

ANNUAL OREGON ALBACORE TUNA (*Thunnus alalunga*) REPORT, 2016

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**ANNUAL REPORT
ALBACORE PORT SAMPLING PROGRAM**

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INTRODUCTION

Albacore tuna (*Thunnus alalunga*) is a highly migratory 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 early 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. There are also several large freezer boats (>60 ft.) that travel the North and South Pacific year-round while primarily fishing for albacore.

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 9.5 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.

The "Fishing Regime" under the U.S./Canada Albacore treaty was suspended for the 2012 fishing season. This suspension disallowed any Canadian vessels in the U.S. EEZ, and any U.S. vessels in the Canadian EEZ. For 2013, a temporary fishing regime allowed 45 pre-authorized Canadian vessels to harvest tuna from the US EEZ from June 15 to September 15 and an unlimited number of US vessels to fish in the Canadian EEZ from June 15 through October 31. A new 3-year "Fishing Regime" began in 2014 and mirrored the 2013 regime. Three Canadian vessels landed 134,112 total pounds of albacore in Oregon during their three month eligibility in 2016.

Sampling of Oregon's commercial albacore fishery is a cooperative effort between the Oregon Department of Fish and Wildlife (ODFW), the NMFS Southwest Fisheries Science Center (SWFSC) and the Pacific States Marine Fisheries Commission (PSMFC). This report documents the progress of the 2016 fishery off Oregon and associated sampling activities.

The Oregon Department of Fish and Wildlife's Ocean Recreational Boat Survey (ORBS) made adjustments to sampling protocol beginning in 2000 to better estimate effort and catch in the growing recreational albacore fishery off Oregon. Recreational fishing for albacore off Oregon has grown in popularity since 2000, and especially in the past nine 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 2007, catches have averaged 39,934 fish (approximately 750,000 pounds) per year.

2016 ALBACORE COMMERCIAL FISHERY

Favorable ocean conditions of warm water temperatures (62°F and above) and calm seas began an early derby in 2016 for Oregon albacore. The warm temperatures pushed north and extended offshore during the months of July and August (Figure 2), reaching a high of 67°F offshore of Coos Bay (Buoy station 46002). There was a prolonged break costing fishers many valuable days of fishing during the month of August due to a couple of strong wind storms that unsettled the ocean. Upwelling along the Oregon coast in October quickly cooled the ocean temperatures marking the end of the 2016 albacore season for Oregon fishers. The “Blob” (a phenomenon of warmer water pushed up against the Pacific Northwest coastline) had dissipated some during the later months of 2015 and earlier months of 2016 in response to the strong El Niño event of 2015. Current reports, however, suggest that the “Blob” is still present in the North Pacific and is currently impacting fish behavior as well as weather patterns on a global scale.

Primary fishing grounds for Oregon-landed tuna in 2016 were within a block bound by 43-45°N latitudes and 125-126°W longitudes. Many albacore fishers reported that the tuna bite was best during the month of June, though only a few had anticipated this and were ready to harvest tuna so early in the season. The general consensus from albacore fishers suggested a fair to below average daily success catch rate that varied widely throughout the fishing season and became spotty during the later months of September and October. Many smaller troll vessels opted to participate in the salmon fishery this year instead of chasing tuna due to the high market value price of Chinook salmon.

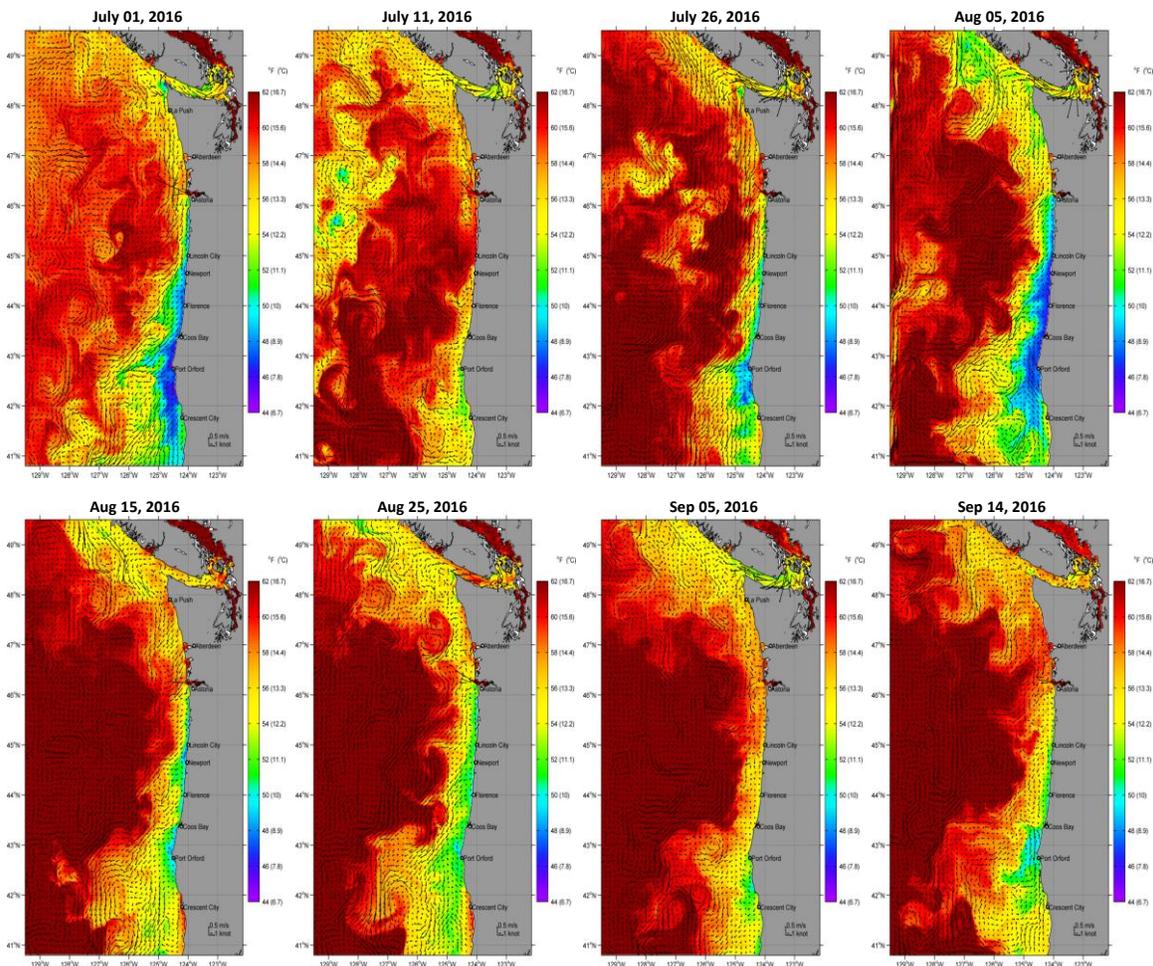


Figure 1: 2016 Oregon Coastal Temperatures during the primary albacore fishing months. July 01 – September 14. Temperature gradients range from 7°C (purple) to 17°C (darkest red). Latitudes range from 41°N to 49°N and longitudes range from 123°W to 129°W.

