
Entrance Island	3	119.7	900	251	2	0	249	0.1
Epsom Point	4	118.3	1200	789	3	5	781	0.8
French Creek	4	119.5	1200	451	3	2	446	0.4
Grant Reefs	4	120.3	1200	705	2	4	699	0.4
Halibut Bank	4	119.3	1200	756	9	0	747	0.6
Hornby Island	3	122.7	900	366	2	0	364	0.1
Porlier Pass	4	119.5	1200	498	1	5	492	0.1
Sinclair Bank	4	119.3	1200	544	1	0	543	0.9
Sturgeon Bank	4	120.8	1200	512	4	0	508	0.0
Total	46	119.8	13800	7009	42	21	6946	0.4

Table 2. Summary of species captured and sampled during the 2014 Pacific Spiny Dogfish Longline Survey including total sexes, weights, maturities, age structures, and genetic samples.

Species Captured	Number of sets	Total catch	Lengths	Sex	Weights	Maturities	A stru
Pacific Spiny Dogfish	45	7009	6946	6945	0	0	
Big Skate	1	1	1	1	1	0	
Bluntnose Sixgill Shark	2	2	2	1	1	0	
Brown Cat Shark	1	2					
Longnose Skate	9	16	16	15	12	0	
Spotted Ratfish	2	2	1	1	0	0	
Lingcod	2	6	5	5	5	0	
Pacific Cod	4	4	1	1	1	1	
Pacific Hake	2	2					
Canary Rockfish	1	2	2	2	2	2	
Copper Rockfish	1	1	1	1	1	1	
Greenstriped Rockfish	2	4	4	0	0	0	
Quillback Rockfish	9	63	61	61	61	61	
Yelloweye Rockfish	11	31	30	29	30	29	
Yellowtail Rockfish	1	2	2	0	0	0	
Pacific Halibut	1	1	1	1	0	0	
Pacific Sanddab	3	4	2	0	0	0	
Petrale Sole	2	2	2	1	0	0	
Southern Rock Sole	1	1	1	0	0	0	
Pacific Staghorn Sculpin	1	5	5	0	0	0	
Brown Box Crab	1	1					
Glass Sponges	2	5					
Octopus	1	1					
Sunflower Starfish	2	3					
Total	46	7170	7083	7064	114	94	

Table 3. Pacific Spiny Dogfish catch per unit of effort (CPUE: fish pieces per 1000 hooks) by index site for males and females for: (1) all sets and depth strata fished and; (2) excluding sets fished in the deepest stratum (> 220 m) which was not available at Entrance Island and Hornby Island index sites.

Index Site	CPUE: All Depth Strata				CPUE: Excluding Deepest Stratum			
	No. Sets	Male	Female	Total	No. Sets	Male	Female	Total
Active Pass	4	508	105	620	3	517	81	607
Cape Lazo	4	553	92	651	3	580	67	653
Cape Mudge	4	351	157	510	3	349	112	462
Entrance Island	3	247	30	279	3	247	30	279
Epsom Point	4	130	520	658	3	121	489	618
French Creek	4	231	141	376	3	148	108	257
Grant Reefs	4	359	223	588	3	341	206	550
Halibut Bank	4	236	387	630	3	222	351	581
Hornby Island	3	374	30	407	3	374	30	407
Porlier Pass	4	375	35	415	3	362	29	396
Sinclair Bank	4	53	399	453	3	62	342	404
Sturgeon Bank	4	413	10	427	3	370	7	377
Total	46	319	184	508	36	308	154	466

Table 4. Pacific Spiny Dogfish catch per unit of effort (CPUE: fish pieces per 1000 hooks) by depth stratum for males and females for: (1) all sets and index sites fished and; (2) excluding sets at Entrance Island and Hornby Island index sites where the deepest stratum was not available.

Depth Stratum	CPUE: All Index Sites				CPUE: Exclude Entrance/Hornby			
	No. Sets	Male	Female	Total	No. Sets	Male	Female	Total
56 – 110 m	12	195.0	91.1	289.7	10	231.0	105.7	341.0
111 – 165 m	12	319.2	145.6	468.3	10	302.3	169.3	475.0
166 – 220 m	12	409.2	226.1	639.4	10	388.3	262.3	655.3
> 220 m	10	361.7	290.0	659.3	10	361.7	290.0	659.3
Total	46	319.5	183.8	507.9	40	320.8	206.8	532.7

