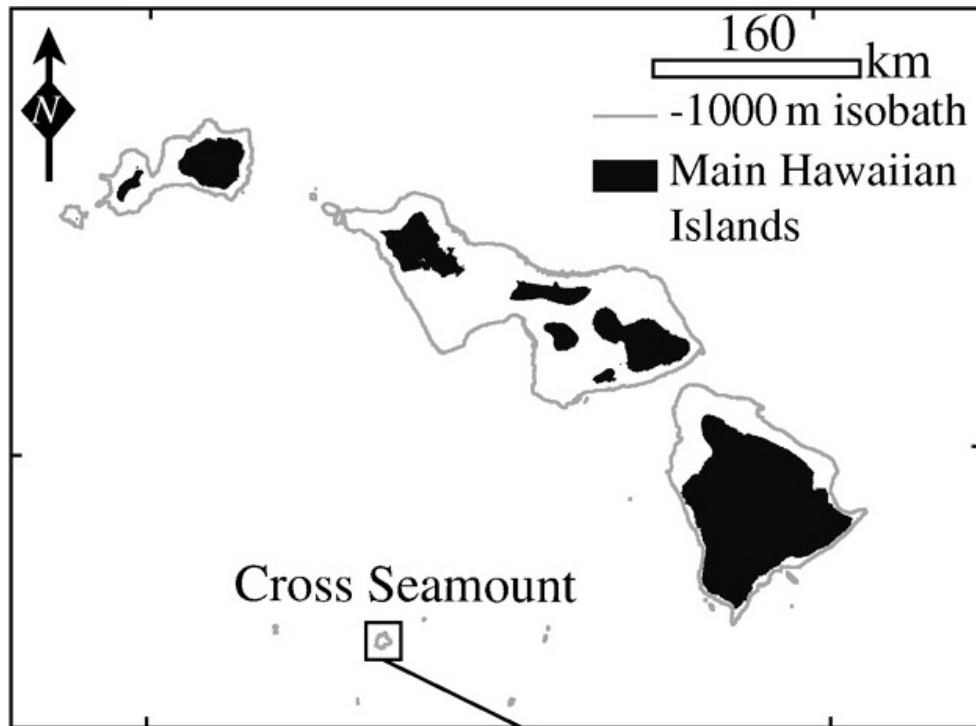


# A Statistical Analysis of the Cross Seamount Fishery from January 2009–July 2014



October 2014



Western Pacific Regional Fishery Management Council  
1164 Bishop Street, Suite 1400, Honolulu, HI 96813

A report of the Western Pacific Regional Fishery Management Council  
1164 Bishop Street, Suite 1400, Honolulu, HI 96813

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the Western Pacific Regional Fishery Management Council.

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# 1 INTRODUCTION

The Cross Seamount, approximately 150 nautical miles to the southwest of the Big Island of Hawai‘i, has an associated fishery of great interest to the Western Pacific Regional Fishery Management Council. This fishery is responsible for the harvest of large amounts of numerous fish species, such as yellowfin and bigeye tuna, due to large aggregations of fish around the seamount, as well as their accessibility by the various gear types used by Cross Seamount fishermen. This report analyzes and summarizes the data collected on the Cross Seamount fishery from January 2009 to July 2014.

## 2 FISHERMEN AND TRIPS

The number of people that reported fishing the Cross increased from 2009 to 2013 (Figs. 1–7). In 2009, there were nine unduplicated licensed fishermen, and, in 2013, there were 14. The annual number of trips taken to the seamount also reflects a similar increasing trend (Figs. 1–7). In 2009, 63 trips were made to the Cross Seamount and 224 trips occurred in 2013, a 355.5 percent increase. Data for 2014 is still in progress and is, therefore, only current up until July 2014. It should be noted that this data is for licensed fishermen and does not take into account unlicensed fishermen that may make trips to the seamount. There are peaks in the number of trips taken each year. The following is the peak month for each year (note: data incomplete for 2014):

Year	2009	2010	2011	2012	2013	2014
Month	February	December	January	August	May	May
Trips	10	18	15	18	29	16

The trend appears to be the second half of the year having more total licenses and trips in comparison to the first half of the year from 2009 to 2013. This could indicate a seasonal trend of a more lucrative second half of the year (Figs. 1-7).

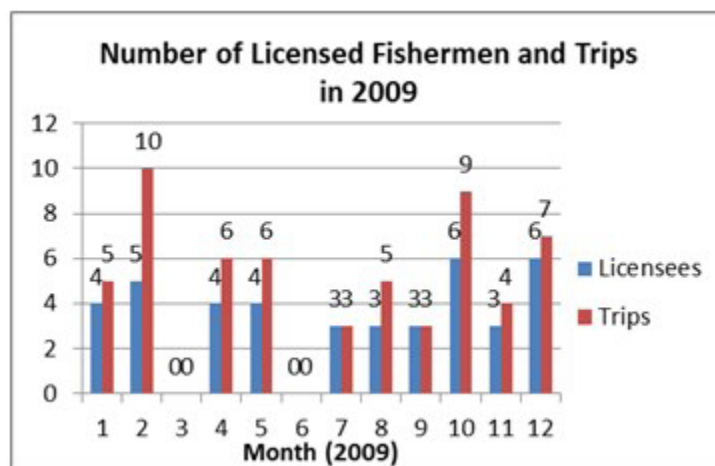


Figure 1 The number of licensed fishermen and trips to Cross Seamount by month in 2009.

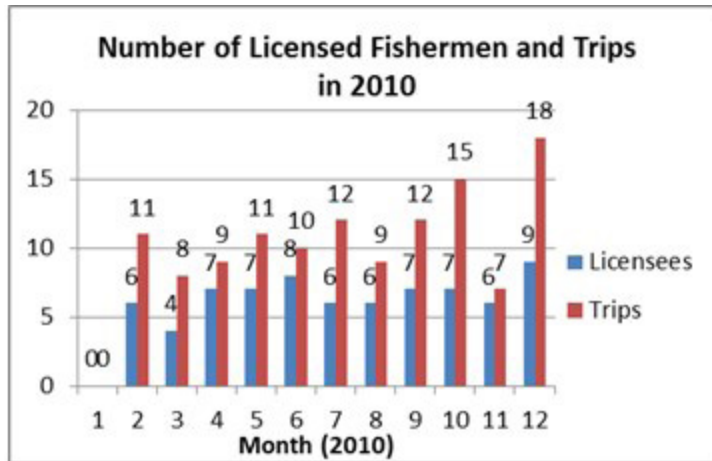


Figure 2 The number of licensed fishermen and trips to Cross Seamount by month in 2010.

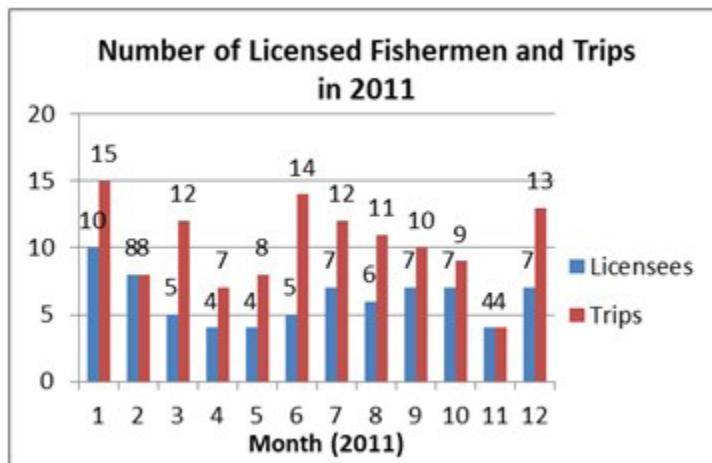


Figure 3 The number of licensed fishermen and trips to Cross Seamount by month in 2011.

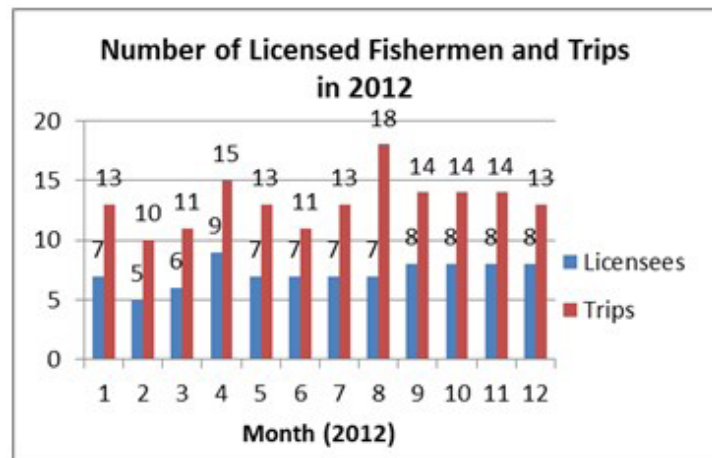


Figure 4 The number of licensed fishermen and trips to Cross Seamount by month in 2012.

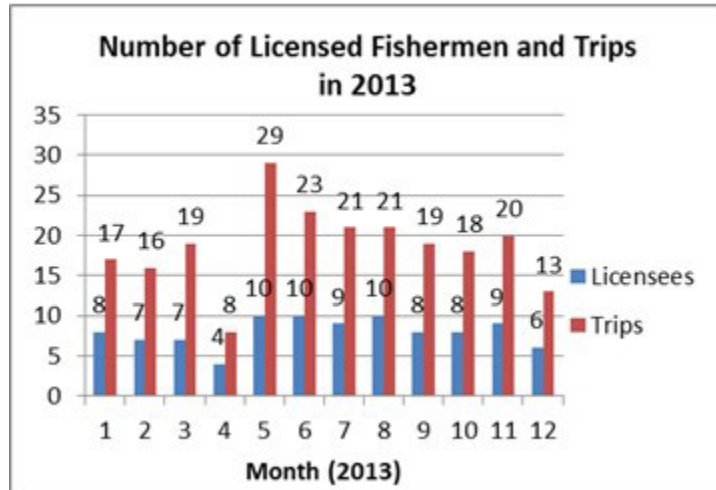


Figure 5 The number of licensed fishermen and trips to Cross Seamount by month in 2013.

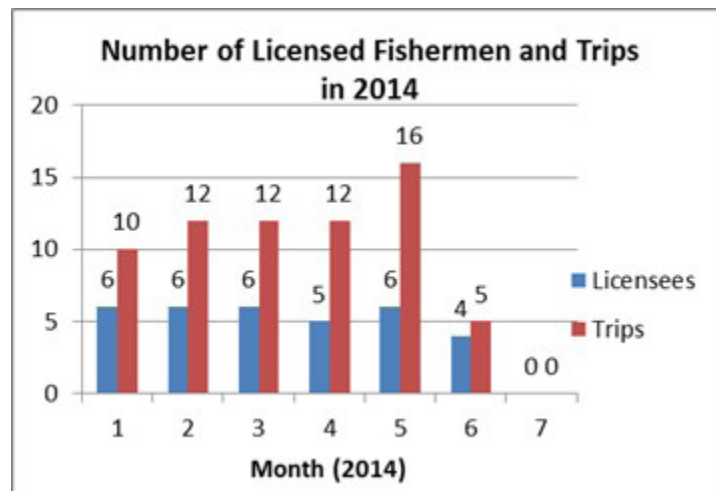


Figure 6 The number of licensed fishermen and trips to Cross Seamount by month in 2014.

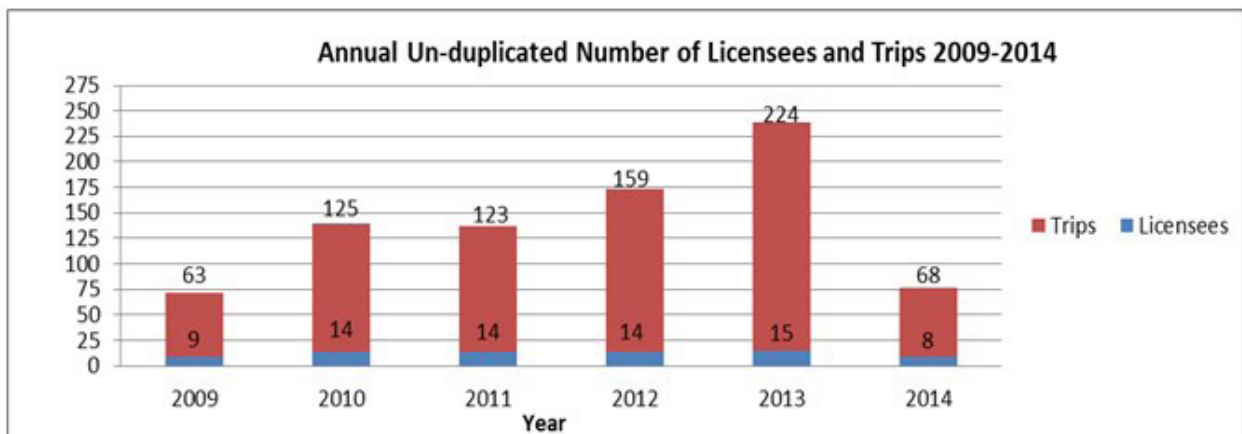


Figure 7 Unduplicated annual counts of licensed fishermen and trips to Cross Seamount, January 2009–July 2014.

