

Estimation of Bycatch with Sea Turtles, Seabirds, and Fish in the 2016 Hawaii Permitted Deep-Set Longline Fishery¹

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The attached Excel Workbook (pir.hll.bycat16.xlsx) includes bycatch estimates for the year 2016. The workbook includes a worksheet labeled 'key' that provides definitions of the column headings and the items being estimated.

McCracken (2017a) describes the sample design used to sample the deep-set fleet and point estimators used, and McCracken (2017b) describes the estimators of standard error for the estimated number of bycatch events.

References

McCracken, M. L.

2017a. Sampling the Hawaii Deep-set Longline Fishery and Point Estimators of Bycatch, Technical Report (in prep), PIFSC, NOAA, U.S. Department of Commerce.

McCracken, M. L.

2017b. Interval Estimation of Annual Bycatch in the Hawaii Deep-set Longline Fishery, Technical Report (in prep), PIFSC, NOAA, U.S. Department of Commerce

¹ PIFSC Data Report DR-17-015.
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Definitions		
	bycatch	The event that an animal is observed hooked or entangled in the gear (as bycatch)
	NA	Not available; see Note 2 for explanation
Column Key for deep-set and shallow-set sectors		
	column names	definition
	Species code	Species code in Longline Observer Data System (LODS).
	Landing year	Calendar year when the vessel returned to port after the fishing trip
	Observed Bycatch	Observed bycatch for the landing year (numbers of animals) on the observed trips .
	Point Estimate	Estimated total bycatch for the landing year.
	Standard Error	Standard error of the estimated total bycatch.
Notes		
	1	The total bycatch is the numbers of bycatch events. It is possible for an animal to be bycaught by the fishery more than once during a year. To assume the total bycatch represents the number of unique animals taken by the fishery during a year assumes an animal can only be taken by the fishery once during a year.
	2	On 27 August 2012, there was a change in the regulations of the Hawaii longline deep set fishery that prevents the collection of a random probability sample of trips in the fishery. The regulation imposed new limits on swordfish landed. The new limits are as follows: (1) With a NMFS observer onboard, there is no limit on the number of swordfish landed or possessed on a trip, regardless of the type of hook used. (2) With no NMFS observer onboard, the limit is 25 swordfish landed or possessed on a trip, if the vessel uses only circle hooks. (3) With no NMFS observer onboard, and if the vessel uses any hooks other than circle hooks, the limit is 10 swordfish landed or possessed on a trip. In essence, this regulation created three components of the deep-set fleet defined by the number of swordfish a trip can keep. The first component has no limit on swordfish kept and has 100% coverage. The second and third components have a limit on the number of swordfish kept that is determined by the type of hooks being used. These two components have no observer coverage. These regulations introduce the possibility of exclusion bias (bias introduced as a result of excluding part of the population from being sampled) in all take estimates. Because vessels with an observer onboard have no limit on the number of swordfish that can be landed and vessels without an observer do have a limit, take estimates for swordfish are not provided.

Cheloniidae-Hard shelled sea turtles				
Turtle, Green				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
502	2016	1	5	4.437
Turtle, Loggerhead				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
504	2016	2	7	6.312
Turtle, Olive Ridley				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
505	2016	31	162	25.734
Turtle, Unidentified Hard Shell				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
500	2016	1	5	4.550
Dermodochelyidae-Leatherback sea turtles				
Turtle, Leatherback				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
506	2016	3	15	10.066
Diomedeidae-Albatrosses				
Albatross, Black-footed				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
681	2016	104	485	81.783
Albatross, Laysan				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
682	2016	34	166	57.706
Albatross, Short-tailed				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error

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683	2016	0	0	4.483
Albatross, Unidentified				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
680	2016	1	7	6.079
Sulidae-Boobies & Gannets				
Booby, Red-footed				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
664	2016	2	12	7.593
Booby, Brown				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
662	2016	0	0	4.483
Procellariidae-Gadfly & Diving petrels				
Shearwater, unidentified				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
670	2016	4	21	14.399
Alepisauridae-Lancetfish				
Longnose Lancetfish				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
121	2016	47062	229791	10778.440
Shortnose Lancetfish				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
122	2016	1	5	4.007
Balistidae-Triggerfishes				
Rough Triggerfish (Pelegic)				

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Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
151	2016	0	0	4.483
Bramidae-Pomfrets				
Pomfret, unidentified				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
180	2016	59	290	69.645
Sickle Pomfret				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
185	2016	451	2284	217.602
Lustrous Pomfret				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
186	2016 [1]	12	62	10.792
Dagger Pomfret				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
187	2016	1308	6464	362.186
Rough Pomfret				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
188	2016	128	658	129.896
Brama Pomfret				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
189	2016	944	4773	546.169
Fanfishes				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
195	2016	14	63	16.539
Carangidae-Jacks				

Rainbow Runner				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
177	2016	0	0	4.483
Yellowtail				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
178	2016	0	0	4.483
Cottonmouth Jack				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
168	2016	1	5	5.047
Jack, Unidentified				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
174	2016	1	5	4.664
Chiasmodontidae-Swallowers				
Swallowers				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
241	2016	25	122	44.888
Coryphaenidae-Dolphinfishes				
Dolphinfish				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
218	2016	1062	5277	343.833
Pompano Dolphinfish				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
219	2016	40	195	29.376
Echeneidae-Remoras				
Remora or Suckerfish				

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Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
199	2016	3	13	10.850
Gempylidae-Snake Mackerels				
Longfin Escolar				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
196	2016	564	2823	205.777
Roudi Escolar				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
197	2016	80	414	82.099
Escolar				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
191	2016	7688	37860	2281.276
Oilfish				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
192	2016	198	994	112.763
Snake Mackerel				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
193	2016	22430	110655	7850.181
Black Gemfish				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
194	2016	30	150	26.723
Unidentified Snake Mackerel				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
190	2016	7	33	19.970
Istiophoridae-Billfishes				