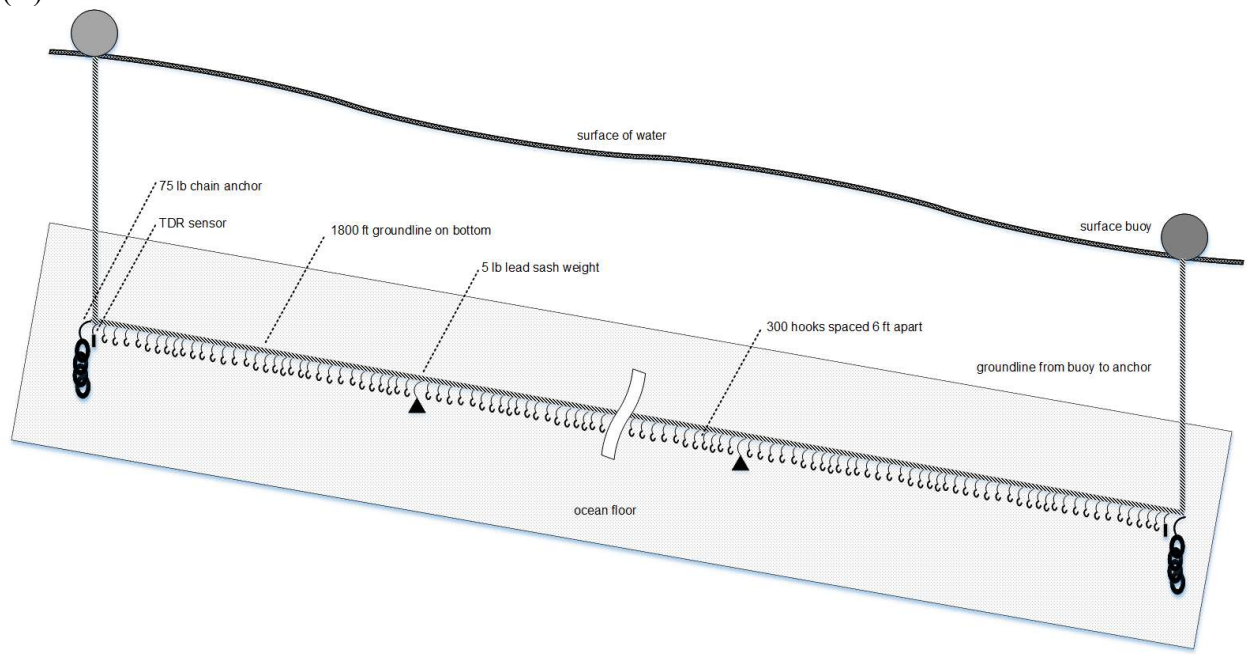
Table 5. Summary of male and female Pacific Spiny Dogfish total lengths (mm) by index site.

Index Site	Male lengths (mm)				Female lengths (mm)			
	N	Min	Max	Mean	N	Min	Max	Mean
Active Pass	609	420	870	700	126	520	770	628
Cape Lazo	663	470	880	732	110	490	760	620
Cape Mudge	421	470	860	733	188	490	1100	641
Entrance Island	222	510	890	735	27	590	1140	868
Epsom Point	156	550	910	710	624	480	990	707
French Creek	277	480	900	654	169	510	1040	686
Grant Reefs	431	500	880	689	268	510	1160	646
Halibut Bank	283	450	880	700	464	470	1050	683
Hornby Island	337	610	870	755	27	550	1040	664
Porlier Pass	450	450	930	710	42	460	1100	642
Sinclair Bank	609	420	870	700	479	520	1000	713
Sturgeon Bank	663	470	880	732	12	570	700	646
Total	4409	420	940	720	2536	460	1160	683

Table 6. Summary of male and female Pacific Spiny Dogfish total lengths (mm) by depth stratum.

Depth Stratum	Male lengths (mm)				Female lengths (mm)			
	N	Min	Max	Mean	N	Min	Max	Mean
56 – 110 m	702	500	880	727	328	480	1160	740
111 – 165 m	1149	470	940	738	524	470	1140	699
166 – 220 m	1473	420	900	714	814	490	1030	661
> 220 m	1085	460	900	704	870	460	1050	673
Total	4409	420	940	720	2536	460	1160	683

(A)



(B)

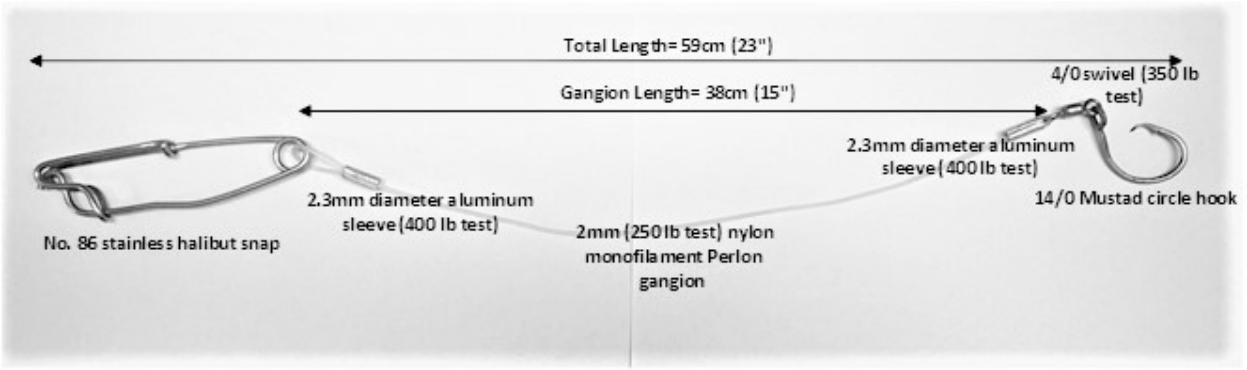


Figure 1. Gear schematic for the 2014 Pacific Spiny Dogfish longline survey in the Strait of Georgia illustrating the longline (A) and hook setup (B).

