

# Marine Mammal, Seabird, and Sea Turtle Summary of Observed Interactions, 2002-2014

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March 8, 2016

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Table 1: Protected Species Interaction Codes. Note that the At-sea Hake Observer Program (A-SHOP) program has five additional codes used only for seabirds.

Numeric Code	Description
3	Feeding on Catch
7	Deterrence used
8	Boarded vessel
10	Killed by gear
12	Previously dead
13	Lethal removal - trailing gear
14	Lethal removal - not trailing gear
15	Entangled in gear - not trailing gear
16	Entangled in gear - trailing gear
17	Other
18	Unknown
A-SHOP seabirds	Gear interaction
A-SHOP seabirds	Land on vessel
A-SHOP seabirds	Third wire, paravane or warp cable contact
A-SHOP seabirds	Rig strike
A-SHOP seabirds	Foraging, not bait

## 1 Introduction

This document summarizes the **observed** interactions between fishing vessels in the U.S. West Coast Groundfish fisheries and marine mammals, seabird, and sea turtles for the period 2002-2014. Observers are placed on commercial fishing vessels by the Fisheries Observation Science Program (FOS), in the Fishery Resource Analysis and Monitoring Division (FRAMD) of the Northwest Fisheries Science Center (NWFSC, NOAA Fisheries). The observed interactions are summarized by species and interaction type for each sector, gear type and year. The years covered by these tables are 2002-2014. The tables are divided into three sections, one for each group of protected species. Each section is divided into subsections, each representing a different sector (combination of target species and gear type used) of the groundfish fisheries. Each subsection (i.e., sector) contains two tables: observer coverage for that sector observed interactions for that sector. The data presented in these tables is available on the [FOS Protected Species website](#). Descriptions of each groundfish fishery sector, vessel selection process and coverage can be found on the [FOS website](#).

FOS observers also haphazardly collect sightings of marine mammals, seabirds, and sea turtles. FOS observed sightings data can be requested by contacting the primary author.

## 2 Disclaimer

These data represent the observations as recorded by the observers. These tables **do not** include values expanded to the fleet-level. The observer coverage tables provide an estimate of the amount of fishing effort sampled to provide context for the observed numbers. Observer coverage tables should be used in conjunction with the interaction tables to provide a clear understanding of the scale of these interactions.

## 3 Data Processing Notes

The data sources used for this summary includes the West Coast Groundfish Observer Program data (WCGOP), the At-Sea Hake Observer Program data (A-SHOP), and the Pacific Fisheries Information Network data (PacFIN). Coverage rates are calculated as the percentage of landed catch that was observed, rounded to the nearest whole percentage. WCGOP data has been processed to exclude a small number of MMSBT observations, mainly due to incomplete information or failed data. WCGOP data were processed and occasionally combined to maintain confidentiality (more than 2 vessels per stratum). WCGOP and A-SHOP interaction descriptions and species common names were made consistent with each other (e.g., minor spelling and capitalization differences) when

possible. PacFIN data for fish ticket landings with state species composition sampling applied was queried in March 2015 (for the period 2002-2014).

## 4 Marine Mammal Observed Interactions

### 4.1 At-sea Hake sectors - marine mammals

Table 2: Observer coverage, by year for At-sea Hake sectors. Tribal data for some years is not shown because of confidentiality (2012) or no fishing (2013,2014). MS = Mothership

Year	Sector	Gear	No.vessels	Sampled tows	Unsampled tows	Tows sampled(%)	Tow duration (hrs)	Sampled P.hake (mt)	Coverage rate
2002	Catcher Processor	Midwater Trawl	5	556	1	99.8	1061.3	36332.9	100%
2003	Catcher Processor	Midwater Trawl	6	766	1	99.9	911	41468.6	100%
2004	Catcher Processor	Midwater Trawl	6	1492	4	99.7	1973.4	72858.7	100%
2005	Catcher Processor	Midwater Trawl	6	1332	2	99.9	2238.8	78497.5	100%
2006	Catcher Processor	Midwater Trawl	9	1488	2	99.9	2980.7	78246.3	100%
2007	Catcher Processor	Midwater Trawl	9	1566	4	99.7	4403.7	72898.1	100%
2008	Catcher Processor	Midwater Trawl	8	1864	18	99	5557.9	107754.4	100%
2009	Catcher Processor	Midwater Trawl	5	863	0	100	1932.4	34590.8	100%
2010	Catcher Processor	Midwater Trawl	6	1063	1	99.9	2653.1	54217.3	100%
2011	Catcher Processor	Midwater Trawl	9	1530	4	99.7	4761.9	71336.7	100%
2012	Catcher Processor	Midwater Trawl	9	1100	2	99.8	3545.6	55522.6	100%
2013	Catcher Processor	Midwater Trawl	9	1439	4	99.7	3293.9	78004.8	100%
2014	Catcher Processor	Midwater Trawl	9	1683	1	99.9	4731.4	103171.3	100%
2002	MS Catcher Vessels	Midwater Trawl	11	573	1	99.8	1624.6	26502.9	100%
2003	MS Catcher Vessels	Midwater Trawl	12	522	14	97.4	500.9	25332.9	100%
2004	MS Catcher Vessels	Midwater Trawl	10	569	2	99.6	796.8	24010.1	100%
2005	MS Catcher Vessels	Midwater Trawl	18	1038	1	99.9	1882.7	48600.6	100%
2006	MS Catcher Vessels	Midwater Trawl	20	1243	40	96.9	2325.7	54138.8	100%
2007	MS Catcher Vessels	Midwater Trawl	20	1135	11	99	3133.6	47276.3	100%
2008	MS Catcher Vessels	Midwater Trawl	19	1346	3	99.8	3866.2	57687.4	100%
2009	MS Catcher Vessels	Midwater Trawl	19	597	3	99.5	1686.3	24066.4	100%
2010	MS Catcher Vessels	Midwater Trawl	22	908	0	100	2804.5	35726.9	100%
2011	MS Catcher Vessels	Midwater Trawl	18	1246	2	99.8	2975.7	49970.6	100%
2012	MS Catcher Vessels	Midwater Trawl	16	931	18	98.1	3161.8	38042.1	100%
2013	MS Catcher Vessels	Midwater Trawl	18	1249	7	99.4	3075.7	52348.3	100%
2014	MS Catcher Vessels	Midwater Trawl	19	1288	18	98.6	3547.1	61793.7	100%
2002	Tribal	Midwater Trawl	4	625	8	98.7	1003.8	21629	100%
2003	Tribal	Midwater Trawl	4	537	3	99.4	740.4	19430.8	100%
2004	Tribal	Midwater Trawl	5	632	0	100	577.3	23511.4	100%
2005	Tribal	Midwater Trawl	4	632	1	99.8	674.5	23561.6	100%
2006	Tribal	Midwater Trawl	4	154	6	96.2	270.8	5405.4	100%
2007	Tribal	Midwater Trawl	5	156	0	100	283.2	5129.4	100%
2008	Tribal	Midwater Trawl	5	380	2	99.5	486.5	14977.3	100%
2009	Tribal	Midwater Trawl	5	403	1	99.8	834.3	13469.4	100%

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Year	Sector	Gear	No.vessels	Sampled tows	Unsampled tows	Tows sampled(%)	Tow duration (hrs)	Sampled P.hake (mt)	Coverage rate
2010	Tribal	Midwater Trawl	6	516	0	100	633.5	16206.2	100%
2011	Tribal	Midwater Trawl	5	228	0	100	409.6	6146.9	100%
2012	Tribal	Midwater Trawl	*	*	*	*	*	*	*
2013	Tribal	Midwater Trawl	0	–	–	–	–	–	–
2014	Tribal	Midwater Trawl	0	–	–	–	–	–	–

Table 3: Marine mammal interactions observed in At-sea Hake sectors by year and gear. MS = Mothership

Species	Interaction	Year	Gear	Sector	No.individuals
California Sea Lion	Entangled In Gear (not Trailing Gear)	2012	Midwater Trawl	MS Catcher Vessels	1
California Sea Lion	Feeding On Catch	2003	Midwater Trawl	Catcher Processor	9
California Sea Lion	Feeding On Catch	2005	Midwater Trawl	Catcher Processor	1
California Sea Lion	Feeding On Catch	2008	Midwater Trawl	Catcher Processor	1
California Sea Lion	Feeding On Catch	2011	Midwater Trawl	MS Catcher Vessels	2
California Sea Lion	Feeding On Catch	2013	Midwater Trawl	Catcher Processor	2
California Sea Lion	Feeding On Catch	2013	Midwater Trawl	MS Catcher Vessels	3
California Sea Lion	Feeding On Catch	2014	Midwater Trawl	MS Catcher Vessels	3
California Sea Lion	Killed By Gear	2002	Midwater Trawl	MS Catcher Vessels	1
California Sea Lion	Killed By Gear	2003	Midwater Trawl	Catcher Processor	2
California Sea Lion	Killed By Gear	2004	Midwater Trawl	Catcher Processor	2
California Sea Lion	Killed By Gear	2006	Midwater Trawl	Catcher Processor	1
California Sea Lion	Killed By Gear	2006	Midwater Trawl	MS Catcher Vessels	1
California Sea Lion	Killed By Gear	2008	Midwater Trawl	Catcher Processor	1
California Sea Lion	Killed By Gear	2010	Midwater Trawl	MS Catcher Vessels	1
California Sea Lion	Killed By Gear	2011	Midwater Trawl	Catcher Processor	1
California Sea Lion	Killed By Gear	2013	Midwater Trawl	Catcher Processor	1
California Sea Lion	Killed By Gear	2013	Midwater Trawl	MS Catcher Vessels	1
California Sea Lion	Killed By Gear	2014	Midwater Trawl	Catcher Processor	4
California Sea Lion	Other	2003	Midwater Trawl	Catcher Processor	3
Dalls Porpoise	Killed By Gear	2002	Midwater Trawl	Tribal	1
Harbor Seal	Killed By Gear	2004	Midwater Trawl	Tribal	1
Harbor Seal	Killed By Gear	2005	Midwater Trawl	Catcher Processor	1
Harbor Seal	Killed By Gear	2006	Midwater Trawl	Catcher Processor	1
Harbor Seal	Killed By Gear	2008	Midwater Trawl	Catcher Processor	1
Harbor Seal	Killed By Gear	2008	Midwater Trawl	Tribal	1
Northern Elephant Seal	Entangled In Gear (not Trailing Gear)	2013	Midwater Trawl	Catcher Processor	1
Northern Elephant Seal	Feeding On Catch	2013	Midwater Trawl	Catcher Processor	1
Northern Elephant Seal	Killed By Gear	2004	Midwater Trawl	Catcher Processor	3
Northern Elephant Seal	Killed By Gear	2007	Midwater Trawl	Catcher Processor	1
Northern Elephant Seal	Killed By Gear	2007	Midwater Trawl	MS Catcher Vessels	1

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Species	Interaction	Year	Gear	Sector	No.individuals
Northern Elephant Seal	Killed By Gear	2008	Midwater Trawl	Catcher Processor	5
Northern Elephant Seal	Killed By Gear	2008	Midwater Trawl	MS Catcher Vessels	2
Northern Elephant Seal	Killed By Gear	2009	Midwater Trawl	Catcher Processor	1
Northern Elephant Seal	Killed By Gear	2010	Midwater Trawl	Catcher Processor	2
Northern Elephant Seal	Killed By Gear	2012	Midwater Trawl	MS Catcher Vessels	1
Otariid Unid	Feeding On Catch	2006	Midwater Trawl	Catcher Processor	1
Otariid Unid	Killed By Gear	2010	Midwater Trawl	MS Catcher Vessels	1
Otariid Unid	Other	2005	Midwater Trawl	Catcher Processor	1
Pacific White-sided Dolphin	Killed By Gear	2002	Midwater Trawl	Tribal	1
Pinniped Unid	Feeding On Catch	2005	Midwater Trawl	Catcher Processor	1
Pinniped Unid	Feeding On Catch	2008	Midwater Trawl	Catcher Processor	1
Sea Lion Unid	Feeding On Catch	2013	Midwater Trawl	MS Catcher Vessels	1
Steller Sea Lion	Entangled In Gear (not Trailing Gear)	2010	Midwater Trawl	Catcher Processor	2
Steller Sea Lion	Entangled In Gear (not Trailing Gear)	2014	Midwater Trawl	MS Catcher Vessels	1
Steller Sea Lion	Feeding On Catch	2010	Midwater Trawl	Catcher Processor	2
Steller Sea Lion	Feeding On Catch	2011	Midwater Trawl	MS Catcher Vessels	16
Steller Sea Lion	Feeding On Catch	2012	Midwater Trawl	MS Catcher Vessels	18
Steller Sea Lion	Feeding On Catch	2013	Midwater Trawl	MS Catcher Vessels	6
Steller Sea Lion	Feeding On Catch	2014	Midwater Trawl	MS Catcher Vessels	19
Steller Sea Lion	Killed By Gear	2002	Midwater Trawl	Catcher Processor	1
Steller Sea Lion	Killed By Gear	2003	Midwater Trawl	Catcher Processor	1
Steller Sea Lion	Killed By Gear	2005	Midwater Trawl	Catcher Processor	2
Steller Sea Lion	Killed By Gear	2006	Midwater Trawl	Catcher Processor	2
Steller Sea Lion	Killed By Gear	2006	Midwater Trawl	MS Catcher Vessels	1
Steller Sea Lion	Killed By Gear	2007	Midwater Trawl	Catcher Processor	3
Steller Sea Lion	Killed By Gear	2008	Midwater Trawl	Catcher Processor	1
Steller Sea Lion	Killed By Gear	2010	Midwater Trawl	Catcher Processor	8
Steller Sea Lion	Killed By Gear	2010	Midwater Trawl	MS Catcher Vessels	1
Steller Sea Lion	Killed By Gear	2011	Midwater Trawl	Catcher Processor	1
Steller Sea Lion	Killed By Gear	2011	Midwater Trawl	MS Catcher Vessels	1
Steller Sea Lion	Killed By Gear	2012	Midwater Trawl	Catcher Processor	1
Steller Sea Lion	Killed By Gear	2013	Midwater Trawl	Catcher Processor	2
Steller Sea Lion	Killed By Gear	2014	Midwater Trawl	Catcher Processor	3
Steller Sea Lion	Killed By Gear	2014	Midwater Trawl	MS Catcher Vessels	1

## 4.2 Groundfish trawl sectors - marine mammals

Note that, to maintain confidentiality, in 2002,2003,2004,2006 & 2011, both midwater and bottom trawl vessels are included in "Bottom Trawl" gear.