### 3 FISHING METHODS/GEAR TYPES

The individuals that fish at the Cross Seamount have high levels of ingenuity. The data suggests that fishermen do not stick to only one fishing method; instead they use a multitude of gear types per trip to target the variety of species found at the seamount. These gear types include shortline, troll, tuna handline, vertical line, deep-sea handline and a hybrid of these various methods. Due to the limited number of licensees reporting and concerns with data confidentiality, some data were not conveyed, making it difficult to gain an accurate view of various gear types throughout the entire time of the study. The data do suggest that the hybrid method is the most used amongst Cross Seamount fishermen (see Tables 1–6).

**Table 1 Number of licensed fishermen and trips made to Cross Seamount by gear type and quarter, 2009.**

Gear Type	Quarter 1						Quarter 2					
	January		February		March		April		May		June	
	Licensees	Trips	Licensees	Trips	Licensees	Trips	Licensees	Trips	Licensees	Trips	Licensees	Trips
Hybrid	n.a.	n.a.	4	7	n.a.	n.a.	3	4	3	4	n.a.	n.a.
Shortline	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Troll	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	3	4	-	-
Tuna Handline	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-	-	-	-
Other	-	-	n.a.	n.a.	n.a.	n.a.	-	-	-	-	-	-
Vertical Line	-	-	-	-	-	-	-	-	-	-	-	-
<b>Un-duplicated count</b>	4	5	5	10	n.a.	n.a.	4	6	4	6	n.a.	n.a.

Gear Type	Quarter 3						Quarter 4					
	July		August		September		October		November		December	
	Licensees	Trips	Licensees	Trips	Licensees	Trips	Licensees	Trips	Licensees	Trips	Licensees	Trips
Hybrid	3	3	n.a.	n.a.	n.a.	n.a.	3	4	n.a.	n.a.	n.a.	n.a.
Shortline	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	3	4
Troll	n.a.	n.a.	3	4	n.a.	n.a.	4	6	n.a.	n.a.	5	5
Tuna Handline	-	-	n.a.	n.a.	n.a.	n.a.	3	5	n.a.	n.a.	4	4
Other	-	-	-	-	n.a.	n.a.	-	-	-	-	-	-
Vertical Line	-	-	-	-	-	-	-	-	-	-	n.a.	n.a.
<b>Un-duplicated count</b>	3	3	3	5	3	3	6	9	3	4	6	7

n.a. = fewer than 3, data not available due to data confidentiality



**Table 2 Number of licensed fishermen and trips made to Cross Seamount by gear type and quarter, 2010.**

Gear Type	Quarter 1						Quarter 2					
	January		February		March		April		May		June	
	Licenseses	Trips	Licenseses	Trips	Licenseses	Trips	Licenseses	Trips	Licenseses	Trips	Licenseses	Trips
Hybrid	<u>n.a.</u>	<u>n.a.</u>	3	4	3	7	4	6	5	6	4	5
<u>Shortline</u>	<u>n.a.</u>	<u>n.a.</u>	4	5	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>
Troll	<u>n.a.</u>	<u>n.a.</u>	3	7	<u>n.a.</u>	<u>n.a.</u>	4	5	4	8	5	6
<u>Tuna Handline</u>	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>	4	4	4	6	4	5
<b>Un-duplicated count</b>	<u>n.a.</u>	<u>n.a.</u>	6	11	4	8	7	9	7	11	8	10

Gear Type	Quarter 3						Quarter 4					
	July		August		September		October		November		December	
	Licenseses	Trips	Licenseses	Trips	Licenseses	Trips	Licenseses	Trips	Licenseses	Trips	Licenseses	Trips
Hybrid	<u>n.a.</u>	<u>n.a.</u>	3	5	4	6	4	4	3	3	5	11
<u>Shortline</u>	4	6	3	5	4	6	5	9	3	3	6	9
Troll	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>	3	4	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>	6	10
<u>Tuna Handline</u>	3	7	<u>n.a.</u>	<u>n.a.</u>	4	6	3	7	3	4	3	6
Other	-	-	-	-	<u>n.a.</u>	<u>n.a.</u>						
<b>Un-duplicated count</b>	6	12	6	9	7	12	7	15	6	7	9	18

n.a. = fewer than 3, data not available due to data confidentiality

**Table 3 Number of licensed fishermen and trips made to Cross Seamount by gear type and quarter, 2011.**

Gear Type	Quarter 1						Quarter 2					
	January		February		March		April		May		June	
	Licenseses	Trips	Licenseses	Trips	Licenseses	Trips	Licenseses	Trips	Licenseses	Trips	Licenseses	Trips
Hybrid	6	10	5	5	3	8	<u>n.a.</u>	<u>n.a.</u>	3	5	3	7
<u>Shortline</u>	5	7	<u>n.a.</u>	<u>n.a.</u>	4	5	3	4	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>
Troll	5	6	5	5	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>
<u>Tuna Handline</u>	<u>n.a.</u>	<u>n.a.</u>	-	-	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>	-	-	<u>n.a.</u>	<u>n.a.</u>
Other Vertical Line												
<b>Un-duplicated count</b>	10	15	8	8	5	12	4	7	4	8	5	14

Gear Type	Quarter 3						Quarter 4					
	July		August		September		October		November		December	
	Licenseses	Trips	Licenseses	Trips	Licenseses	Trips	Licenseses	Trips	Licenseses	Trips	Licenseses	Trips
Hybrid	3	6	4	5	5	6	3	4	<u>n.a.</u>	<u>n.a.</u>	4	6
<u>Shortline</u>	3	4	3	3	4	6	3	4	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>
Troll	3	4	4	8	4	6	4	6	<u>n.a.</u>	<u>n.a.</u>	4	6
<u>Tuna Handline</u>	3	4	3	7	3	4	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>	3	5
Other Vertical Line												
<b>Un-duplicated count</b>	7	12	6	11	7	10	7	9	4	4	7	13

n.a. = fewer than 3, data not available due to data confidentiality

**Table 4 Number of licensed fishermen and trips made to Cross Seamount by gear type and quarter, 2012.**

Gear Type	Quarter 1						Quarter 2					
	January		February		March		April		May		June	
	Licensees	Trips	Licensees	Trips	Licensees	Trips	Licensees	Trips	Licensees	Trips	Licensees	Trips
Hybrid	4	7	3	6	5	8	6	9	4	6	4	7
Shortline	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	3	4	3	5
Troll	4	7	4	8	4	7	5	8	3	6	4	6
Tuna Handline	5	8	n.a.	n.a.	3	3	4	7	3	6	3	3
<b>Un-duplicated count</b>	<b>7</b>	<b>13</b>	<b>5</b>	<b>10</b>	<b>6</b>	<b>11</b>	<b>9</b>	<b>15</b>	<b>7</b>	<b>13</b>	<b>7</b>	<b>11</b>

Gear Type	Quarter 3						Quarter 4					
	July		August		September		October		November		December	
	Licensees	Trips	Licensees	Trips	Licensees	Trips	Licensees	Trips	Licensees	Trips	Licensees	Trips
Hybrid	3	5	3	5	4	6	4	8	n.a.	n.a.	3	5
Shortline	n.a.	n.a.	3	7	3	7	3	7	n.a.	n.a.	3	5
Troll	4	7	4	8	n.a.	n.a.	4	6	4	8	4	7
Tuna Handline	n.a.	n.a.	7	9	3	4	4	4	n.a.	n.a.	3	4
Deep-sea handline							n.a.	n.a.	-	-	n.a.	n.a.
<b>Un-duplicated count</b>	<b>7</b>	<b>13</b>	<b>7</b>	<b>18</b>	<b>8</b>	<b>14</b>	<b>8</b>	<b>14</b>	<b>8</b>	<b>14</b>	<b>8</b>	<b>14</b>

n.a. = fewer than 3, data not available due to data confidentiality

**Table 5 Number of licensed fishermen and trips made to Cross Seamount by gear type and quarter, 2013.**

Gear Type	Quarter 1						Quarter 2					
	January		February		March		April		May		June	
	Licensees	Trips	Licensees	Trips	Licensees	Trips	Licensees	Trips	Licensees	Trips	Licensees	Trips
Hybrid	4	9	3	8	4	15	n.a.	n.a.	6	16	5	10
Shortline	3	6	4	7	5	9	n.a.	n.a.	3	4	3	6
Troll	4	10	4	9	4	12	n.a.	n.a.	4	9	6	11
Tuna Handline	3	6	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	6	12
Deep-sea handline	-	-	n.a.	n.a.	n.a.	n.a.	-	-	n.a.	n.a.	-	-
<b>Un-duplicated count</b>	<b>8</b>	<b>17</b>	<b>7</b>	<b>16</b>	<b>7</b>	<b>19</b>	<b>4</b>	<b>8</b>	<b>10</b>	<b>29</b>	<b>10</b>	<b>23</b>

Gear Type	Quarter 3						Quarter 4					
	July		August		September		October		November		December	
	Licensees	Trips	Licensees	Trips	Licensees	Trips	Licensees	Trips	Licensees	Trips	Licensees	Trips
Hybrid	5	11	6	11	4	10	4	8	4	10	4	9
Shortline	3	5	5	9	4	6	4	5	n.a.	n.a.	n.a.	n.a.
Troll	3	6	4	6	n.a.	n.a.	4	8	5	9	3	5
Tuna Handline	4	9	5	12	n.a.	n.a.	5	11	4	10	n.a.	n.a.
Other	-	-	-	-	n.a.	n.a.						
<b>Un-duplicated count</b>	<b>9</b>	<b>21</b>	<b>10</b>	<b>21</b>	<b>8</b>	<b>19</b>	<b>8</b>	<b>18</b>	<b>9</b>	<b>20</b>	<b>6</b>	<b>13</b>

n.a. = fewer than 3, data not available due to data confidentiality

**Table 6 Number of licensed fishermen and trips made to Cross Seamount by gear type and quarter, 2014.**

Gear Type	Quarter 1						Quarter 2					
	January		February		March		April		May		June	
	Licensees	Trips	Licensees	Trips	Licensees	Trips	Licensees	Trips	Licensees	Trips	Licensees	Trips
Hybrid	4	6	4	10	3	6	n.a.	n.a.	3	8	3	4
Shortline	n.a.	n.a.	n.a.	n.a.	4	6	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Troll	3	6	4	3	4	5	n.a.	n.a.	3	4	n.a.	n.a.
Tuna Handline	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.						
<b>Un-duplicated count</b>	<b>6</b>	<b>10</b>	<b>6</b>	<b>12</b>	<b>6</b>	<b>12</b>	<b>5</b>	<b>12</b>	<b>6</b>	<b>16</b>	<b>4</b>	<b>5</b>

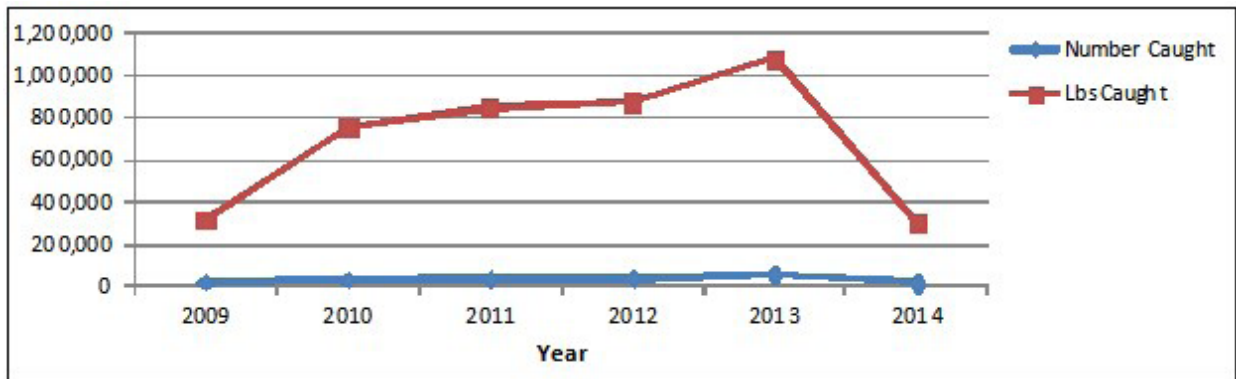
  

Gear Type	Quarter 3*						Quarter 4*					
	July		August		September		October		November		December	
	Licensees	Trips	Licensees	Trips	Licensees	Trips	Licensees	Trips	Licensees	Trips	Licensees	Trips
Hybrid	n.a.	n.a.										
Troll	n.a.	n.a.										
<b>Un-duplicated count</b>	<b>n.a.</b>	<b>n.a.</b>										

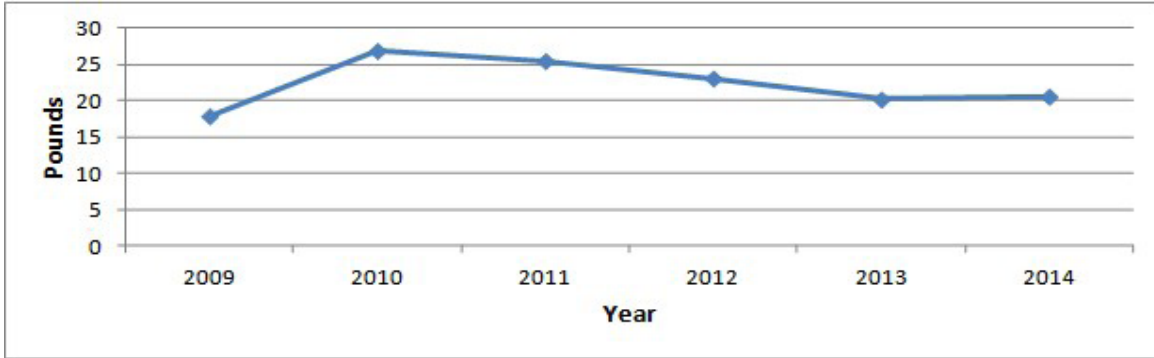
n.a. = fewer than 3, data not available due to data confidentiality  
 \*This report is being generated in October 2014, thus 2014 data are incomplete.

