

ANNUAL OREGON ALBACORE TUNA (*Thunnus alalunga*) REPORT, 2013

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**ANNUAL PROGRESS REPORT
ALBACORE PORT SAMPLING PROGRAM**

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INTRODUCTION

Albacore is a highly migratory tuna species found worldwide in temperate seas. Albacore caught off Oregon belong to the North Pacific stock and are generally juvenile and sub-adult fish that have not spawned. During their trans-Pacific migrations, albacore are targeted at different times of the year by fisheries of several nations including the United States, Canada, Taiwan and Japan. The United States West Coast fishery harvests this stock during the summer and fall months.

Albacore has been fished commercially off Oregon since 1929 when the fishery expanded North from the traditional grounds off Southern California. For many years, both bait-boats and jig-boats fished for albacore off Oregon, but in recent years jig-caught (troll-caught) albacore have been predominantly landed. However, bait fishing with live anchovies is growing in popularity with an increasing number of vessels employing this technique with much success, especially late in the season for the past several years. The West Coast fleet consists primarily of 20 to 60 foot 'combination' boats with multiple permits to fish crab, salmon, or groundfish at other times of the year; also several large freezer boats (>60 ft.) that travel the North and South Pacific, fishing primarily albacore year-round.

Commercial albacore landings in Oregon were first recorded in 1929, and have been highly variable through the years, ranging from a low of 27,600 pounds in 1936 to a high of almost 38 million pounds in 1968. In the last decade, landings in Oregon have averaged 9.7 million pounds per year.

Beginning in 2005 under the Highly Migratory Species Fisheries Management Plan, the National Marine Fisheries Service (NMFS) required vessels to submit logbook data while fishing for albacore inside the 200 mile Economic Exclusive Zone (EEZ). Prior to this, the logbook program was voluntary and only vessels fishing outside the EEZ were required to submit logbooks under the High Seas Fishing Compliance Act.

Sampling of Oregon's commercial albacore fishery is a cooperative effort between the Oregon Department of Fish and Wildlife (ODFW), the NMFS's Southwest Fisheries Science Center and the Pacific States Marine Fisheries Commission. This report documents the progress of the 2013 fishery off Oregon and associated sampling activities.

Recreational marine fisheries programs began focusing data collection on the recreational albacore fishery in 2000. Recreational fishing for albacore off Oregon has been growing in popularity during the past decade, and especially in the past six years. Catches have ranged from a low of 2,901 fish (approximately 57,000 pounds) in 2000 to a high of 63,167 fish (approximately 1,105,000 pounds) in 2012. Since 2000, catches have averaged 21,000 fish (approximately 410,000 pounds) per year.

2013 COMMERCIAL FISHERY

The 2013 Oregon albacore season began with one small landing on June 29th in Charleston. Two large landings of frozen tuna were sold on May 31st; however these vessels were not fishing offshore of Oregon. The number of deliveries made per week increased steadily with five weeks of peak landings occurring from the second week of August through the first week of September (Figure 1). The season ended with a final landing made on October 30th in Charleston.

High winds and hazardous seas occurring in late June and early July delayed many vessels from entering the albacore fishery until favorable conditions prompted peak fishing effort by early August. Several small storms occurred in late August briefly reducing vessel trips but fishing effort generally remained steady through mid-September.

Sea surface temperatures reached highs of 62-63°F by mid-July and early August but stayed in the distant offshore areas of Oregon. This warmer water did not consistently reach inside the 125°W line until mid-August where it remained through late September.

Primary fishing locations for 2013 included the central to north Oregon coast for latitudes 43-46°N and longitudes 124-126°W. Albacore vessels reported fair to above average success with daily catch rates widely varying. Many vessels reported high concentrations of forage fish and speculated this kept albacore dispersed and traveling faster/farther than usually observed. Many smaller vessels opted to primarily participate in the Chinook salmon troll fishery with favorable prices and catch rates.

The "Fishing Regime" under the U.S./Canada Albacore treaty was suspended for the 2012 fishing season. This treaty suspension disallowed any Canadian vessels in the U.S. EEZ, and any U.S. vessels in the Canadian EEZ. The treaty was originally signed in 1981 and expired after 30 years with U.S. officials declining an agreement for a treaty renewal in 2012. For 2013, a temporary allowance of 45 pre-authorized Canadian vessels was permitted to extract tuna from the US EEZ from June 15 to September 15, 2013. Seventeen Canadian vessels landed 1.05 million pounds of albacore in Oregon during their three month eligibility.

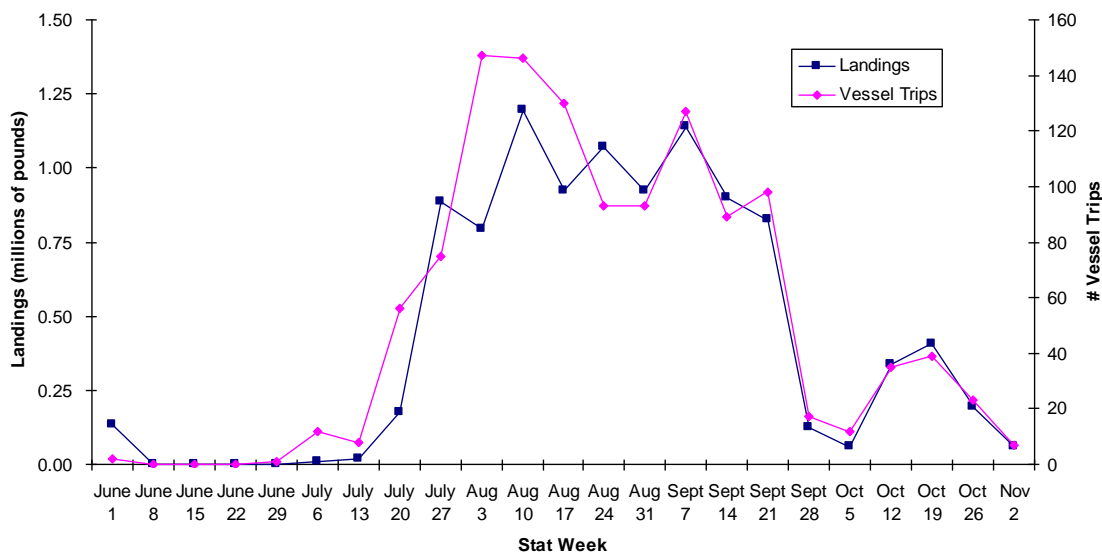


Figure 1 – Total albacore landings and number of vessel trips per week in 2013.

- **2013 Albacore Landings**

A total of 397 vessels made at least one landing of albacore in Oregon ports for 2013, down from 447 vessels in 2012 (Figure 2). These vessels made 1,217 total trip landings in 2013, down from 1,608 landings in 2012.

The peak month of August yielded 45% of the total landings for 2013 with 4,581,684 pounds (Figure 3). This amount proved to be the most productive August in Oregon's albacore history, now ahead of August 2012. Total landings in the month of September were 2,994,862 pounds, the most productive since September 1996. For 2013, the months of August and September produced 74% of Oregon's albacore landings.

The preliminary total for 2013 commercial landings is 10,171,575 pounds. This is a 2.4% increase from the 9,928,716 total pounds landed in 2012, and is a 4.5% increase from the ten-year average (2004-2013) of 9,735,480 pounds (Table 1). The standard deviation for ten years of total landings is $\pm 932,934$ pounds, or approximately $\pm 9.6\%$.

Newport received the majority of Oregon's albacore landings in 2013 with 48.4% of total weight landed; followed by Astoria with 25.4%, Charleston with 18.7%, Garibaldi with 2.5%, Brookings with 2.5%, and Winchester Bay with 1.9% (Table 2). The remaining seven smaller ports landed a combined 0.5% of the total weight.