2016 Albacore Landings

The 2016 Oregon albacore commercial season began with one small landing on the 26th of May in Newport. The next landing did not occur until the 6th of June, though by mid-June fishers who were fortunate enough to be ready for an early tuna season, were reaping the benefit. Albacore fishing effort increased consistently during June and July, with a peak of 147 trips landing tuna during the third full week of July (Figure 2). The season ended with the last recorded landing made on October 21st in Garibaldi.

Tuna fishers collectively made 1,337 trips on 373 commercial vessels and landed just over 7.2 million pounds of albacore in Oregon during 2016. The total vessel trips targeting albacore (1,337) was higher than the 10-year average of 1,279 while the total number of commercial vessels targeting albacore (373) remained well below the 10-year average of 399. The 2016 landings in Oregon (7.2 million pounds) represent the lowest albacore landings in Oregon since 2002 (Figures 3 and 4).

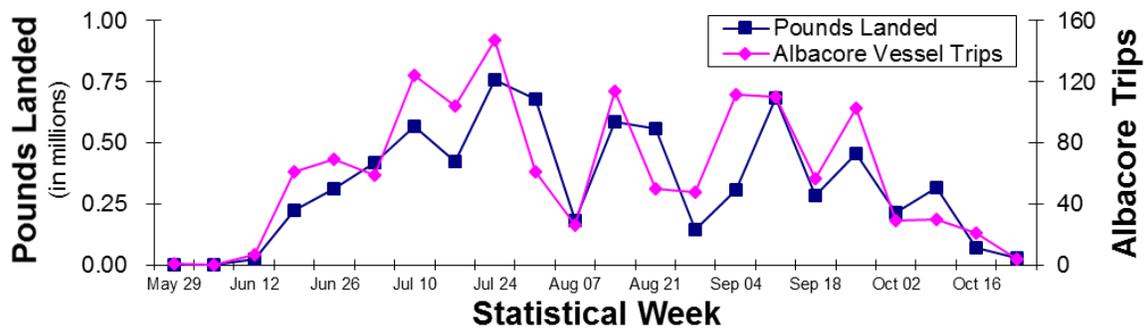


Figure 2: Total pounds of albacore landings and number of albacore vessel trip landings per week in 2016.

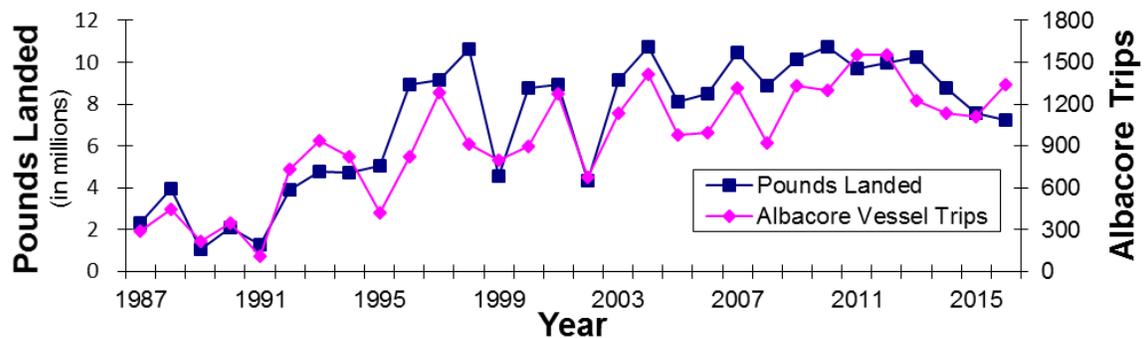


Figure 3: Total pounds of albacore landings and number of albacore vessel trip landings in Oregon by year.

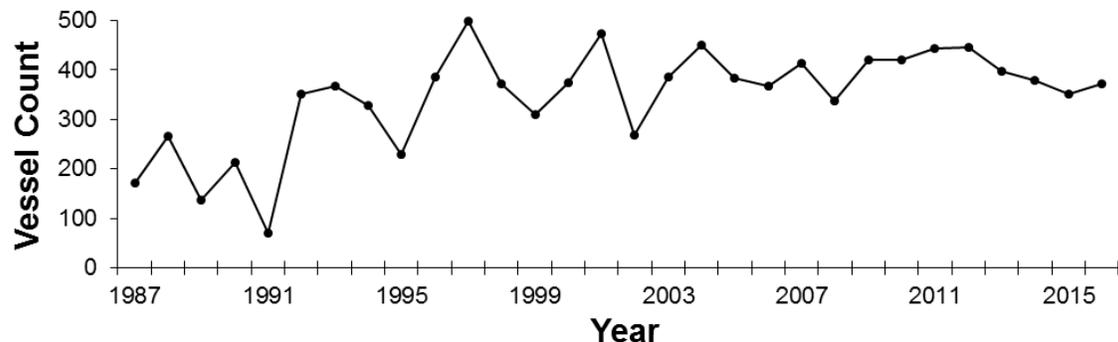


Figure 4: Total number of vessels landing albacore in Oregon by year.

The month of July represented the peak month for albacore landings in 2016, yielding 2,555,848 pounds that represented 35.3% of the total landings for the year (Figure 5). Historically, fishing for tuna during the month of August yields the highest quantity of tuna and profit for fishers, but two large wind storms severely limited the number of fishing days available. During the month of August only 1,581,264 pounds were landed in 2016, 48.9% lower than August, 2015 total landings of 3,091,804 pounds and 65.6% lower than an impressive landing of 4,594,648 pounds in August of 2013. For the 2016 albacore season, the months of July and August produced 57.1% of Oregon’s albacore landings.