Shortbill Spearfish				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
303	2016	716	3559	277.330
Blue Marlin				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
305	2016	34	176	20.986
Striped Marlin				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
302	2016	190	878	151.145
Sailfish				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
304	2016	12	59	16.274
Black Marlin				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
311	2016	0	0	4.483
Unidentified Billfish				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
300	2016	95	499	86.098
Lampridae-Opah				
Opah				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
144	2016	195	963	116.495
Lophotidae-Crestfishes				
Crestfishes				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
145	2016	38	184	31.587

Louvaridae-Louvar				
Louvar				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
251	2016	0	0	4.483
Molidae-Molas or Ocean sunfishes				
Common Mola				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
315	2016	31	148	26.551
Sharptail Mola				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
316	2016	19	91	21.508
Slender Mola				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
317	2016	356	1480	260.010
Nomeidae-Cigarfishes				
Cigarfishes				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
233	2016	10	49	18.186
Omosudidae-Hammerjaw				
Hammerjaw				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
238	2016	82	415	31.530
Regalecidae-Oarfish				

Oarfish				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
146	2016	0	0	4.483
Scrombridae-Mackerels, Tunas & Seerfishes				
Bigeye Tuna				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
211	2016	4112	20723	1431.140
Skipjack Tuna				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
212	2016	1096	5502	1047.312
Albacore Tuna				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
215	2016	52	265	60.214
Bluefin Tuna, (N. Pacific)				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
214	2016	0	0	4.483
Yellowfin Tuna				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
216	2016	1121	5615	404.277
Unidentified Tuna				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
210	2016	1125	5731	353.784
Wahoo				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
221	2016	392	1989	119.583

Mackerel				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
224	2016	0	0	4.483
Sphyraenidae-Barracudas				
Great Barracuda				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
263	2016	55	271	64.196
Tetrodontidae-Pufferfishes				
Pelagic Puffer (Oceanic)				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
261	2016	160	798	121.429
Unidentified Puffer				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
260	2016	8	42	11.120
Trachipteridae-Ribbonfishes				
Scalloped Ribbonfish				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
147	2016	4	21	8.829
Tapertail Ribbonfish				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
148	2016	58	286	73.034
King-of-the-Salmon				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
149	2016	0	0	4.483
Trichiuridae-Cutlassfishes & Scabbardfishes				

Scabbarfish, other				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
230	2016	0	0	4.483
Razorback Scabbardfish				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
232	2016	7	38	14.484
Xiphiidae-Swordfish				
Swordfish (see Note 2 in key)				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
301	2016	834	NA	NA
Unidentified or Identified Uncoded Fish				
Unidentified Fish				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
100	2016	75	357	55.305
Identified Uncoded Fish				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
101	2016	7	37	12.682
Alopiidae-Thresher Sharks				
Bigeye Thresher Shark				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
424	2016	2337	11639	1178.638
Common Thresher Shark				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
425	2016	0	0	4.483

Pelagic Thresher Shark				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
426	2016	332	1403	608.546
Unidentified Thresher Shark				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
420	2016	96	476	145.676
Dalatiidae-Kitefin Sharks				
Cookie Cutter Shark				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
437	2016	5	24	8.990
Carcharinidae-Requiem Sharks				
Blacktip Shark				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
406	2016	0	0	4.483
Blue Shark				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
418	2016	20267	102250	1929.563
Galapagos Shark				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
407	2016	3	16	9.736
Gray Reef Shark				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
408	2016	0	0	4.483
Oceanic Whitetip Shark				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
419	2016	423	2188	130.804

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Sandbar Shark				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
405	2016	4	20	7.400
Silky Shark				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
413	2016	493	2538	219.671
Tiger Shark				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
415	2016	7	34	15.116
Lamnidae-Mackerel Sharks				
Great White Shark				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
431	2016	0	0	4.483
Shortfin Mako Shark				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
432	2016	1240	6205	383.024
Longfin Mako Shark				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
433	2016	45	228	23.593
Salmon Shark				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
434	2016	0	0	4.483
Unidentified Mako Shark				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
430	2016	8	42	14.262

Magachasmidae-Megamouth Shark				
Megamouth Shark				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
442	2016	0	0	4.483
Odontaspidae-Sand Tiger Shark				
Bigeye Sand Tiger Shark				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
439	2016	0	0	4.483
Pseudocarcharinidae-Crocodile Shark				
Crocodile Shark				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
438	2016	423	2132	337.713
Sphyrnidae-Hammerhead Sharks				
Scalloped Hammerhead Shark				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
422	2016	0	0	0.000
Smooth Hammerhead Shark				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
423	2016	31	167	27.894
Unidentified Hammerhead Shark				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
421	2016	9	44	12.092
Squalidae-Dogfishes				
Deepwater Dogfishes				

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Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
436	2016	434	2225	329.900
Unidentified Sharks and Identified Uncoded Sharks				
Unidentified Shark				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
400	2016	172	853	101.746
Identified Uncoded Shark				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
401	2016	2	10	6.751
Dasyatidae-Stingrays				
Pelagic Stingray				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
457	2016	1362	6958	342.196
Mobulidae-Manta & Mobulas				
Giant Manta Ray				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
455	2016	4	22	11.564
Mobula				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
454	2016	24	120	22.677
Manta/Mobula ray				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
453	2016	3	16	6.217
Unidentified Ray				

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Unidentified Ray				
Species Code	Landing Year	Observed Bycatch	Point Estimate	Standard Error
450	2016	1	4	2.968