Landing percentages for Oregon's primary albacore landing ports in 2013 were consistent with ten-year averages (2004-2013), with the exception of Brookings. The port of Brookings landed 252,920 total pounds, which is a 270% increase from their ten-year average of 68,452 pounds. This amount is a record year for albacore landings in Brookings.

The average landing in Oregon for 2013 was 7,978 pounds, a 31% increase from 6,084 pounds in 2012. Table 3 describes the quartile partition of landing size in the 2013 Oregon albacore fishery, which helps to explain the landing characteristics of the fishery. The average weight of a landing was 7,978 pounds, but for 50% of all vessel trips the landings consisted of $\leq 2,875$ pounds.



Figure 2 – Total number of vessels landing albacore in Oregon by year.

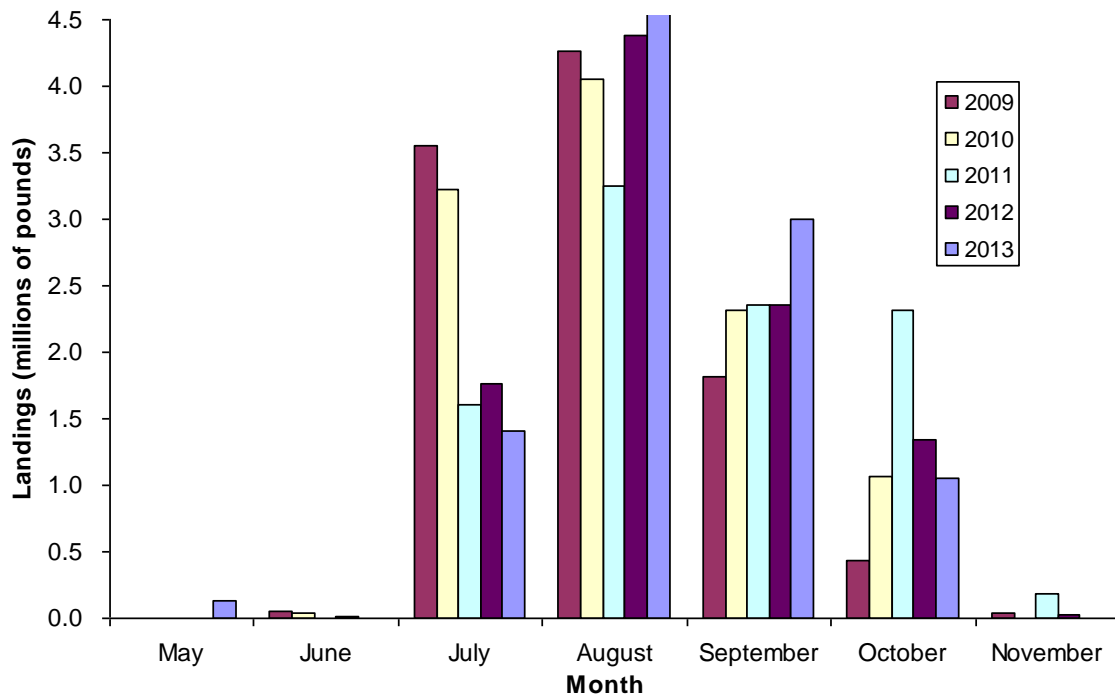


Figure 3 – Total albacore landings by month; 2009 through 2013.

Table 1 – Ten years of total landings with ten-year average, percent difference from average, and standard deviation.

| Year | Total Landings (lbs) | % Difference from Average |
|----------------------|-----------------------------|----------------------------------|
| 2013 | 10,171,575 | +4.5% |
| 2012 | 9,928,716 | +2.0% |
| 2011 | 9,699,236 | -0.4% |
| 2010 | 10,712,292 | +10.0% |
| 2009 | 10,156,183 | +4.3% |
| 2008 | 8,876,158 | -8.8% |
| 2007 | 10,447,567 | +7.3% |
| 2006 | 8,521,642 | -12.5% |
| 2005 | 8,087,413 | -16.9% |
| 2004 | 10,754,016 | +10.5% |
| Average | 9,735,578 | 0% |
| Std Deviation | 932,934 | ±9.6% |

Table 2 – Percentage of total landings for 2013 (preliminary) and 10-year (2004-2013) average.

| 2013 | | | 10-Year Average | | |
|-------------------------|----------------|-----------|-----------------|----------------|-----------|
| Port | Landings (lbs) | Landing % | Port | Landings (lbs) | Landing % |
| Newport | 4,921,648 | 48.4% | Newport | 4,162,919 | 42.7% |
| Astoria | 2,587,884 | 25.4% | Astoria | 2,917,176 | 30.0% |
| Charleston | 1,904,310 | 18.7% | Charleston | 2,131,442 | 21.9% |
| Garibaldi | 257,307 | 2.5% | Garibaldi | 233,488 | 2.4% |
| Brookings | 252,920 | 2.5% | Winchester Bay | 145,247 | 1.5% |
| Winchester Bay | 193,704 | 1.9% | Brookings | 68,452 | 0.70% |
| Port Orford | 21,113 | 0.21% | Florence | 30,817 | 0.32% |
| Florence | 13,069 | 0.13% | Port Orford | 20,826 | 0.21% |
| Bandon** | 10,971 | 0.11% | Pacific City | 8,335 | 0.09% |
| Gearhart-Seaside** | 4,152 | 0.04% | Depoe Bay | 6,287 | 0.06% |
| Pacific City | 3,917 | 0.04% | | | |
| Depoe Bay & Gold Beach* | 580 | 0.01% | | | |

* For confidentiality these ports are combined

**Gearhart-Seaside, Bandon, and Gold Beach do not have landings every year.

Table 3 – Quartile partition of 2013 Oregon albacore landings.

| Quartile | | Pounds |
|----------|-----------------|---------|
| 100% | Max | 125,777 |
| 75% | Quartile | 8,220 |
| 50% | Median | 2,875 |
| 25% | Quartile | 838 |
| 0% | Min | 15 |

- **2013 Albacore Revenue**

The West Coast's albacore market in 2013 was above average and consistent throughout the season, although not nearly as strong as the all-time record revenues of the 2011 season. Ex-vessel revenue generated from albacore in 2013 totaled at \$16,011,154, a 6% increase from the 2012 total of \$15,147,543 (Figure 4). The average price for 2013 was \$1.57 per pound, up from the average \$1.53 per pound in 2012. The average price for the 2001 to 2010 seasons was \$0.95 per pound. This phenomenon of sudden increased values began in 2011 after the tsunami in Japan destroyed their tuna fleet and the largest fish freezer in the world which contained millions of pounds of albacore. Other world market factors may have also influenced the value spike.

For the 2013 season, fresh-iced tuna prices averaged \$1.40 ± \$0.30 per pound; brine-frozen tuna prices averaged \$1.26 ± \$0.17 per pound; blast-frozen tuna prices averaged \$1.87 ± \$0.24 per pound; public sales of tuna averaged \$2.53 ± \$0.31 per pound. These average prices remained fairly consistent throughout the season and did not decline much as cumulative supply peaked in late September (Figure 5). Blast-frozen tuna deliveries accounted for 47% of total sales in Oregon, primarily sold in Astoria (Table 4). Brine-frozen tuna deliveries accounted for 35% of total sales, primarily sold in Newport. Fresh-iced tuna deliveries accounted for 18% of total sales, primarily sold in all other Oregon ports.

During the primary tuna sampling season July 1 through October 31 of 2013, albacore accounted for 21% of Oregon's marine fish revenue (Table 5). Albacore typically ranks 3rd for total revenues generated in Oregon marine fisheries for an entire year, behind Dungeness crab and Pink shrimp.