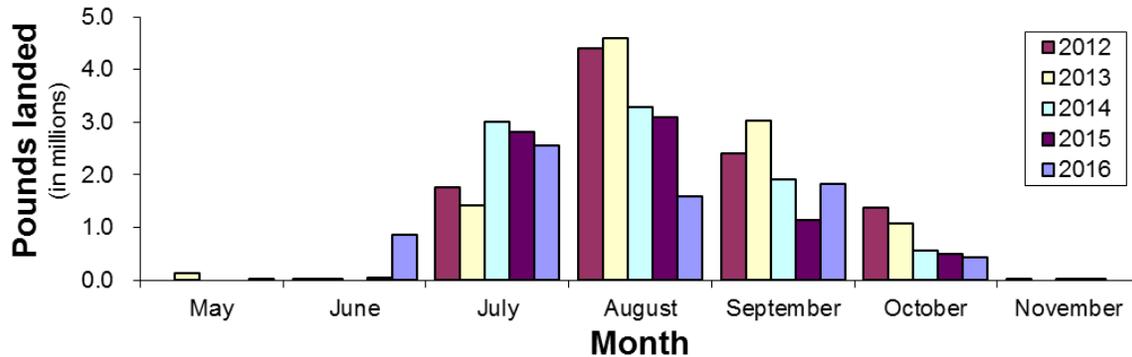


Figure 5: Total pounds of albacore landings by month; 2012 through 2016.

The preliminary total for 2016 commercial landings is 7,241,768 pounds. This is a 4.5% decrease from the 7,583,975 total pounds landed in 2015, and 22.7% lower than the ten-year average (2007-2016) of 9,368,080 pounds (Table 1). The standard deviation for ten years of total landings is $\pm 1,206,836$ pounds, or approximately $\pm 12.9\%$.

Newport replaced Astoria as the primary Oregon port for albacore landings in 2016 with 39.0% of the total weight (Table 2). Charleston landed 29.9% of the total weight, followed by Astoria with 26.5%. The remaining ports landed a combined 4.6% of the total weight, highlighted by Winchester Bay with 1.8%, Garibaldi with 1.4%, Brookings with 1.0% of the total weight.

Table 1: Annual albacore landings (pounds) and percentage difference from the 10-year average (2007-2016). The 10-year average and standard deviation across years are shown.

| Year | Total Landings (lbs) | % Difference from Average |
|----------------------|----------------------|--------------------------------|
| 2016 | 7,241,768 | -22.7% |
| 2015 | 7,583,975 | -19.0% |
| 2014 | 8,769,154 | -6.4% |
| 2013 | 10,228,014 | 9.2% |
| 2012 | 9,964,238 | 6.4% |
| 2011 | 9,699,216 | 3.5% |
| 2010 | 10,713,209 | 14.4% |
| 2009 | 10,156,183 | 8.4% |
| 2008 | 8,876,158 | -5.3% |
| 2007 | 10,448,882 | 11.5% |
| Average | 9,368,080 | |
| Std Deviation | 1,206,836 | $\pm 12.9\%$ |

Table 2: Albacore landings by port for 2016 (pounds and percentage) and average landings (pounds and percentage) across 10 years (2007-2016).

| Port | 2016 | | Port | 10-Year Average | |
|----------------|----------------|-----------|----------------|-----------------|-----------|
| | Landings (lbs) | Landing % | | Landings (lbs) | Landing % |
| Newport | 2,824,676 | 39.0% | Newport | 3,922,418 | 41.9% |
| Charleston | 2,167,648 | 29.9% | Astoria | 2,845,827 | 30.4% |
| Astoria | 1,917,729 | 26.5% | Charleston | 2,078,225 | 22.2% |
| Winchester Bay | 128,088 | 1.8% | Garibaldi | 227,607 | 2.4% |
| Garibaldi | 103,119 | 1.4% | Winchester Bay | 128,559 | 1.4% |
| Brookings | 69,425 | 1.0% | Brookings | 95,239 | 1.0% |
| Florence | 15,744 | 0.2% | Florence | 25,268 | 0.3% |
| Port Orford | 4,518 | 0.1% | Port Orford | 19,223 | 0.2% |
| Pacific City | 2,419 | 0.0% | Pacific City | 9,108 | 0.1% |
| Depoe Bay | 2,739 | 0.0% | Depoe Bay | 5,899 | 0.1% |
| Other Ports | 5,663 | 0.1% | | | |

* Gearhart-Seaside, Bandon and Gold Beach are combined as "Other Ports" due to a limited number of albacore offloads at each port.

The average landing in Oregon for 2016 was 5,380 pounds, a decrease of 1,425 pounds (20.9%) from 2015 (Table 3). The quartile partition of landing size in the 2016 Oregon albacore fishery provides landing characteristics of the fishery. Referencing Table 3 below, 50% of all vessel trips landed less than or equal to 2,457 pounds.

Table 3: Quartile partition of 2016 Oregon albacore landings.

| Quartile | | Pounds |
|----------|-----------------|---------|
| 100% | Max | 105,086 |
| 75% | Quartile | 5,960 |
| 50% | Median | 2,457 |
| 25% | Quartile | 874 |
| 0% | Min | 9 |
| | Average | 5,380 |

2016 Albacore Revenue

The west coast's albacore market demand in 2016 was above average, causing prices to increase. For the season, fresh-iced tuna prices averaged \$1.55 ± \$0.44 per pound, blast-frozen tuna prices averaged \$2.11 ± \$0.47 per pound, brine-frozen tuna prices averaged \$1.38 ± \$0.19 per pound, and public sales of tuna averaged \$2.50 - \$3.50 per pound. The most dramatic increase in price was observed for the blast-frozen market, where prices increased on the average of 86 cents per pound relative to 2015. At \$2.11 per pound, this is the highest average price blast-frozen tuna has ever sustained during the entire fishing season. The market value of fresh-iced and brine-frozen prices increased as well, with fresh-iced tuna selling for over two dollars a pound at times during the months of September and October.