#### 4 CATCH SIZE, QUANTITY AND SPECIES COMPOSITION

The yearly yield from the Cross Seamount has been increasing since 2009. As illustrated in figure 8, from 2009 to 2013, the number of fish caught increased 305 percent and the pounds harvested increased 344 percent. This increase in yield may be due to increased effort and improved fishing methods. However, after a peak average weight of 26.9 pounds (lbs) in 2010, the average weight of fish harvested from Cross Seamount has decreased. In 2013, the average weight was 20.2 lbs, which was a 15 percent decrease from 2010 (Fig. 9).

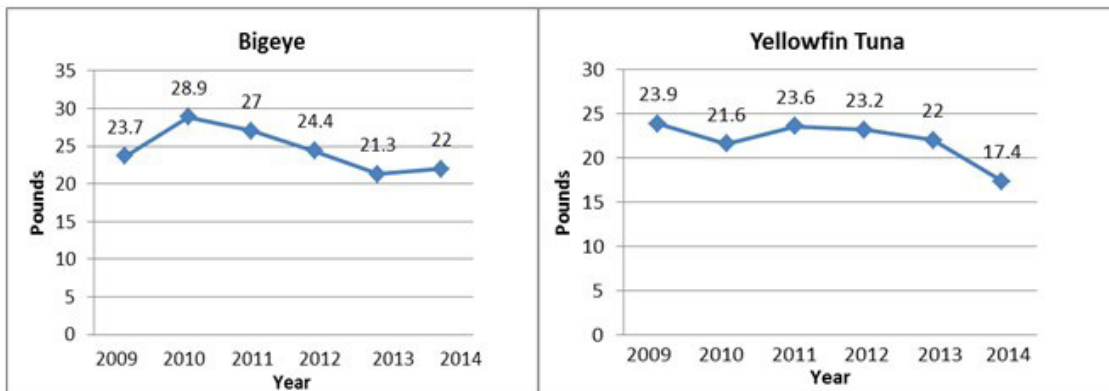


**Figure 8 Total number of fish landed and pounds caught annually, January 2009–July 2014.**

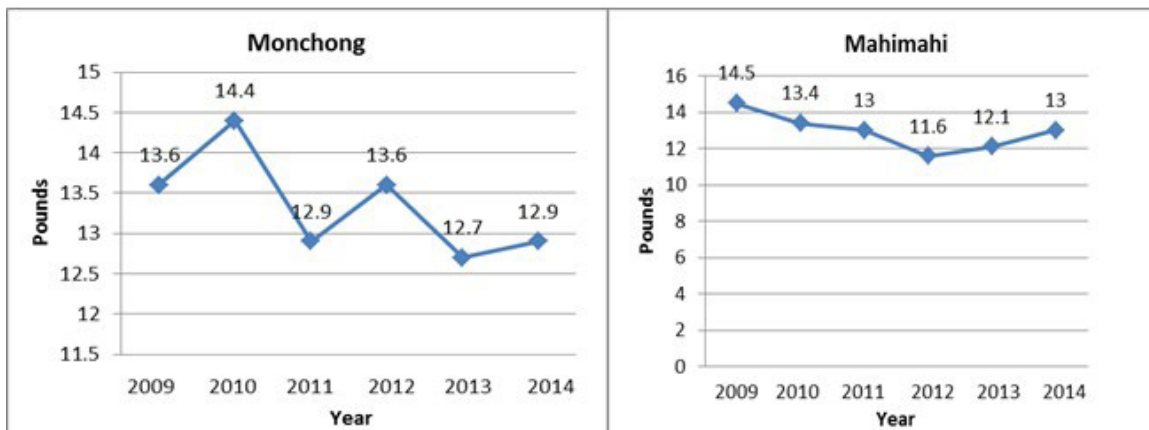


**Figure 9** The average yearly weight of all fish harvested from Cross Seamount, January 2009–July 2014.

On an individual species level, similar trends have emerged from the data of a decrease in the average weight of fish harvested. Tombo (albacore tuna) and striped marlin are the only species in the data set that have shown an increase in average size. Bigeye tuna, yellowfin tuna, monchong (pomfret), mahimahi (dolphin fish), aku (skipjack tuna), blue marlin, walu (oilfish), ono (wahoo), swordfish, short-nosed spearfish and kaku (barracuda) are all decreasing in their average weight (Figs. 10–18).



**Figure 10** Average weight of bigeye and yellowfin harvested at Cross Seamount, January 2009–July 2014.



**Figure 11** Average weight of monchong and mahimahi harvested at Cross Seamount, January 2009–July 2014.

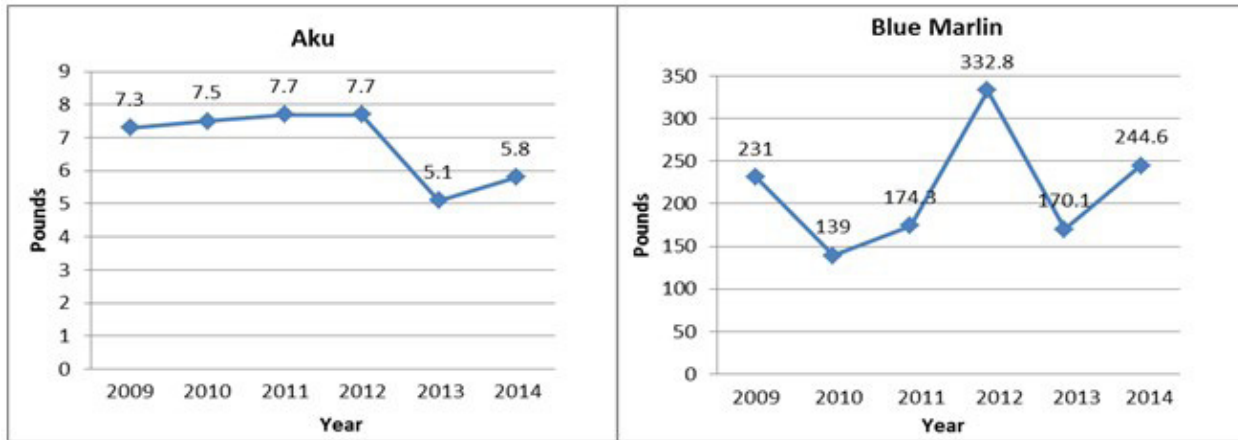


Figure 12 Average weight of aku and blue marlin harvested at Cross Seamount, January 2009–July 2014.

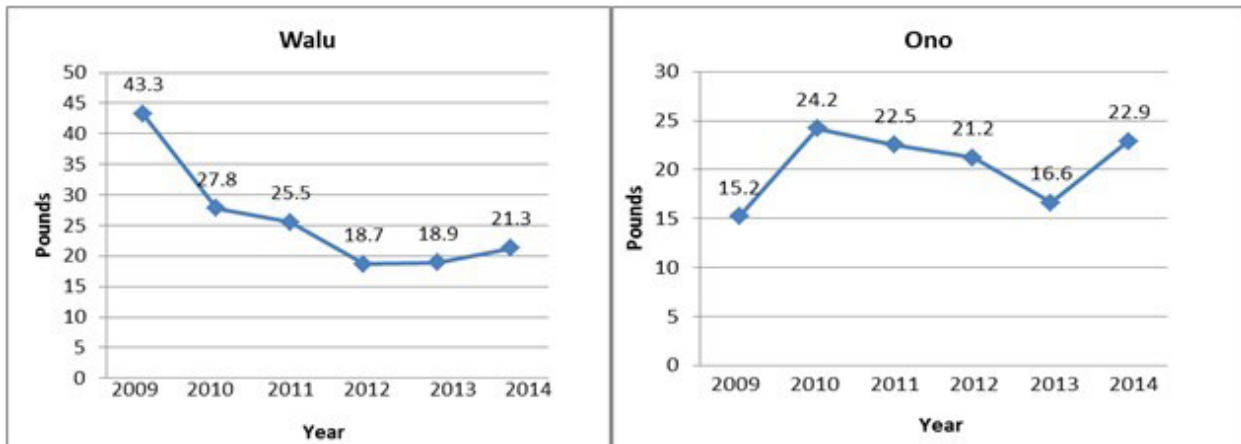


Figure 13 Average weight of walu and ono harvested at Cross Seamount, January 2009–July 2014.

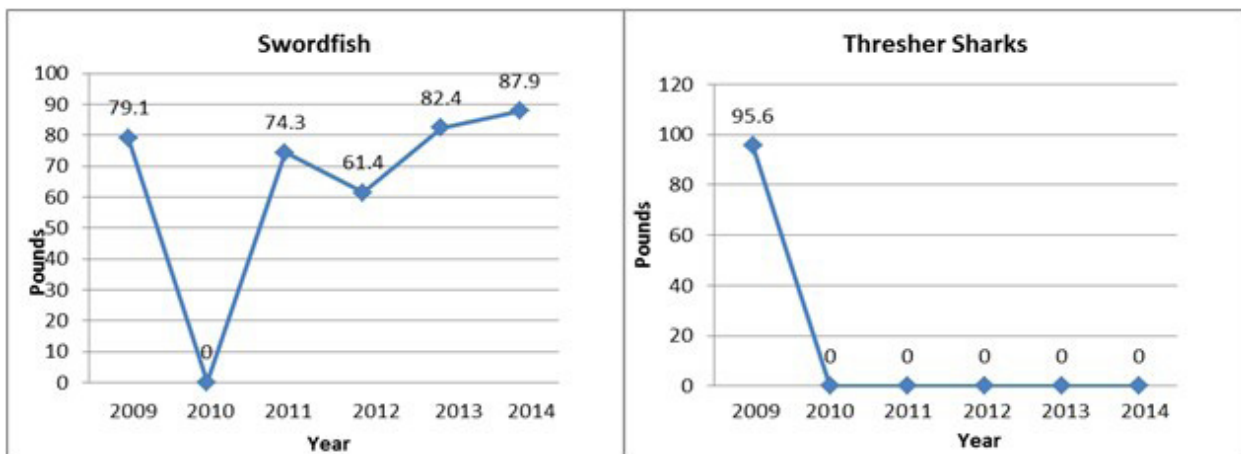


Figure 14 Average weight of swordfish and thresher sharks harvested at Cross Seamount, January 2009–July 2014.

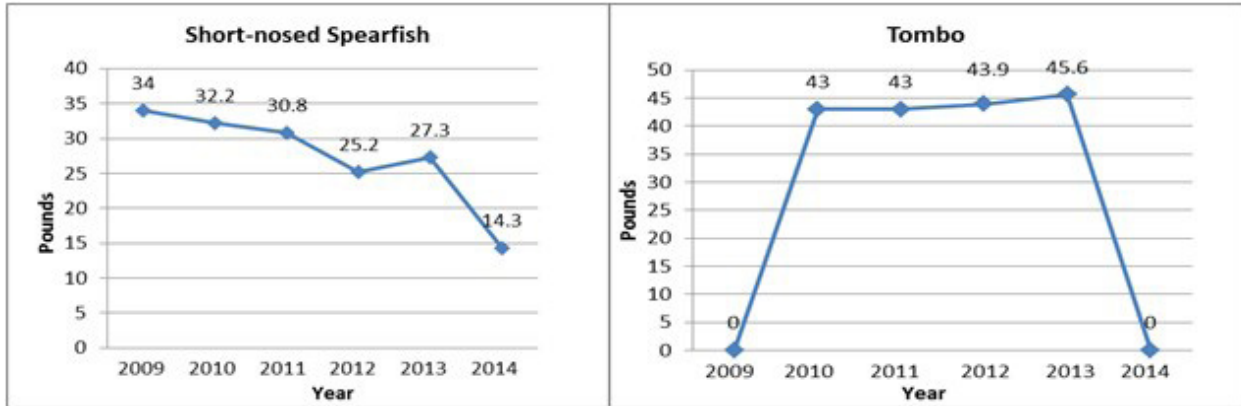


Figure 15 Average weight of short-nosed spearfish and tombo harvested at Cross Seamount, January 2009–July 2014.