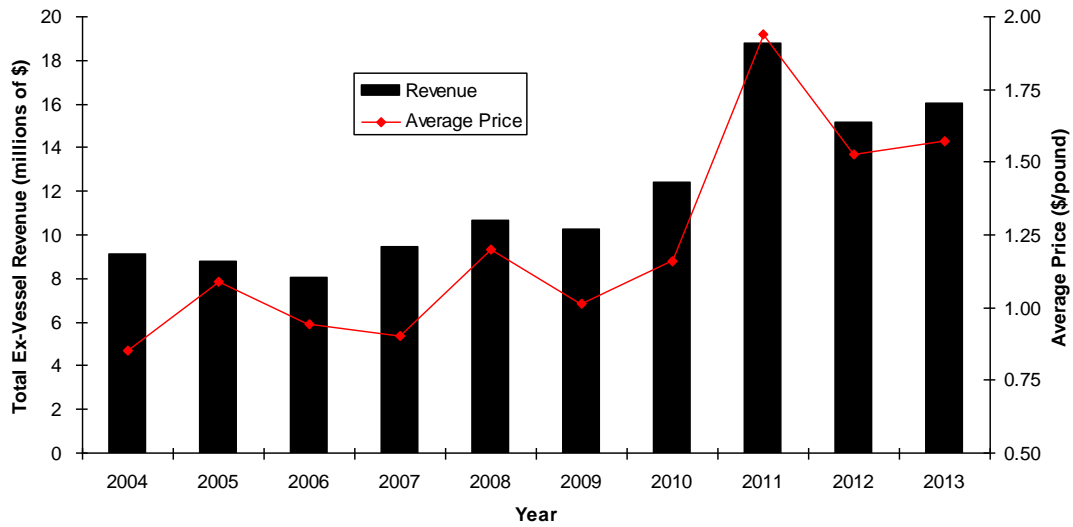


Figure 4 – Total revenue (ex-vessel) and average price by year for Oregon commercial albacore.

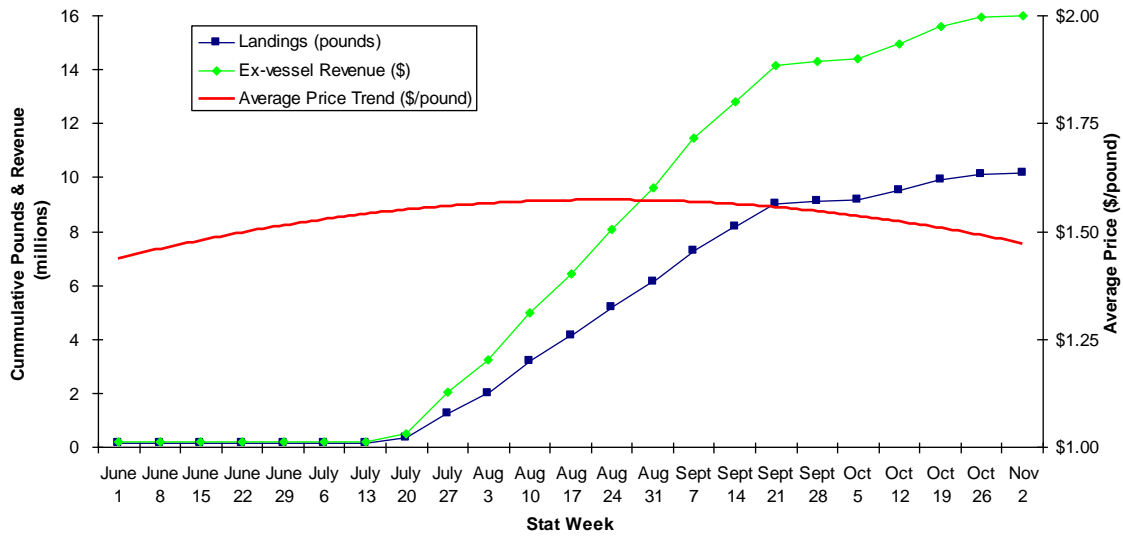


Figure 5 – Cumulative landings, cumulative ex-vessel revenue, and average price by week in 2013.

Table 4 – Treatment type by landings (pounds), port, and 2013 preliminary total percentage.

| Port | Blast frozen | Blast% | Brine frozen | Brine% | Iced | Iced% | TOTAL landings |
|--------------|------------------|--------------|------------------|--------------|------------------|--------------|-------------------|
| Astoria | 1,754,586 | 67.8% | 537,030 | 20.8% | 296,268 | 11.4% | 2,587,884 |
| Newport | 1,912,744 | 38.9% | 2,418,551 | 49.1% | 590,353 | 12.0% | 4,921,648 |
| Charleston | 838,019 | 44.0% | 482,240 | 25.3% | 584,051 | 30.7% | 1,904,310 |
| Other Ports | 253,165 | 33.4% | 169,258 | 22.3% | 335,310 | 44.3% | 757,733 |
| TOTAL | 4,758,514 | 46.8% | 3,607,079 | 35.5% | 1,805,982 | 17.8% | 10,171,575 |

**Table 5 – Oregon marine fish revenue (ex-vessel) for tuna sampling season:
July 1 - October 31, 2013.**

| Fishery Species | Revenue % |
|------------------------|------------------|
| Pacific Whiting | 25% |
| Albacore tuna | 21% |
| Pink shrimp | 18% |
| Salmon (all species) | 13% |
| Pacific Sardine | 8% |
| All other groundfish | 8% |
| Sablefish | 6% |

2013 COMMERCIAL SAMPLING RESULTS

In 2013, the albacore sampling season began July 1st, soon after the start of the fishing season. Dedicated samplers in Astoria, Newport (4 months each), and Charleston (2.25 months) were well prepared before the peak landings occurred in early August, allowing for an overall sampling rate of 64.3%. Additional sampling was conducted by ODFW commercial groundfish port samplers throughout the albacore season when available, as well as before and after the dedicated sampling season. Sampling activities included measuring albacore for length-frequencies, distribution of logbooks to vessels with valid Highly Migratory Species Permits, logbook envelopes for completed logbooks, and providing information to fishers. Table 6 presents a summary of commercial sampling rate information for the 2013 season. Additional summaries required by the contractual agreement with NMFS and PSMFC for albacore sampling funding are presented in Appendix A.

Table 6 – 2013 preliminary Oregon commercial albacore sampling season summary.
LF = Length frequency.

| Port | 2013 Landings | Pounds Sampled | Sampled Rate (sampled pounds/ landed pounds) | # LF | # Fish | Fish/LF |
|------------------------------------|----------------------|-----------------------|---|-------------|---------------|----------------|
| Astoria | 2,587,884 | 2,113,879 | 81.7% | 105 | 6,599 | 63 |
| Gearhart-Seaside | 4,152 | - | - | - | - | - |
| Garibaldi | 257,307 | - | - | - | - | - |
| Pacific City | 3,917 | - | - | - | - | - |
| Newport | 4,921,648 | 3,195,274 | 64.9% | 172 | 15,028 | 87 |
| Florence | 13,069 | - | - | - | - | - |
| Winchester Bay | 193,704 | - | - | - | - | - |
| Charleston | 1,904,310 | 1,122,705 | 59.0% | 73 | 5,256 | 72 |
| Bandon | 10,971 | - | - | - | - | - |
| Port Orford | 21,113 | 5,145 | 24.4% | 1 | 50 | 50 |
| Depoe Bay & Gold Beach* | 580 | - | - | - | - | - |
| Brookings | 252,920 | 98,777 | 39.1% | 7 | 351 | 50 |
| TOTAL | 10,171,575 | 6,535,780 | 64.3% | 358 | 27,284 | 76 |

*These ports are combined for confidentiality

- **2013 Sampling Rate Analysis**

Overall sampling rates for landings were well above the 50% minimum, and the average number of fish per length-frequency was above the 50 fish minimum for the 2013 Oregon commercial albacore season. The three primary tuna sampling ports are Astoria, Newport, and Charleston; smaller ports' tuna landings were occasionally sampled by ODFW commercial groundfish samplers and port biologists when available. Little priority is given to sampling Oregon's smaller ports because of lack of

staff to sample at those ports; the overall sampling rate is not typically influenced due to their insignificant landing weights. The tuna sampling rate is determined by the percentage of length-frequency sampled landing weights to total landing weights by port and state. Considerations for sampling biases have been measured in the past and found to be insignificant.