The 2016 average prices for albacore increased gradually throughout the season following an early quick, though common, drop in prices as tuna became more accessible to fishers and buyers (Figure 6). Blast-frozen tuna deliveries accounted for 40% of total sales in Oregon and were primarily sold in Astoria (Table 4). Brine-frozen tuna deliveries accounted for 35% of total sales, primarily landed in Newport and the fresh-iced tuna deliveries accounted for 25% of total sales that were distributed among many of Oregon's ports, though primarily landed in Charleston.

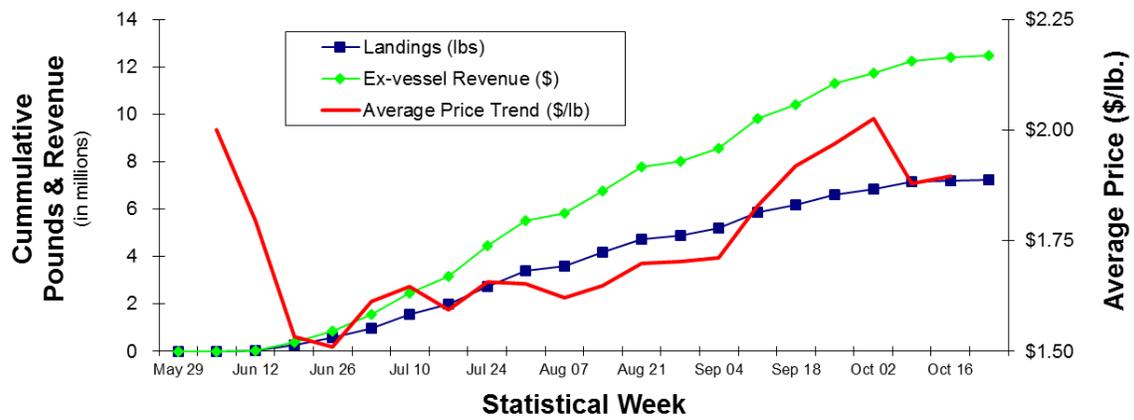


Figure 6: Cumulative landings, cumulative ex-vessel revenue, and average price by week in 2016.

Table 4: Treatment type by landings (pounds), port, and 2016 preliminary total percentage.

| Port | Blast frozen (lbs) | Blast% | Brine frozen | Brine% | Iced/Fresh (lbs) | Iced% | Total landings |
|---------------------------|--------------------|--------------|------------------|--------------|------------------|--------------|------------------|
| Astoria | 1,369,183 | 71.4% | 412,278 | 21.5% | 136,268 | 7.1% | 1,917,729 |
| Newport | 968,314 | 34.3% | 1,210,139 | 42.8% | 646,223 | 22.9% | 2,824,676 |
| Charleston | 420,672 | 19.4% | 871,543 | 40.2% | 875,433 | 40.4% | 2,167,648 |
| Remaining Ports | 122,160 | 36.8% | 32,038 | 9.7% | 177,517 | 53.5% | 331,715 |
| Total by treatment | 2,880,329 | 39.8% | 2,525,998 | 34.9% | 1,835,441 | 25.3% | 7,241,768 |

Ex-vessel revenue generated from albacore in 2016 totaled \$12,486,210 (Figure 7), a 35.4% increase from the 2015 total of \$9,219,534. The average price for 2016 was \$1.72 per pound, historically the second highest average price per pound and well above the ten-year average of \$1.35 per pound. The average price per pound for tuna was strongly influenced by the historical high price of blast-frozen tuna at \$2.11 per pound (Figure 8).

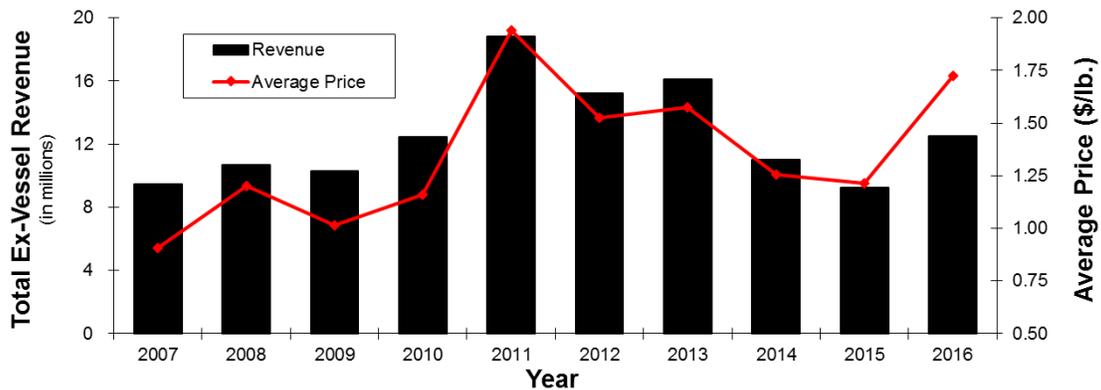


Figure 7: Total revenue (ex-vessel) and average price by year for Oregon commercial albacore.

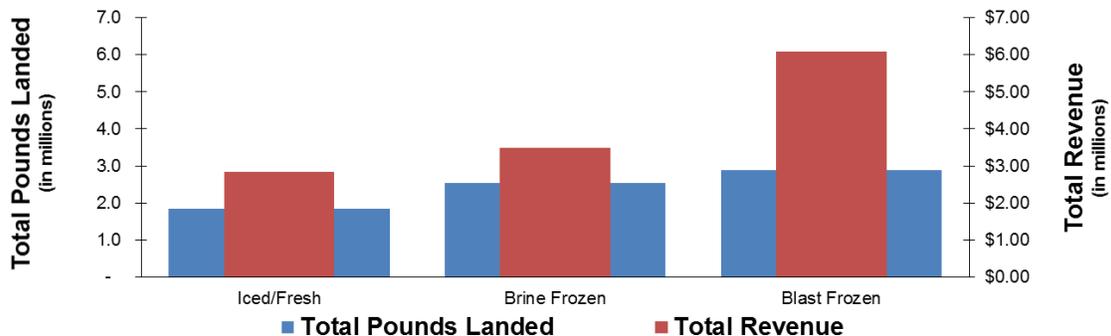


Figure 8: Total landed weight and total revenue of albacore landed by treatment type in 2016.