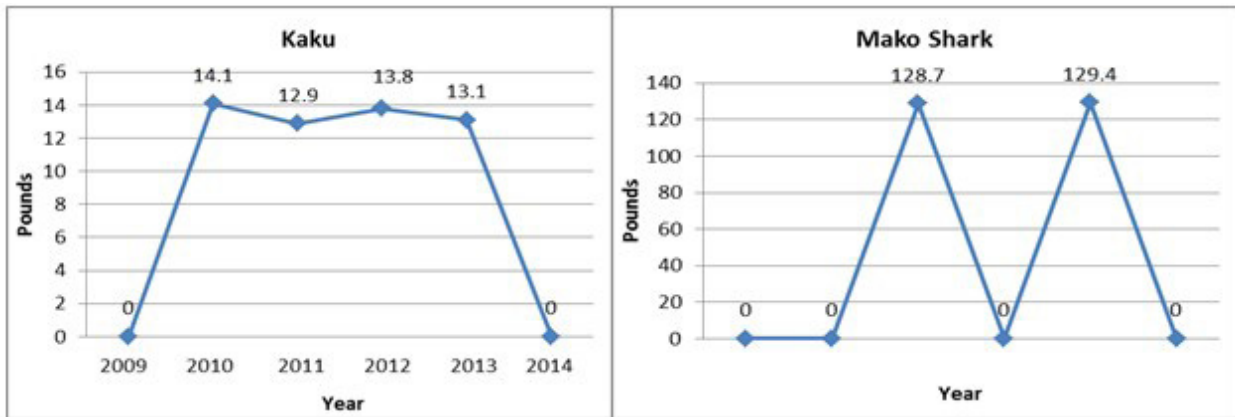


Figure 16 Average weight of kaku and mako sharks harvested at Cross Seamount, January 2009–July 2014.

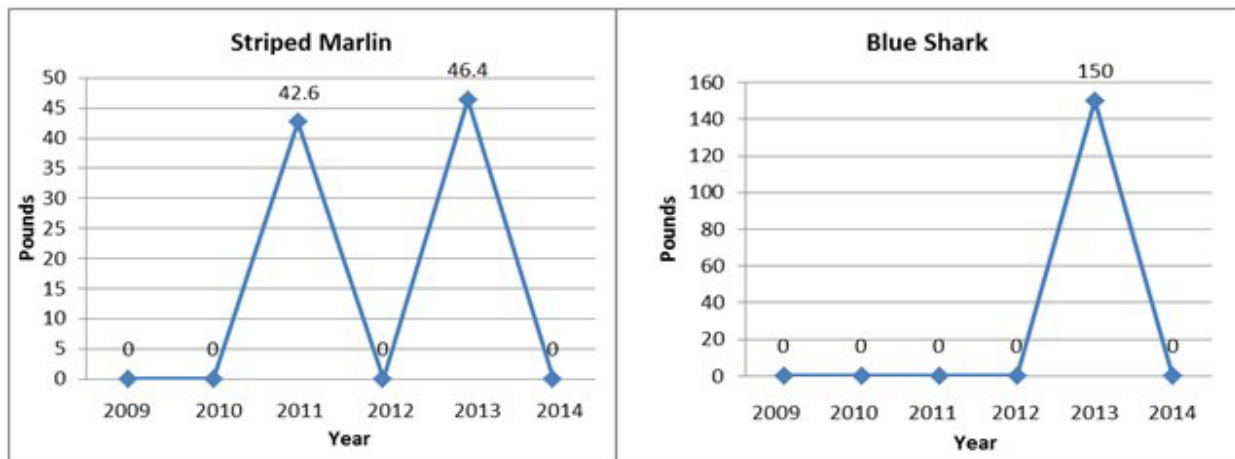
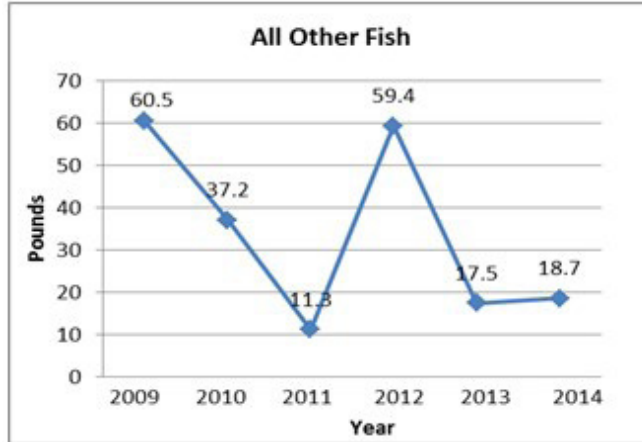


Figure 17 Average weight of striped marlin and blue shark harvested at Cross Seamount, January 2009–July 2014.



**Figure 18 Average weight of all other fish harvested at Cross Seamount, January 2009–July 2014.**

The species that are consistently landed the most from the seamount are bigeye tuna, yellowfin tuna, monchong and mahimahi (Tables 7 and 8). Yearly totals of individual species of fish caught, total weight, number of licensees, number of fish lost to predation and number of fish released are displayed in Table 7–15.

**Table 7 Number and pounds caught, number licensees, number fish lost to predation or released: Bigeye tuna and yellowfin tuna, January 2009–July 2014.**

Year	Bigeye Tuna					Yellowfin Tuna				
	Number Caught	Lbs Caught	Number Licensees	Number Lost to Predation	Number Released	Number Caught	Lbs Caught	Number Licensees	Number Lost to Predation	Number Released
2009	13,158	312,297	8	0	0	2,154	51,575	8	0	0
2010	22,403	648,915	14	73	546	3,063	66,367	14	1	20
2011	24,967	674,327	14	72	1665	5,541	131,159	12	26	80
2012	29,492	720,614	14	2	0	4,283	99,394	12	2	0
2013	42,022	895,482	15	0	77	4,684	103,112	12	0	0
2014	10,990	242,457	8	0	0	1,860	32,422	7	0	0

**Table 8 Number and pounds caught, number licensees, number fish lost to predation or released: Monchong and mahimahi, January 2009–July 2014.**

Year	Monchong					Mahimahi				
	Number Caught	Lbs Caught	Number Licensees	Number Lost to Predation	Number Released	Number Caught	Lbs Caught	Number Licensees	Number Lost to Predation	Number Released
2009	1,257	17,192	5	2	0	515	7,489	8	1	0
2010	774	11,146	8	0	0	934	12,547	14	2	0
2011	936	12,132	7	5	0	905	11,823	13	3	0
2012	848	11,548	6	0	2	2,012	23,428	13	0	0
2013	1,690	21,560	7	0	0	1,379	16,718	11	4	0
2014	877	11,362	4	0	0	395	5,152	8	0	0

**Table 9 Number and pounds caught, number licensees, number fish lost to predation or released: Aku and blue marlin, January 2009–July 2014.**

Year	Aku					Blue Marlin				
	Number Caught	Lbs Caught	Number Licensees	Number Lost to Predation	Number Released	Number Caught	Lbs Caught	Number Licensees	Number Lost to Predation	Number Released
2009	201	1,471	5	0	0	6	1,386	4	0	0
2010	536	4,048	10	0	0	12	1,669	7	0	1
2011	427	3,322	14	0	0	21	3,661	6	0	0
2012	808	6,294	10	0	0	17	5,658	7	0	3
2013	2,597	13,290	10	0	0	45	7,655	8	0	4
2014	273	1,584	4	0	0	20	4,893	4	0	5

**Table 10 Number and pounds caught, number licensees, number fish lost to predation or released: Walu and ono, January 2009–July 2014.**

Year	Walu					Ono				
	Number Caught	Lbs Caught	Number Licensees	Number Lost to Predation	Number Released	Number Caught	Lbs Caught	Number Licensees	Number Lost to Predation	Number Released
2009	29	1,257	4	0	0	49	748	5	0	0
2010	32	890	6	0	11	49	1,186	9	1	0
2011	44	1,124	3	0	4	55	1,240	8	0	0
2012	89	1,667	4	0	115	74	1,575	11	0	0
2013	138	2,609	7	0	0	228	3,791	10	0	0
2014	46	982	4	0	0	67	1,539	7	0	0

**Table 11 Number and pounds caught, number licensees, number fish lost to predation or released: Swordfish and thresher shark, January 2009–July 2014.**

Year	Swordfish					Thresher Shark				
	Number Caught	Lbs Caught	Number Licensees	Number Lost to Predation	Number Released	Number Caught	Lbs Caught	Number Licensees	Number Lost to Predation	Number Released
2009	6	475	3	0	0	3	287	3	0	1
2010	0	0	0	0	0	0	0	0	0	0
2011	8	595	4	0	0	0	0	0	0	0
2012	5	307	3	0	4	0	0	0	0	0
2013	35	2,886	6	0	5	0	0	0	0	0
2014	10	879	4	0	0	0	0	0	0	0

**Table 12 Number and pounds caught, number licensees, number fish lost to predation or released: Short-nosed spearfish and tombo, January 2009–July 2014.**

Year	Short-nosed Spearfish					Tombo				
	Number Caught	Lbs Caught	Number Licensees	Number Lost to Predation	Number Released	Number Caught	Lbs Caught	Number Licensees	Number Lost to Predation	Number Released
2009	5	170	3	0	0	0	0	0	0	0
2010	14	451	6	0	0	156	6,721	4	1	0
2011	39	1,203	7	0	0	82	3,531	5	0	0
2012	20	505	6	0	0	16	703	3	0	0
2013	50	1,368	8	0	0	63	2,879	7	0	0
2014	66	946	6	0	0	0	0	0	0	0



**Table 13 Number and pounds caught, number licensees, number fish lost to predation or released: Kaku and mako shark, January 2009–July 2014.**

Year	Kaku					Mako Shark				
	Number Caught	Lbs Caught	Number Licensees	Number Lost to Predation	Number Released	Number Caught	Lbs Caught	Number Licensees	Number Lost to Predation	Number Released
2009	0	0	0	0	0	0	0	0	0	0
2010	38	539	4	0	0	0	0	0	0	0
2011	42	542	3	0	0	8	1,030	3	0	0
2012	22	304	3	0	0	0	0	0	0	0
2013	59	777	5	0	4	7	906	3	0	3
2014	0	0	0	0	0	0	0	0	0	0

**Table 14 Number and pounds caught, number licensees, number fish lost to predation or released: Striped marlin and blue shark, January 2009–July 2014.**

Year	Striped Marlin					Blue Shark				
	Number Caught	Lbs Caught	Number Licensees	Number Lost to Predation	Number Released	Number Caught	Lbs Caught	Number Licensees	Number Lost to Predation	Number Released
2009	0	0	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0	0	0
2011	13	554	3	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	0	0	0
2013	38	1,766	5	0	0	2	300	3	0	88
2014	0	0	0	0	0	0	0	0	0	0

**Table 15 Number and pounds caught, number licensees, number fish lost to predation or released: All other fish, January 2009–July 2014.**

Year	Number				
	Number Caught	Lbs Caught	Number Licensees	Number Lost to Predation	Number Released
2009	12	727	5	10	2
2010	12	447	6	11	12
2011	47	533	6	36	654
2012	41	2,436	4	0	479
2013	71	1,245	4	4	66
2014	28	525	4	0	0

Each species has some seasonality in regards to when it can be found at the Cross Seamount. Bigeye tuna (Fig. 19), yellowfin tuna (Fig. 20) and mahimahi (Fig. 23) are more frequently caught from December to March. Monchong (Fig. 25) seem to congregate from September to March. Walu (Fig. 26.) catch peaks between August and January; ono (Fig. 29) and tombo (Fig. 33) from July to September; short-nosed spearfish (Fig. 31) from December to February; kaku (Fig. 34) from May to September; aku (Fig. 37) from September to February; blue marlin (Fig. 39) from June to September; striped marlin (Fig. 41) in May; and swordfish (Fig. 43) in June, October and February. The number of fish landed tracks with the pounds landed for most species. The average weight of the fish do not appear to shift dramatically throughout the year as there are not times when the number of fish decreases but the weight increases, and vice versa. Short-nosed spearfish is the only species that shows decreased numbers caught with increased weight (Figs. 31 and 32).