In addition to calculating sampling rates for minimum sampling percentages, analyzing the difference between the sampled trip landing weights and all individual trip landing weights is important to understand what the sample data is describing (Table 7). Large landings will be defined as total trip landing weights greater than 75% of all individual albacore trip landing weights, while small landings will be defined as total trip landing weights less than the top 25% of all individual albacore trip landing weights. For 2013 the 75% quartile landing weight cutoff is 8,220 pounds; therefore considering large landings as greater than 8,220 pounds, and small landings as less than 8,220 pounds. Sampled landings in 2013 consisted of 61% sampled trips greater than 8,220 pounds and 39% sampled trips less than 8,220 pounds.

Table 7 – Quartile partition for all landings and sampled landings in 2013.

| All Landings | | | Sampled Landings | | |
|--------------|-----------------|---------|------------------|-----------------|---------|
| Quartile | | Pounds | Quartile | | Pounds |
| 100% | Max | 125,777 | 100% | Max | 125,777 |
| 75% | Quartile | 8,220 | 75% | Quartile | 23,953 |
| 50% | Median | 2,875 | 50% | Median | 11,698 |
| 25% | Quartile | 838 | 25% | Quartile | 5,651 |
| 0% | Min | 15 | 0% | Min | 415 |

- **2013 Length Frequency Analysis**

A total of 27,284 albacore tuna were measured for length frequencies in the ports of Astoria, Garibaldi, Newport, Charleston, Port Orford, and Brookings (Figure 6). All the sampled ports' length data suggest a similar bimodal distribution; where the primary mode represents a younger age-class of approximately 3.7 years old, and the secondary mode represents an older age-class of approximately 4.7 years old (Suda 1966). Although the number of fish sampled in each port widely varies, the distribution and trend appear to be very similar for each port with all sampled months combined (Figure 7). Average lengths for sampled fish showed an increase of 3.3 cm for small (younger) grade fish through the season, and a 5.5 cm increase for large (older) grade fish (Figure 8). The proportion of small to large grade fish varied each month with an increasing trend of small grade fish through the season, while large grade fish showed a decreasing trend (Figure 9). Modal analysis using a mixed distribution model calculated the average length for the small grade fish at 66.8 ± 3.3 cm for 55% of all sampled fish, and the large grade fish at 77.8 ± 3.8 cm for 45% of all sampled fish. There is a very small representation of approximately 2.8 year old fish at 56.8 ± 2.7 cm for <1% of all sampled fish. Based on length to weight approximations the average weight for small grade fish is 13.5 pounds, and 21 pounds for large grade fish (Clemens 1961). Individual figures for Port Orford and Brookings length data are not provided here due to small sample size.

In addition to fish length analysis by port or month, comparing length data of fish sampled from small and large landings may indicate the stocks of fish targeted by vessels of different capacities. Fish sampled from small landings were represented by 46% small grade fish and 54% large grade fish; while fish sampled from large landings were represented by 60% small grade fish and 40% large grade fish (Figure 10). Results from a two sample Kolmogorov–Smirnov test show that the length data from large and small landings are significantly different with a $p\text{-value} < 2E-16$.

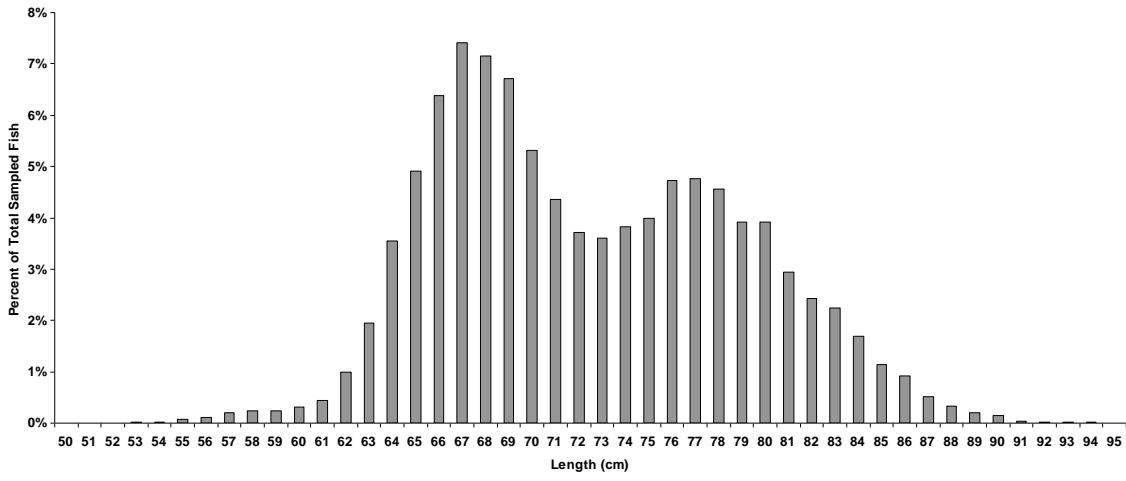


Figure 6 – Length frequency data for all sampled ports, all months combined in 2013.
n = 27,284.

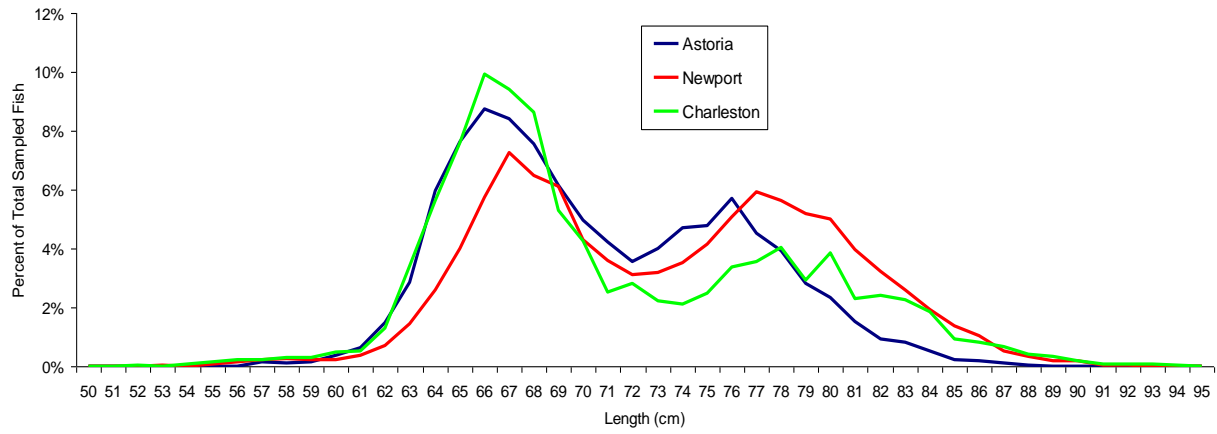


Figure 7 – Length frequency data for all sampled months by port in 2013.
Astoria n = 6,599. Newport n = 15,028. Charleston n = 5,256.