During the primary tuna sampling season (July 1 through October 31 of 2016), albacore accounted for 20.8% of Oregon's marine fish revenue (Table 5). For a full calendar year, albacore typically ranks 4th or 5th for total annual revenues generated in Oregon marine fisheries. Albacore tuna revenue ranked 5th relative to other Oregon fisheries during 2016 representing 8.7% of the total annual revenue. Oregon fisheries that exceeded albacore revenue (in percent of total revenue) were Dungeness crab (35.5%), pink shrimp (17.4%), groundfish (11.7%) and sablefish (10.5%) (Table 6).

Table 5: Oregon marine fish revenue (ex-vessel) during the albacore sampling season: July 1 - October 31, 2016.

| Fishery Species | Pounds Landed | Percentage of Pounds Landed | Revenue | Percentage of Revenue |
|--|--------------------|-----------------------------|---------------------|-----------------------|
| Pink Shrimp | 20,727,585 | 14.7% | \$13,934,145 | 26.0% |
| Albacore Tuna | 6,388,992 | 4.5% | \$11,138,312 | 20.8% |
| Sablefish | 2,279,412 | 1.6% | \$7,129,697 | 13.3% |
| Pacific Whiting | 87,958,703 | 62.6% | \$7,104,664 | 13.2% |
| Groundfish ^x | 9,528,570 | 6.8% | \$5,720,611 | 10.7% |
| Chinook Salmon | 1,150,229 | 0.8% | \$4,549,763 | 8.5% |
| All Other Marine Species ^{xx} | 12,333,163 | 8.8% | \$3,229,588 | 6.0% |
| Dungeness Crab ^o | 198,117 | 0.1% | \$857,794 | 1.6% |
| Total | 140,564,771 | | \$53,664,574 | |

^x Groundfish excluding Pacific Whiting and Sablefish.

^{xx} Including Pacific Halibut.

^o Includes Bay and Ocean Dungeness fisheries.

Table 6: Oregon annual marine fish revenue (ex-vessel) for January 1 – December 31, 2016:*

| Fishery Species | Pounds Landed | Percentage of Pounds Landed | Revenue | Percentage of Revenue |
|--|--------------------|-----------------------------|---------------------|-----------------------|
| Dungeness Crab ^o | 14,193,974 | 6.3% | \$51,140,376 | 35.5% |
| Pink Shrimp | 35,528,407 | 15.8% | \$25,092,992 | 17.4% |
| Groundfish ^x | 30,098,958 | 13.4% | \$16,839,079 | 11.7% |
| Sablefish | 5,424,696 | 2.4% | \$15,141,210 | 10.5% |
| Albacore Tuna | 7,241,781 | 3.2% | \$12,486,180 | 8.7% |
| Pacific Whiting | 113,034,786 | 50.2% | \$8,694,387 | 6.0% |
| Chinook Salmon | 1,525,855 | 0.7% | \$7,883,995 | 5.5% |
| All Other Marine Species ^{xx} | 18,131,733 | 8.1% | \$6,902,110 | 4.8% |
| Total | 210,986,216 | | \$93,039,953 | |

* Results preliminary (1/3/17).

^x Groundfish excluding Pacific Whiting and Sablefish.

^{xx} Including Pacific Halibut.

^o Includes Bay and Ocean Dungeness fisheries for calendar year December 2015 – November 2016.

2016 Sampling & Coverage Rate Analysis

During the 2016 albacore sampling season, sampling goals remained unchanged relative to 2015. This consistency between years was maintained to reflect a trip coverage rate instead of a sampling rate determined by total weight landed. The tuna sampling rate will be defined as the percentage of length-frequency sampled landing weights to total landing weights by port and state. Coverage rate will be defined by the percentage of length-frequency sampled trips, to the total albacore trips landed by port and state. To ensure a higher coverage rate, sampling methods were modified in 2015 to streamline the sampling process. A minimum of 20 albacore lengths are now required per length frequency sample. The previous minimum was set at 50 lengths.

In 2016, commercial albacore sampling began in June, a month earlier than expected. Funding for tuna samplers is allocated to cover the months of July through October, so port biologist and assistants arranged to collect a few albacore samples during the month of June, and the assigned tuna samplers began sampling on July 1st. Dedicated samplers in Astoria (4 months), Newport (4 months), and Charleston (4 months at half time) were trained, prepared, and

stationed on site, resulting in a season sampling rate of 50.2% (sampled pounds per pounds landed) and a coverage rate of 29.2% (sampled trips per trips landed). Additional sampling was conducted by ODFW commercial groundfish port samplers throughout the albacore season, when available. Sampling activities included measuring albacore for length-frequencies, distributing logbooks to vessels with valid Highly Migratory Species Permits, distributing addressed envelopes for completed logbooks, and providing information to fishers. Table 7 presents a summary of commercial sampling rates and coverage rates for the 2016 season. Additional summaries required by the contractual agreement with NMFS and PSMFC for albacore sampling funding are presented in Appendix A.

Table 7: 2016 preliminary Oregon commercial albacore sampling season summary.

| Port | Total | Pounds ^Y | Sample Rate | Albacore | Number | Average Fish | Commercial Coverage Rate |
|------------------|------------------|---------------------|---------------------------------|---------------|-----------------|----------------------|--|
| | Pounds Landed | Sampled | (sampled pounds/ landed pounds) | Trips Sampled | of Fish Sampled | per Length Frequency | Albacore Trips (sampled trips/ trips landed) |
| Astoria | 1,917,729 | 945,018 | 49.3% | 70 | 1,877 | 26.8 | 205 34.1% |
| Gearhart-Seaside | 1,307 | - | - | - | - | - | 2 - |
| Garibaldi | 103,119 | 8,390 | 8.1% | 1 | 20 | 20.0 | 66 1.5% |
| Pacific City | 2,419 | - | - | - | - | - | 6 - |
| Depoe Bay | 2,739 | - | - | - | - | - | 6 - |
| Newport | 2,824,676 | 1,886,485 | 66.8% | 207 | 9,665 | 46.7 | 521 39.7% |
| Florence | 15,744 | - | - | - | - | - | 10 - |
| Winchester Bay | 128,088 | - | - | - | - | - | 56 - |
| Charleston | 2,167,648 | 780,920 | 36.0% | 112 | 3,953 | 35.3 | 443 25.3% |
| Bandon | 1,643 | - | - | - | - | - | 1 - |
| Port Orford | 4,518 | - | - | - | - | - | 7 - |
| Gold Beach | 2,713 | - | - | - | - | - | 1 - |
| Brookings | 69,425 | 13,389 | 19.3% | 1 | 55 | 55.0 | 13 7.7% |
| TOTAL | 7,241,768 | 3,634,202 | 50.2% | 391 | 15,570 | 39.8 | 1,337 29.2% |

^Y Pounds Sampled are total pounds landed for every offload that is sub-sampled.