Table 4: Observer coverage, by year and gear for groundfish trawl sectors. Since 2011, Limited Entry Trawl vessels can fish or midwater trawl. In the case of fixed gear, Tow duration represents the Soak time of fixed gear. To maintain confidentiality in this table, in some years, Bottom Trawl gear includes both bottom and midwater trawl not targeting P. hake. GF = groundfish

Year	Sector	Gear	Observed						Fleet-wide	
			Vessels (no.)	Trips (no.)	Hauls (no.)	FG.units (no.)	Tow duration or Soak time (hrs)	Observed Retained GF (mt)	Landed GF (mt)	Coverage rate
2002	Limited Entry Trawl	Bottom Trawl	132	573	3163		13471.8	2680.0	18001.5	15%
2003	Limited Entry Trawl	Bottom Trawl	125	462	2289		11496.1	2590.4	18382.1	14%
2004	Limited Entry Trawl	Bottom Trawl	103	615	3441		13837.8	4309.8	17667.8	24%
2005	Limited Entry Trawl	Bottom Trawl	105	522	3460		12621.0	4241.6	19285.3	22%
2006	Limited Entry Trawl	Bottom Trawl	87	477	2977		11456.0	3443.3	17794.9	19%
2007	Limited Entry Trawl	Bottom Trawl	88	371	2515		11380.6	3442.3	20442.5	17%
2008	Limited Entry Trawl	Bottom Trawl	100	438	3185		15004.2	4905.2	24187.5	20%
2009	Limited Entry Trawl	Bottom Trawl	101	590	4394		19581.1	6053.5	26055.5	23%
2010	Limited Entry Trawl	Bottom Trawl	83	347	2614		13039.7	4019.5	22320.2	18%
2011	Catch Shares	Bottom Trawl	71	1110	9085		39895.4	17244.4	17244.4	100%
2011	Catch Shares	Hook & Line	11	92	622	2246390	6593.9	336.0	336.0	100%
2011	Catch Shares	Pot	17	227	1515	40916	103517.7	817.2	817.2	100%
2012	Catch Shares	Bottom Trawl	66	1071	8887		37894.6	17103.5	17103.5	100%
2012	Catch Shares	Hook & Line	8	32	500	1457804	4588.0	241.3	241.3	100%
2012	Catch Shares	Midwater Trawl	4	9	30		70.4	197.6	197.6	100%
2012	Catch Shares	Pot	19	258	1699	51939	145400.0	739.6	739.6	100%
2013	Catch Shares	Bottom Trawl	68	1211	10070		42217.7	18620.5	18620.5	100%
2013	Catch Shares	Hook & Line	4	18	153	580992	1218.0	85.6	85.6	100%
2013	Catch Shares	Midwater Trawl	5	19	59		113.1	404.7	404.7	100%
2013	Catch Shares	Pot	10	93	1078	29936	84926.9	470.8	470.8	100%
2014	Catch Shares	Bottom Trawl	63	1012	8246		34026.0	15994.9	15994.9	100%
2014	Catch Shares	Hook & Line	4	17	146	573933	1315.4	86.4	86.4	100%
2014	Catch Shares	Midwater Trawl	9	34	125		257.1	873.7	873.7	100%
2014	Catch Shares	Pot	14	113	1246	31582	81643.4	685.4	685.4	100%

Table 5: Observer coverage, by year and gear for the Shoreside Hake sector.

Year	Sector	Gear	Observed				Fleet-wide		Coverage rate
			No.vessels	No.trips	No.hauls	Tow duration (hrs)	Observed Retained P.hake (mt)	Landed P.hake (mt)	
2011	Shoreside Hake	Midwater Trawl	26	913	1701	3940.1	90249.1	90249.1	100%
2012	Shoreside Hake	Midwater Trawl	24	715	1565	5902.3	65288.4	65288.4	100%
2013	Shoreside Hake	Midwater Trawl	24	940	1702	4593.7	96867.8	96867.8	100%
2014	Shoreside Hake	Midwater Trawl	25	955	1681	4666.3	97925.2	97925.2	100%

Table 6: Marine mammal interactions observed in groundfish trawl sectors by year and gear.

Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
California Sea Lion	Boarded vessel	1	2011	Bottom Trawl	Catch Shares	100%
California Sea Lion	Boarded vessel	1	2012	Bottom Trawl	Catch Shares	100%
California Sea Lion	Deterrence used	3	2011	Bottom Trawl	Catch Shares	100%
California Sea Lion	Deterrence used	4	2011	Hook & Line	Catch Shares	100%
California Sea Lion	Deterrence used	10	2014	Hook & Line	Catch Shares	100%
California Sea Lion	Entangled in gear - not trailing gear	2	2003	Bottom Trawl	Limited Entry Trawl	14%
California Sea Lion	Entangled in gear - not trailing gear	3	2005	Bottom Trawl	Limited Entry Trawl	22%
California Sea Lion	Entangled in gear - not trailing gear	2	2006	Bottom Trawl	Limited Entry Trawl	19%
California Sea Lion	Entangled in gear - not trailing gear	2	2008	Bottom Trawl	Limited Entry Trawl	20%
California Sea Lion	Entangled in gear - not trailing gear	4	2009	Bottom Trawl	Limited Entry Trawl	23%
California Sea Lion	Entangled in gear - not trailing gear	7	2011	Bottom Trawl	Catch Shares	100%
California Sea Lion	Entangled in gear - not trailing gear	6	2012	Bottom Trawl	Catch Shares	100%
California Sea Lion	Entangled in gear - not trailing gear	3	2013	Bottom Trawl	Catch Shares	100%
California Sea Lion	Entangled in gear - not trailing gear	2	2014	Bottom Trawl	Catch Shares	100%
California Sea Lion	Entangled in gear - trailing gear	1	2011	Bottom Trawl	Catch Shares	100%
California Sea Lion	Entangled in gear - trailing gear	2	2013	Bottom Trawl	Catch Shares	100%
California Sea Lion	Feeding on catch	85	2002	Bottom Trawl	Limited Entry Trawl	15%
California Sea Lion	Feeding on catch	52	2003	Bottom Trawl	Limited Entry Trawl	14%
California Sea Lion	Feeding on catch	11	2004	Bottom Trawl	Limited Entry Trawl	24%
California Sea Lion	Feeding on catch	25	2005	Bottom Trawl	Limited Entry Trawl	22%
California Sea Lion	Feeding on catch	20	2006	Bottom Trawl	Limited Entry Trawl	19%
California Sea Lion	Feeding on catch	32	2007	Bottom Trawl	Limited Entry Trawl	17%
California Sea Lion	Feeding on catch	52	2008	Bottom Trawl	Limited Entry Trawl	20%
California Sea Lion	Feeding on catch	44	2009	Bottom Trawl	Limited Entry Trawl	23%
California Sea Lion	Feeding on catch	10	2010	Bottom Trawl	Limited Entry Trawl	18%
California Sea Lion	Feeding on catch	68	2011	Bottom Trawl	Catch Shares	100%
California Sea Lion	Feeding on catch	8	2011	Hook & Line	Catch Shares	100%
California Sea Lion	Feeding on catch	4	2011	Midwater Trawl	Shoreside Hake	100%
California Sea Lion	Feeding on catch	2	2011	Pot	Catch Shares	100%

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Table 6 – continued from previous page

Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
California Sea Lion	Feeding on catch	102	2012	Bottom Trawl	Catch Shares	100%
California Sea Lion	Feeding on catch	3	2012	Pot	Catch Shares	100%
California Sea Lion	Feeding on catch	25	2013	Bottom Trawl	Catch Shares	100%
California Sea Lion	Feeding on catch	5	2013	Pot	Catch Shares	100%
California Sea Lion	Feeding on catch	19	2014	Bottom Trawl	Catch Shares	100%
California Sea Lion	Feeding on catch	1	2014	Pot	Catch Shares	100%
California Sea Lion	Killed by gear	2	2002	Bottom Trawl	Limited Entry Trawl	15%
California Sea Lion	Killed by gear	7	2003	Bottom Trawl	Limited Entry Trawl	14%
California Sea Lion	Killed by gear	1	2004	Bottom Trawl	Limited Entry Trawl	24%
California Sea Lion	Killed by gear	2	2005	Bottom Trawl	Limited Entry Trawl	22%
California Sea Lion	Killed by gear	3	2006	Bottom Trawl	Limited Entry Trawl	19%
California Sea Lion	Killed by gear	2	2007	Bottom Trawl	Limited Entry Trawl	17%
California Sea Lion	Killed by gear	4	2009	Bottom Trawl	Limited Entry Trawl	23%
California Sea Lion	Killed by gear	10	2011	Bottom Trawl	Catch Shares	100%
California Sea Lion	Killed by gear	7	2012	Bottom Trawl	Catch Shares	100%
California Sea Lion	Killed by gear	9	2014	Bottom Trawl	Catch Shares	100%
California Sea Lion	Killed by gear	1	2014	Midwater Trawl	Shoreside Hake	100%
California Sea Lion	Lethal removal - not trailing gear	1	2005	Bottom Trawl	Limited Entry Trawl	22%
California Sea Lion	Lethal removal -trailing gear	1	2013	Bottom Trawl	Catch Shares	100%
California Sea Lion	Previously dead	2	2006	Bottom Trawl	Limited Entry Trawl	19%
California Sea Lion	Previously dead	1	2007	Bottom Trawl	Limited Entry Trawl	17%
California Sea Lion	Previously dead	1	2012	Bottom Trawl	Catch Shares	100%
Common Unid Dolphin	Feeding on catch	22	2011	Bottom Trawl	Catch Shares	100%
Dalls Porpoise	Previously dead	1	2006	Bottom Trawl	Limited Entry Trawl	19%
Dalls Porpoise	Unknown	2	2008	Bottom Trawl	Limited Entry Trawl	20%
Dolphin Unid	Other	200	2011	Bottom Trawl	Catch Shares	100%
Dolphin Unid	Previously dead	1	2014	Bottom Trawl	Catch Shares	100%
Harbor Porpoise	Previously dead	1	2010	Bottom Trawl	Limited Entry Trawl	18%
Harbor Seal	Feeding on catch	1	2010	Bottom Trawl	Limited Entry Trawl	18%
Harbor Seal	Feeding on catch	3	2014	Bottom Trawl	Catch Shares	100%
Harbor Seal	Killed by gear	1	2007	Bottom Trawl	Limited Entry Trawl	17%
Harbor Seal	Previously dead	1	2005	Bottom Trawl	Limited Entry Trawl	22%
Harbor Seal	Previously dead	1	2008	Bottom Trawl	Limited Entry Trawl	20%
Humpback Whale	Feeding on catch	3	2012	Midwater Trawl	Shoreside Hake	100%
Humpback Whale	Previously dead	1	2014	Midwater Trawl	Shoreside Hake	100%
Marine mammal Unid	Previously dead	1	2009	Bottom Trawl	Limited Entry Trawl	23%
Northern Elephant Seal	Killed by gear	1	2007	Bottom Trawl	Limited Entry Trawl	17%
Northern Elephant Seal	Killed by gear	1	2011	Bottom Trawl	Catch Shares	100%
Northern Elephant Seal	Killed by gear	2	2011	Hook & Line	Catch Shares	100%
Northern Elephant Seal	Killed by gear	1	2011	Midwater Trawl	Shoreside Hake	100%
Northern Elephant Seal	Lethal removal - not trailing gear	1	2009	Bottom Trawl	Limited Entry Trawl	23%
Northern Elephant Seal	Unknown	1	2013	Bottom Trawl	Catch Shares	100%

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Table 6 – continued from previous page

Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
Pacific White-sided Dolphin	Feeding on catch	20	2011	Bottom Trawl	Catch Shares	100%
Pacific White-sided Dolphin	Feeding on catch	100	2013	Bottom Trawl	Catch Shares	100%
Pacific White-sided Dolphin	Killed by gear	1	2003	Bottom Trawl	Limited Entry Trawl	14%
Pacific White-sided Dolphin	Killed by gear	1	2014	Bottom Trawl	Catch Shares	100%
Pacific White-sided Dolphin	Previously dead	1	2012	Bottom Trawl	Catch Shares	100%
Pinniped Unid	Feeding on catch	1	2007	Bottom Trawl	Limited Entry Trawl	17%
Pinniped Unid	Feeding on catch	3	2009	Bottom Trawl	Limited Entry Trawl	23%
Pinniped Unid	Previously dead	1	2003	Bottom Trawl	Limited Entry Trawl	14%
Porpoise Unid	Previously dead	1	2012	Bottom Trawl	Catch Shares	100%
Rissos Dolphin	Killed by gear	1	2008	Bottom Trawl	Limited Entry Trawl	20%
Sea Lion Unid	Entangled in gear - not trailing gear	1	2006	Bottom Trawl	Limited Entry Trawl	19%
Sea Lion Unid	Entangled in gear - not trailing gear	1	2013	Bottom Trawl	Catch Shares	100%
Sea Lion Unid	Feeding on catch	1	2003	Bottom Trawl	Limited Entry Trawl	14%
Sea Lion Unid	Feeding on catch	2	2004	Bottom Trawl	Limited Entry Trawl	24%
Sea Lion Unid	Feeding on catch	2	2005	Bottom Trawl	Limited Entry Trawl	22%
Sea Lion Unid	Feeding on catch	28	2006	Bottom Trawl	Limited Entry Trawl	19%
Sea Lion Unid	Feeding on catch	1	2007	Bottom Trawl	Limited Entry Trawl	17%
Sea Lion Unid	Feeding on catch	5	2014	Bottom Trawl	Catch Shares	100%
Sea Lion Unid	Killed by gear	1	2002	Bottom Trawl	Limited Entry Trawl	15%
Seal Unid	Entangled in gear - not trailing gear	1	2011	Bottom Trawl	Catch Shares	100%
Short-beaked Common Dolphin	Previously dead	1	2014	Bottom Trawl	Catch Shares	100%
Sperm Whale	Feeding on catch	1	2011	Hook & Line	Catch Shares	100%
Sperm Whale	Feeding on catch	2	2012	Hook & Line	Catch Shares	100%
Sperm Whale	Feeding on catch	2	2014	Hook & Line	Catch Shares	100%
Steller Sea Lion	Boarded vessel	2	2011	Bottom Trawl	Catch Shares	100%
Steller Sea Lion	Deterrence used	5	2011	Bottom Trawl	Catch Shares	100%
Steller Sea Lion	Deterrence used	24	2012	Bottom Trawl	Catch Shares	100%
Steller Sea Lion	Deterrence used	12	2013	Bottom Trawl	Catch Shares	100%
Steller Sea Lion	Deterrence used	6	2013	Hook & Line	Catch Shares	100%
Steller Sea Lion	Entangled in gear - not trailing gear	10	2004	Bottom Trawl	Limited Entry Trawl	24%
Steller Sea Lion	Entangled in gear - not trailing gear	1	2006	Bottom Trawl	Limited Entry Trawl	19%
Steller Sea Lion	Entangled in gear - not trailing gear	1	2007	Bottom Trawl	Limited Entry Trawl	17%
Steller Sea Lion	Entangled in gear - not trailing gear	14	2009	Bottom Trawl	Limited Entry Trawl	23%
Steller Sea Lion	Entangled in gear - not trailing gear	13	2010	Bottom Trawl	Limited Entry Trawl	18%
Steller Sea Lion	Entangled in gear - not trailing gear	24	2011	Bottom Trawl	Catch Shares	100%
Steller Sea Lion	Entangled in gear - not trailing gear	17	2012	Bottom Trawl	Catch Shares	100%
Steller Sea Lion	Entangled in gear - not trailing gear	12	2013	Bottom Trawl	Catch Shares	100%
Steller Sea Lion	Entangled in gear - not trailing gear	9	2014	Bottom Trawl	Catch Shares	100%
Steller Sea Lion	Feeding on catch	8	2002	Bottom Trawl	Limited Entry Trawl	15%
Steller Sea Lion	Feeding on catch	28	2003	Bottom Trawl	Limited Entry Trawl	14%
Steller Sea Lion	Feeding on catch	10	2004	Bottom Trawl	Limited Entry Trawl	24%
Steller Sea Lion	Feeding on catch	11	2005	Bottom Trawl	Limited Entry Trawl	22%

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Table 6 – continued from previous page

Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
Steller Sea Lion	Feeding on catch	33	2006	Bottom Trawl	Limited Entry Trawl	19%
Steller Sea Lion	Feeding on catch	42	2007	Bottom Trawl	Limited Entry Trawl	17%
Steller Sea Lion	Feeding on catch	139	2008	Bottom Trawl	Limited Entry Trawl	20%
Steller Sea Lion	Feeding on catch	165	2009	Bottom Trawl	Limited Entry Trawl	23%
Steller Sea Lion	Feeding on catch	25	2010	Bottom Trawl	Limited Entry Trawl	18%
Steller Sea Lion	Feeding on catch	275	2011	Bottom Trawl	Catch Shares	100%
Steller Sea Lion	Feeding on catch	1	2011	Midwater Trawl	Shoreside Hake	100%
Steller Sea Lion	Feeding on catch	242	2012	Bottom Trawl	Catch Shares	100%
Steller Sea Lion	Feeding on catch	2	2012	Midwater Trawl	Shoreside Hake	100%
Steller Sea Lion	Feeding on catch	355	2013	Bottom Trawl	Catch Shares	100%
Steller Sea Lion	Feeding on catch	22	2013	Pot	Catch Shares	100%
Steller Sea Lion	Feeding on catch	276	2014	Bottom Trawl	Catch Shares	100%
Steller Sea Lion	Killed by gear	2	2002	Bottom Trawl	Limited Entry Trawl	15%
Steller Sea Lion	Killed by gear	2	2007	Bottom Trawl	Limited Entry Trawl	17%
Steller Sea Lion	Killed by gear	4	2009	Bottom Trawl	Limited Entry Trawl	23%
Steller Sea Lion	Killed by gear	7	2010	Bottom Trawl	Limited Entry Trawl	18%
Steller Sea Lion	Killed by gear	13	2011	Bottom Trawl	Catch Shares	100%
Steller Sea Lion	Killed by gear	1	2011	Midwater Trawl	Shoreside Hake	100%
Steller Sea Lion	Killed by gear	5	2012	Bottom Trawl	Catch Shares	100%
Steller Sea Lion	Killed by gear	4	2013	Bottom Trawl	Catch Shares	100%
Steller Sea Lion	Killed by gear	4	2014	Bottom Trawl	Catch Shares	100%
Steller Sea Lion	Killed by gear	1	2014	Midwater Trawl	Shoreside Hake	100%
Steller Sea Lion	Lethal removal - not trailing gear	1	2011	Bottom Trawl	Catch Shares	100%
Steller Sea Lion	Other	5	2011	Bottom Trawl	Catch Shares	100%
Steller Sea Lion	Previously dead	1	2003	Bottom Trawl	Limited Entry Trawl	14%
Steller Sea Lion	Previously dead	1	2009	Bottom Trawl	Limited Entry Trawl	23%
Steller Sea Lion	Previously dead	1	2011	Bottom Trawl	Catch Shares	100%

## 4.3 California halibut- marine mammals

Table 7: Observer coverage, by year for the California halibut (CHLB) fishery. Since 2013, LE CA Halibut data has been combined with Catch Shares bottom trawl data.