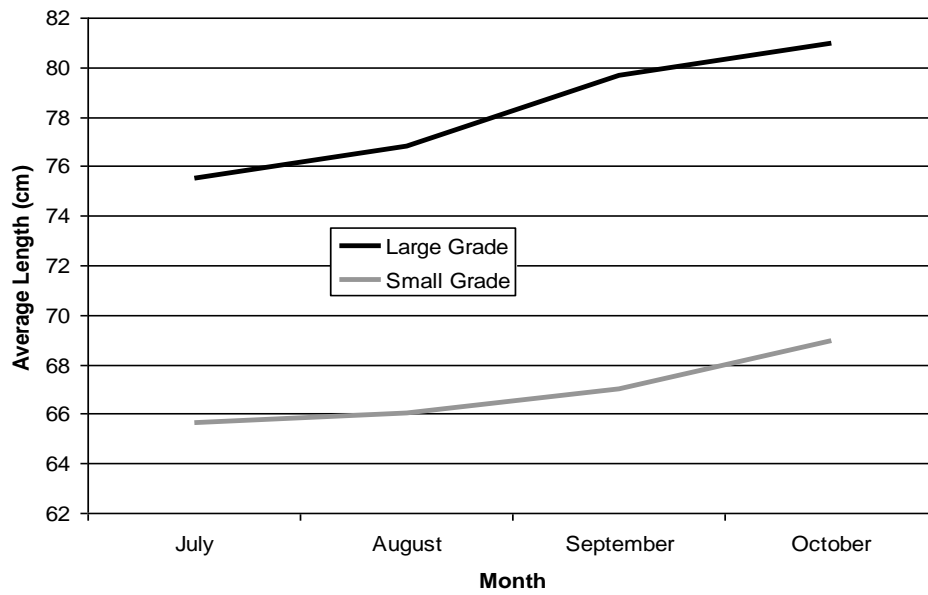


Figure 8 – Average length for small (young) and large (older) grade fish sampled each month. July n = 4,430. August n = 12,069. September n = 7,584. October n = 3,201.

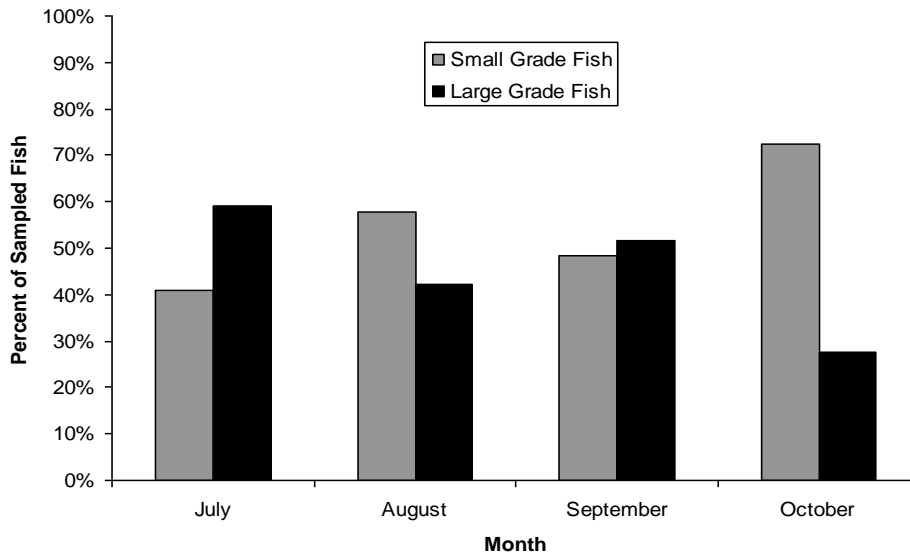


Figure 9 – Proportion of small (young) and large (older) grade fish sampled each month.

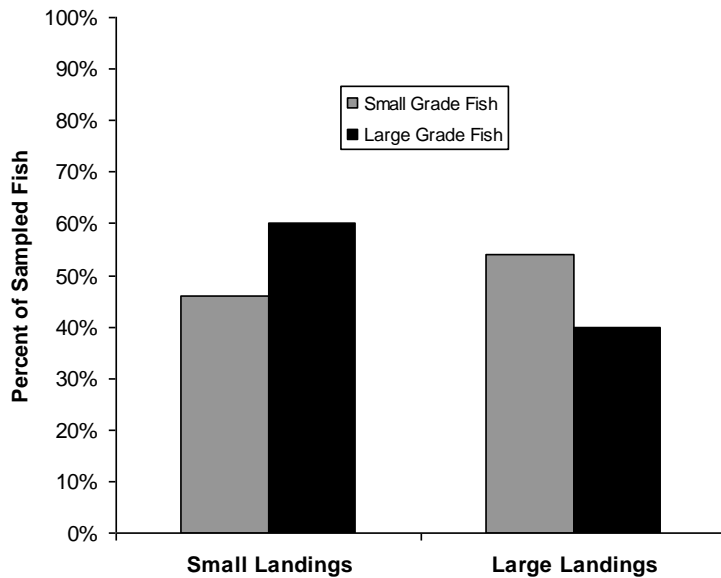


Figure 10 – Proportion of small (young) to large (older) grade fish for small and large landings. Large landings n = 17,626; small landings n = 9,658.

2013 RECREATIONAL FISHERY

The 2013 recreational tuna season proved to be well below average for effort and landings in comparison to recent years (Figures 11 & 12). Access to albacore for recreational vessels off Oregon can be highly variable, depending on weather conditions and distance to the fish. Hazardous seas in July delayed the early season for sport tuna fishermen, and the warmer water associated with productive tuna fishing did not approach sport vessel ranges until mid-August. Peak effort and landings occurred in August and early September, and quickly dropped off in late September.

Directed charter fishing effort for albacore totaled 2,734 angler trips in 2013, a 3% decrease from the five-year average of 2,823 angler trips (Table 8). Directed private albacore trips totaled 6,670 angler trips, a 24% decrease from the five-year average of 8,766 angler trips (Table 9).

Directed charter catch for albacore totaled 5,761 fish in 2013, a 27% decrease from the five-year average at 7,881 fish (Table 10). Directed private albacore catch totaled 15,816 fish, a 49% decrease from the five-year average of 30,908 fish (Table 11).

Combined charter and private albacore landings for 2013 indicate that Newport, Garibaldi, and Depoe Bay were the top three ports with 88% of all Oregon's recreational catch (Table 12). These three top recreational ports landed a combined 44% fewer fish than the five-year average. Effort and landings were significantly represented by the north Oregon coast, while Charleston landed 91% less albacore than their five-year average.

Charter vessel catch-per-unit of effort (CPUE) in 2013 was calculated to 2.1 albacore per angler, while the private vessel CPUE was calculated to 2.4 albacore per angler (Table 13). The combined CPUE for Oregon's recreational season was calculated to 2.3 albacore per angler, the lowest catch rate in the last seven years.