Port sampling coverage rate, shown in the last column of Table 7, was well above the 2016 minimum goals of 20% for Astoria and Newport and 10% for Charleston. The average number of fish per length-frequency sample also significantly exceeded the 20 fish minimum. In addition, port samplers acquired samples from Garibaldi and Brookings, which were not included in the minimum sampling goals.

Further analysis between the sampled trip landing weights and all individual trip landing weights is important to understand what the sampled data describes (Table 8). Large landings are defined as total trip landing weights greater than 75% of all individual albacore trip landing weights, while small landings are defined as total trip landing weights less than 25% of all individual albacore trip landing weights. For 2016, the 75% quartile landing weight for all landings is 5,960 pounds. Sampled “large” landings in 2016 consisted of 47% sampled trips greater than 5,960 pounds, suggesting that the distribution of sampled trips were skewed “large” relative to the distribution of all landings.

Table 8: Quartile partition for all Oregon albacore landings and sampled landings in 2016.

| All Landings | | | Sampled Landings | | |
|--------------|-----------------|---------|------------------|-----------------|---------|
| Quartile | | Pounds | Quartile | | Pounds |
| 100% | Max | 105,086 | 100% | Max | 105,086 |
| 75% | Quartile | 5,960 | 75% | Quartile | 10,682 |
| 50% | Median | 2,457 | 50% | Median | 5,614 |
| 25% | Quartile | 874 | 25% | Quartile | 2,852 |
| 0% | Min | 9 | 0% | Min | 187 |
| | Average | 5,380 | | Average | 9,241 |

2016 Length Frequency Analysis

Length frequency measurements were collected from random, non-sorted, ocean run commercially harvested albacore during fish buying offloads by port samplers from June through October of 2016. A total of 15,570 albacore tuna were measured for length frequencies in the ports of Astoria, Newport, Charleston, Garibaldi and Brookings (Figure 9). Collectively, the length data from the sampled ports suggest a tri-modal distribution. The primary mode represents an age-class of approximately four year-old tuna, the secondary mode represents an older age-class of approximately five year-old tuna, and the tertiary mode represents the youngest age-class of approximately three year-old tuna (Suda 1966). Although the number of fish sampled in each port widely varies, the distribution and trend appear to be very similar among the three primary sampled ports for all months combined (Figure 10).

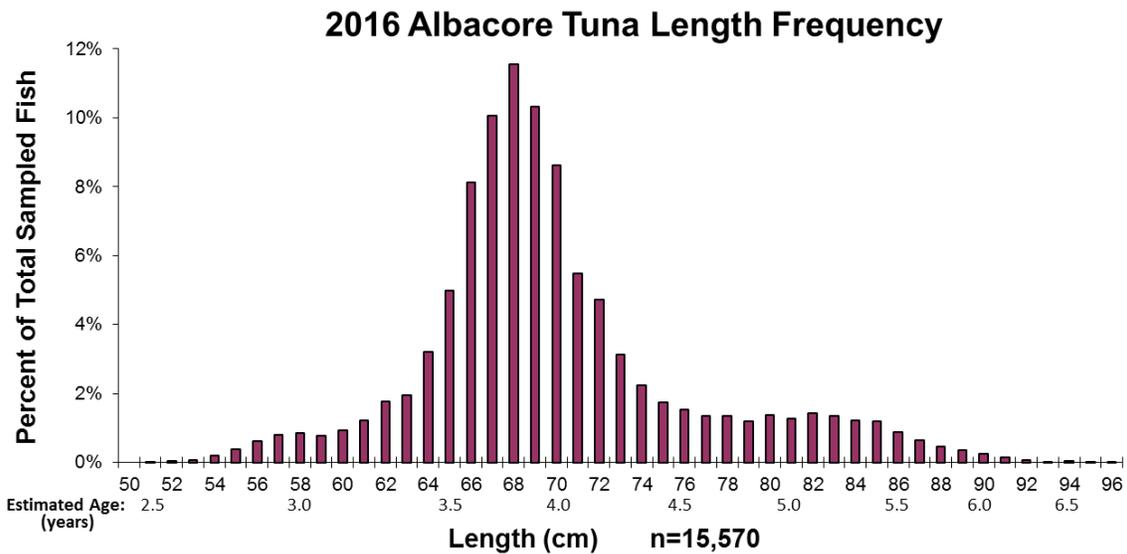


Figure 9: Length frequency data for all sampled ports, all months combined in 2016. Average length = 69.9cm, n = 15,570.

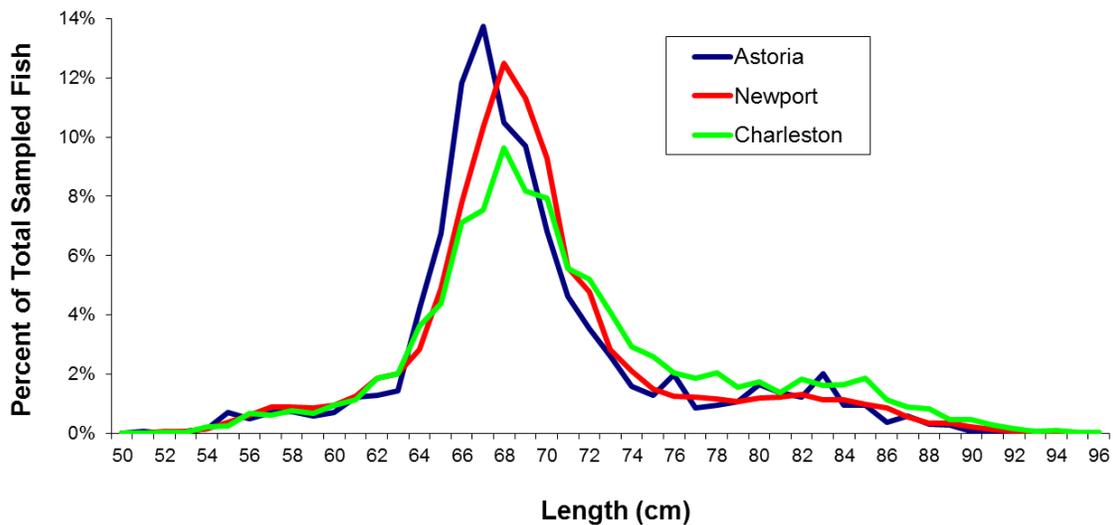


Figure 10: Length frequency data for all sampled months by port in 2016. Astoria n = 1,877. Newport n = 9,665. Charleston n = 3,953.