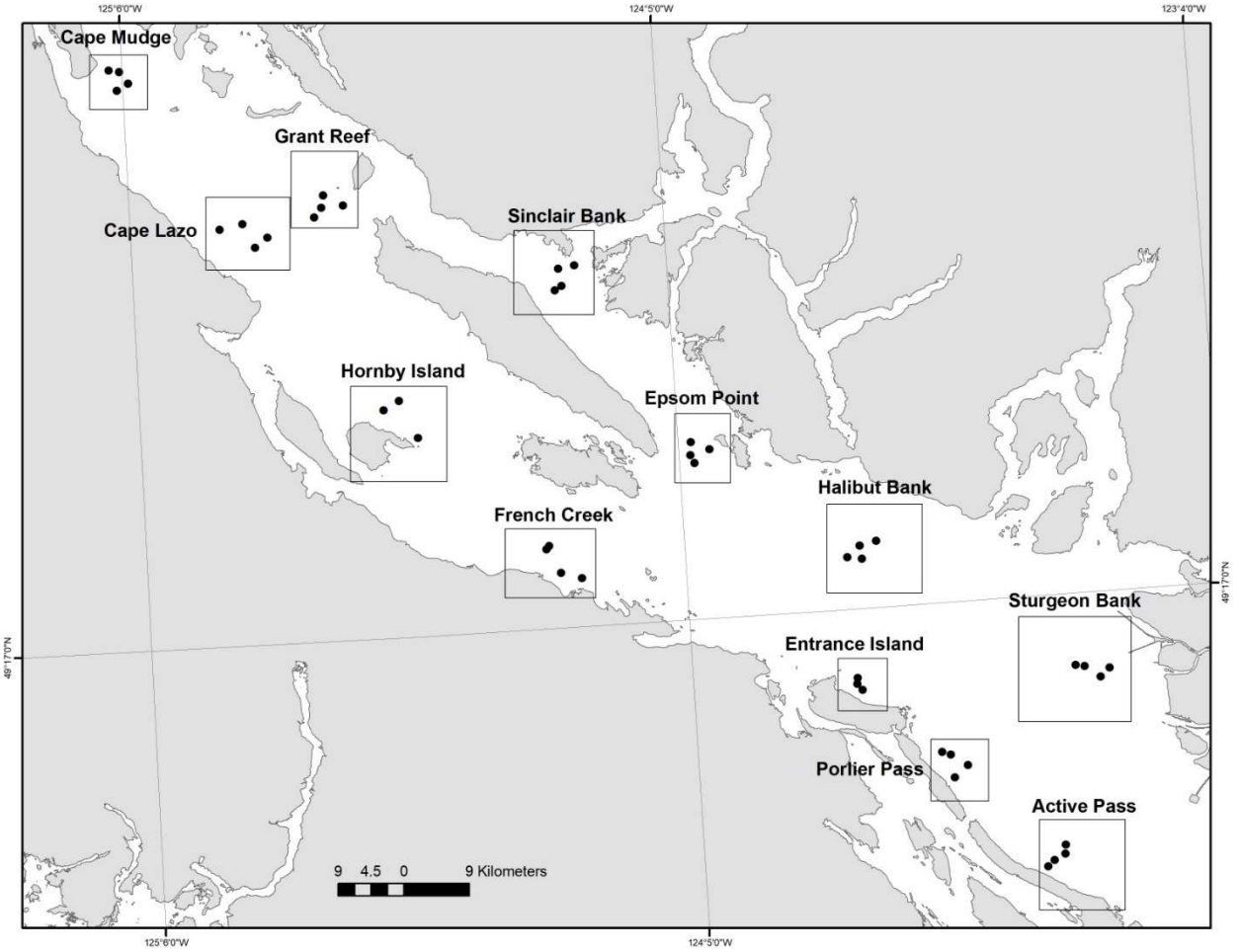


Figure 2. Fishing locations by index site for the 2014 Pacific Spiny Dogfish longline survey in the Strait of Georgia. For detailed positional information see Appendix A.