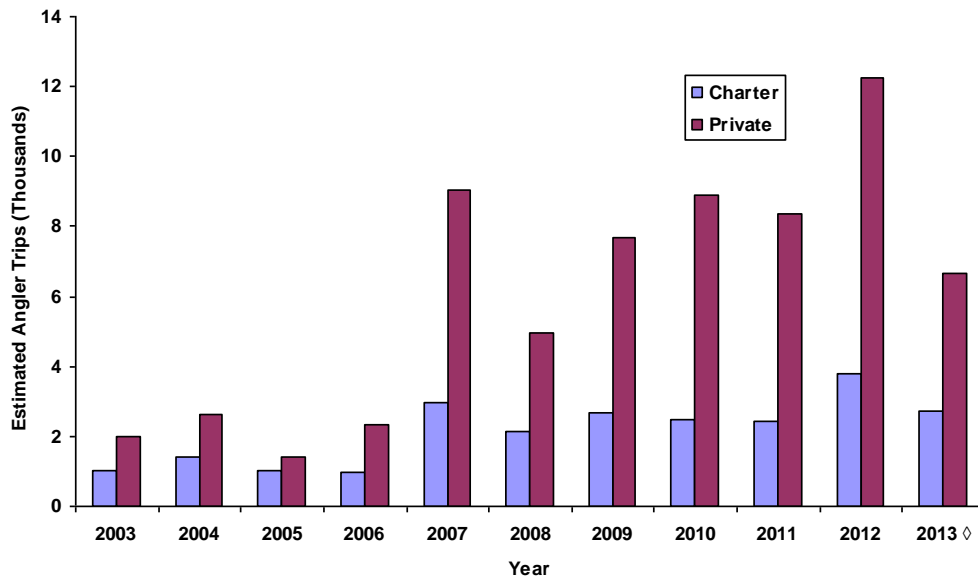


Figure 11 – Oregon recreational albacore fishing effort (angler trips) separated by vessel type, 2003-2013. ◇ 2013 totals are preliminary.

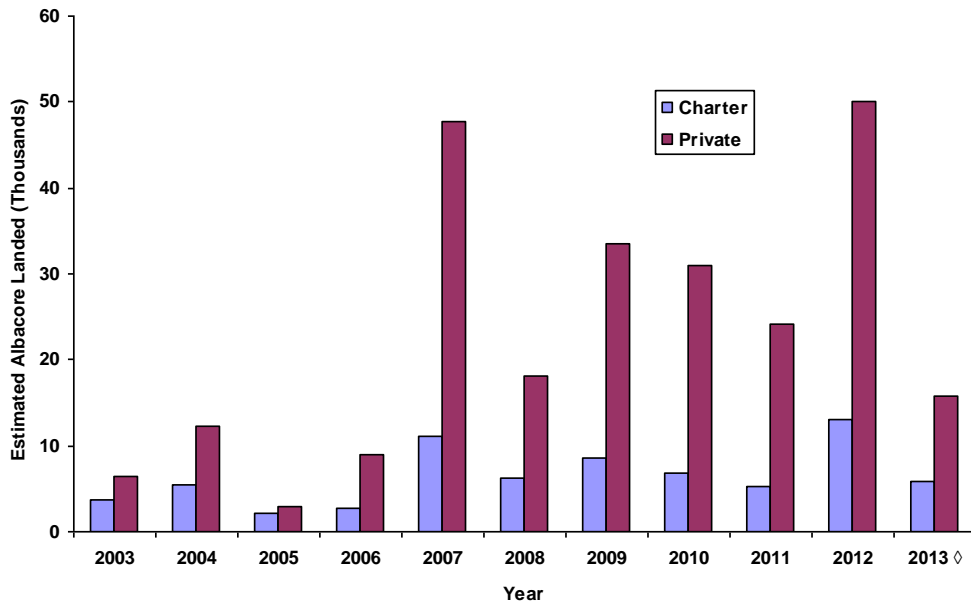


Figure 12 – Oregon recreational albacore catch (estimated number of fish) by vessel type, 2003-2013. ◇ 2013 totals are preliminary.

Table 8 – Oregon charter vessel albacore fishing effort (angler trips) by port, 2003-2013.

| Port | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 \diamond | 5-Year Average \yen |
|--------------|--------------|--------------|--------------|------------|--------------|--------------|--------------|--------------|--------------|--------------|-----------------|-----------------------|
| Astoria | 28 | 46 | 72 | 108 | 311 | 390 | 330 | 399 | 193 | 407 | 306 | 327 |
| Garibaldi | 31 | 64 | 80 | 38 | 111 | 164 | 117 | 212 | 150 | 310 | 315 | 221 |
| P. City | 0 | 12 | 5 | 0 | 9 | 5 | 1 | 8 | 0 | 7 | 5 | 4 |
| D. Bay | 110 | 256 | 151 | 94 | 683 | 245 | 432 | 595 | 503 | 1,169 | 985 | 737 |
| Newport | 583 | 722 | 611 | 646 | 1,463 | 1,089 | 1,260 | 970 | 1,217 | 1,393 | 1,064 | 1,181 |
| W. Bay | 109 | 160 | 77 | 0 | 12 | 0 | 12 | 0 | 0 | 0 | 0 | 2 |
| Charleston | 55 | 68 | 0 | 10 | 69 | 109 | 240 | 142 | 206 | 240 | 52 | 176 |
| Bandon | 36 | 48 | 14 | 83 | 231 | 107 | 222 | 149 | 166 | 247 | 7 | 158 |
| G. Beach | 14 | NS | 0 | 0 | 30 | 0 | 48 | 0 | 0 | 0 | 0 | 10 |
| Brookings | 51 | 46 | 12 | 0 | 57 | 14 | 20 | 0 | 14 | 0 | 0 | 7 |
| Total | 1,017 | 1,422 | 1,022 | 979 | 2,976 | 2,123 | 2,682 | 2,475 | 2,449 | 3,773 | 2,734 | 2,823 |

 \diamond 2013 Preliminary Totals \yen 5-year average includes 2009-2013

NS Indicates no port samplers present that year

Table 9 - Oregon private vessel albacore fishing effort (angler trips) by port, 2003-2013.

| Port | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 \diamond | 5-Year Average \yen |
|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|-----------------|-----------------------|
| Astoria | 77 | 95 | 186 | 187 | 338 | 422 | 59 | 242 | 97 | 161 | 90 | 130 |
| Garibaldi | 94 | 88 | 120 | 641 | 1,263 | 960 | 1,059 | 2,535 | 579 | 2,075 | 1,898 | 1,629 |
| P. City | 134 | 132 | 58 | 80 | 209 | 35 | 92 | 246 | 80 | 330 | 127 | 175 |
| D. Bay | 227 | 419 | 406 | 385 | 1,644 | 743 | 694 | 1,067 | 930 | 1,760 | 1,502 | 1,191 |
| Newport | 224 | 697 | 586 | 644 | 2,415 | 1,475 | 1,991 | 2,959 | 2,519 | 3,807 | 2,306 | 2,716 |
| Florence | NS | 0 | 0 | NS | 30 | 67 | 15 | 16 | 24 | 28 | NS | 21 |
| W. Bay | 44 | 98 | 20 | 12 | 367 | 231 | 370 | 177 | 475 | 403 | 286 | 342 |
| Charleston | 528 | 561 | 19 | 144 | 1,712 | 960 | 2,962 | 1,526 | 2,871 | 3,503 | 376 | 2,248 |
| Bandon | 4 | 53 | 0 | 76 | 132 | 0 | 239 | 19 | 41 | 152 | 0 | 90 |
| P. Orford | 10 | NS | NS | NS | NS | NS | NS | NS | 53 | 0 | NS | 27 |
| G. Beach | 55 | NS | 0 | 6 | 12 | 0 | 28 | 0 | 108 | 0 | 0 | 27 |
| Brookings | 610 | 505 | 39 | 179 | 932 | 85 | 166 | 115 | 564 | 21 | 85 | 190 |
| Total | 2,007 | 2,648 | 1,434 | 2,354 | 9,054 | 4,978 | 7,675 | 8,902 | 8,341 | 12,240 | 6,670 | 8,766 |

 \diamond 2013 Preliminary Totals \yen 5-year average includes 2009-2013

NS Indicates no port samplers present that year

Table 10 - Oregon charter vessel albacore catch (number of fish) by port, 2003-2013.