Average lengths for sampled fish throughout the 2016 season increased steadily as the fishing season progressed. During the month of October, the percent of large grade albacore landed by fishers was 48% compared to the 52% of the medium grade landed. This was a very welcoming sight for Oregon fishers, as the grades landed during 2015 were very heavily weighted towards the medium grade at 86.3%, compared to just 73.7% for 2016 (Figure 11). Grades are set as follows; small grade (known as peanuts) are tuna that measure 58 cm or less (nine pounds and under), medium grade (most common) are tuna that measure 59 cm to 72 cm, and large grade (known as hogs) are tuna that measure 73 cm and over (18 pounds and over). The common bench mark for large vs medium size tuna for 2016 was 18 pounds, though grades are determined by individual dealers and occasionally the buyer will set the larger grade fish at 15 pounds. Tuna kept on ice or in a brine solution are rarely sorted between the large and medium grade fish, though all tuna under nine pounds are more difficult for the fishers to find buyers. Peanuts are typically avoided and/or released at sea by fishers.

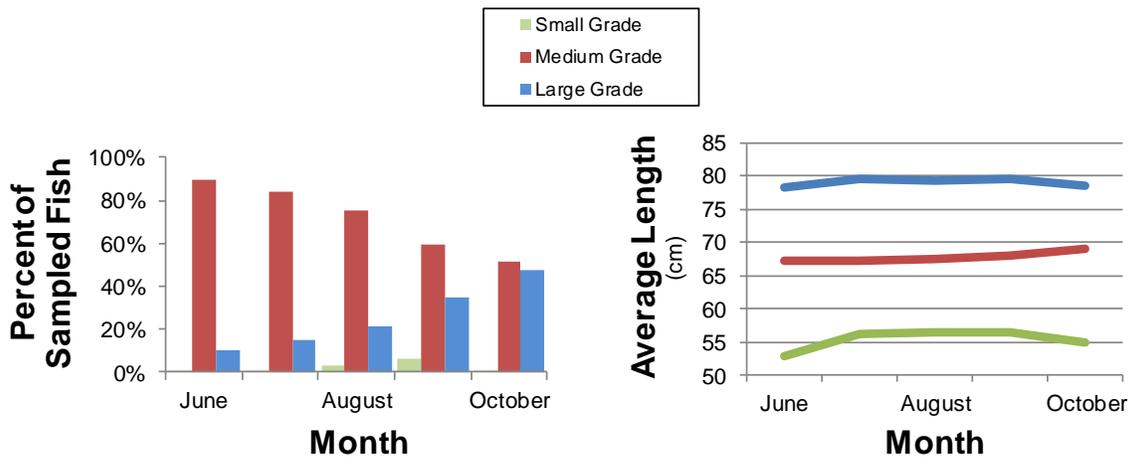


Figure 11: 2016 proportion (left) & average length (right) of small, medium & large grade fish sampled each month. June n = 1,003. July n = 5,502. August n = 3,988. September n = 4,539. October n = 538.

Modal analysis using a mixed distribution model calculated the average length for the large grade fish at 80.3 ± 4.6 cm representing 23.3% of all sampled tuna, the medium grade fish at 67.8 ± 3.0 cm representing 73.7% of all sampled tuna, and the small grade fish at 56.4 ± 1.5 cm representing 3.0% of all sampled tuna. Based on length to weight approximations the average weight for small grade fish is 8.3 pounds, medium grade fish is 14.4 pounds, and 23.9 pounds for large grade fish (Clemens 1961). The 2016 commercial albacore season was influenced heavily by the approximately four year old albacore tuna age class, according to both the length frequency data collected by tuna samplers, and the reports from many albacore fishers during the 2016 albacore fishing season. The large grade of tuna, representing the approximately five year old age class, made a stronger presence this year with 23.3% of the total landed fish in 2016 compared to 13.0% in 2015.

2016 ALBACORE RECREATIONAL FISHERY

Access to albacore for recreational vessels off Oregon can be highly variable, depending on weather conditions and distance offshore to the fish. This year, tuna arrived off the Oregon coast during the second week of June with a few landings in Charleston. By mid-June, tuna were regularly targeted and caught offshore from Charleston. Similarly with the commercial fishery, recreational effort and catches continued to increase during the month of July and dropped significantly in August due to the two large wind storms that swept through and churned up the ocean. Peak effort and landings occurred on the 3rd full week of July, with an estimate of 8,011 albacore tuna landed. Tuna were landed through the last week of September (Figure 12).

An estimate of 37,129 albacore tuna were landed during four months of fishing for tuna this year. Tuna-specific trips caught an estimate of 36,741 albacore, while 388 albacore were caught on either a combo trip (salmon & other fish), bottomfish trip, halibut trip or a salmon trip. The graphs and tables that follow reference albacore harvested on tuna-specific trips from the recreational fishery. For 2016, the recreational albacore season fell short of the ten-year average for landings and effort (Figure 13).