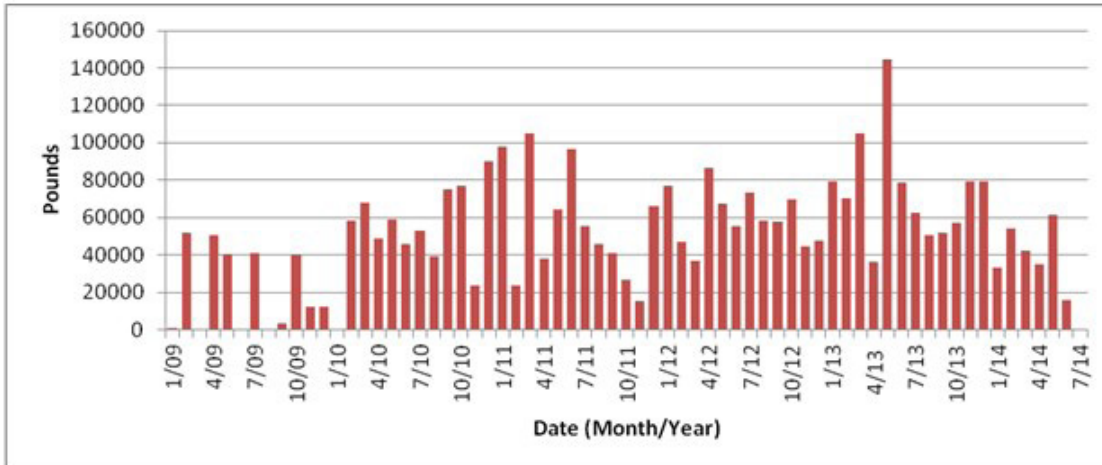


Figure 19 Monthly catches of bigeye tuna (lbs), January 2009–July 2014.

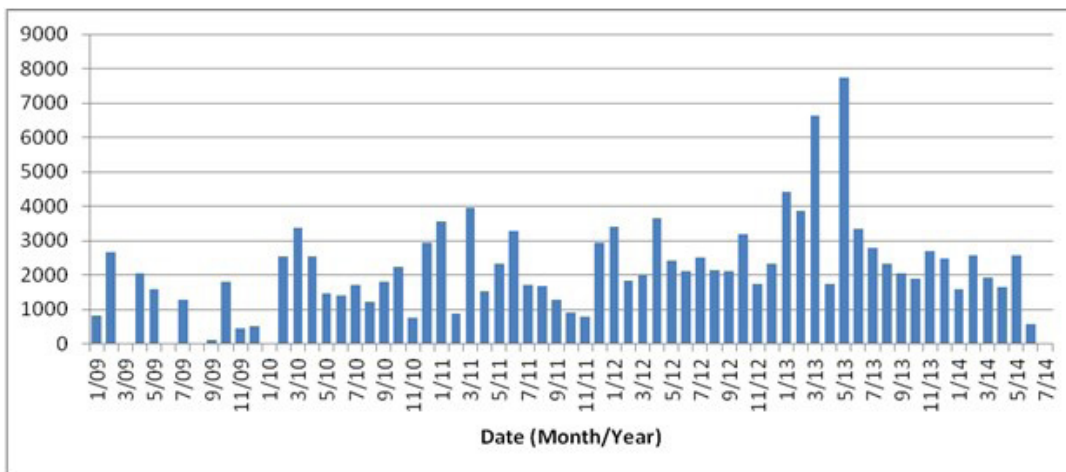


Figure 20 Monthly catches of bigeye tuna (numbers), January 2009–July 2014.

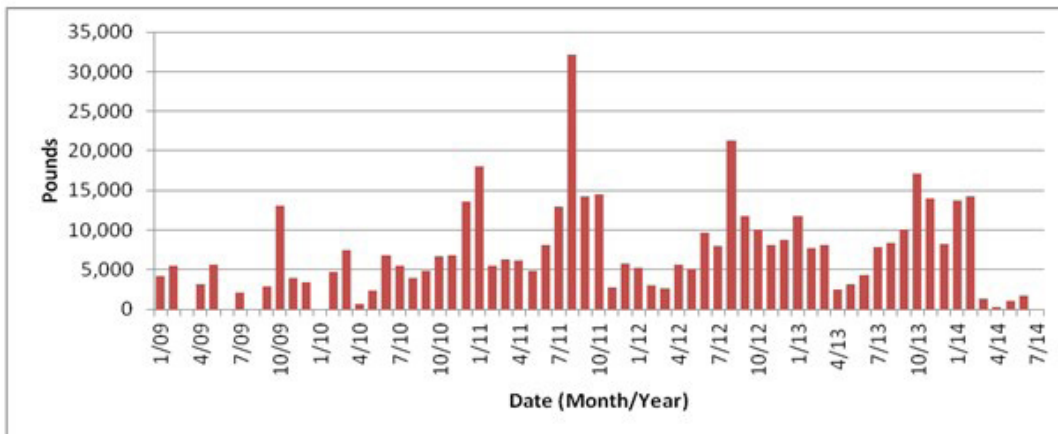


Figure 21 Monthly catches of yellowfin tuna (lbs), January 2009–July 2014.

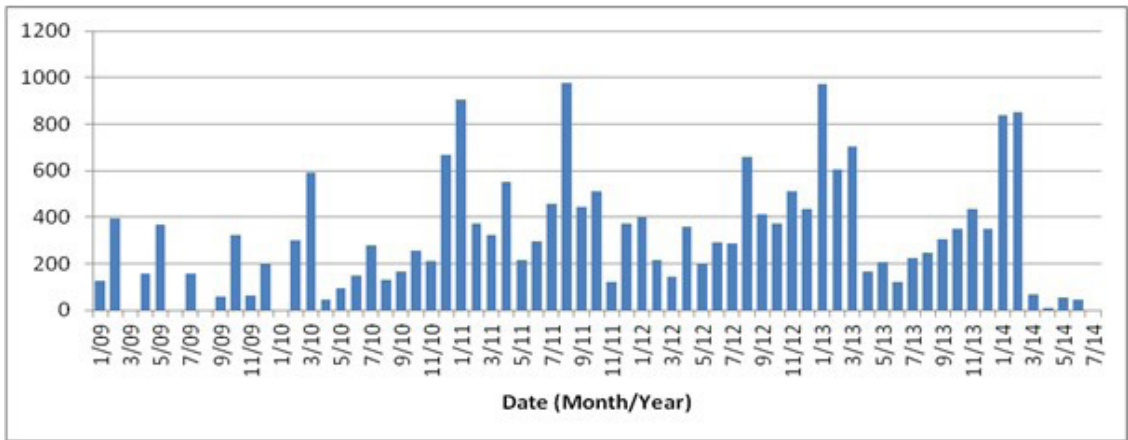


Figure 22 Monthly catches of yellowfin tuna (numbers), January 2009–July 2014.

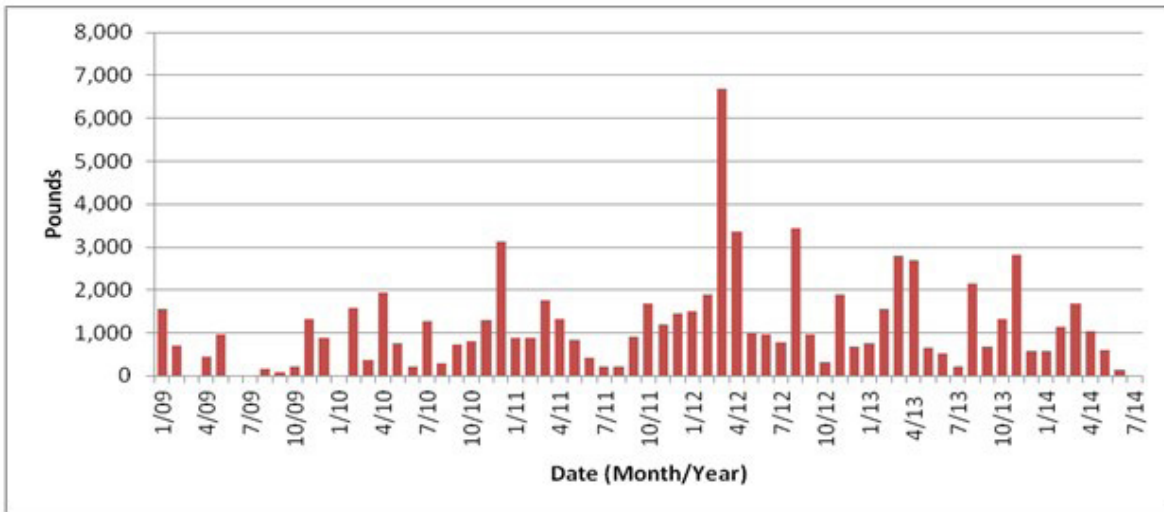


Figure 23 Monthly catches of mahimahi (lbs), January 2009–July 2014.

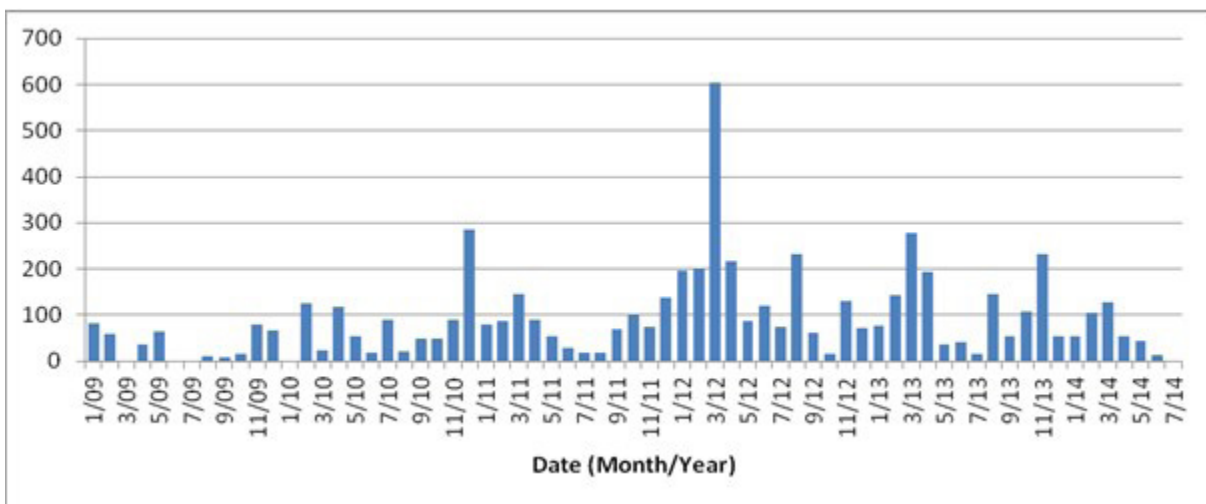


Figure 24 Monthly catches of mahimahi (numbers), January 2009–July 2014.

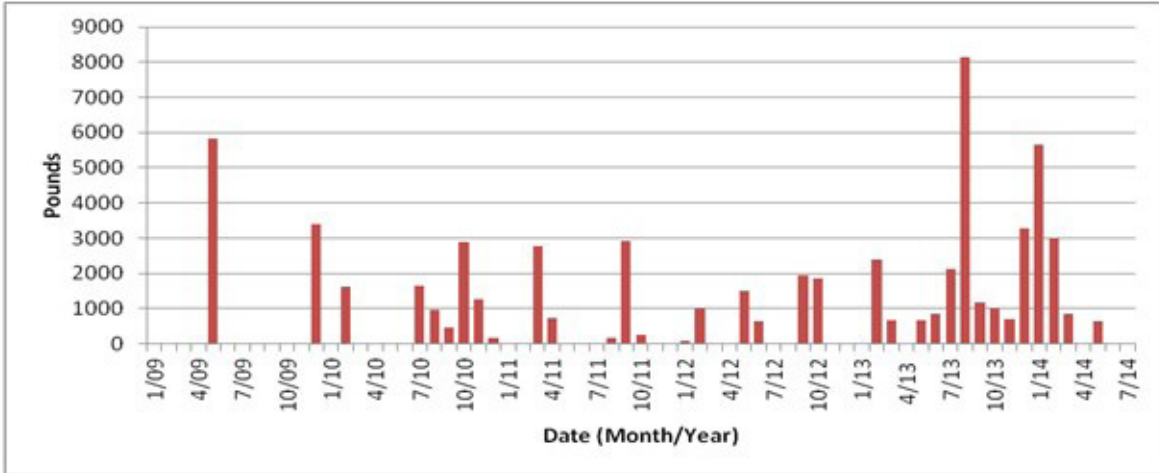


Figure 25 Monthly catches of monchong (lbs), January 2009–July 2014.