Year	Sector	Gear	Observed				Fleet-wide		Coverage rate
			No.vessels	No.trips	No.hauls	Tow duration (hrs)	Observed Retained CHLB (mt)	Landed CHLB (mt)	
2002	LE CA Halibut	Bottom Trawl	7	19	52	240.1	3.6	105.2	3%
2003	LE CA Halibut	Bottom Trawl	12	73	206	794.4	19.1	105.5	18%
2004	LE CA Halibut	Bottom Trawl	8	46	170	774.1	31.5	136.3	23%
2005	LE CA Halibut	Bottom Trawl	10	74	233	898.8	30.5	188.9	16%
2006	LE CA Halibut	Bottom Trawl	9	78	224	613.1	14.3	119.5	12%
2007	LE CA Halibut	Bottom Trawl	5	39	80	329.7	5.4	39.2	14%
2008	LE CA Halibut	Bottom Trawl	6	40	118	484.9	9.6	36.4	26%
2009	LE CA Halibut	Bottom Trawl	3	12	29	83.7	2.9	47.2	6%
2010	LE and OA CA Hal.	Bottom Trawl	8	43	152	367.3	8.7	123.6	7%
2011	LE CA Halibut	Bottom Trawl	3	63	157	513.3	11.9	11.9	100%
2012	LE CA Halibut	Bottom Trawl	*	*	*	*	*	*	*
2003	OA CA Halibut	Bottom Trawl	5	18	110	145.0	2.0	25.8	8%
2004	OA CA Halibut	Bottom Trawl	4	53	244	381.9	5.1	70.8	7%
2005	OA CA Halibut	Bottom Trawl	6	59	360	550.8	7.5	64.5	12%
2007	OA CA Halibut	Bottom Trawl	8	48	226	274.9	2.7	39.2	7%
2008	OA CA Halibut	Bottom Trawl	7	49	197	224.3	2.6	51.9	5%
2009	OA CA Halibut	Bottom Trawl	3	9	30	53.5	0.6	82.4	1%
2011	OA CA Halibut	Bottom Trawl	13	48	204	486.9	12.4	79.9	16%
2012	OA CA Halibut	Bottom Trawl	7	27	77	182.6	3.5	55.2	6%
2013	OA CA Halibut	Bottom Trawl	5	29	81	258.1	4.3	68.9	6%
2014	OA CA Halibut	Bottom Trawl	6	51	145	426.0	18.1	81.4	22%

Table 8: Marine mammal interactions observed in California halibut fishery by year and gear.

Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
California Sea Lion	Boarded vessel	1	2008	Bottom Trawl	OA CA Halibut	5%
California Sea Lion	Entangled in gear - not trailing gear	1	2003	Bottom Trawl	LE CA Halibut	18%
California Sea Lion	Entangled in gear - not trailing gear	1	2010	Bottom Trawl	LE and OA CA Hal.	7%
California Sea Lion	Entangled in gear - not trailing gear	1	2012	Bottom Trawl	LE CA Halibut	100%
California Sea Lion	Entangled in gear - not trailing gear	2	2014	Bottom Trawl	OA CA Halibut	22%
California Sea Lion	Entangled in gear - trailing gear	1	2011	Bottom Trawl	OA CA Halibut	16%
California Sea Lion	Feeding on catch	17	2002	Bottom Trawl	LE CA Halibut	3%
California Sea Lion	Feeding on catch	6	2004	Bottom Trawl	LE CA Halibut	23%

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Table 8 – continued from previous page

Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
California Sea Lion	Feeding on catch	3	2005	Bottom Trawl	LE CA Halibut	16%
California Sea Lion	Feeding on catch	18	2005	Bottom Trawl	OA CA Halibut	12%
California Sea Lion	Feeding on catch	10	2006	Bottom Trawl	LE CA Halibut	12%
California Sea Lion	Feeding on catch	3	2007	Bottom Trawl	LE CA Halibut	14%
California Sea Lion	Feeding on catch	16	2008	Bottom Trawl	LE CA Halibut	26%
California Sea Lion	Feeding on catch	45	2008	Bottom Trawl	OA CA Halibut	5%
California Sea Lion	Feeding on catch	2	2010	Bottom Trawl	LE and OA CA Hal.	7%
California Sea Lion	Feeding on catch	6	2012	Bottom Trawl	OA CA Halibut	6%
California Sea Lion	Feeding on catch	20	2013	Bottom Trawl	OA CA Halibut	6%
California Sea Lion	Killed by gear	1	2002	Bottom Trawl	LE CA Halibut	3%
California Sea Lion	Killed by gear	12	2003	Bottom Trawl	LE CA Halibut	18%
California Sea Lion	Killed by gear	2	2004	Bottom Trawl	LE CA Halibut	23%
California Sea Lion	Killed by gear	1	2004	Bottom Trawl	OA CA Halibut	7%
California Sea Lion	Killed by gear	1	2005	Bottom Trawl	LE CA Halibut	16%
California Sea Lion	Killed by gear	2	2005	Bottom Trawl	OA CA Halibut	12%
California Sea Lion	Killed by gear	13	2006	Bottom Trawl	LE CA Halibut	12%
California Sea Lion	Killed by gear	4	2007	Bottom Trawl	LE CA Halibut	14%
California Sea Lion	Killed by gear	3	2008	Bottom Trawl	LE CA Halibut	26%
California Sea Lion	Killed by gear	1	2008	Bottom Trawl	OA CA Halibut	5%
California Sea Lion	Killed by gear	1	2010	Bottom Trawl	LE and OA CA Hal.	7%
California Sea Lion	Killed by gear	1	2011	Bottom Trawl	LE CA Halibut	100%
California Sea Lion	Killed by gear	3	2011	Bottom Trawl	OA CA Halibut	16%
California Sea Lion	Killed by gear	1	2013	Bottom Trawl	OA CA Halibut	6%
California Sea Lion	Lethal removal - not trailing gear	1	2006	Bottom Trawl	LE CA Halibut	12%
California Sea Lion	Previously dead	1	2003	Bottom Trawl	OA CA Halibut	8%
California Sea Lion	Previously dead	1	2009	Bottom Trawl	OA CA Halibut	1%
Harbor Porpoise	Killed by gear	1	2004	Bottom Trawl	LE CA Halibut	23%
Harbor Seal	Deterrence used	21	2009	Bottom Trawl	OA CA Halibut	1%
Harbor Seal	Feeding on catch	5	2008	Bottom Trawl	OA CA Halibut	5%
Harbor Seal	Feeding on catch	1	2010	Bottom Trawl	LE and OA CA Hal.	7%
Harbor Seal	Killed by gear	1	2006	Bottom Trawl	LE CA Halibut	12%
Harbor Seal	Previously dead	2	2011	Bottom Trawl	OA CA Halibut	16%
Pacific White-sided Dolphin	Previously dead	2	2003	Bottom Trawl	OA CA Halibut	8%
Pinniped Unid	Previously dead	2	2007	Bottom Trawl	OA CA Halibut	7%
Sea Otter	Previously dead	1	2006	Bottom Trawl	LE CA Halibut	12%
Steller Sea Lion	Feeding on catch	11	2009	Bottom Trawl	LE CA Halibut	6%
Steller Sea Lion	Feeding on catch	4	2010	Bottom Trawl	LE and OA CA Hal.	7%
Steller Sea Lion	Feeding on catch	10	2013	Bottom Trawl	OA CA Halibut	6%
Steller Sea Lion	Killed by gear	1	2003	Bottom Trawl	LE CA Halibut	18%
Steller Sea Lion	Killed by gear	1	2008	Bottom Trawl	LE CA Halibut	26%

## 4.4 Limited Entry Sablefish - marine mammal

Table 9: Observer coverage, by year and gear for the Limited Entry Sablefish (SABL) sector.

Year	Sector	Gear	Observed				Fleet-wide		Coverage rate
			No.vessels	No.trips	No.hauls	No.fixed gear units	Observed Retained SABL (mt)	Landed SABL (mt)	
2002	Limited Entry Sablefish	Hook & Line	25	68	391	779624.0	190.8	788.5	24%
2003	Limited Entry Sablefish	Hook & Line	14	47	349	733602.0	222.8	1028.6	22%
2004	Limited Entry Sablefish	Hook & Line	17	45	320	490342.0	179.1	1305.9	14%
2005	Limited Entry Sablefish	Hook & Line	26	101	663	1454151.0	481.5	1259.7	38%
2006	Limited Entry Sablefish	Hook & Line	19	67	469	939951.0	295.9	1369.0	22%
2007	Limited Entry Sablefish	Hook & Line	22	75	517	1034046.0	298.5	1072.5	28%
2008	Limited Entry Sablefish	Hook & Line	18	77	539	1244141.0	330.0	1088.5	30%
2009	Limited Entry Sablefish	Hook & Line	9	46	287	649327.0	98.2	1439.0	7%
2010	Limited Entry Sablefish	Hook & Line	21	143	756	1759568.0	343.1	1290.5	27%
2011	Limited Entry Sablefish	Hook & Line	23	98	673	1405444.0	240.7	1147.5	21%
2012	Limited Entry Sablefish	Hook & Line	17	88	532	1580075.0	227.2	1055.0	22%
2013	Limited Entry Sablefish	Hook & Line	18	58	353	1047526.0	166.4	743.8	22%
2014	Limited Entry Sablefish	Hook & Line	17	85	486	1174141.0	199.7	737.0	27%
2002	Limited Entry Sablefish	Pot	6	23	247	5438.0	82.5	352.2	23%
2003	Limited Entry Sablefish	Pot	6	35	362	9017.0	148.3	604.2	25%
2004	Limited Entry Sablefish	Pot	3	13	139	5378.0	82.7	619.6	13%
2005	Limited Entry Sablefish	Pot	7	39	491	13786.0	281.1	615.0	46%
2006	Limited Entry Sablefish	Pot	7	39	288	10708.0	200.5	581.8	34%
2007	Limited Entry Sablefish	Pot	4	30	154	5816.0	90.0	428.4	21%
2008	Limited Entry Sablefish	Pot	6	24	329	13638.0	244.9	433.0	57%
2009	Limited Entry Sablefish	Pot	3	27	67	3883.0	66.5	489.1	14%
2010	Limited Entry Sablefish	Pot	7	43	314	11294.0	139.4	508.9	27%
2011	Limited Entry Sablefish	Pot	3	22	227	9029.0	137.4	371.9	37%
2012	Limited Entry Sablefish	Pot	5	19	351	14218.0	101.1	296.9	34%
2013	Limited Entry Sablefish	Pot	3	14	47	1934.0	40.5	283.1	14%
2014	Limited Entry Sablefish	Pot	4	16	194	7542.0	104.0	337.3	31%

Table 10: Marine mammal interactions observed in Limited Entry Sablefish sector by year and gear.

Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
California Sea Lion	Deterrence used	1	2010	Hook & Line	Limited Entry Sablefish	27%
California Sea Lion	Deterrence used	9	2011	Hook & Line	Limited Entry Sablefish	21%
California Sea Lion	Entangled in gear - trailing gear	1	2010	Hook & Line	Limited Entry Sablefish	27%
California Sea Lion	Entangled in gear - trailing gear	1	2014	Hook & Line	Limited Entry Sablefish	27%

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Table 10 – continued from previous page

Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
California Sea Lion	Feeding on catch	2	2002	Hook & Line	Limited Entry Sablefish	24%
California Sea Lion	Feeding on catch	1	2003	Hook & Line	Limited Entry Sablefish	22%
California Sea Lion	Feeding on catch	5	2004	Hook & Line	Limited Entry Sablefish	14%
California Sea Lion	Feeding on catch	2	2005	Hook & Line	Limited Entry Sablefish	38%
California Sea Lion	Feeding on catch	1	2007	Hook & Line	Limited Entry Sablefish	28%
California Sea Lion	Feeding on catch	1	2008	Hook & Line	Limited Entry Sablefish	30%
California Sea Lion	Feeding on catch	11	2010	Hook & Line	Limited Entry Sablefish	27%
California Sea Lion	Feeding on catch	1	2011	Hook & Line	Limited Entry Sablefish	21%
California Sea Lion	Feeding on catch	11	2012	Hook & Line	Limited Entry Sablefish	22%
California Sea Lion	Feeding on catch	7	2013	Hook & Line	Limited Entry Sablefish	22%
California Sea Lion	Feeding on catch	25	2014	Hook & Line	Limited Entry Sablefish	27%
California Sea Lion	Killed by gear	1	2003	Hook & Line	Limited Entry Sablefish	22%
California Sea Lion	Killed by gear	1	2004	Hook & Line	Limited Entry Sablefish	14%
California Sea Lion	Killed by gear	5	2005	Hook & Line	Limited Entry Sablefish	38%
Humpback Whale	Killed by gear	1	2014	Pot	Limited Entry Sablefish	31%
Northern Elephant Seal	Entangled in gear - not trailing gear	1	2010	Hook & Line	Limited Entry Sablefish	27%
Northern Elephant Seal	Killed by gear	1	2006	Hook & Line	Limited Entry Sablefish	22%
Northern Elephant Seal	Killed by gear	1	2012	Hook & Line	Limited Entry Sablefish	22%
Northern Elephant Seal	Previously dead	1	2003	Hook & Line	Limited Entry Sablefish	22%
Northern Fur Seal	Feeding on catch	3	2014	Hook & Line	Limited Entry Sablefish	27%
Northern Fur Seal	Feeding on catch	1	2014	Pot	Limited Entry Sablefish	31%
Northern Fur Seal	Other	1	2011	Hook & Line	Limited Entry Sablefish	21%
Pinniped Unid	Deterrence used	1	2010	Hook & Line	Limited Entry Sablefish	27%
Sea Lion Unid	Deterrence used	1	2010	Hook & Line	Limited Entry Sablefish	27%
Sea Lion Unid	Deterrence used	3	2011	Hook & Line	Limited Entry Sablefish	21%
Sea Lion Unid	Feeding on catch	3	2011	Hook & Line	Limited Entry Sablefish	21%
Sea Lion Unid	Killed by gear	1	2011	Hook & Line	Limited Entry Sablefish	21%
Sea Lion Unid	Previously dead	1	2005	Pot	Limited Entry Sablefish	46%
Sperm Whale	Feeding on catch	1	2005	Hook & Line	Limited Entry Sablefish	38%
Sperm Whale	Feeding on catch	1	2008	Hook & Line	Limited Entry Sablefish	30%
Sperm Whale	Feeding on catch	3	2009	Hook & Line	Limited Entry Sablefish	7%
Sperm Whale	Feeding on catch	5	2010	Hook & Line	Limited Entry Sablefish	27%
Sperm Whale	Feeding on catch	1	2013	Hook & Line	Limited Entry Sablefish	22%
Sperm Whale	Feeding on catch	2	2014	Hook & Line	Limited Entry Sablefish	27%
Sperm Whale	Other	1	2003	Pot	Limited Entry Sablefish	24%
Sperm Whale	Other	1	2007	Hook & Line	Limited Entry Sablefish	28%
Sperm Whale	Other	2	2011	Pot	Limited Entry Sablefish	37%
Steller Sea Lion	Deterrence used	1	2010	Hook & Line	Limited Entry Sablefish	27%
Steller Sea Lion	Deterrence used	7	2011	Hook & Line	Limited Entry Sablefish	21%
Steller Sea Lion	Feeding on catch	2	2005	Hook & Line	Limited Entry Sablefish	38%
Steller Sea Lion	Feeding on catch	1	2007	Hook & Line	Limited Entry Sablefish	28%
Steller Sea Lion	Feeding on catch	6	2008	Hook & Line	Limited Entry Sablefish	30%