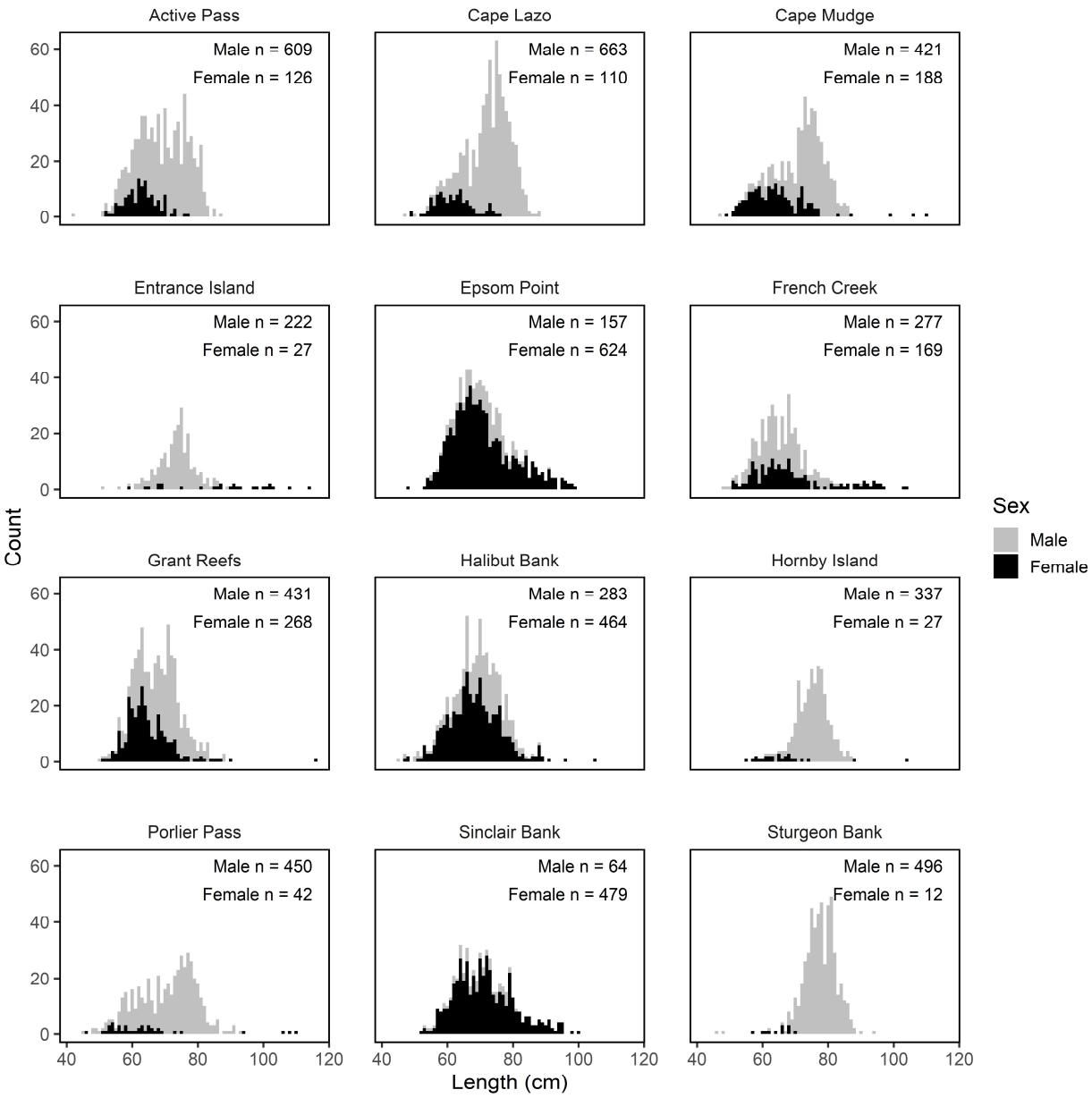


Figure 3. Pacific Spiny Dogfish male and female length frequency by index site.