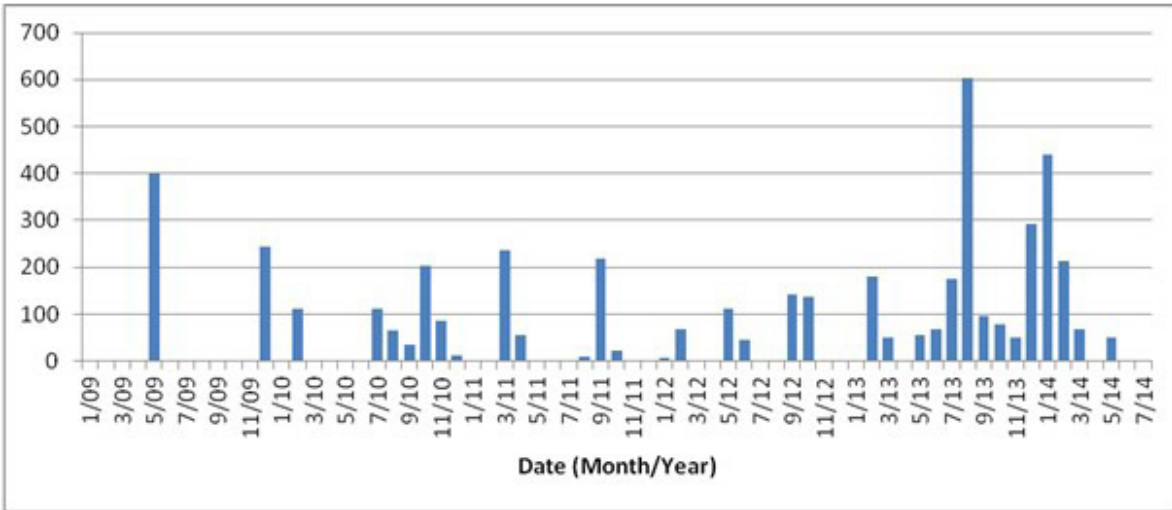


Figure 26 Monthly catches of monchong (numbers), January 2009–July 2014.

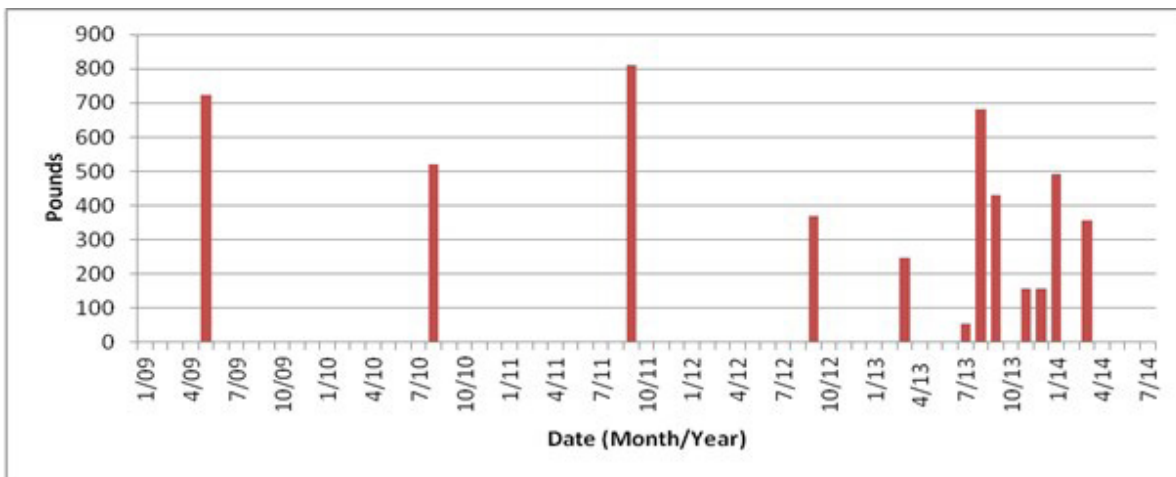


Figure 27 Monthly catches of walu (lbs), January 2009–July 2014.

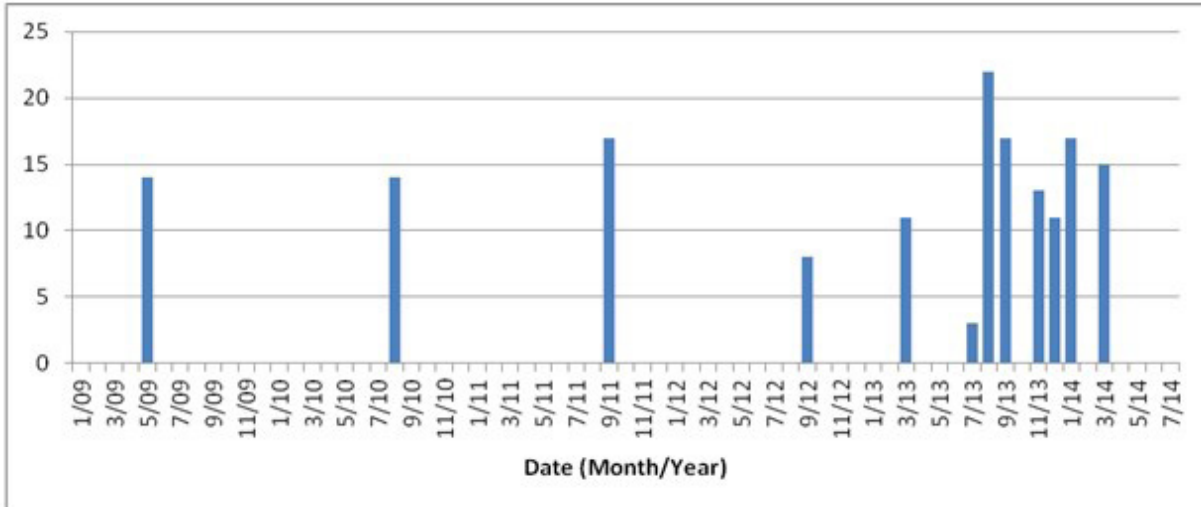


Figure 28 Monthly catches of walu (numbers), January 2009–July 2014.

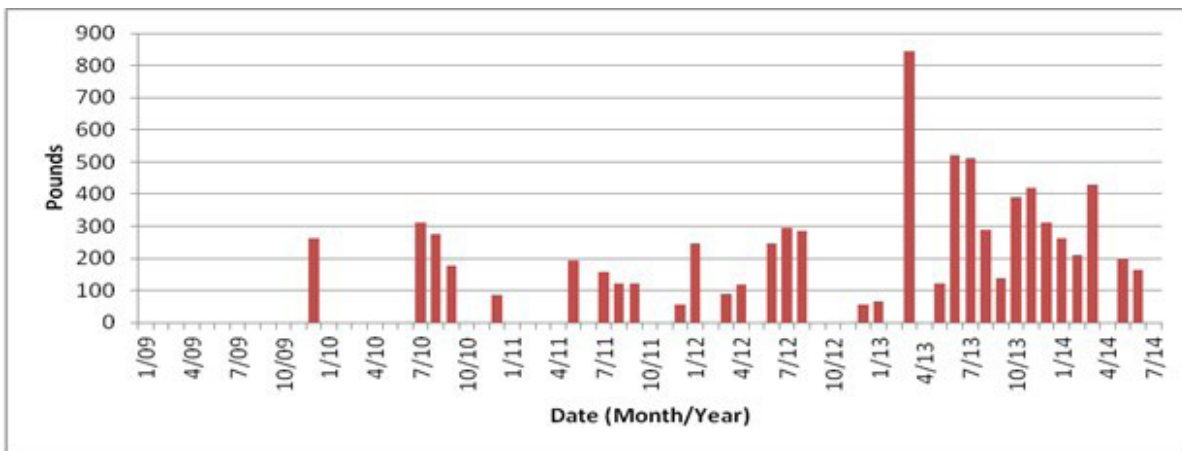


Figure 29 Monthly catches of ono (lbs), January 2009–July 2014.

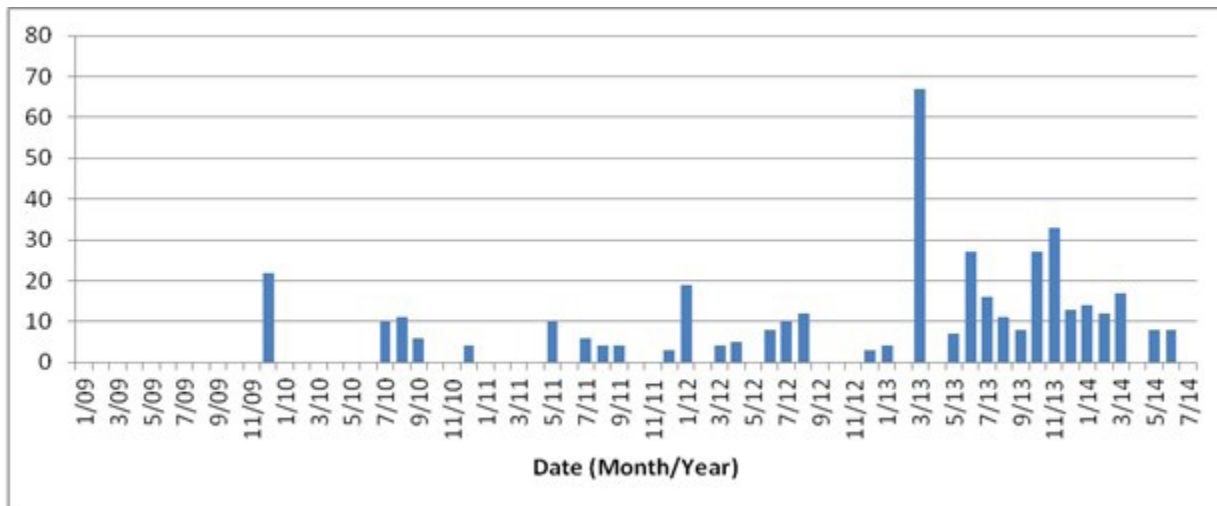


Figure 30 Monthly catches of ono (numbers), January 2009–July 2014.

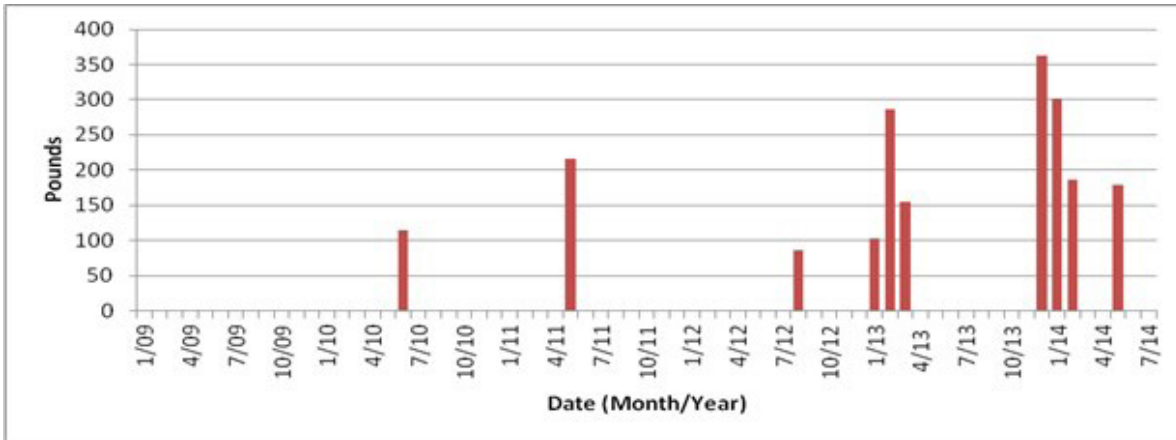


Figure 31 Monthly catches of short-nosed spearfish (lbs), January 2009–July 2014.

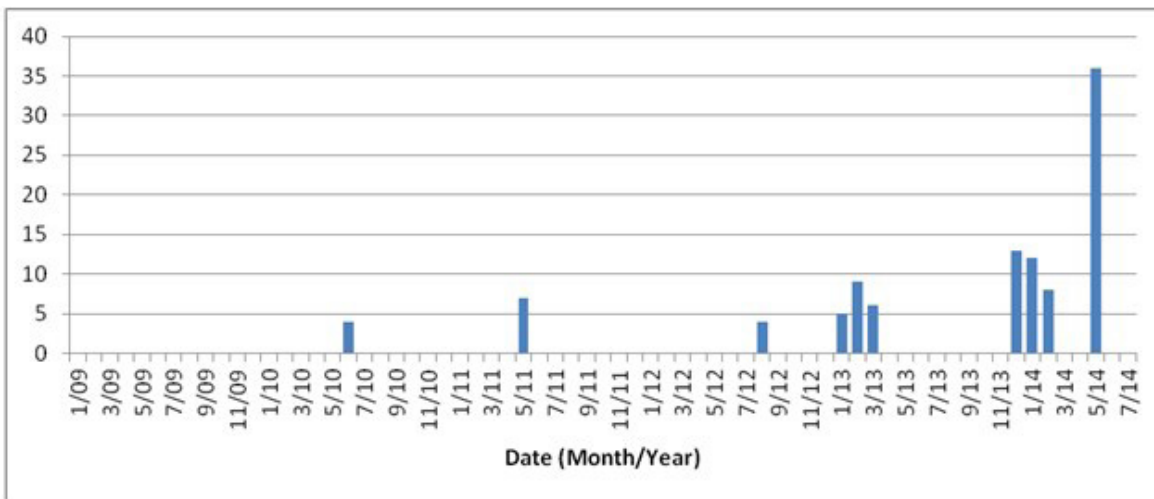


Figure 32 Monthly catches of short-nosed spearfish (numbers), January 2009–July 2014.