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Table 10 – continued from previous page

Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
Steller Sea Lion	Feeding on catch	12	2010	Hook & Line	Limited Entry Sablefish	27%
Steller Sea Lion	Feeding on catch	4	2010	Pot	Limited Entry Sablefish	27%
Steller Sea Lion	Feeding on catch	18	2011	Hook & Line	Limited Entry Sablefish	21%
Steller Sea Lion	Feeding on catch	1	2012	Hook & Line	Limited Entry Sablefish	22%
Steller Sea Lion	Feeding on catch	2	2013	Hook & Line	Limited Entry Sablefish	22%
Steller Sea Lion	Feeding on catch	4	2014	Hook & Line	Limited Entry Sablefish	27%

## 4.5 Open Access Fixed Gear - marine mammals

Table 11: Observer coverage, by year and gear for the Open Access Fixed Gear sector. GF = groundfish

Year	Sector	Gear	Observed				Fleet-wide		Coverage rate
			No.vessels	No.trips	No.hauls	No.fixed gear units	Observed Retained GF (mt)	Landed GF (mt)	
2003	OA Fixed Gear	Hook & Line	13	41	49	86518.0	16.6	548.6	3%
2004	OA Fixed Gear	Hook & Line	14	42	50	85845.0	16.2	474.4	3%
2005	OA Fixed Gear	Hook & Line	10	34	37	58384.0	9.8	624.9	2%
2006	OA Fixed Gear	Hook & Line	7	10	11	29296.0	4.5	495.2	1%
2007	OA Fixed Gear	Hook & Line	25	50	66	53615.0	10.4	272.2	4%
2008	OA Fixed Gear	Hook & Line	33	58	68	73885.0	16.3	427.8	4%
2009	OA Fixed Gear	Hook & Line	33	68	101	118870.0	21.7	667.7	3%
2010	OA Fixed Gear	Hook & Line	37	69	104	158102.0	23.1	774.5	3%
2011	OA Fixed Gear	Hook & Line	40	68	100	161419.0	19.7	446.0	4%
2012	OA Fixed Gear	Hook & Line	24	34	53	82597.0	11.3	333.5	3%
2013	OA Fixed Gear	Hook & Line	14	23	30	51870.0	4.7	203.9	2%
2014	OA Fixed Gear	Hook & Line	21	28	38	71457.0	11.8	228.4	5%
2003	OA Fixed Gear	Pot	7	16	50	345.0	2.9	186.4	2%
2004	OA Fixed Gear	Pot	17	96	185	1950.0	17.0	186.0	9%
2005	OA Fixed Gear	Pot	14	43	50	835.0	10.7	379.3	3%
2006	OA Fixed Gear	Pot	15	38	39	666.0	7.9	443.0	2%
2007	OA Fixed Gear	Pot	20	45	72	614.0	8.7	257.6	3%
2008	OA Fixed Gear	Pot	20	55	74	831.0	10.6	241.0	4%
2009	OA Fixed Gear	Pot	18	30	45	540.0	8.5	373.0	2%
2010	OA Fixed Gear	Pot	26	40	69	644.0	10.6	325.7	3%
2011	OA Fixed Gear	Pot	28	60	84	830.0	18.9	255.8	7%
2012	OA Fixed Gear	Pot	19	35	70	610.0	9.1	126.8	7%
2013	OA Fixed Gear	Pot	17	25	48	590.0	6.3	72.2	9%
2014	OA Fixed Gear	Pot	21	41	63	686.0	11.7	147.8	8%

Table 12: Marine mammal interactions observed in Open Access Fixed Gear sector by year and gear.

Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
California Sea Lion	Feeding on catch	2	2003	Hook & Line	OA Fixed Gear	3%
California Sea Lion	Feeding on catch	1	2004	Pot	OA Fixed Gear	9%
California Sea Lion	Feeding on catch	1	2007	Hook & Line	OA Fixed Gear	4%
California Sea Lion	Feeding on catch	13	2009	Hook & Line	OA Fixed Gear	3%
California Sea Lion	Feeding on catch	1	2009	Pot	OA Fixed Gear	2%
California Sea Lion	Feeding on catch	1	2011	Hook & Line	OA Fixed Gear	4%

Continued on next page

Table 12 – continued from previous page

Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
California Sea Lion	Feeding on catch	63	2012	Hook & Line	OA Fixed Gear	3%
California Sea Lion	Feeding on catch	1	2013	Hook & Line	OA Fixed Gear	2%
Dalls Porpoise	Feeding on catch	3	2011	Hook & Line	OA Fixed Gear	4%
Northern Elephant Seal	Feeding on catch	1	2010	Hook & Line	OA Fixed Gear	3%
Sperm Whale	Deterrence used	2	2010	Hook & Line	OA Fixed Gear	3%
Steller Sea Lion	Deterrence used	14	2011	Hook & Line	OA Fixed Gear	4%
Steller Sea Lion	Feeding on catch	1	2007	Hook & Line	OA Fixed Gear	4%
Steller Sea Lion	Feeding on catch	1	2009	Hook & Line	OA Fixed Gear	3%
Steller Sea Lion	Feeding on catch	1	2013	Hook & Line	OA Fixed Gear	2%

## 4.6 Limited Entry Daily Trip Limits - marine mammals

Table 13: Observer coverage, by year for the Limited Entry Daily Trip Limit (DTL) sector. Note that the Observer Program does not cover LE DTL vessels fishing pot gear. GF = groundfish

Year	Sector	Gear	Observed				Fleet-wide		Coverage rate
			No.vessels	No.trips	No.hauls	No.fixed gear units	Observed Retained GF (mt)	Landed GF (mt)	
2002	LE Fixed Gear DTL	Hook & Line	4	11	22	46000.0	3.0	626.9	0%
2003	LE Fixed Gear DTL	Hook & Line	17	130	219	537817.0	32.1	546.5	6%
2004	LE Fixed Gear DTL	Hook & Line	14	62	130	318048.0	15.9	399.7	4%
2005	LE Fixed Gear DTL	Hook & Line	11	35	60	198150.0	9.3	553.8	2%
2006	LE Fixed Gear DTL	Hook & Line	21	121	196	527594.0	23.8	467.8	5%
2007	LE Fixed Gear DTL	Hook & Line	36	158	303	724389.0	37.6	515.0	7%
2008	LE Fixed Gear DTL	Hook & Line	32	122	220	631653.0	31.8	642.3	5%
2009	LE Fixed Gear DTL	Hook & Line	34	138	271	668813.0	30.3	812.0	4%
2010	LE Fixed Gear DTL	Hook & Line	38	226	470	1102420.0	57.6	1016.0	6%
2011	LE Fixed Gear DTL	Hook & Line	38	201	426	1154241.0	83.7	1241.7	7%
2012	LE Fixed Gear DTL	Hook & Line	26	128	252	706437.0	28.7	806.4	4%
2013	LE Fixed Gear DTL	Hook & Line	22	124	248	705827.0	32.1	796.2	4%
2014	LE Fixed Gear DTL	Hook & Line	18	77	154	493845.0	23.8	714.8	3%

Table 14: Marine mammal interactions observed in Limited Entry Daily Trip Limit (DTL) sector by year and gear.

Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
Bottlenose Dolphin	Entangled in gear - not trailing gear	1	2009	Hook & Line	LE Fixed Gear DTL	4%
California Sea Lion	Deterrence used	1	2004	Hook & Line	LE Fixed Gear DTL	4%
California Sea Lion	Deterrence used	11	2007	Hook & Line	LE Fixed Gear DTL	7%
California Sea Lion	Entangled in gear - not trailing gear	1	2004	Hook & Line	LE Fixed Gear DTL	4%
California Sea Lion	Entangled in gear - not trailing gear	1	2007	Hook & Line	LE Fixed Gear DTL	7%
California Sea Lion	Feeding on catch	1	2003	Hook & Line	LE Fixed Gear DTL	6%
California Sea Lion	Feeding on catch	52	2006	Hook & Line	LE Fixed Gear DTL	5%
California Sea Lion	Feeding on catch	4	2007	Hook & Line	LE Fixed Gear DTL	7%
California Sea Lion	Feeding on catch	1	2008	Hook & Line	LE Fixed Gear DTL	5%
California Sea Lion	Feeding on catch	3	2009	Hook & Line	LE Fixed Gear DTL	4%
California Sea Lion	Feeding on catch	11	2010	Hook & Line	LE Fixed Gear DTL	6%
California Sea Lion	Feeding on catch	2	2011	Hook & Line	LE Fixed Gear DTL	7%
California Sea Lion	Feeding on catch	11	2012	Hook & Line	LE Fixed Gear DTL	4%
California Sea Lion	Feeding on catch	6	2013	Hook & Line	LE Fixed Gear DTL	4%
California Sea Lion	Feeding on catch	3	2014	Hook & Line	LE Fixed Gear DTL	3%
Harbor Seal	Killed by gear	1	2009	Hook & Line	LE Fixed Gear DTL	4%

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Table 14 – continued from previous page

Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
Pinniped Unid	Feeding on catch	1	2007	Hook & Line	LE Fixed Gear DTL	7%
Pinniped Unid	Killed by gear	1	2007	Hook & Line	LE Fixed Gear DTL	7%

## 4.7 Nearshore - marine mammals

Table 15: Observer coverage, by year for state Nearshore fisheries. The Observer Program does combines fixed gear types for these fisheries for reporting purposes. NS = nearshore species

Year	Sector	Gear	Observed				Fleet-wide		Coverage rate
			No.vessels	No.trips	No.hauls	No.fixed gear units	Observed Retained NS (mt)	Landed NS (mt)	
2003	Nearshore	Fixed Gears	32	108	205	54905.0	8.1	463.9	2%
2004	Nearshore	Fixed Gears	98	367	629	144198.0	33.5	501.4	7%
2005	Nearshore	Fixed Gears	96	308	386	124462.0	24.7	462.0	5%
2006	Nearshore	Fixed Gears	96	342	538	121421.0	27.8	426.5	7%
2007	Nearshore	Fixed Gears	76	303	466	132470.0	28.2	456.2	6%
2008	Nearshore	Fixed Gears	70	225	270	109599.0	20.8	483.3	4%
2009	Nearshore	Fixed Gears	73	239	341	132848.0	20.6	485.0	4%
2010	Nearshore	Fixed Gears	82	253	327	192485.0	20.3	392.3	5%
2011	Nearshore	Fixed Gears	89	349	454	226749.0	24.3	411.8	6%
2012	Nearshore	Fixed Gears	98	385	526	265696.0	32.4	398.5	8%
2013	Nearshore	Fixed Gears	104	353	454	195075.0	27.7	429.2	6%
2014	Nearshore	Fixed Gears	98	308	374	173792.0	28.3	452.9	6%

Table 16: Marine mammal interactions observed in state Nearshore fisheries by year and gear.

Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
California Sea Lion	Boarded vessel	1	2006	Fixed Gears	Nearshore	6%
California Sea Lion	Entangled in gear - not trailing gear	1	2006	Fixed Gears	Nearshore	6%
California Sea Lion	Feeding on catch	5	2004	Fixed Gears	Nearshore	7%
California Sea Lion	Feeding on catch	1	2007	Fixed Gears	Nearshore	6%
California Sea Lion	Feeding on catch	2	2011	Fixed Gears	Nearshore	6%
California Sea Lion	Previously dead	1	2012	Fixed Gears	Nearshore	8%
Harbor Seal	Entangled in gear - not trailing gear	1	2008	Fixed Gears	Nearshore	4%
Harbor Seal	Entangled in gear - not trailing gear	1	2009	Fixed Gears	Nearshore	4%
Harbor Seal	Entangled in gear - trailing gear	1	2008	Fixed Gears	Nearshore	4%
Harbor Seal	Feeding on catch	2	2003	Fixed Gears	Nearshore	2%
Harbor Seal	Feeding on catch	9	2004	Fixed Gears	Nearshore	7%
Harbor Seal	Feeding on catch	1	2009	Fixed Gears	Nearshore	4%
Harbor Seal	Unknown	1	2006	Fixed Gears	Nearshore	6%
Sea Lion Unid	Deterrence used	3	2006	Fixed Gears	Nearshore	6%
Steller Sea Lion	Deterrence used	1	2010	Fixed Gears	Nearshore	5%
Steller Sea Lion	Feeding on catch	4	2006	Fixed Gears	Nearshore	6%
Steller Sea Lion	Feeding on catch	1	2007	Fixed Gears	Nearshore	6%

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Table 16 – continued from previous page

Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
Steller Sea Lion	Feeding on catch	1	2012	Fixed Gears	Nearshore	8%

## 4.8 Pink Shrimp - marine mammals

Table 17: Observer coverage, by year for the state Pink Shrimp (PS) fisheries. Pink shrimp fisheries were not observed in 2003 or 2006.

Year	Sector	Gear	Observed				Fleet-wide		Coverage rate
			No.vessels	No.trips	No.hauls	Tow duration (hrs)	Observed Retained PS (mt)	Landed PS (mt)	
2004	Pink Shrimp	Shrimp Trawl	22	57	1027	2246.8	583.9	8974.3	7%
2005	Pink Shrimp	Shrimp Trawl	23	38	509	984.5	424.7	10861.9	4%
2007	Pink Shrimp	Shrimp Trawl	30	63	951	1770.1	672.7	10935.0	6%
2008	Pink Shrimp	Shrimp Trawl	31	55	840	1487.8	805.8	15374.6	5%
2009	Pink Shrimp	Shrimp Trawl	36	59	708	1041.4	881.6	14412.2	6%
2010	Pink Shrimp	Shrimp Trawl	51	126	1654	2376.4	2383.3	20357.0	12%
2011	Pink Shrimp	Shrimp Trawl	57	186	2579	4026.9	4103.8	29459.9	14%
2012	Pink Shrimp	Shrimp Trawl	64	200	2731	4461.4	3994.4	29324.6	14%
2013	Pink Shrimp	Shrimp Trawl	67	153	1916	2945.7	3299.8	31611.0	10%
2014	Pink Shrimp	Shrimp Trawl	62	175	2128	3131.8	3869.7	41271.8	9%

Table 18: Marine mammal interactions observed in state Pink Shrimp fisheries by year and gear.

Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
California Sea Lion	Feeding on catch	6	2004	Shrimp Trawl	Pink Shrimp	6%
California Sea Lion	Feeding on catch	1	2008	Shrimp Trawl	Pink Shrimp	5%
California Sea Lion	Feeding on catch	2	2011	Shrimp Trawl	Pink Shrimp	14%
Steller Sea Lion	Feeding on catch	4	2012	Shrimp Trawl	Pink Shrimp	14%
Steller Sea Lion	Feeding on catch	2	2013	Shrimp Trawl	Pink Shrimp	10%

### 4.9 Exempted Fishing Permit Vessels - marine mammals

Year	Sector	Gear	Observed							
			Vessels (no.)	Trips (no.)	Hauls (no.)	FG.units (no.)	Tow duration or Soak time (hrs)	Observed Retained GF (mt)	Observed Retained P.hake (mt)	Coverage rate
2002	CA Flatfish EFP	Bottom Trawl	4	13	41		202.6	42.0		100%
2002	WA Yellowtail EFP	Bottom & Mid-water Trawl	1	10	30		70.5	13.7		100%
2002-2004	WA Arrowtooth EFP	Bottom & Mid-water Trawl	3	47	652		1405.6	1364.5		100%
2003	OR Flatfish EFP	Bottom Trawl	8	127	1239		3322.1	981.9		100%
2003-2004	CA Flatfish EFP	Bottom Trawl	5	58	188		328.7	129.5		100%
2004	OR DTS EFP	Bottom Trawl	2	11	88		371.4	103.9		100%
2006	P. Hake EFPs	Bottom & Mid-water Trawl	8	47	78		137.8	0.4	1861.5	100%
2008	CA TNC EFPs	Hook & Line	3	29	162	92500	587.0	30.0		100%
2009	CA TNC EFPs	Hook & Line	5	83	141	426127	1175.0	115.2		100%
2010	CA TNC EFPs	Fixed Gears	6	136	389	1073176	15834.1	236.0		100%
2013-2014	Emley-Platt & Fosmark EFPs	Hook & Line	4	16	187	15655	97.3	5.1		100%

Table 20: Marine mammal interactions observed on groundfish Exempted Fishing Permit(EFP) vessels by year and gear.

Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
California Sea Lion	Entangled in gear - not trailing gear	2	2010	Fixed Gears	CA TNC EFPs	100%
California Sea Lion	Entangled in gear - trailing gear	1	2009	Hook & Line	CA TNC EFPs	100%
California Sea Lion	Feeding on catch	6	2003	Bottom Trawl	OR Flatfish EFP	100%
California Sea Lion	Feeding on catch	6	2008	Hook & Line	CA TNC EFPs	100%
California Sea Lion	Feeding on catch	59	2009	Hook & Line	CA TNC EFPs	100%
California Sea Lion	Feeding on catch	56	2010	Fixed Gears	CA TNC EFPs	100%
California Sea Lion	Feeding on catch	2	2010	Fixed Gears	CA TNC EFPs	100%
California Sea Lion	Killed by gear	1	2002	Bottom Trawl	CA Flatfish EFP	100%
California Sea Lion	Killed by gear	1	2003-2004	Bottom Trawl	CA Flatfish EFP	100%
Harbor Seal	Killed by gear	1	2002-2004	Bottom & Midwater Trawl	WA Arrowtooth EFP	100%
Pacific White-sided Dolphin	Feeding on catch	8	2010	Fixed Gears	CA TNC EFPs	100%

## 5 Seabird Observed Interactions

### 5.1 At-sea Hake sectors - seabirds

Table 21: Observer coverage, by year for At-sea Hake sectors. Tribal data for some years is not shown because of confidentiality (2012) or no fishing (2013,2014). MS = Mothership

Year	Sector	Gear	No.vessels	Sampled tows	Unsampled tows	Tows sampled(%)	Tow duration (hrs)	Sampled P.hake (mt)	Coverage rate
2002	Catcher Processor	Midwater Trawl	5	556	1	99.8	1061.3	36332.9	100%
2003	Catcher Processor	Midwater Trawl	6	766	1	99.9	911	41468.6	100%
2004	Catcher Processor	Midwater Trawl	6	1492	4	99.7	1973.4	72858.7	100%
2005	Catcher Processor	Midwater Trawl	6	1332	2	99.9	2238.8	78497.5	100%
2006	Catcher Processor	Midwater Trawl	9	1488	2	99.9	2980.7	78246.3	100%
2007	Catcher Processor	Midwater Trawl	9	1566	4	99.7	4403.7	72898.1	100%
2008	Catcher Processor	Midwater Trawl	8	1864	18	99	5557.9	107754.4	100%
2009	Catcher Processor	Midwater Trawl	5	863	0	100	1932.4	34590.8	100%
2010	Catcher Processor	Midwater Trawl	6	1063	1	99.9	2653.1	54217.3	100%
2011	Catcher Processor	Midwater Trawl	9	1530	4	99.7	4761.9	71336.7	100%
2012	Catcher Processor	Midwater Trawl	9	1100	2	99.8	3545.6	55522.6	100%
2013	Catcher Processor	Midwater Trawl	9	1439	4	99.7	3293.9	78004.8	100%
2014	Catcher Processor	Midwater Trawl	9	1683	1	99.9	4731.4	103171.3	100%
2002	MS Catcher Vessels	Midwater Trawl	11	573	1	99.8	1624.6	26502.9	100%
2003	MS Catcher Vessels	Midwater Trawl	12	522	14	97.4	500.9	25332.9	100%
2004	MS Catcher Vessels	Midwater Trawl	10	569	2	99.6	796.8	24010.1	100%
2005	MS Catcher Vessels	Midwater Trawl	18	1038	1	99.9	1882.7	48600.6	100%
2006	MS Catcher Vessels	Midwater Trawl	20	1243	40	96.9	2325.7	54138.8	100%
2007	MS Catcher Vessels	Midwater Trawl	20	1135	11	99	3133.6	47276.3	100%
2008	MS Catcher Vessels	Midwater Trawl	19	1346	3	99.8	3866.2	57687.4	100%
2009	MS Catcher Vessels	Midwater Trawl	19	597	3	99.5	1686.3	24066.4	100%
2010	MS Catcher Vessels	Midwater Trawl	22	908	0	100	2804.5	35726.9	100%
2011	MS Catcher Vessels	Midwater Trawl	18	1246	2	99.8	2975.7	49970.6	100%
2012	MS Catcher Vessels	Midwater Trawl	16	931	18	98.1	3161.8	38042.1	100%
2013	MS Catcher Vessels	Midwater Trawl	18	1249	7	99.4	3075.7	52348.3	100%
2014	MS Catcher Vessels	Midwater Trawl	19	1288	18	98.6	3547.1	61793.7	100%
2002	Tribal	Midwater Trawl	4	625	8	98.7	1003.8	21629	100%
2003	Tribal	Midwater Trawl	4	537	3	99.4	740.4	19430.8	100%
2004	Tribal	Midwater Trawl	5	632	0	100	577.3	23511.4	100%
2005	Tribal	Midwater Trawl	4	632	1	99.8	674.5	23561.6	100%
2006	Tribal	Midwater Trawl	4	154	6	96.2	270.8	5405.4	100%
2007	Tribal	Midwater Trawl	5	156	0	100	283.2	5129.4	100%
2008	Tribal	Midwater Trawl	5	380	2	99.5	486.5	14977.3	100%
2009	Tribal	Midwater Trawl	5	403	1	99.8	834.3	13469.4	100%

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Table 21 – continued from previous page

Year	Sector	Gear	No.vessels	Sampled tows	Unsampled tows	Tows sampled(%)	Tow duration (hrs)	Sampled P.hake (mt)	Coverage rate
2010	Tribal	Midwater Trawl	6	516	0	100	633.5	16206.2	100%
2011	Tribal	Midwater Trawl	5	228	0	100	409.6	6146.9	100%
2012	Tribal	Midwater Trawl	*	*	*	*	*	*	*
2013	Tribal	Midwater Trawl	0	–	–	–	–	–	–
2014	Tribal	Midwater Trawl	0	–	–	–	–	–	–

Table 22: Seabird interactions observed in At-sea Hake sectors by year and gear. MS = Mothership

Species	Interaction	Year	Gear	Sector	No.individuals
Bird Unid	Gear Interaction	2008	Midwater Trawl	Catcher Processor	2
Bird Unid	Gear Interaction	2008	Midwater Trawl	MS Catcher Vessels	2
Bird Unid	Gear Interaction	2014	Midwater Trawl	Catcher Processor	1
Bird Unid	Land On Vessel	2013	Midwater Trawl	Catcher Processor	1
Bird Unid	Third Wire, Paravane Or Warp Cable Contact	2013	Midwater Trawl	Catcher Processor	1
Black-footed Albatross	Feeding On Catch	2013	Midwater Trawl	MS Catcher Vessels	75
Black-footed Albatross	Gear Interaction	2007	Midwater Trawl	Catcher Processor	2
Black-footed Albatross	Gear Interaction	2008	Midwater Trawl	Catcher Processor	1
Black-footed Albatross	Gear Interaction	2010	Midwater Trawl	Catcher Processor	1
Black-footed Albatross	Gear Interaction	2011	Midwater Trawl	Catcher Processor	3
Black-footed Albatross	Third Wire, Paravane Or Warp Cable Contact	2010	Midwater Trawl	Catcher Processor	2
Black-footed Albatross	Third Wire, Paravane Or Warp Cable Contact	2011	Midwater Trawl	Catcher Processor	2
Black-footed Albatross	Third Wire, Paravane Or Warp Cable Contact	2012	Midwater Trawl	Catcher Processor	1
Black-footed Albatross	Third Wire, Paravane Or Warp Cable Contact	2013	Midwater Trawl	Catcher Processor	2
Black-footed Albatross	Third Wire, Paravane Or Warp Cable Contact	2014	Midwater Trawl	Catcher Processor	1
Cassins Auklet	Gear Interaction	2009	Midwater Trawl	Catcher Processor	2
Cassins Auklet	Gear Interaction	2013	Midwater Trawl	Catcher Processor	1
Cassins Auklet	Gear Interaction	2014	Midwater Trawl	MS Catcher Vessels	2
Cassins Auklet	Land On Vessel	2012	Midwater Trawl	MS Catcher Vessels	1
Cassins Auklet	Land On Vessel	2014	Midwater Trawl	MS Catcher Vessels	1
Cassins Auklet	Rig Strike	2011	Midwater Trawl	Catcher Processor	1
Common (Guillemot) Murre	Land On Vessel	2010	Midwater Trawl	Catcher Processor	1
Glaucous-winged Gull	Land On Vessel	2013	Midwater Trawl	Catcher Processor	4
Gull Unid	Gear Interaction	2007	Midwater Trawl	Catcher Processor	15
Gull Unid	Gear Interaction	2010	Midwater Trawl	Catcher Processor	1
Gull Unid	Gear Interaction	2013	Midwater Trawl	Catcher Processor	1
Gull Unid	Land On Vessel	2013	Midwater Trawl	Catcher Processor	2
Gull Unid	Third Wire, Paravane Or Warp Cable Contact	2011	Midwater Trawl	Catcher Processor	8
Herring Gull	Third Wire, Paravane Or Warp Cable Contact	2013	Midwater Trawl	Catcher Processor	3
Leachs Storm-Petrel	Foraging, Not Bait	2013	Midwater Trawl	Catcher Processor	1
Leachs Storm-Petrel	Land On Vessel	2013	Midwater Trawl	Catcher Processor	1

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Table 22 – continued from previous page

Species	Interaction	Year	Gear	Sector	No.individuals
Leachs Storm-Petrel	Rig Strike	2013	Midwater Trawl	Catcher Processor	1
Northern Fulmar	Boarded Vessel	2013	Midwater Trawl	MS Catcher Vessels	1650
Northern Fulmar	Feeding On Catch	2013	Midwater Trawl	MS Catcher Vessels	100
Northern Fulmar	Gear Interaction	2007	Midwater Trawl	Catcher Processor	62
Northern Fulmar	Gear Interaction	2008	Midwater Trawl	Catcher Processor	4
Northern Fulmar	Gear Interaction	2009	Midwater Trawl	Catcher Processor	32
Northern Fulmar	Gear Interaction	2010	Midwater Trawl	Catcher Processor	9
Northern Fulmar	Gear Interaction	2011	Midwater Trawl	Catcher Processor	10
Northern Fulmar	Gear Interaction	2012	Midwater Trawl	Catcher Processor	1
Northern Fulmar	Gear Interaction	2012	Midwater Trawl	MS Catcher Vessels	1
Northern Fulmar	Gear Interaction	2013	Midwater Trawl	Catcher Processor	18
Northern Fulmar	Gear Interaction	2014	Midwater Trawl	Catcher Processor	2
Northern Fulmar	Land On Vessel	2011	Midwater Trawl	Catcher Processor	6
Northern Fulmar	Land On Vessel	2012	Midwater Trawl	MS Catcher Vessels	2
Northern Fulmar	Land On Vessel	2013	Midwater Trawl	Catcher Processor	1
Northern Fulmar	Third Wire, Paravane Or Warp Cable Contact	2011	Midwater Trawl	Catcher Processor	3
Northern Fulmar	Third Wire, Paravane Or Warp Cable Contact	2013	Midwater Trawl	Catcher Processor	31
Shearwater Unid	Gear Interaction	2007	Midwater Trawl	Catcher Processor	1
Shearwater Unid	Gear Interaction	2013	Midwater Trawl	Catcher Processor	2
Shearwater Unid	Land On Vessel	2014	Midwater Trawl	Catcher Processor	1
Short-tailed Albatross	Feeding On Catch	2011	Midwater Trawl	MS Catcher Vessels	1
Short-tailed Shearwater	Land On Vessel	2013	Midwater Trawl	Catcher Processor	1
Sooty Shearwater	Gear Interaction	2013	Midwater Trawl	Catcher Processor	1
Tubenoses Unid	Gear Interaction	2008	Midwater Trawl	Catcher Processor	2
Tubenoses Unid	Gear Interaction	2009	Midwater Trawl	Catcher Processor	6
Tubenoses Unid	Third Wire, Paravane Or Warp Cable Contact	2011	Midwater Trawl	Catcher Processor	4
Western Gull	Boarded Vessel	2013	Midwater Trawl	MS Catcher Vessels	100

## 5.2 Groundfish trawl sectors - seabirds

Note that, to maintain confidentiality, in 2002,2003,2004,2006 & 2011, both midwater and bottom trawl vessels are included in "Bottom Trawl" gear.

Table 23: Observer coverage, by year and gear for groundfish trawl sectors. Since 2011, Limited Entry Trawl vessels can fish or midwater trawl. In the case of fixed gear, Tow duration represents the Soak time of fixed gear. To maintain confidentiality in this table, in some years, Bottom Trawl gear includes both bottom and midwater trawl not targeting P. hake. GF = groundfish

Year	Sector	Gear	Observed						Fleet-wide	
			Vessels (no.)	Trips (no.)	Hauls (no.)	FG.units (no.)	Tow duration or Soak time (hrs)	Observed Retained GF (mt)	Landed GF (mt)	Coverage rate
2002	Limited Entry Trawl	Bottom Trawl	132	573	3163		13471.8	2680.0	18001.5	15%
2003	Limited Entry Trawl	Bottom Trawl	125	462	2289		11496.1	2590.4	18382.1	14%
2004	Limited Entry Trawl	Bottom Trawl	103	615	3441		13837.8	4309.8	17667.8	24%
2005	Limited Entry Trawl	Bottom Trawl	105	522	3460		12621.0	4241.6	19285.3	22%
2006	Limited Entry Trawl	Bottom Trawl	87	477	2977		11456.0	3443.3	17794.9	19%
2007	Limited Entry Trawl	Bottom Trawl	88	371	2515		11380.6	3442.3	20442.5	17%
2008	Limited Entry Trawl	Bottom Trawl	100	438	3185		15004.2	4905.2	24187.5	20%
2009	Limited Entry Trawl	Bottom Trawl	101	590	4394		19581.1	6053.5	26055.5	23%
2010	Limited Entry Trawl	Bottom Trawl	83	347	2614		13039.7	4019.5	22320.2	18%
2011	Catch Shares	Bottom Trawl	71	1110	9085		39895.4	17244.4	17244.4	100%
2011	Catch Shares	Hook & Line	11	92	622	2246390	6593.9	336.0	336.0	100%
2011	Catch Shares	Pot	17	227	1515	40916	103517.7	817.2	817.2	100%
2012	Catch Shares	Bottom Trawl	66	1071	8887		37894.6	17103.5	17103.5	100%
2012	Catch Shares	Hook & Line	8	32	500	1457804	4588.0	241.3	241.3	100%
2012	Catch Shares	Midwater Trawl	4	9	30		70.4	197.6	197.6	100%
2012	Catch Shares	Pot	19	258	1699	51939	145400.0	739.6	739.6	100%
2013	Catch Shares	Bottom Trawl	68	1211	10070		42217.7	18620.5	18620.5	100%
2013	Catch Shares	Hook & Line	4	18	153	580992	1218.0	85.6	85.6	100%
2013	Catch Shares	Midwater Trawl	5	19	59		113.1	404.7	404.7	100%
2013	Catch Shares	Pot	10	93	1078	29936	84926.9	470.8	470.8	100%
2014	Catch Shares	Bottom Trawl	63	1012	8246		34026.0	15994.9	15994.9	100%
2014	Catch Shares	Hook & Line	4	17	146	573933	1315.4	86.4	86.4	100%
2014	Catch Shares	Midwater Trawl	9	34	125		257.1	873.7	873.7	100%
2014	Catch Shares	Pot	14	113	1246	31582	81643.4	685.4	685.4	100%

Table 24: Observer coverage, by year and gear for the Shoreside Hake sector.