| Port | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 ◇ | 5-Year Average ¥ |
|--------------|--------------|--------------|--------------|--------------|---------------|--------------|--------------|--------------|--------------|---------------|--------------|------------------|
| Astoria | 106 | 172 | 275 | 231 | 907 | 1,167 | 1,016 | 1,294 | 366 | 1,386 | 836 | 980 |
| Garibaldi | 119 | 186 | 170 | 204 | 628 | 440 | 322 | 651 | 149 | 1,061 | 878 | 612 |
| P. City | 0 | 62 | 3 | 0 | 70 | 98 | 4 | 20 | 0 | 52 | 13 | 18 |
| D. Bay | 254 | 572 | 186 | 113 | 2,139 | 670 | 942 | 1,552 | 858 | 3,387 | 1,874 | 1,723 |
| Newport | 1,978 | 2,934 | 1,043 | 1,653 | 4,920 | 3,126 | 3,419 | 2,364 | 2,231 | 4,880 | 2,062 | 2,991 |
| W. Bay | 555 | 782 | 327 | 0 | 36 | 0 | 31 | 0 | 0 | 0 | 0 | 6 |
| Charleston | 281 | 192 | 0 | 50 | 301 | 269 | 850 | 410 | 537 | 836 | 68 | 540 |
| Bandon | 243 | 216 | 46 | 398 | 1,607 | 333 | 1,727 | 510 | 1,034 | 1,527 | 30 | 966 |
| G. Beach | 147 | NS | 0 | 0 | 256 | 0 | 161 | 0 | 0 | 0 | 0 | 32 |
| Brookings | 91 | 327 | 3 | 0 | 319 | 81 | 41 | 0 | 25 | 0 | 0 | 13 |
| Total | 3,774 | 5,443 | 2,053 | 2,649 | 11,183 | 6,184 | 8,513 | 6,801 | 5,200 | 13,129 | 5,761 | 7,881 |

◇ 2013 Preliminary Totals

¥ 5-year average includes 2009-2013

NS Indicates no port samplers present that year

Table 11 - Oregon private vessel albacore catch (number of fish) by port, 2003-2013.

| Port | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 ◇ | 5-Year Average ¥ |
|--------------|--------------|---------------|--------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|--------------|------------------|
| Astoria | 496 | 499 | 317 | 804 | 1,832 | 1,809 | 247 | 344 | 208 | 920 | 284 | 401 |
| Garibaldi | 498 | 819 | 155 | 3,160 | 4,943 | 3,993 | 4,119 | 10,309 | 539 | 6,405 | 5,628 | 5,400 |
| P. City | 369 | 1,932 | 53 | 92 | 1,910 | 314 | 767 | 1,468 | 387 | 1,697 | 150 | 894 |
| D. Bay | 1,230 | 2,259 | 943 | 1,413 | 9,100 | 2,666 | 3,458 | 3,477 | 2,277 | 6,995 | 3,397 | 3,921 |
| Newport | 762 | 2,894 | 1,472 | 1,875 | 14,825 | 6,267 | 10,887 | 9,911 | 5,843 | 17,187 | 5,242 | 9,814 |
| Florence | NS | 0 | 0 | NS | 65 | 287 | 41 | 32 | 13 | 36 | NS | 31 |
| W. Bay | 191 | 624 | 8 | 0 | 1,571 | 460 | 969 | 547 | 1,281 | 1,229 | 190 | 843 |
| Charleston | 811 | 2,258 | 12 | 816 | 8,370 | 2,153 | 12,036 | 4,617 | 10,629 | 14,875 | 749 | 8,581 |
| Bandon | 2 | 167 | 0 | 517 | 624 | 0 | 813 | 28 | 115 | 685 | 0 | 328 |
| P. Orford | 46 | NS | NS | NS | NS | NS | NS | NS | 424 | 0 | NS | 424 |
| G. Beach | 109 | NS | 0 | 0 | 210 | 0 | 21 | 0 | 967 | 0 | 0 | 247 |
| Brookings | 1,962 | 812 | 2 | 303 | 4,289 | 136 | 184 | 187 | 1,539 | 9 | 176 | 419 |
| Total | 6,476 | 12,264 | 2,962 | 8,980 | 47,739 | 18,085 | 33,542 | 30,920 | 24,222 | 50,038 | 15816 | 30,908 |

◇ 2013 Preliminary Totals

¥ 5-year average includes 2009-2013

NS Indicates no port samplers present that year

Table 12 – Percentage of Oregon’s recreational albacore catch (combined charter and private) by port, 2013.

| Port | Landing % |
|--------------|------------------|
| Newport | 33.9% |
| Garibaldi | 30.2% |
| Depoe Bay | 24.4% |
| Astoria | 5.2% |
| Charleston | 3.8% |
| W. Bay | 0.9% |
| Brookings | 0.8% |
| Pacific City | 0.8% |
| Bandon | 0.1% |

Table 13 – Oregon’s preliminary 2013 recreational catch, effort, and CPUE (catch/effort) by vessel type, port total, and statewide total.

| Port | Catch (No. of Albacore) | | | Effort (Angler Trips) | | | Catch per Unit of Effort | | |
|--------------|--------------------------------|----------------|---------------|------------------------------|----------------|--------------|---------------------------------|----------------|--------------|
| | Private | Charter | Total | Private | Charter | Total | Private | Charter | Total |
| Astoria | 284 | 836 | 1,120 | 90 | 306 | 396 | 3.2 | 2.7 | 2.8 |
| Garibaldi | 5628 | 878 | 6,506 | 1898 | 315 | 2,213 | 3.0 | 2.8 | 2.9 |
| Pacific City | 150 | 13 | 163 | 127 | 5 | 132 | 1.2 | 2.6 | 1.2 |
| Depoe Bay | 3397 | 1874 | 5,271 | 1502 | 985 | 2,487 | 2.3 | 1.9 | 2.1 |
| Newport | 5242 | 2062 | 7,304 | 2306 | 1064 | 3,370 | 2.3 | 1.9 | 2.2 |
| Florence | - | - | - | - | - | - | - | - | - |
| W. Bay | 190 | 0 | 190 | 286 | 0 | 286 | 0.7 | - | 0.7 |
| Charleston | 749 | 68 | 817 | 376 | 52 | 428 | 2.0 | 1.3 | 1.9 |
| Bandon | 0 | 30 | 30 | 0 | 7 | 7 | - | 4.3 | 4.3 |
| P. Orford | - | - | - | - | - | - | - | - | - |
| G. Beach | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - |
| Brookings | 176 | 0 | 176 | 85 | 0 | 85 | 2.1 | - | 2.1 |
| | | | | | | 0 | | | |
| Total | 15,816 | 5,761 | 21,577 | 6,670 | 2,734 | 9,404 | 2.4 | 2.1 | 2.3 |

- **Recreational Length Frequency Analysis**

Length frequency information was collected on 848 recreationally caught albacore from most of Oregon’s ports by Ocean Recreational Boat Survey (ORBS) port samplers in 2013. Modal analysis using a mixed distribution model calculated the average length for small grade fish at 64.6±3.3 cm for 8% of all sampled fish, and the large grade fish at 77.2±3.9 cm for 92% of all sampled fish. Based on length to weight approximations the average weight for small grade fish is 12 pounds, and 21 pounds for large grade fish (Clemens 1961).

Figure 13 shows the length frequency histogram of non-sorted, randomly sampled albacore during the 2013 recreational season. The length data suggests a bimodal distribution; where the primary mode represents an older age-class of approximately 4.7 years old, and the secondary mode represents a younger age-class of approximately 3.7 years old (Suda 1966).