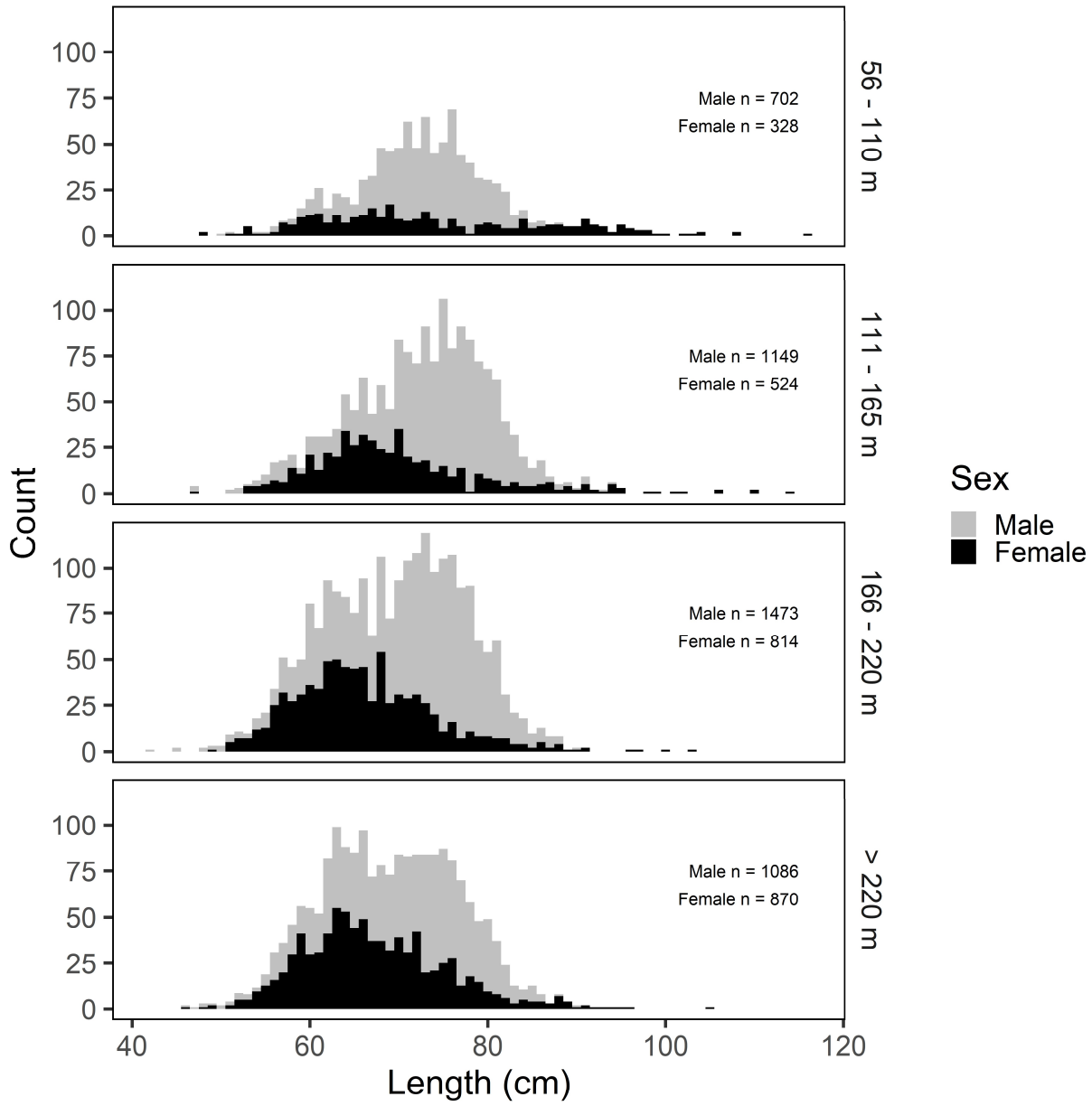


Figure 4. Pacific Spiny Dogfish length frequency by depth stratum: 56–110 m; 111-165 m; 166-220 m; >220 m.