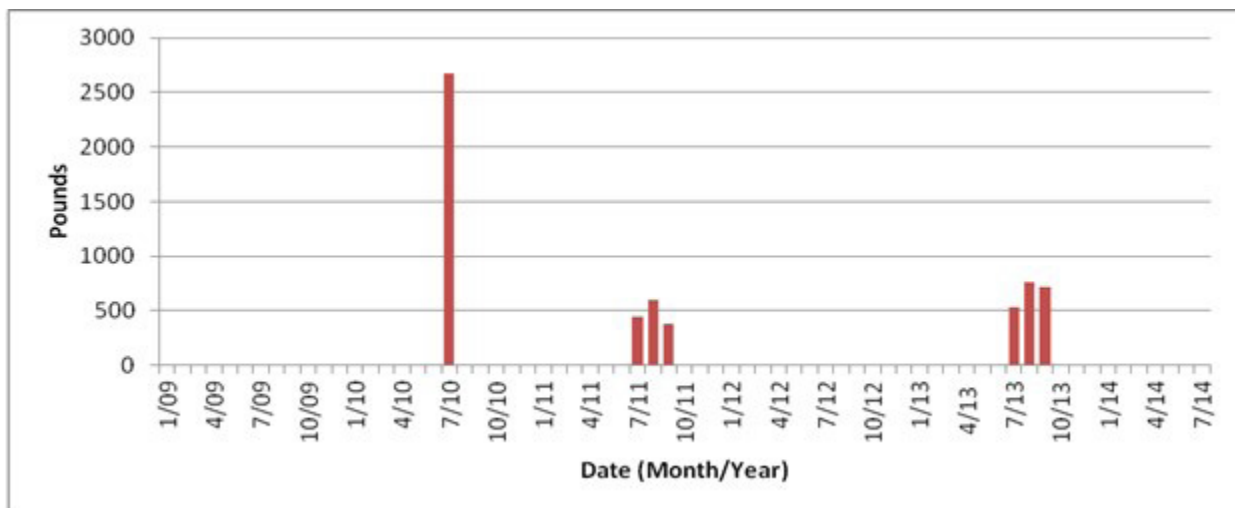


Figure 33 Monthly catches of tombo (lbs), January 2009–July 2014.

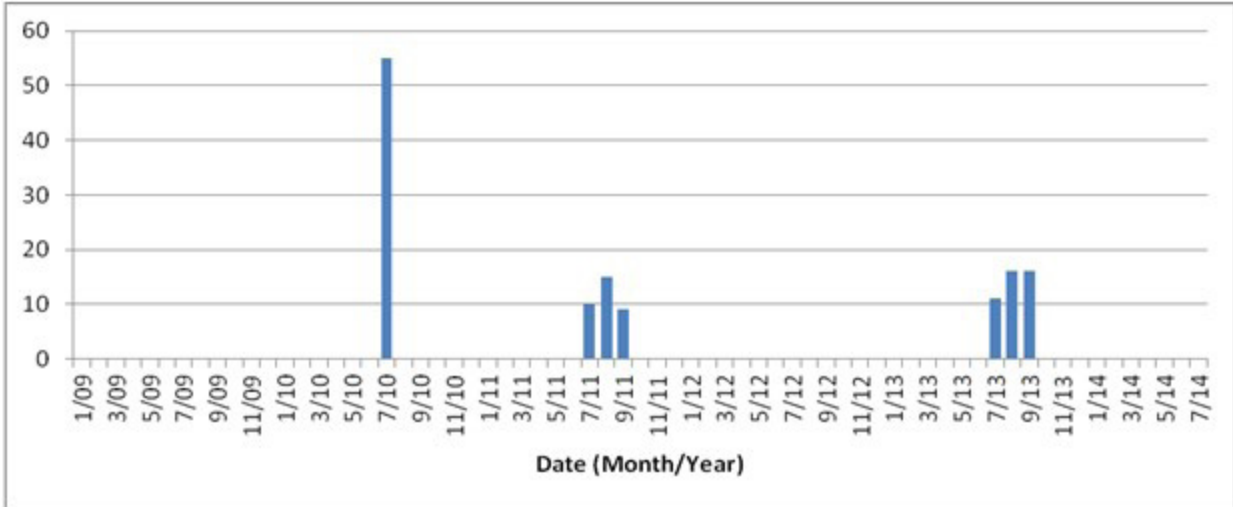


Figure 34 Monthly catches of tombo (numbers), January 2009–July 2014.

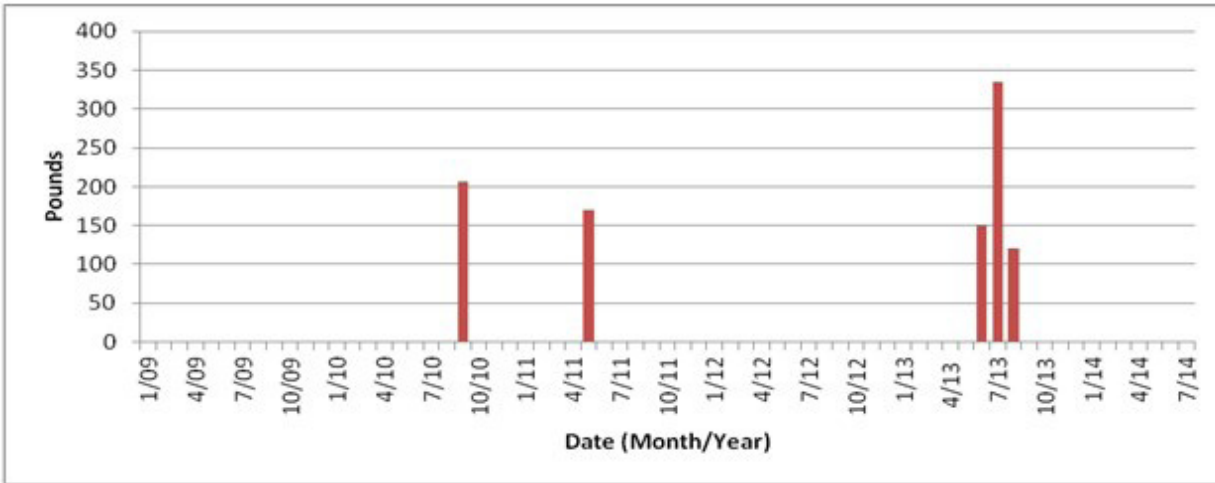


Figure 35 Monthly catches of kaku (lbs), January 2009–July 2014.

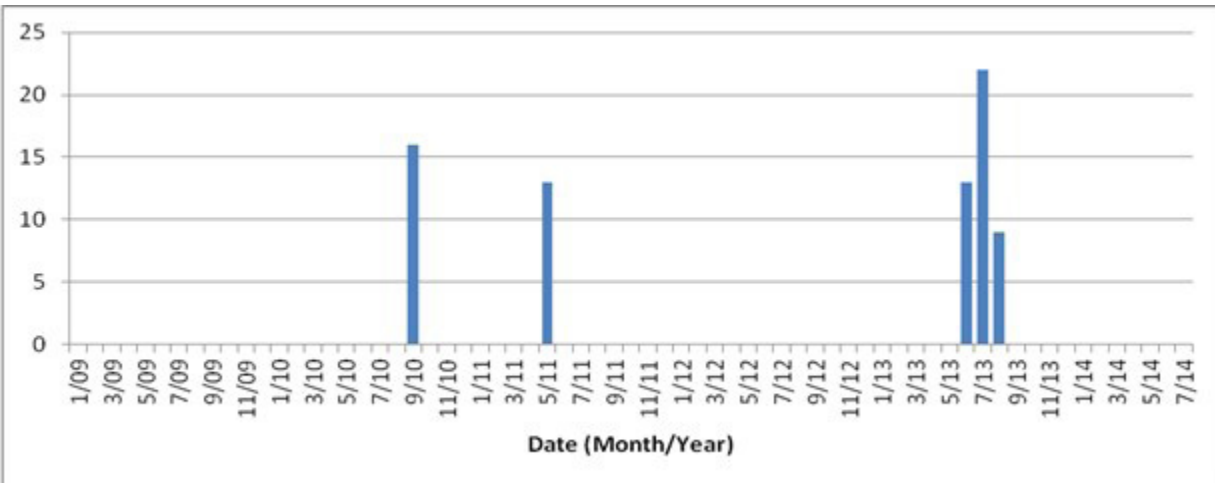


Figure 36 Monthly catches of kaku (numbers), January 2009–July 2014.

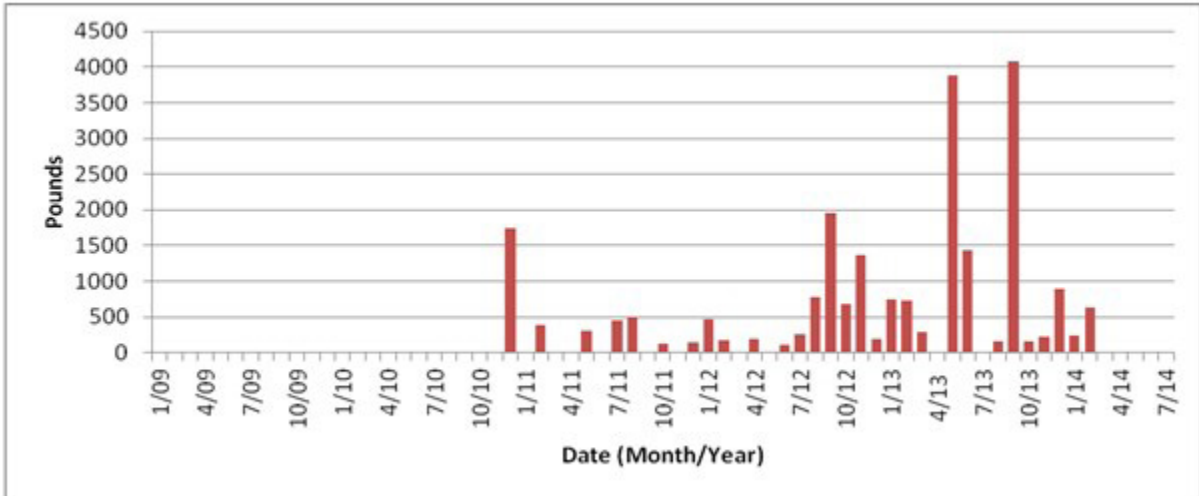


Figure 37 Monthly catches of aku (lbs), January 2009–July 2014.

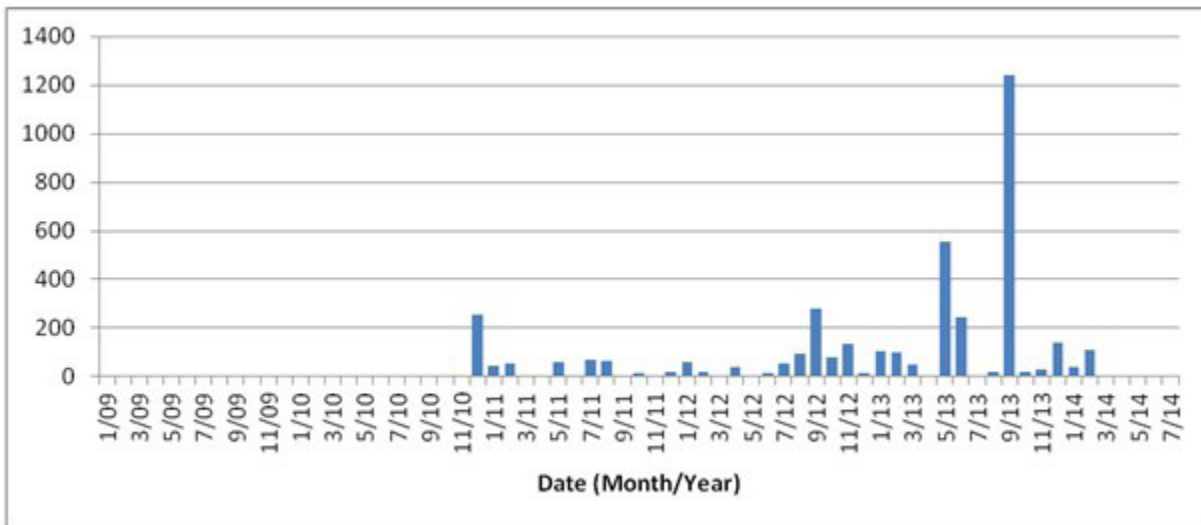


Figure 38 Monthly catches of aku (numbers), January 2009–July 2014.