Although many fewer fish were sampled for length in the recreational catch than commercial, there appears to be a strong trend towards the larger grade albacore landed by sport vessels as compared to commercial vessels. Results from a two sample Kolmogorov–Smirnov test show that the length data between recreational and commercial landings, as well as between large and small commercial landings are significantly different with a p-value<2E-16 (Figure 14).

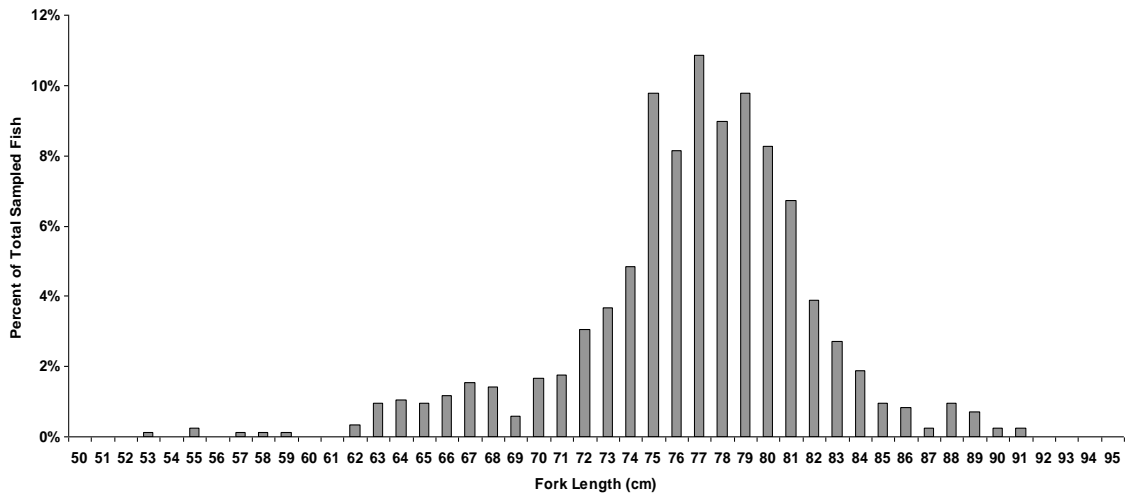


Figure 13 - Length frequency data for all ports sampled for tuna by ORBS in 2013.
n = 848.

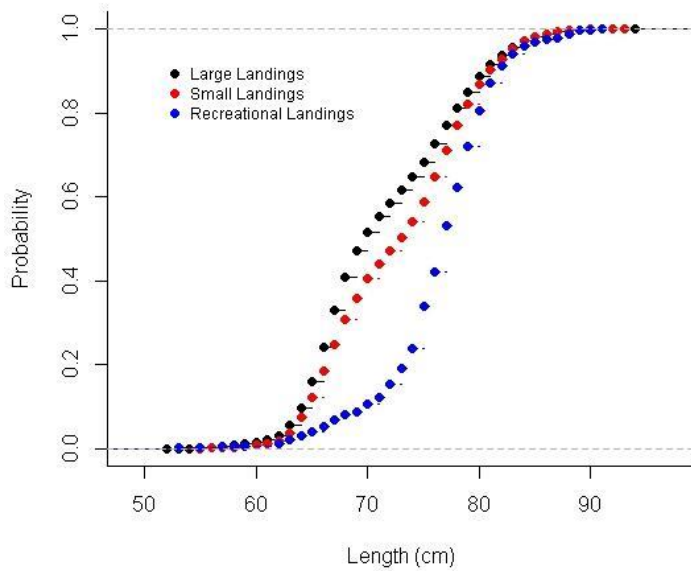


Figure 14 – Cumulative distribution frequencies of large commercial landings, small commercial landings, and recreational landings.

SUMMARY

Oregon's preliminary commercial albacore landings in 2013 totaled 10,171,575 pounds, a 2.4% increase from 2012, and 4.5% greater than the ten-year average (2004-2013). Ex-vessel revenues from albacore totaled \$16,011,154, a 6% increase from the 2012 season, and 35% above the ten-year average (2004-2013). Sampling goals were met and exceeded for the three primary ports, and Oregon overall.

Recreational tuna fishers experienced challenging conditions and a below average season landing an estimated 21,577 fish weighing approximately 444,486 pounds, 44% less fish than the five-year average (2009-2013).

Seventeen Canadian vessels landed 1,052,415 total pounds of albacore in Oregon during their three month eligibility of 2013, primarily in Astoria. All Canadian albacore landed in Oregon consisted of high quality blast-frozen fish which totaled to \$1,965,264 in ex-vessel revenues. The future of Canadian vessels fishing in the US EEZ is still not clear until the next bilateral agreement is made.

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REFERENCES

- Clemens, H.B. 1961. The migration, age, and growth of Pacific albacore (*Thunnus germo*) 1951–1958. Fish Bull. Calif. Dep. Fish Game (115):128 p.
- Suda, Akira. 1966. Catch variations in the North Pacific albacore-VI. The speculations about the influences of fisheries on the catch and abundance of the albacore in the North Pacific by use of some simplified mathematical models. Nankai Reg. Fish. Res. Lab., Rep. 24: 1-14.

APPENDIX A

2013 Summary Statistics for Oregon's Albacore Port Sampling Program

| PORT NAME | Astoria | Garibaldi | Newport | W. Bay | Charleston | Brookings | All Other Oregon Ports | TOTAL |
|--|----------------|------------------|----------------|---------------|-------------------|------------------|-------------------------------|------------------|
| NO. OF LOGBOOKS ISSUED | 2 | 0 | 6 | 0 | 12 | 0 | 0 | 20 |
| LBS LANDED BY COMMERCIAL SAMPLED VESSELS | 2,113,879 | 0 | 3,195,274 | 0 | 1,122,705 | 98,777 | 5,145 | 6,535,780 |
| NO. FISH MEASURED | 6,599 | 0 | 15,028 | 0 | 5,256 | 351 | 50 | 27,284 |
| NO. COMMERCIAL TRIPS SAMPLED FOR LENGTH-FREQUENCY | 105 | 0 | 172 | 0 | 73 | 7 | 1 | 358 |
| TOTAL NO. OF COMMERCIAL TRIPS/LANDINGS | 218 | 143 | 538 | 12 | 248 | 22 | 36 | 1,217 |
| TOTAL NO. OF COMMERCIAL VESSELS Ω | 89 | 51 | 190 | 9 | 105 | 10 | 27 | 481 |
| LBS LANDED BY COMMERCIAL JIG/TROLL VESSELS | 2,384,756 | 257,307 | 4,719,241 | 193,704 | 1,901,811 | 252,920 | 53,802 | 9,763,541 |
| LBS LANDED BY COMMERCIAL BAIT VESSELS | 4,391 | 0 | 34,340 | 0 | 2,499 | 0 | 0 | 41,230 |
| LBS LANDED BY COMMERCIAL JIG&BAIT VESSELS | 198,737 | 0 | 168,067 | 0 | 0 | 0 | 0 | 366,804 |
| LBS LANDED BY COMMERCIAL GILLNET VESSELS | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| LBS LANDED BY SPORT VESSELS** | 23,072 | 134,024 | 150,462 | 3,914 | 16,830 | 3,626 | 112,558 | 444,486 |
| LBS LANDED BY OTHER VESSELS | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PERCENT COMMERCIAL COVERAGE (weight) | 81.7% | 0.0% | 64.9% | 0.0% | 59.0% | 39.1% | 24.4% | 64.3% |
| PERCENT COMMERCIAL COVERAGE (trips) | 48.2% | 0.0% | 32.1% | 0.0% | 29.4% | 31.8% | 3.1% | 29.6% |

Ω Several vessels made trips into multiple ports, so total numbers of vessels at each port will add up to more than Oregon's total.

** Sport-caught albacore weight estimated using Clemens, 1961.