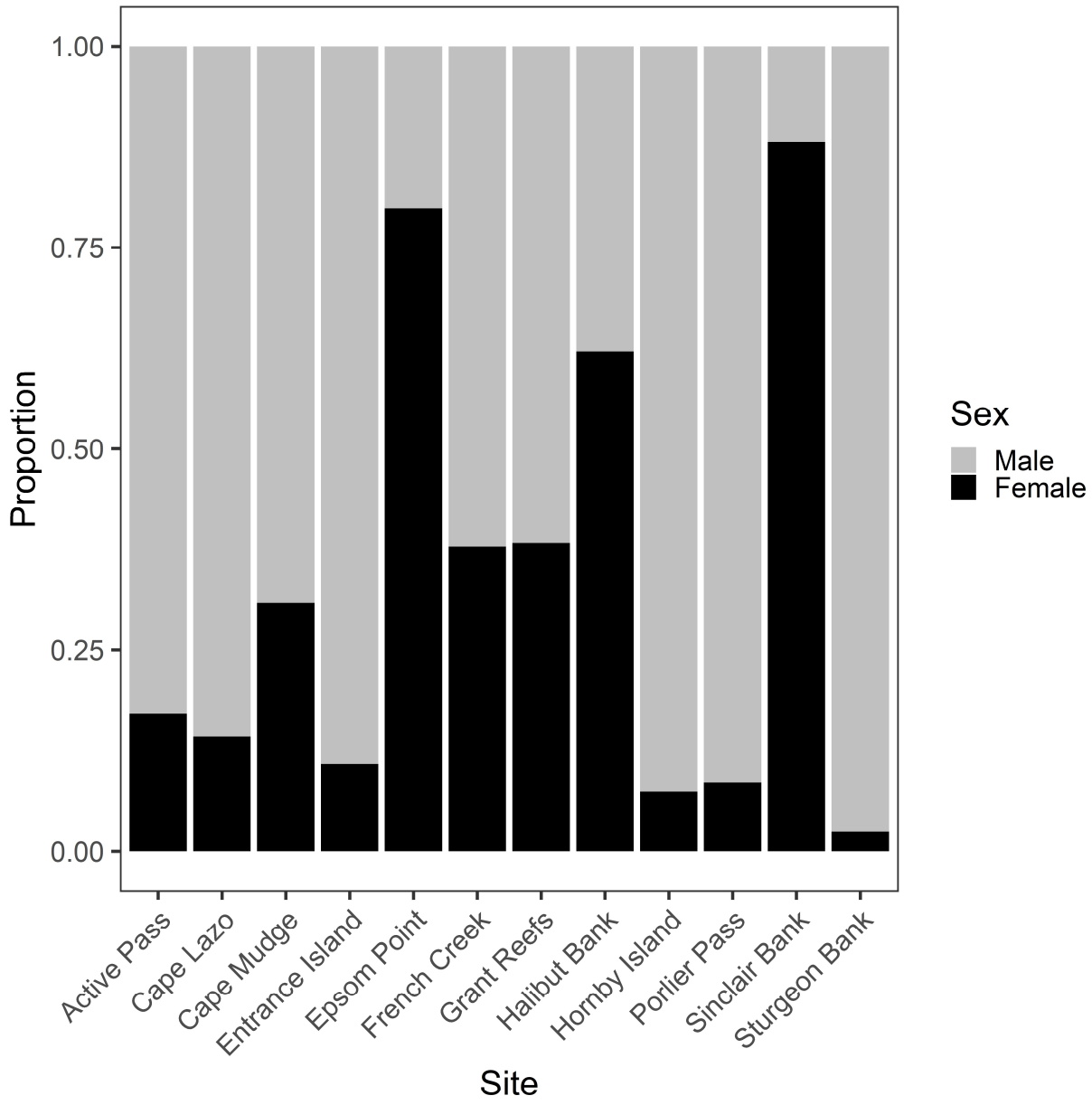


Figure 5. Sex ratio of Pacific Spiny Dogfish catch by index site.

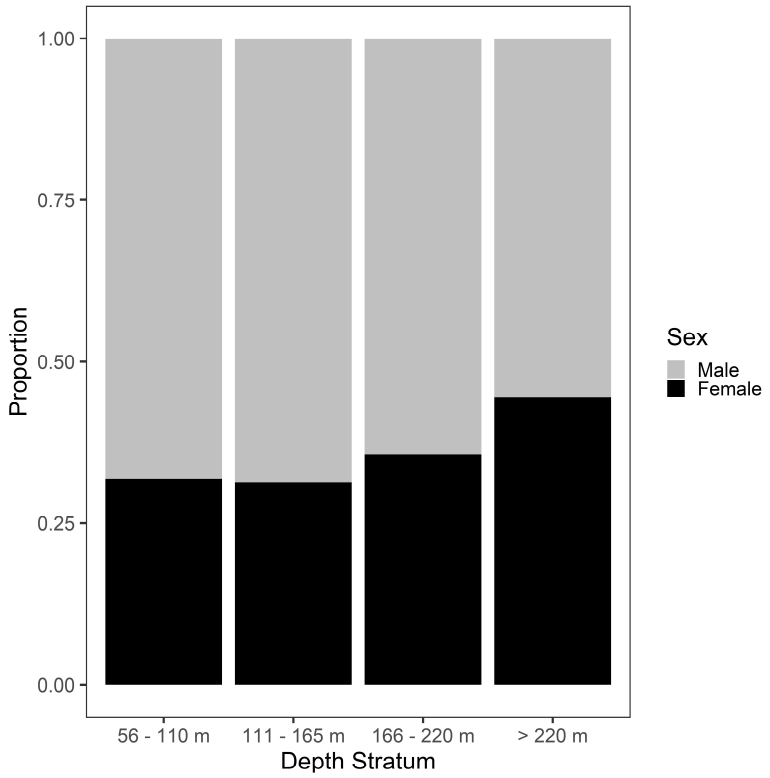


Figure 6. Sex ratio of Pacific Spiny Dogfish catch by depth stratum: 56–110 m; 111-165 m; 166-220 m; >220 m.

Appendix A: Bridge Log Data

Table A 1. Bridge log data from the October 2-13, 2014 Pacific Spiny Dogfish longline survey aboard the CCGS *Neocaligus*. Latitude and longitude in decimal degrees; effective fishing time (duration) in minutes; distance in kilometers; all depths in meters.