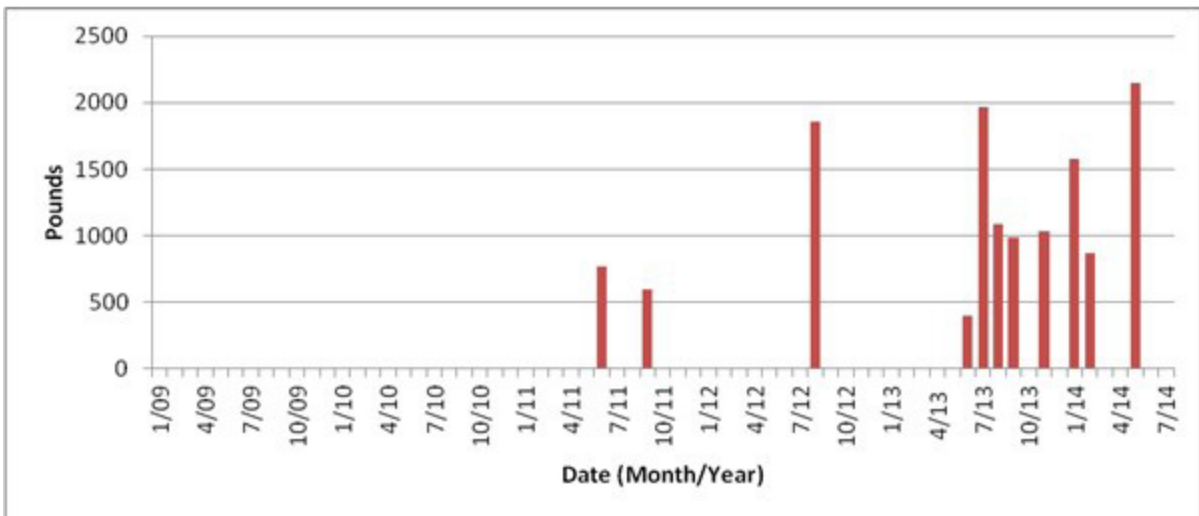


Figure 39 Monthly catches of blue marlin (lbs), January 2009–July 2014.



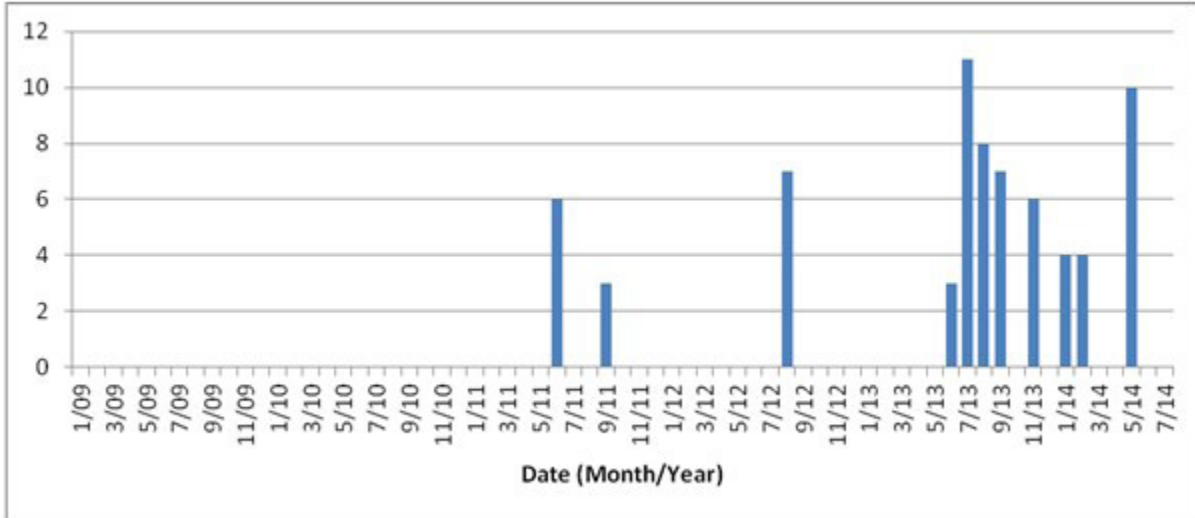


Figure 40 Monthly catches of blue marlin (numbers), January 2009–July 2014.

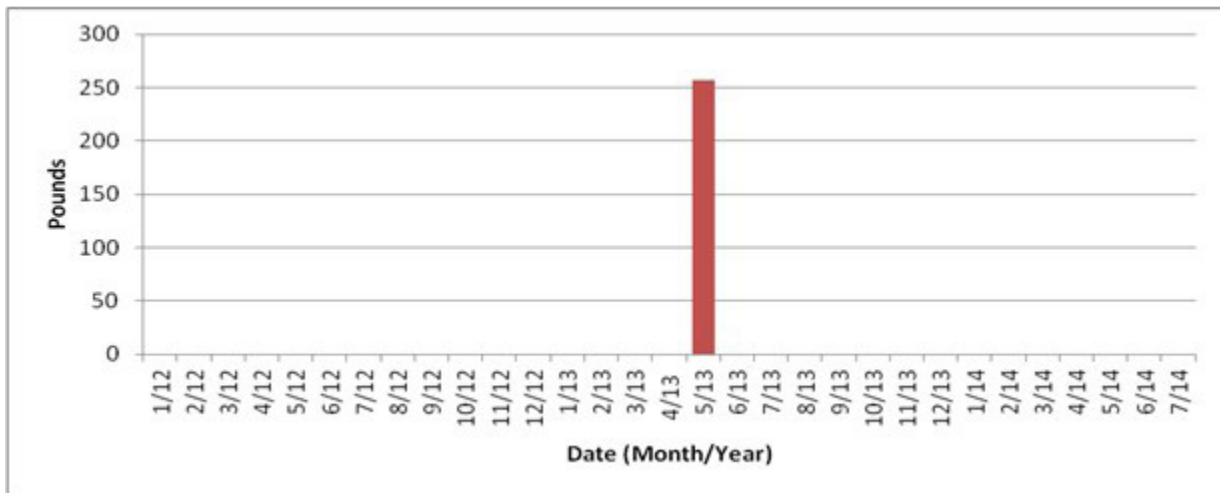


Figure 41 Monthly catches of striped marlin (lbs), January 2009–July 2014.

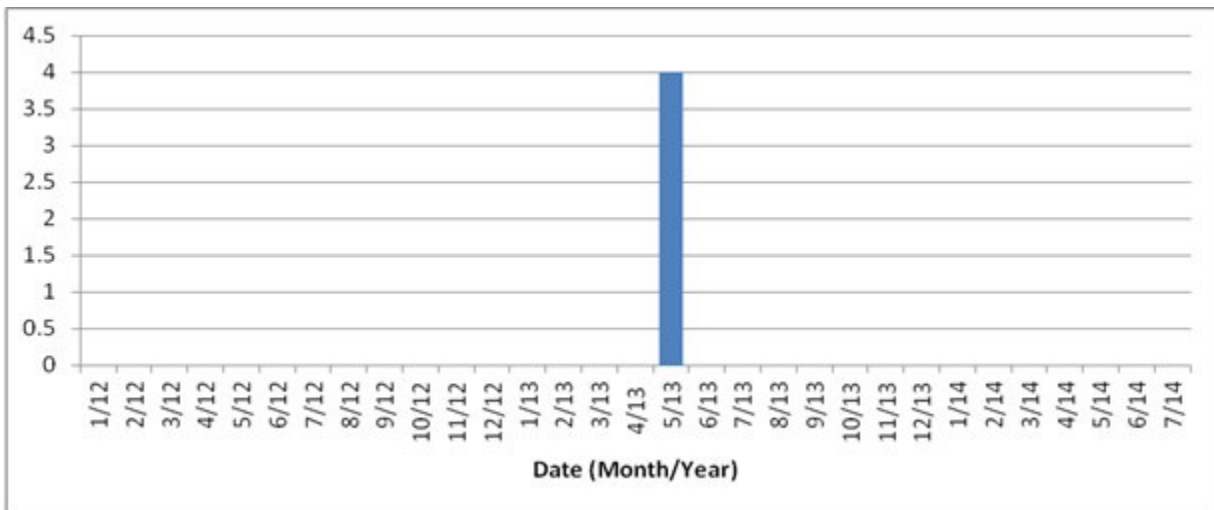


Figure 42 Monthly catches of striped marlin (numbers), January 2009–July 2014.

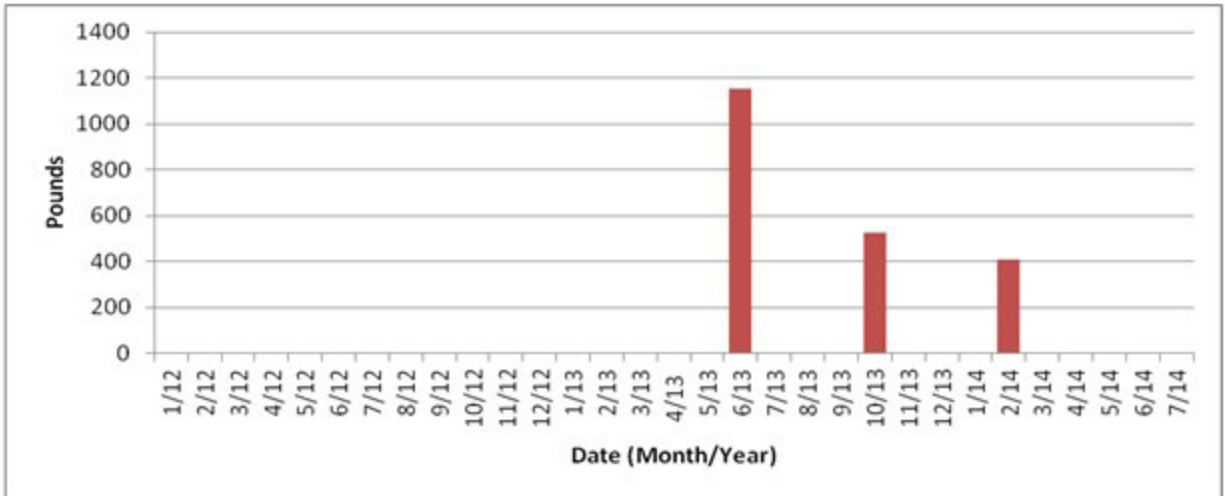


Figure 43 Monthly catches of swordfish (lbs), January 2009–July 2014.

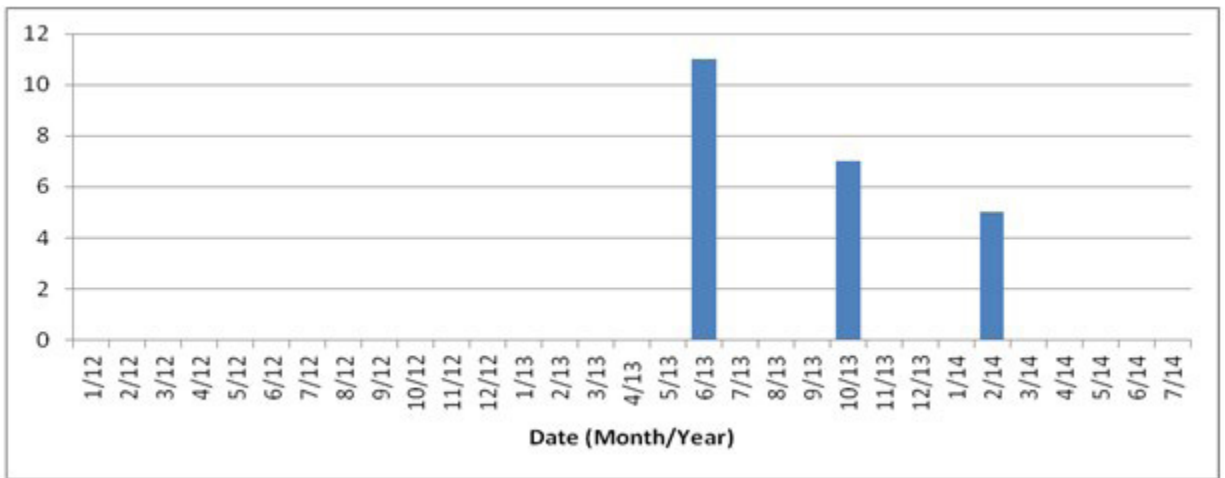


Figure 44 Monthly catches of swordfish (numbers), January 2009–July 2014.

## 5 CONCLUSION

The Cross Seamount fishery is a niche fishery for a relatively small number of fishermen, although the number of yearly trips to the seamount has been increasing since 2009. The seamount produces relatively high landings of fish, which have also increased in the past several. This is likely due in part to gear modification and experience. However, although the harvest has increased in recent years, the average weight for a number of species has decreases. Managers may be concerned about this trend especially in both bigeye and yellowfin tuna.

The Cross Seamount produces fish almost year round, due to the seasonality of the various species that can be found there. It is important to note that these data are from reported catches by licensed fishermen. There may be some unreported catch and effort occurring at the Cross Seamount fishery.