Year	Sector	Gear	Observed				Fleet-wide		Coverage rate
			No.vessels	No.trips	No.hauls	Tow duration (hrs)	Observed Retained P.hake (mt)	Landed P.hake (mt)	
2011	Shoreside Hake	Midwater Trawl	26	913	1701	3940.1	90249.1	90249.1	100%
2012	Shoreside Hake	Midwater Trawl	24	715	1565	5902.3	65288.4	65288.4	100%
2013	Shoreside Hake	Midwater Trawl	24	940	1702	4593.7	96867.8	96867.8	100%
2014	Shoreside Hake	Midwater Trawl	25	955	1681	4666.3	97925.2	97925.2	100%

Table 25: Seabird interactions observed in groundfish trawl sectors by year and gear.

Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
Bird Unid	Boarded vessel	8	2002	Bottom Trawl	Limited Entry Trawl	15%
Bird Unid	Boarded vessel	1	2004	Bottom Trawl	Limited Entry Trawl	24%
Bird Unid	Boarded vessel	14	2005	Bottom Trawl	Limited Entry Trawl	22%
Bird Unid	Boarded vessel	1	2008	Bottom Trawl	Limited Entry Trawl	20%
Bird Unid	Feeding on catch	1	2011	Midwater Trawl	Shoreside Hake	100%
Black-footed Albatross	Boarded vessel	1	2007	Bottom Trawl	Limited Entry Trawl	17%
Black-footed Albatross	Boarded vessel	40	2011	Bottom Trawl	Catch Shares	100%
Black-footed Albatross	Boarded vessel	8	2013	Bottom Trawl	Catch Shares	100%
Black-footed Albatross	Deterrence used	36	2013	Bottom Trawl	Catch Shares	100%
Black-footed Albatross	Entangled in gear - not trailing gear	1	2004	Bottom Trawl	Limited Entry Trawl	24%
Black-footed Albatross	Entangled in gear - not trailing gear	1	2005	Bottom Trawl	Limited Entry Trawl	22%
Black-footed Albatross	Feeding on catch	130	2002	Bottom Trawl	Limited Entry Trawl	15%
Black-footed Albatross	Feeding on catch	40	2004	Bottom Trawl	Limited Entry Trawl	24%
Black-footed Albatross	Feeding on catch	50	2005	Bottom Trawl	Limited Entry Trawl	22%
Black-footed Albatross	Feeding on catch	1	2006	Bottom Trawl	Limited Entry Trawl	19%
Black-footed Albatross	Feeding on catch	50	2007	Bottom Trawl	Limited Entry Trawl	17%
Black-footed Albatross	Feeding on catch	27	2008	Bottom Trawl	Limited Entry Trawl	20%
Black-footed Albatross	Feeding on catch	261	2009	Bottom Trawl	Limited Entry Trawl	23%
Black-footed Albatross	Feeding on catch	65	2010	Bottom Trawl	Limited Entry Trawl	18%
Black-footed Albatross	Feeding on catch	122	2011	Bottom Trawl	Catch Shares	100%
Black-footed Albatross	Feeding on catch	242	2011	Midwater Trawl	Shoreside Hake	100%
Black-footed Albatross	Feeding on catch	176	2013	Bottom Trawl	Catch Shares	100%
Black-footed Albatross	Feeding on catch	253	2014	Bottom Trawl	Catch Shares	100%
Black-footed Albatross	Killed by gear	5	2011	Hook & Line	Catch Shares	100%
Black-footed Albatross	Killed by gear	4	2012	Hook & Line	Catch Shares	100%
Black-footed Albatross	Killed by gear	2	2014	Hook & Line	Catch Shares	100%
Black-footed Albatross	Other	25	2014	Bottom Trawl	Catch Shares	100%
Brown Booby	Boarded vessel	1	2014	Bottom Trawl	Catch Shares	100%
Brown Pelican	Boarded vessel	1	2012	Bottom Trawl	Catch Shares	100%

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Table 25 – continued from previous page

Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
Brown Pelican	Feeding on catch	1	2009	Bottom Trawl	Limited Entry Trawl	23%
California Gull	Killed by gear	1	2014	Bottom Trawl	Catch Shares	100%
Cassins Auklet	Boarded vessel	10	2002	Bottom Trawl	Limited Entry Trawl	15%
Cassins Auklet	Boarded vessel	1	2004	Bottom Trawl	Limited Entry Trawl	24%
Cassins Auklet	Boarded vessel	1	2008	Bottom Trawl	Limited Entry Trawl	20%
Cassins Auklet	Boarded vessel	1	2009	Bottom Trawl	Limited Entry Trawl	23%
Cassins Auklet	Boarded vessel	1	2010	Bottom Trawl	Limited Entry Trawl	18%
Cassins Auklet	Boarded vessel	2	2011	Bottom Trawl	Catch Shares	100%
Common (Guillemot) Murre	Killed by gear	2	2004	Bottom Trawl	Limited Entry Trawl	24%
Fork-tailed Storm-Petrel	Boarded vessel	1	2003	Bottom Trawl	Limited Entry Trawl	14%
Fork-tailed Storm-Petrel	Boarded vessel	1	2004	Bottom Trawl	Limited Entry Trawl	24%
Fork-tailed Storm-Petrel	Feeding on catch	98	2011	Midwater Trawl	Shoreside Hake	100%
Gull Unid	Killed by gear	1	2011	Hook & Line	Catch Shares	100%
Gull Unid	Killed by gear	1	2012	Hook & Line	Catch Shares	100%
Gull Unid	Lethal removal - not trailing gear	1	2005	Bottom Trawl	Limited Entry Trawl	22%
Herring Gull	Killed by gear	1	2011	Bottom Trawl	Catch Shares	100%
Laysan Albatross	Boarded vessel	1	2005	Bottom Trawl	Limited Entry Trawl	22%
Laysan Albatross	Feeding on catch	1	2004	Bottom Trawl	Limited Entry Trawl	24%
Laysan Albatross	Feeding on catch	1	2006	Bottom Trawl	Limited Entry Trawl	19%
Laysan Albatross	Feeding on catch	1	2007	Bottom Trawl	Limited Entry Trawl	17%
Laysan Albatross	Feeding on catch	5	2009	Bottom Trawl	Limited Entry Trawl	23%
Laysan Albatross	Feeding on catch	1	2014	Midwater Trawl	Shoreside Hake	100%
Laysan Albatross	Other	1	2002	Bottom Trawl	Limited Entry Trawl	15%
Laysan Albatross	Other	1	2013	Bottom Trawl	Catch Shares	100%
Leachs Storm-Petrel	Boarded vessel	1	2002	Bottom Trawl	Limited Entry Trawl	15%
Leachs Storm-Petrel	Boarded vessel	1	2003	Bottom Trawl	Limited Entry Trawl	14%
Leachs Storm-Petrel	Boarded vessel	2	2007	Bottom Trawl	Limited Entry Trawl	17%
Leachs Storm-Petrel	Boarded vessel	1	2011	Bottom Trawl	Catch Shares	100%
Leachs Storm-Petrel	Killed by gear	1	2002	Bottom Trawl	Limited Entry Trawl	15%
Leachs Storm-Petrel	Killed by gear	1	2007	Bottom Trawl	Limited Entry Trawl	17%
Marbled Murrelet	Boarded vessel	1	2002	Bottom Trawl	Limited Entry Trawl	15%
Mew Gull	Killed by gear	1	2011	Hook & Line	Catch Shares	100%
Murre Unid	Killed by gear	1	2012	Bottom Trawl	Catch Shares	100%
Northern Fulmar	Boarded vessel	2	2002	Bottom Trawl	Limited Entry Trawl	15%
Northern Fulmar	Boarded vessel	2	2003	Bottom Trawl	Limited Entry Trawl	14%
Northern Fulmar	Boarded vessel	1	2007	Bottom Trawl	Limited Entry Trawl	17%
Northern Fulmar	Boarded vessel	2	2009	Bottom Trawl	Limited Entry Trawl	23%
Northern Fulmar	Boarded vessel	22	2011	Bottom Trawl	Catch Shares	100%
Northern Fulmar	Boarded vessel	1	2011	Midwater Trawl	Shoreside Hake	100%
Northern Fulmar	Boarded vessel	10	2014	Bottom Trawl	Catch Shares	100%
Northern Fulmar	Feeding on catch	739	2011	Midwater Trawl	Shoreside Hake	100%
Northern Fulmar	Killed by gear	1	2002	Bottom Trawl	Limited Entry Trawl	15%

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Table 25 – continued from previous page

Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
Northern Fulmar	Killed by gear	1	2011	Pot	Catch Shares	100%
Northern Fulmar	Killed by gear	1	2012	Bottom Trawl	Catch Shares	100%
Northern Fulmar	Killed by gear	2	2014	Hook & Line	Catch Shares	100%
Northern Fulmar	Other	1	2011	Midwater Trawl	Shoreside Hake	100%
Pink-footed Shearwater	Feeding on catch	4	2011	Midwater Trawl	Shoreside Hake	100%
Rhinoceros Auklet	Boarded vessel	1	2003	Bottom Trawl	Limited Entry Trawl	14%
Rhinoceros Auklet	Boarded vessel	1	2009	Bottom Trawl	Limited Entry Trawl	23%
Shearwater Unid	Boarded vessel	1	2003	Bottom Trawl	Limited Entry Trawl	14%
Shearwater Unid	Boarded vessel	1	2007	Bottom Trawl	Limited Entry Trawl	17%
Shearwater Unid	Entangled in gear - not trailing gear	1	2011	Midwater Trawl	Shoreside Hake	100%
Short-tailed Albatross	Feeding on catch	2	2002	Bottom Trawl	Limited Entry Trawl	15%
Short-tailed Albatross	Feeding on catch	2	2009	Bottom Trawl	Limited Entry Trawl	23%
Short-tailed Albatross	Feeding on catch	3	2010	Bottom Trawl	Limited Entry Trawl	18%
Short-tailed Albatross	Feeding on catch	4	2011	Bottom Trawl	Catch Shares	100%
Short-tailed Albatross	Feeding on catch	1	2011	Midwater Trawl	Shoreside Hake	100%
Short-tailed Albatross	Feeding on catch	3	2012	Bottom Trawl	Catch Shares	100%
Short-tailed Albatross	Feeding on catch	2	2012	Midwater Trawl	Shoreside Hake	100%
Short-tailed Albatross	Feeding on catch	2	2012	Pot	Catch Shares	100%
Short-tailed Albatross	Feeding on catch	3	2013	Bottom Trawl	Catch Shares	100%
Short-tailed Albatross	Feeding on catch	1	2013	Midwater Trawl	Shoreside Hake	100%
Short-tailed Albatross	Feeding on catch	4	2014	Bottom Trawl	Catch Shares	100%
Short-tailed Albatross	Other	1	2011	Hook & Line	Catch Shares	100%
Sooty Shearwater	Feeding on catch	12	2011	Midwater Trawl	Shoreside Hake	100%
Sooty Shearwater	Killed by gear	2	2013	Bottom Trawl	Catch Shares	100%
Storm-Petrel Unid	Boarded vessel	1	2003	Bottom Trawl	Limited Entry Trawl	14%
Storm-Petrel Unid	Boarded vessel	1	2004	Bottom Trawl	Limited Entry Trawl	24%
Storm-Petrel Unid	Boarded vessel	1	2009	Bottom Trawl	Limited Entry Trawl	23%
Storm-Petrel Unid	Entangled in gear - not trailing gear	1	2003	Bottom Trawl	Limited Entry Trawl	14%
Storm-Petrel Unid	Entangled in gear - not trailing gear	1	2011	Bottom Trawl	Catch Shares	100%
Storm-Petrel Unid	Entangled in gear - not trailing gear	1	2013	Bottom Trawl	Catch Shares	100%
Storm-Petrel Unid	Entangled in gear - not trailing gear	1	2013	Pot	Catch Shares	100%
Storm-Petrel Unid	Killed by gear	1	2004	Bottom Trawl	Limited Entry Trawl	24%
Storm-Petrel Unid	Other	1	2013	Bottom Trawl	Catch Shares	100%
Western Gull	Boarded vessel	2	2009	Bottom Trawl	Limited Entry Trawl	23%
Western Gull	Feeding on catch	23	2011	Midwater Trawl	Shoreside Hake	100%
Western Gull	Killed by gear	1	2011	Hook & Line	Catch Shares	100%
Western Gull	Killed by gear	29	2012	Hook & Line	Catch Shares	100%
Western Gull	Other	23	2009	Bottom Trawl	Limited Entry Trawl	23%

## 5.3 California halibut- seabirds

Table 26: Observer coverage, by year for the California halibut (CHLB) fishery. Since 2013, LE CA Halibut data has been combined with Catch Shares bottom trawl data.

Year	Sector	Gear	Observed				Fleet-wide		Coverage rate
			No.vessels	No.trips	No.hauls	Tow duration (hrs)	Observed Retained CHLB (mt)	Landed CHLB (mt)	
2002	LE CA Halibut	Bottom Trawl	7	19	52	240.1	3.6	105.2	3%
2003	LE CA Halibut	Bottom Trawl	12	73	206	794.4	19.1	105.5	18%
2004	LE CA Halibut	Bottom Trawl	8	46	170	774.1	31.5	136.3	23%
2005	LE CA Halibut	Bottom Trawl	10	74	233	898.8	30.5	188.9	16%
2006	LE CA Halibut	Bottom Trawl	9	78	224	613.1	14.3	119.5	12%
2007	LE CA Halibut	Bottom Trawl	5	39	80	329.7	5.4	39.2	14%
2008	LE CA Halibut	Bottom Trawl	6	40	118	484.9	9.6	36.4	26%
2009	LE CA Halibut	Bottom Trawl	3	12	29	83.7	2.9	47.2	6%
2010	LE and OA CA Hal.	Bottom Trawl	8	43	152	367.3	8.7	123.6	7%
2011	LE CA Halibut	Bottom Trawl	3	63	157	513.3	11.9	11.9	100%
2012	LE CA Halibut	Bottom Trawl	*	*	*	*	*	*	*
2003	OA CA Halibut	Bottom Trawl	5	18	110	145.0	2.0	25.8	8%
2004	OA CA Halibut	Bottom Trawl	4	53	244	381.9	5.1	70.8	7%
2005	OA CA Halibut	Bottom Trawl	6	59	360	550.8	7.5	64.5	12%
2007	OA CA Halibut	Bottom Trawl	8	48	226	274.9	2.7	39.2	7%
2008	OA CA Halibut	Bottom Trawl	7	49	197	224.3	2.6	51.9	5%
2009	OA CA Halibut	Bottom Trawl	3	9	30	53.5	0.6	82.4	1%
2011	OA CA Halibut	Bottom Trawl	13	48	204	486.9	12.4	79.9	16%
2012	OA CA Halibut	Bottom Trawl	7	27	77	182.6	3.5	55.2	6%
2013	OA CA Halibut	Bottom Trawl	5	29	81	258.1	4.3	68.9	6%
2014	OA CA Halibut	Bottom Trawl	6	51	145	426.0	18.1	81.4	22%

Table 27: Seabird interactions observed in California halibut fishery by year and gear.

Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
Brandts Cormorant	Killed by gear	1	2003	Bottom Trawl	LE CA Halibut	18%
Brandts Cormorant	Killed by gear	1	2014	Bottom Trawl	OA CA Halibut	22%
Common (Guillemot) Murre	Killed by gear	36	2003	Bottom Trawl	LE CA Halibut	18%
Common (Guillemot) Murre	Killed by gear	1	2003	Bottom Trawl	OA CA Halibut	8%
Common (Guillemot) Murre	Killed by gear	4	2004	Bottom Trawl	LE CA Halibut	23%
Common (Guillemot) Murre	Killed by gear	1	2011	Bottom Trawl	OA CA Halibut	16%
Cormorant Unid	Entangled in gear - not trailing gear	1	2010	Bottom Trawl	LE and OA CA Hal.	7%
Cormorant Unid	Killed by gear	2	2003	Bottom Trawl	LE CA Halibut	18%

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Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
Cormorant Unid	Killed by gear	2	2004	Bottom Trawl	LE CA Halibut	23%
Cormorant Unid	Killed by gear	1	2005	Bottom Trawl	OA CA Halibut	12%
Cormorant Unid	Killed by gear	1	2007	Bottom Trawl	OA CA Halibut	7%
Cormorant Unid	Killed by gear	2	2010	Bottom Trawl	LE and OA CA Hal.	7%

## 5.4 Limited Entry Sablefish- seabirds

Table 28: Observer coverage, by year and gear for the Limited Entry Sablefish (SABL) sector.

Year	Sector	Gear	Observed				Fleet-wide		Coverage rate
			No.vessels	No.trips	No.hauls	No.fixed gear units	Observed Retained SABL (mt)	Landed SABL (mt)	
2002	Limited Entry Sablefish	Hook & Line	25	68	391	779624.0	190.8	788.5	24%
2003	Limited Entry Sablefish	Hook & Line	14	47	349	733602.0	222.8	1028.6	22%
2004	Limited Entry Sablefish	Hook & Line	17	45	320	490342.0	179.1	1305.9	14%
2005	Limited Entry Sablefish	Hook & Line	26	101	663	1454151.0	481.5	1259.7	38%
2006	Limited Entry Sablefish	Hook & Line	19	67	469	939951.0	295.9	1369.0	22%
2007	Limited Entry Sablefish	Hook & Line	22	75	517	1034046.0	298.5	1072.5	28%
2008	Limited Entry Sablefish	Hook & Line	18	77	539	1244141.0	330.0	1088.5	30%
2009	Limited Entry Sablefish	Hook & Line	9	46	287	649327.0	98.2	1439.0	7%
2010	Limited Entry Sablefish	Hook & Line	21	143	756	1759568.0	343.1	1290.5	27%
2011	Limited Entry Sablefish	Hook & Line	23	98	673	1405444.0	240.7	1147.5	21%
2012	Limited Entry Sablefish	Hook & Line	17	88	532	1580075.0	227.2	1055.0	22%
2013	Limited Entry Sablefish	Hook & Line	18	58	353	1047526.0	166.4	743.8	22%
2014	Limited Entry Sablefish	Hook & Line	17	85	486	1174141.0	199.7	737.0	27%
2002	Limited Entry Sablefish	Pot	6	23	247	5438.0	82.5	352.2	23%
2003	Limited Entry Sablefish	Pot	6	35	362	9017.0	148.3	604.2	25%
2004	Limited Entry Sablefish	Pot	3	13	139	5378.0	82.7	619.6	13%
2005	Limited Entry Sablefish	Pot	7	39	491	13786.0	281.1	615.0	46%
2006	Limited Entry Sablefish	Pot	7	39	288	10708.0	200.5	581.8	34%
2007	Limited Entry Sablefish	Pot	4	30	154	5816.0	90.0	428.4	21%
2008	Limited Entry Sablefish	Pot	6	24	329	13638.0	244.9	433.0	57%
2009	Limited Entry Sablefish	Pot	3	27	67	3883.0	66.5	489.1	14%
2010	Limited Entry Sablefish	Pot	7	43	314	11294.0	139.4	508.9	27%
2011	Limited Entry Sablefish	Pot	3	22	227	9029.0	137.4	371.9	37%
2012	Limited Entry Sablefish	Pot	5	19	351	14218.0	101.1	296.9	34%
2013	Limited Entry Sablefish	Pot	3	14	47	1934.0	40.5	283.1	14%
2014	Limited Entry Sablefish	Pot	4	16	194	7542.0	104.0	337.3	31%

Table 29: Seabird interactions observed in Limited Entry Sablefish sector by year and gear.

Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
Alcid Unid	Killed by gear	2	2011	Hook & Line	Limited Entry Sablefish	21%
Bird Unid	Boarded vessel	1	2005	Hook & Line	Limited Entry Sablefish	38%
Bird Unid	Boarded vessel	1	2005	Pot	Limited Entry Sablefish	46%
Bird Unid	Killed by gear	1	2003	Hook & Line	Limited Entry Sablefish	22%

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Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
Bird Unid	Killed by gear	1	2011	Hook & Line	Limited Entry Sablefish	21%
Black-footed Albatross	Boarded vessel	1	2002	Hook & Line	Limited Entry Sablefish	24%
Black-footed Albatross	Deterrence used	50	2010	Hook & Line	Limited Entry Sablefish	27%
Black-footed Albatross	Deterrence used	89	2012	Hook & Line	Limited Entry Sablefish	22%
Black-footed Albatross	Entangled in gear - trailing gear	2	2010	Hook & Line	Limited Entry Sablefish	27%
Black-footed Albatross	Feeding on catch	1	2008	Hook & Line	Limited Entry Sablefish	30%
Black-footed Albatross	Feeding on catch	52	2010	Hook & Line	Limited Entry Sablefish	27%
Black-footed Albatross	Feeding on catch	1	2012	Hook & Line	Limited Entry Sablefish	22%
Black-footed Albatross	Killed by gear	1	2002	Hook & Line	Limited Entry Sablefish	24%
Black-footed Albatross	Killed by gear	4	2003	Hook & Line	Limited Entry Sablefish	22%
Black-footed Albatross	Killed by gear	3	2004	Hook & Line	Limited Entry Sablefish	14%
Black-footed Albatross	Killed by gear	12	2005	Hook & Line	Limited Entry Sablefish	38%
Black-footed Albatross	Killed by gear	10	2006	Hook & Line	Limited Entry Sablefish	22%
Black-footed Albatross	Killed by gear	45	2007	Hook & Line	Limited Entry Sablefish	28%
Black-footed Albatross	Killed by gear	16	2008	Hook & Line	Limited Entry Sablefish	30%
Black-footed Albatross	Killed by gear	21	2010	Hook & Line	Limited Entry Sablefish	27%
Black-footed Albatross	Killed by gear	17	2011	Hook & Line	Limited Entry Sablefish	21%
Black-footed Albatross	Killed by gear	29	2012	Hook & Line	Limited Entry Sablefish	22%
Black-footed Albatross	Killed by gear	13	2013	Hook & Line	Limited Entry Sablefish	22%
Black-footed Albatross	Killed by gear	2	2014	Hook & Line	Limited Entry Sablefish	27%
Black-footed Albatross	Lethal removal - not trailing gear	1	2008	Hook & Line	Limited Entry Sablefish	30%
Black-footed Albatross	Other	1	2014	Pot	Limited Entry Sablefish	31%
California Gull	Killed by gear	1	2012	Hook & Line	Limited Entry Sablefish	22%
Cassins Auklet	Boarded vessel	5	2005	Hook & Line	Limited Entry Sablefish	38%
Cassins Auklet	Boarded vessel	1	2013	Hook & Line	Limited Entry Sablefish	22%
Cormorant Unid	Killed by gear	1	2002	Hook & Line	Limited Entry Sablefish	24%
Glaucous-winged Gull	Killed by gear	1	2010	Hook & Line	Limited Entry Sablefish	27%
Glaucous-winged Gull	Killed by gear	3	2012	Hook & Line	Limited Entry Sablefish	22%
Gull Unid	Deterrence used	11	2005	Hook & Line	Limited Entry Sablefish	38%
Gull Unid	Entangled in gear - trailing gear	1	2005	Hook & Line	Limited Entry Sablefish	38%
Gull Unid	Killed by gear	2	2006	Hook & Line	Limited Entry Sablefish	22%
Gull Unid	Killed by gear	3	2012	Hook & Line	Limited Entry Sablefish	22%
Gull Unid	Killed by gear	1	2014	Hook & Line	Limited Entry Sablefish	27%
Heermanns Gull	Boarded vessel	3	2011	Pot	Limited Entry Sablefish	37%
Herring Gull	Killed by gear	4	2012	Hook & Line	Limited Entry Sablefish	22%
Laysan Albatross	Feeding on catch	1	2010	Hook & Line	Limited Entry Sablefish	27%
Laysan Albatross	Feeding on catch	1	2012	Hook & Line	Limited Entry Sablefish	22%
Laysan Albatross	Killed by gear	1	2012	Hook & Line	Limited Entry Sablefish	22%
Laysan Albatross	Other	1	2005	Pot	Limited Entry Sablefish	46%
Northern Fulmar	Boarded vessel	2	2012	Hook & Line	Limited Entry Sablefish	22%
Northern Fulmar	Boarded vessel	1	2013	Hook & Line	Limited Entry Sablefish	22%
Northern Fulmar	Boarded vessel	2	2014	Hook & Line	Limited Entry Sablefish	27%

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Table 29 – continued from previous page

Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
Northern Fulmar	Boarded vessel	1	2014	Pot	Limited Entry Sablefish	31%
Northern Fulmar	Killed by gear	2	2007	Hook & Line	Limited Entry Sablefish	28%
Northern Fulmar	Killed by gear	1	2008	Hook & Line	Limited Entry Sablefish	30%
Northern Fulmar	Killed by gear	6	2012	Hook & Line	Limited Entry Sablefish	22%
Pink-footed Shearwater	Killed by gear	2	2012	Hook & Line	Limited Entry Sablefish	22%
Ring-billed Gull	Killed by gear	1	2012	Hook & Line	Limited Entry Sablefish	22%
Short-tailed Albatross	Killed by gear	1	2011	Hook & Line	Limited Entry Sablefish	21%
Short-tailed Albatross	Other	1	2010	Hook & Line	Limited Entry Sablefish	27%
Short-tailed Albatross	Other	2	2011	Hook & Line	Limited Entry Sablefish	21%
Sooty Shearwater	Killed by gear	1	2011	Hook & Line	Limited Entry Sablefish	21%
Sooty Shearwater	Killed by gear	2	2013	Hook & Line	Limited Entry Sablefish	22%
Storm-Petrel Unid	Boarded vessel	2	2002	Hook & Line	Limited Entry Sablefish	24%
Western Gull	Deterrence used	1	2012	Hook & Line	Limited Entry Sablefish	22%
Western Gull	Killed by gear	4	2002	Hook & Line	Limited Entry Sablefish	24%
Western Gull	Killed by gear	3	2011	Hook & Line	Limited Entry Sablefish	21%
Western Gull	Killed by gear	6	2012	Hook & Line	Limited Entry Sablefish	22%
Western Gull	Killed by gear	1	2013	Hook & Line	Limited Entry Sablefish	22%
Western Gull	Killed by gear	1	2014	Hook & Line	Limited Entry Sablefish	27%

## 5.5 Open Access Fixed Gear - seabirds

Table 30: Observer coverage, by year and gear for the Open Access Fixed Gear sector. GF = groundfish

Year	Sector	Gear	Observed				Fleet-wide		Coverage rate
			No.vessels	No.trips	No.hauls	No.fixed gear units	Observed Retained GF (mt)	Landed GF (mt)	
2003	OA Fixed Gear	Hook & Line	13	41	49	86518.0	16.6	548.6	3%
2004	OA Fixed Gear	Hook & Line	14	42	50	85845.0	16.2	474.4	3%
2005	OA Fixed Gear	Hook & Line	10	34	37	58384.0	9.8	624.9	2%
2006	OA Fixed Gear	Hook & Line	7	10	11	29296.0	4.5	495.2	1%
2007	OA Fixed Gear	Hook & Line	25	50	66	53615.0	10.4	272.2	4%
2008	OA Fixed Gear	Hook & Line	33	58	68	73885.0	16.3	427.8	4%
2009	OA Fixed Gear	Hook & Line	33	68	101	118870.0	21.7	667.7	3%
2010	OA Fixed Gear	Hook & Line	37	69	104	158102.0	23.1	774.5	3%
2011	OA Fixed Gear	Hook & Line	40	68	100	161419.0	19.7	446.0	4%
2012	OA Fixed Gear	Hook & Line	24	34	53	82597.0	11.3	333.5	3%
2013	OA Fixed Gear	Hook & Line	14	23	30	51870.0	4.7	203.9	2%
2014	OA Fixed Gear	Hook & Line	21	28	38	71457.0	11.8	228.4	5%
2003	OA Fixed Gear	Pot	7	16	50	345.0	2.9	186.4	2%
2004	OA Fixed Gear	Pot	17	96	185	1950.0	17.0	186.0	9%
2005	OA Fixed Gear	Pot	14	43	50	835.0	10.7	379.3	3%
2006	OA Fixed Gear	Pot	15	38	39	666.0	7.9	443.0	2%
2007	OA Fixed Gear	Pot	20	45	72	614.0	8.7	257.6	3%
2008	OA Fixed Gear	Pot	20	55	74	831.0	10.6	241.0	4%
2009	OA Fixed Gear	Pot	18	30	45	540.0	8.5	373.0	2%
2010	OA Fixed Gear	Pot	26	40	69	644.0	10.6	325.7	3%
2011	OA Fixed Gear	Pot	28	60	84	830.0	18.9	255.8	7%
2012	OA Fixed Gear	Pot	19	35	70	610.0	9.1	126.8	7%
2013	OA Fixed Gear	Pot	17	25	48	590.0	6.3	72.2	9%
2014	OA Fixed Gear	Pot	21	41	63	686.0	11.7	147.8	8%

Table 31: Seabird interactions observed in Open Access Fixed Gear sector by year and gear.

Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
Black-footed Albatross	Feeding on catch	3	2011	Hook & Line	OA Fixed Gear	4%
Black-footed Albatross	Killed by gear	1	2007	Hook & Line	OA Fixed Gear	4%
Black-footed Albatross	Killed by gear	1	2010	Hook & Line	OA Fixed Gear	3%
Gull Unid	Killed by gear	1	2014	Hook & Line	OA Fixed Gear	5%

## 5.6 Limited Entry Daily Trip Limits - seabirds

Table 32: Observer coverage, by year for the Limited Entry Daily Trip Limit (DTL) sector. Note that the Observer Program does not cover LE DTL vessels fishing pot gear. GF = groundfish

Year	Sector	Gear	Observed				Fleet-wide		Coverage rate
			No.vessels	No.trips	No.hauls	No.fixed gear units	Observed Retained GF (mt)	Landed GF (mt)	
2002	LE Fixed Gear DTL	Hook & Line	4	11	22	46000.0	3.0	626.9	0%
2003	LE Fixed Gear DTL	Hook & Line	17	130	219	537817.0	32.1	546.5	6%
2004	LE Fixed Gear DTL	Hook & Line	14	62	130	318048.0	15.9	399.7	4%
2005	LE Fixed Gear DTL	Hook & Line	11	35	60	198150.0	9.3	553.8	2%
2006	LE Fixed Gear DTL	Hook & Line	21	121	196	527594.0	23.8	467.8	5%
2007	LE Fixed Gear DTL	Hook & Line	36	158	303	724389.0	37.6	515.0	7%
2008	LE Fixed Gear DTL	Hook & Line	32	122	220	631653.0	31.8	642.3	5%
2009	LE Fixed Gear DTL	Hook & Line	34	138	271	668813.0	30.3	812.0	4%
2010	LE Fixed Gear DTL	Hook & Line	38	226	470	1102420.0	57.6	1016.0	6%
2011	LE Fixed Gear DTL	Hook & Line	38	201	426	1154241.0	83.7	1241.7	7%
2012	LE Fixed Gear DTL	Hook & Line	26	128	252	706437.0	28.7	806.4	4%
2013	LE Fixed Gear DTL	Hook & Line	22	124	248	705827.0	32.1	796.2	4%
2014	LE Fixed Gear DTL	Hook & Line	18	77	154	493845.0	23.8	714.8	3%

Table 33: Seabird interactions observed in Limited Entry Daily Trip Limit (DTL) sector by year and gear.

Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
Black-footed Albatross	Feeding on catch	1	2009	Hook & Line	LE Fixed Gear DTL	4%
Black-footed Albatross	Feeding on catch	20	2012	Hook & Line	LE Fixed Gear DTL	4%
Black-footed Albatross	Killed by gear	9	2011	Hook & Line	LE Fixed Gear DTL	7%
Brown Pelican	Feeding on catch	5	2010	Hook & Line	LE Fixed Gear DTL	6%
Brown Pelican	Killed by gear	1	2005	Hook & Line	LE Fixed Gear DTL	2%
Brown Pelican	Killed by gear	2	2012	Hook & Line	LE Fixed Gear DTL	4%
Cormorant Unid	Killed by gear	1	2003	Hook & Line	LE Fixed Gear DTL	6%
Double-crested Cormorant	Feeding on catch	2	2013	Hook & Line	LE Fixed Gear DTL	4%
Double-crested Cormorant	Killed by gear	1	2012	Hook & Line	LE Fixed Gear DTL	4%
Gull Unid	Killed by gear	3	2008	Hook & Line	LE Fixed Gear DTL	5%
Gull Unid	Killed by gear	1	2012	Hook & Line	LE Fixed Gear DTL	4%
Laysan Albatross	Other	2	2009	Hook & Line	LE Fixed Gear DTL	4%
Shearwater Unid	Killed by gear	19	2006	Hook & Line	LE Fixed Gear DTL	5%
Shearwater Unid	Killed by gear	1	2008	Hook & Line	LE Fixed Gear DTL	5%
Sooty Shearwater	Killed by gear	3	2013	Hook & Line	LE Fixed Gear DTL	4%
Western Gull	Killed by gear	1	2003	Hook & Line	LE Fixed Gear DTL	6%

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Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
Western Gull	Killed by gear	1	2009	Hook & Line	LE Fixed Gear DTL	4%

## 5.7 Nearshore - seabirds

Table 34: Observer coverage, by year for state Nearshore fisheries. The Observer Program does combines fixed gear types for these fisheries for reporting purposes. NS = nearshore species

Year	Sector	Gear	Observed				Fleet-wide		Coverage rate
			No.vessels	No.trips	No.hauls	No.fixed gear units	Observed Retained NS (mt)	Landed NS (mt)	
2003	Nearshore	Fixed Gears	32	108	205	54905.0	8.1	463.9	2%
2004	Nearshore	Fixed Gears	98	367	629	144198.0	33.5	501.4	7%
2005	Nearshore	Fixed Gears	96	308	386	124462.0	24.7	462.0	5%
2006	Nearshore	Fixed Gears	96	342	538	121421.0	27.8	426.5	7%
2007	Nearshore	Fixed Gears	76	303	466	132470.0	28.2	456.2	6%
2008	Nearshore	Fixed Gears	70	225	270	109599.0	20.8	483.3	4%
2009	Nearshore	Fixed Gears	73	239	341	132848.0	20.6	485.0	4%
2010	Nearshore	Fixed Gears	82	253	327	192485.0	20.3	392.3	5%
2011	Nearshore	Fixed Gears	89	349	454	226749.0	24.3	411.8	6%
2012	Nearshore	Fixed Gears	98	385	526	265696.0	32.4	398.5	8%
2013	Nearshore	Fixed Gears	104	353	454	195075.0	27.7	429.2	6%
2014	Nearshore	Fixed Gears	98	308	374	173792.0	28.3	452.9	6%

Table 35: Seabird interactions observed in state Nearshore fisheries by year and gear.

Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
Brandts Cormorant	Killed by gear	3	2014	Fixed Gears	Nearshore	6%
Brown Pelican	Killed by gear	1	2010	Fixed Gears	Nearshore	5%
Brown Pelican	Killed by gear	1	2013	Fixed Gears	Nearshore	6%
Brown Pelican	Lethal removal - not trailing gear	1	2006	Fixed Gears	Nearshore	6%
Common (Guillemot) Murre	Entangled in gear - not trailing gear	1	2004	Fixed Gears	Nearshore	7%
Common (Guillemot) Murre	Entangled in gear - not trailing gear	1	2008	Fixed Gears	Nearshore	4%
Common (Guillemot) Murre	Entangled in gear - not trailing gear	1	2009	Fixed Gears	Nearshore	4%
Common (Guillemot) Murre	Entangled in gear - not trailing gear	2	2011	Fixed Gears	Nearshore	6%
Common (Guillemot) Murre	Entangled in gear - trailing gear	1	2011	Fixed Gears	Nearshore	6%
Common (Guillemot) Murre	Killed by gear	1	2013	Fixed Gears	Nearshore	6%
Common Loon	Killed by gear	1	2011	Fixed Gears	Nearshore	6%
Cormorant Unid	Killed by gear	1	2007	Fixed Gears	Nearshore	6%
Cormorant Unid	Killed by gear	1	2009	Fixed Gears	Nearshore	4%
Cormorant Unid	Killed by gear	1	2012	Fixed Gears	Nearshore	8%
Double-crested Cormorant	Killed by gear	1	2012	Fixed Gears	Nearshore	8%
Murre Unid	Entangled in gear - not trailing gear	1	2006	Fixed Gears	Nearshore	6%
Murre Unid	Entangled in gear - not trailing gear	1	2009	Fixed Gears	Nearshore	4%

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Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
Northern Fulmar	Entangled in gear - not trailing gear	1	2007	Fixed Gears	Nearshore	6%
Western Gull	Entangled in gear - not trailing gear	2	2010	Fixed Gears	Nearshore	5%
Western Gull	Entangled in gear - trailing gear	1	2008	Fixed Gears	Nearshore	4%
Western Gull	Entangled in gear - trailing gear	1	2011	Fixed Gears	Nearshore	6%

## 5.8 Pink Shrimp - seabirds

Table 36: Observer coverage, by year for the state Pink Shrimp (PS) fisheries. Pink shrimp fisheries were not observed in 2003 or 2006.

Year	Sector	Gear	Observed				Fleet-wide		Coverage rate
			No.vessels	No.trips	No.hauls	Tow duration (hrs)	Observed Retained PS (mt)	Landed PS (mt)	
2004	Pink Shrimp	Shrimp Trawl	22	57	1027	2246.8	583.9	8974.3	7%
2005	Pink Shrimp	Shrimp Trawl	23	38	509	984.5	424.7	10861.9	4%
2007	Pink Shrimp	Shrimp Trawl	30	63	951	1770.1	672.7	10935.0	6%
2008	Pink Shrimp	Shrimp Trawl	31	55	840	1487.8	805.8	15374.6	5%
2009	Pink Shrimp	Shrimp Trawl	36	59	708	1041.4	881.6	14412.2	6%
2010	Pink Shrimp	Shrimp Trawl	51	126	1654	2376.4	2383.3	20357.0	12%
2011	Pink Shrimp	Shrimp Trawl	57	186	2579	4026.9	4103.8	29459.9	14%
2012	Pink Shrimp	Shrimp Trawl	64	200	2731	4461.4	3994.4	29324.6	14%
2013	Pink Shrimp	Shrimp Trawl	67	153	1916	2945.7	3299.8	31611.0	10%
2014	Pink Shrimp	Shrimp Trawl	62	175	2128	3131.8	3869.7	41271.8	9%

Table 37: Seabird interactions observed in state Pink Shrimp fisheries by year and gear.

Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
Bird Unid	Boarded vessel	1	2005	Shrimp Trawl	Pink Shrimp	4%
California Gull	Boarded vessel	1	2014	Shrimp Trawl	Pink Shrimp	9%
Cassins Auklet	Boarded vessel	3	2011	Shrimp Trawl	Pink Shrimp	14%
Cassins Auklet	Boarded vessel	2	2013	Shrimp Trawl	Pink Shrimp	10%
Cassins Auklet	Boarded vessel	7	2014	Shrimp Trawl	Pink Shrimp	9%
Laysan Albatross	Feeding on catch	1	2012	Shrimp Trawl	Pink Shrimp	14%
Leachs Storm-Petrel	Boarded vessel	1	2013	Shrimp Trawl	Pink Shrimp	10%
Northern Fulmar	Boarded vessel	1	2004	Shrimp Trawl	Pink Shrimp	6%
Northern Fulmar	Boarded vessel	1	2011	Shrimp Trawl	Pink Shrimp	14%
Pink-footed Shearwater	Killed by gear	1	2011	Shrimp Trawl	Pink Shrimp	14%
Shearwater Unid	Killed by gear	1	2014	Shrimp Trawl	Pink Shrimp	9%
Sooty Shearwater	Boarded vessel	2	2012	Shrimp Trawl	Pink Shrimp	14%
Sooty Shearwater	Boarded vessel	3	2013	Shrimp Trawl	Pink Shrimp	10%
Sooty Shearwater	Boarded vessel	1	2014	Shrimp Trawl	Pink Shrimp	9%
Sooty Shearwater	Entangled in gear - not trailing gear	4	2012	Shrimp Trawl	Pink Shrimp	14%
Sooty Shearwater	Killed by gear	14	2012	Shrimp Trawl	Pink Shrimp	14%
Sooty Shearwater	Killed by gear	1	2013	Shrimp Trawl	Pink Shrimp	10%
Storm-Petrel Unid	Boarded vessel	3	2013	Shrimp Trawl	Pink Shrimp	10%

## 5.9 Exempted Fishing Permit Vessels - seabirds

Year	Sector	Gear	Observed							
			Vessels (no.)	Trips (no.)	Hauls (no.)	FG.units (no.)	Tow duration or Soak time (hrs)	Observed Retained GF (mt)	Observed Retained P.hake (mt)	Coverage rate
2002	CA Flatfish EFP	Bottom Trawl	4	13	41		202.6	42.0		100%
2002	WA Yellowtail EFP	Bottom & Mid- water Trawl	1	10	30		70.5	13.7		100%
2002-2004	WA Arrowtooth EFP	Bottom & Mid- water Trawl	3	47	652		1405.6	1364.5		100%
2003	OR Flatfish EFP	Bottom Trawl	8	127	1239		3322.1	981.9		100%
2003-2004	CA Flatfish EFP	Bottom Trawl	5	58	188		328.7	129.5		100%
2004	OR DTS EFP	Bottom Trawl	2	11	88		371.4	103.9		100%
2006	P. Hake EFPs	Bottom & Mid- water Trawl	8	47	78		137.8	0.4	1861.5	100%
2008	CA TNC EFPs	Hook & Line	3	29	162	92500	587.0	30.0		100%
2009	CA TNC EFPs	Hook & Line	5	83	141	426127	1175.0	115.2		100%
2010	CA TNC EFPs	Fixed Gears	6	136	389	1073176	15834.1	236.0		100%
2013-2014	Emley-Platt & Fos- mark EFPs	Hook & Line	4	16	187	15655	97.3	5.1		100%

Table 39: Seabird interactions observed on groundfish Exempted Fishing Permit(EFP) vessels by year and gear.

Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
Black-footed Albatross	Entangled in gear - not trailing gear	1	2010	Fixed Gears	CA TNC EFPs	100%
Northern Fulmar	Boarded vessel	2	2003	Bottom Trawl	OR Flatfish EFP	100%

## 6 Sea Turtle Observed Interactions

### 6.1 Open Access Fixed Gear - sea turtles

Table 40: Observer coverage, by year and gear for the Open Access Fixed Gear sector. GF = groundfish

Year	Sector	Gear	Observed				Fleet-wide		Coverage rate
			No.vessels	No.trips	No.hauls	No.fixed gear units	Observed Retained GF (mt)	Landed GF (mt)	
2003	OA Fixed Gear	Hook & Line	13	41	49	86518.0	16.6	548.6	3%
2004	OA Fixed Gear	Hook & Line	14	42	50	85845.0	16.2	474.4	3%
2005	OA Fixed Gear	Hook & Line	10	34	37	58384.0	9.8	624.9	2%
2006	OA Fixed Gear	Hook & Line	7	10	11	29296.0	4.5	495.2	1%
2007	OA Fixed Gear	Hook & Line	25	50	66	53615.0	10.4	272.2	4%
2008	OA Fixed Gear	Hook & Line	33	58	68	73885.0	16.3	427.8	4%
2009	OA Fixed Gear	Hook & Line	33	68	101	118870.0	21.7	667.7	3%
2010	OA Fixed Gear	Hook & Line	37	69	104	158102.0	23.1	774.5	3%
2011	OA Fixed Gear	Hook & Line	40	68	100	161419.0	19.7	446.0	4%
2012	OA Fixed Gear	Hook & Line	24	34	53	82597.0	11.3	333.5	3%
2013	OA Fixed Gear	Hook & Line	14	23	30	51870.0	4.7	203.9	2%
2014	OA Fixed Gear	Hook & Line	21	28	38	71457.0	11.8	228.4	5%
2003	OA Fixed Gear	Pot	7	16	50	345.0	2.9	186.4	2%
2004	OA Fixed Gear	Pot	17	96	185	1950.0	17.0	186.0	9%
2005	OA Fixed Gear	Pot	14	43	50	835.0	10.7	379.3	3%
2006	OA Fixed Gear	Pot	15	38	39	666.0	7.9	443.0	2%
2007	OA Fixed Gear	Pot	20	45	72	614.0	8.7	257.6	3%
2008	OA Fixed Gear	Pot	20	55	74	831.0	10.6	241.0	4%
2009	OA Fixed Gear	Pot	18	30	45	540.0	8.5	373.0	2%
2010	OA Fixed Gear	Pot	26	40	69	644.0	10.6	325.7	3%
2011	OA Fixed Gear	Pot	28	60	84	830.0	18.9	255.8	7%
2012	OA Fixed Gear	Pot	19	35	70	610.0	9.1	126.8	7%
2013	OA Fixed Gear	Pot	17	25	48	590.0	6.3	72.2	9%
2014	OA Fixed Gear	Pot	21	41	63	686.0	11.7	147.8	8%

Table 41: Sea turtle interactions observed in the Open Access Fixed Gear fishery by year and gear.

Species	Interaction	No.individuals	Year	Gear	Sector	Coverage.rate
Leatherback Turtle	Killed by gear	1	2008	Pot	OA Fixed Gear	4%

## 6.2 At-sea Hake- sea turtles

No sea turtles have been observed interacting with vessels in the At-sea Hake fishery.

## 6.3 Groundfish trawl sectors - sea turtles

No sea turtles have been observed interacting with vessels in the Groundfish trawl sectors.

## 6.4 California halibut- sea turtles

No sea turtles have been observed interacting with vessels in the California halibut fishery.

## 6.5 Limited Entry Sablefish- sea turtles

No sea turtles have been observed interacting with vessels in the Limited Entry Sablefish sector.

## 6.6 Limited Entry Daily Trip Limits - sea turtles

No sea turtles have been observed interacting with vessels in the Limited Entry Daily Trip Limits sector.

## 6.7 Nearshore - sea turtles

No sea turtles have been observed interacting with vessels in the state Nearshore fisheries.

## 6.8 Pink Shrimp - sea turtles

No sea turtles have been observed interacting with vessels in the state Pink Shrimp fisheries.

## 6.9 Exempted Fishin Permit Vessels- sea turtles

No sea turtles have been observed interacting with Exempted Fishing Permit vessels.