Set	Date	Start Time	Index Site	Depth Stratum	Hooks Retrieved	Start Latitude	Start Longitude	End Latitude	End Longitude	Start Depth	End Depth	Duration	Usable
1	02-Oct	07:51	Hornby Island	56 - 110 m	300	49.5270	124.5712	49.5299	124.5779	71	80	123	Yes
2	02-Oct	09:17	Hornby Island	166 - 220 m	300	49.5738	124.6029	49.5772	124.6097	174	173	119	Yes
3	02-Oct	12:45	Hornby Island	111 - 165 m	294	49.5643	124.6327	49.5663	124.6400	144	139	126	Yes
4	03-Oct	08:24	Cape Lazo	111 - 165 m	300	49.7718	124.8595	49.7775	124.8660	137	143	116	Yes
5	03-Oct	09:43	Cape Lazo	> 220 m	300	49.7837	124.8364	49.7887	124.8410	236	256	120	Yes
6	03-Oct	12:42	Cape Lazo	166 - 220 m	300	49.8024	124.881	49.8067	124.8879	178	179	119	Yes
7	03-Oct	13:45	Cape Lazo	56 - 110 m	300	49.7970	124.9264	49.8009	124.9314	91	96	120	Yes
8	04-Oct	08:13	Cape Mudge	56 - 110 m	300	49.9769	125.1152	49.9776	125.1063	84	81	119	Yes
9	04-Oct	09:12	Cape Mudge	> 220 m	300	49.9818	125.0867	49.9888	125.0900	236	239	119	Yes
10	04-Oct	12:36	Cape Mudge	166 - 220 m	300	49.9973	125.1011	50.0025	125.1079	186	193	120	Yes
11	04-Oct	13:28	Cape Mudge	111 - 165 m	300	49.9998	125.1218	50.0056	125.1266	128	137	122	Yes
12	05-Oct	08:19	Grant Reefs	166 - 220 m	300	49.8223	124.7341	49.8160	124.7313	178	182	120	Yes
13	05-Oct	09:15	Grant Reefs	56 - 110 m	300	49.8200	124.6863	49.8204	124.6955	--	79	120	Yes
14	05-Oct	12:36	Grant Reefs	111 - 165 m	293	49.8315	124.7263	49.8373	124.7294	147	160	120	Yes
15	05-Oct	13:24	Grant Reefs	> 220 m	300	49.8097	124.7519	49.8061	124.7434	235	231	121	Yes
16	06-Oct	07:42	Sinclair Bank	> 220 m	298	49.7272	124.2598	49.7323	124.2569	228	222	120	Yes
17	06-Oct	08:31	Sinclair Bank	111 - 165 m	300	49.7250	124.2847	49.7281	124.2937	161	143	118	Yes
18	06-Oct	12:18	Sinclair Bank	56 - 110 m	300	49.7085	124.2862	49.7017	124.2832	95	83	120	Yes
19	06-Oct	13:07	Sinclair Bank	166 - 220 m	300	49.7034	124.3005	49.6975	124.2957	194	175	119	Yes
20	07-Oct	07:50	Epsom Point	111 - 165 m	287	49.5066	124.0616	49.4988	124.0558	159	154	119	Yes
21	07-Oct	08:35	Epsom Point	166 - 220 m	298	49.4900	124.0655	49.4830	124.0570	181	187	117	Yes
22	07-Oct	11:28	Epsom Point	> 220 m	300	49.4753	124.0516	49.4777	124.0571	234	241	119	Yes
23	07-Oct	12:28	Epsom Point	56 - 110 m	300	49.4902	124.0213	49.4948	124.0275	100	71	118	Yes
24	08-Oct	09:15	Porlier Pass	111 - 165 m	300	49.1031	123.6267	49.0969	123.6233	138	155	119	Yes
25	08-Oct	10:02	Porlier Pass	166 - 220 m	298	49.0934	123.6096	49.0985	123.6094	201	202	120	Yes
26	08-Oct	13:32	Porlier Pass	56 - 110 m	300	49.0699	123.6073	49.0652	123.6030	76	85	120	Yes

Set	Date	Start Time	Index Site	Depth Stratum	Hooks Retrieved	Start Latitude	Start Longitude	End Latitude	End Longitude	Start Depth	End Depth	Duration	Usable
27	08-Oct	14:26	Porlier Pass	> 220 m	300	49.0843	123.5794	49.0788	123.5787	228	222	119	Yes
28	09-Oct	08:04	Active Pass	166 - 220 m	300	48.9616	123.4056	48.9662	123.4112	196	198	123	Yes
29	09-Oct	08:51	Active Pass	> 220 m	297	48.9736	123.4037	48.9765	123.4088	230	231	121	Yes
30	09-Oct	12:15	Active Pass	111 - 165 m	300	48.9557	123.4272	48.959	123.4324	148	150	119	Yes
31	09-Oct	13:04	Active Pass	56 - 110 m	300	48.9471	123.4413	48.9533	123.4424	80	97	120	Yes
32	10-Oct	08:45	Sturgeon Bank	166 - 220 m	300	49.1907	123.3464	49.1956	123.3466	190	193	119	Yes
33	10-Oct	09:35	Sturgeon Bank	> 220 m	300	49.1924	123.3621	49.1980	123.3638	221	220	124	Yes
34	10-Oct	13:11	Sturgeon Bank	111 - 165 m	300	49.1814	123.3165	49.1760	123.3198	130	133	120	Yes
35	10-Oct	14:15	Sturgeon Bank	56 - 110 m	300	49.1919	123.2989	49.1863	123.3009	67	79	120	Yes
36	11-Oct	08:36	Halibut Bank	166 - 220 m	299	49.3671	123.7254	49.3638	123.7174	183	197	118	Yes
37	11-Oct	09:27	Halibut Bank	111 - 165 m	300	49.3590	123.7492	49.3635	123.7572	135	136	120	Yes
38	11-Oct	12:47	Halibut Bank	56 - 110 m	300	49.3427	123.7475	49.3473	123.7537	79	74	119	Yes
39	11-Oct	13:36	Halibut Bank	> 220 m	300	49.3457	123.7744	49.3500	123.7819	244	249	120	Yes
40	12-Oct	07:45	French Creek	> 220 m	300	49.3843	124.3340	49.3877	124.3434	237	250	120	Yes
41	12-Oct	08:33	French Creek	166 - 220 m	300	49.3803	124.3391	49.3835	124.3485	179	190	120	Yes
42	12-Oct	12:05	French Creek	56 - 110 m	300	49.3530	124.3236	49.3503	124.3150	65	72	119	Yes
43	12-Oct	12:56	French Creek	111 - 165 m	300	49.3417	124.2765	49.3455	124.2841	122	139	119	Yes
44	13-Oct	08:13	Entrance Island	111 - 165 m	300	49.1915	123.7796	49.1907	123.7713	139	155	120	Yes
45	13-Oct	09:00	Entrance Island	56 - 110 m	300	49.1841	123.7709	49.1825	123.7613	67	72	119	Yes
46	13-Oct	11:46	Entrance Island	166 - 220 m	300	49.1966	123.7696	49.2007	123.7777	188	--	120	Yes

Appendix B: Catch Data

Table B 1. Catch (pieces) data from the October 2-13, 2014 Pacific Spiny Dogfish longline survey aboard the CCGS *Neocaligus*.

Set	Big Skate	Bluntnose Sixgill Shark	Brown Cat Shark	Longnose Skate	Pacific Spiny Dogfish	Spotted Ratfish	Lingcod	Pacific Cod	Pacific Hake	Canary Rockfish	Copper Rockfish	Greenstriped Rockfish	Quillback Rockfish	Yelloweye Rockfish	Yellowtail Rockfish	Pacific Halibut	Pacific Sanddab	Petrale Sole	Southern Rock Sole	Pacific Staghorn Sculpin	Brown Box Crab	Glass Sponges	Octopus	Sunflower Starfish	Total catch
1	0	0	0	1	7	1	0	1	0	2	0	0	14	5	0	0	0	0	0	0	0	0	0	0	31
2	0	0	0	0	174	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	175
3	0	0	0	1	185	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	187
4	0	0	0	0	186	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	186
5	0	0	0	0	193	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	193
6	0	0	0	1	216	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	217
7	0	0	0	0	186	0	0	0	0	0	0	0	6	1	0	0	0	0	0	0	0	1	0	2	196
8	0	0	0	2	129	0	0	0	0	0	0	0	6	2	0	0	0	0	0	0	0	0	0	0	139
9	0	0	0	0	196	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	196
10	0	0	0	2	208	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	210
11	0	0	0	0	79	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	80
12	0	0	0	0	187	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	187
13	0	0	0	0	142	0	0	0	0	0	0	0	17	6	0	0	0	0	0	0	0	0	1	0	166
14	0	0	0	0	166	0	0	0	0	0	0	2	1	2	0	0	0	0	0	0	0	0	0	0	171
15	0	0	0	0	210	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	210
16	0	0	2	0	180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	182
17	0	0	0	3	137	0	1	0	0	0	0	0	11	6	0	0	0	0	0	0	0	0	0	0	158
18	0	0	0	0	15	0	0	0	0	0	0	0	0	3	0	0	1	1	0	0	0	0	0	0	20
19	0	0	0	1	212	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	214
20	0	0	0	0	222	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	222
21	0	0	0	0	224	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	224
22	0	0	0	0	233	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	233

Set	Big Skate	Bluntnose Sixgill Shark	Brown Cat Shark	Longnose Skate	Pacific Spiny Dogfish	Spotted Ratfish	Lingcod	Pacific Cod	Pacific Hake	Canary Rockfish	Copper Rockfish	Greenstriped Rockfish	Quillback Rockfish	Yelloweye Rockfish	Yellowtail Rockfish	Pacific Halibut	Pacific Sanddab	Petrale Sole	Southern Rock Sole	Pacific Staghorn Sculpin	Brown Box Crab	Glass Sponges	Octopus	Sunflower Starfish	Total catch
23	0	0	0	0	110	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	113
24	0	0	0	0	163	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	163
25	0	1	0	0	185	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	186
26	0	0	0	0	8	0	5	0	0	0	0	0	5	2	2	0	0	0	0	0	0	4	0	0	26
27	0	0	0	0	142	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	142
28	0	0	0	0	163	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	163
29	0	0	0	0	198	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	199
30	0	0	0	0	155	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	155
31	0	0	0	0	228	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	228
32	0	1	0	0	189	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	190
33	0	0	0	0	173	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	173
34	1	0	0	0	150	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	152
35	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	5	0	0	0	0	7
36	0	0	0	0	186	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	186
37	0	0	0	0	151	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	153
38	0	0	0	0	186	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	187
39	0	0	0	0	233	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	233
40	0	0	0	0	220	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	220
41	0	0	0	0	196	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	196
42	0	0	0	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	21
43	0	0	0	0	16	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17
44	0	0	0	2	76	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	81
45	0	0	0	0	13	0	0	0	0	0	1	0	2	0	0	0	0	1	0	0	0	0	0	0	17
46	0	0	0	3	162	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	165