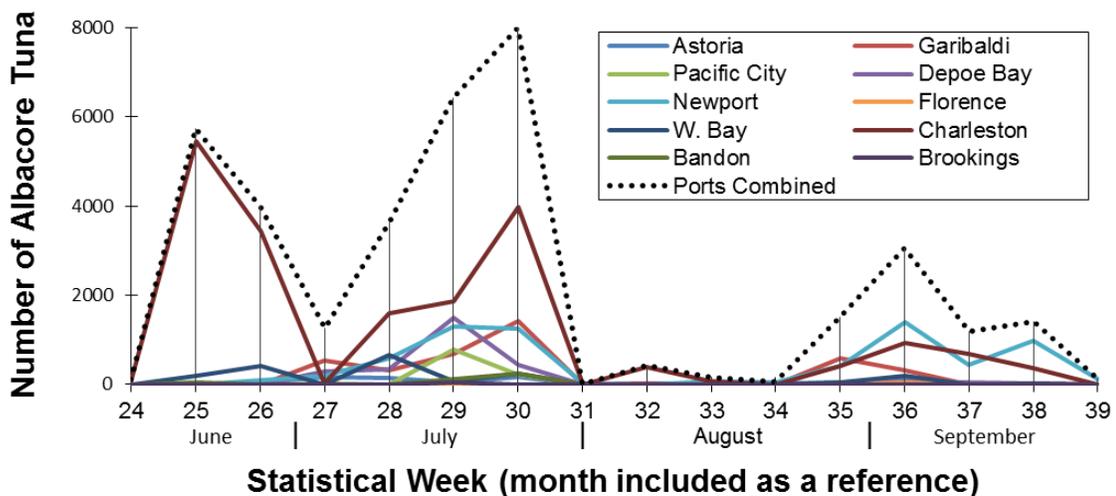


Figure 12: Oregon recreational albacore catch (number of tuna landed) by week from tuna-specific fishing trips.

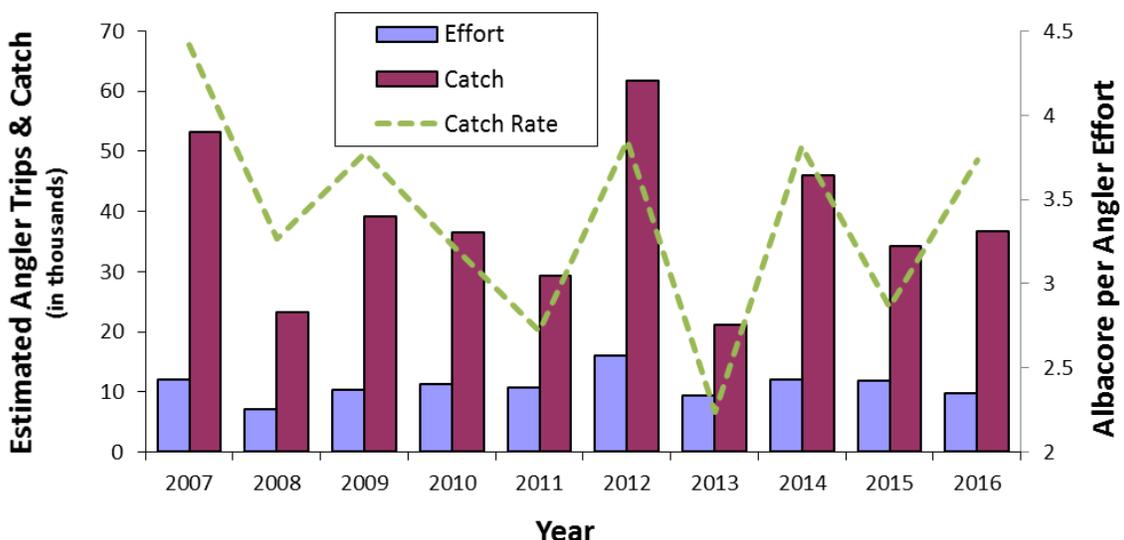


Figure 13: Oregon recreational albacore fishing effort (number of anglers), catch (number of tuna landed) and catch rate (albacore per angler effort) from tuna-specific fishing trips.

Recreational fishing effort for albacore totaled 9,830 angler trips in 2016, 1.1% lower than the ten-year average of 11,085 angler trips (Table 9). The number of albacore tuna landed from these tuna-specific trips totaled 36,741 fish, 3.6% fewer than the ten-year average of 38,104 angler trips (Table 10).

Combined charter and private albacore-specific landings for 2016 indicate that Charleston was the top port with 52% of the total recreational catch, and the four ports of Charleston, Newport, Garibaldi and Depoe Bay accounted for 89% of the tuna landings for the state (Table 11). Of the four main ports, Charleston had the most significant increase in albacore landings from 2015 to 2016, landing 19,261 albacore in 2016 compared to 7,519 albacore in 2015 (Table 10).

Charter vessel catch-per-unit of effort (CPUE) in 2016 was 2.5 albacore per angler trip, while the private vessel CPUE was 3.9 albacore per angler trip (Table 12). The combined CPUE for Oregon's recreational albacore season for charter and private was 3.7 albacore per angler trip, almost one albacore more per angler relative to 2015 (2.8 albacore per angler) and above the ten-year average of 3.4 albacore per angler trip.

Table 9: Oregon recreational albacore fishing effort (angler trips) by port, 2007-2016.

| Port | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 10-Year Average |
|--------------|---------------|--------------|---------------|---------------|---------------|---------------|--------------|---------------|---------------|--------------|-----------------|
| Astoria | 649 | 815 | 390 | 640 | 290 | 564 | 404 | 560 | 284 | 164 | 395 |
| Garibaldi | 1,374 | 1,124 | 1,176 | 2,685 | 728 | 2,385 | 2,214 | 1,845 | 1,662 | 1,586 | 1,938 |
| P. City | 218 | 40 | 93 | 254 | 80 | 337 | 132 | 265 | 247 | 239 | 244 |
| D. Bay | 2,327 | 988 | 1,138 | 1,661 | 1,433 | 2,930 | 2,489 | 1,760 | 2,117 | 936 | 2,046 |
| Newport | 3,878 | 2,567 | 3,251 | 3,929 | 3,734 | 5,201 | 3,368 | 2,823 | 4,080 | 2,760 | 3,646 |
| Florence | 30 | 67 | 15 | 16 | 24 | 28 | NS | 20 | 17 | 7 | 18 |
| W. Bay | 379 | 231 | 382 | 177 | 474 | 403 | 302 | 547 | 158 | 520 | 386 |
| Charleston | 1,781 | 1,067 | 3,202 | 1,667 | 3,076 | 3,744 | 427 | 4,049 | 2,650 | 3,470 | 2,868 |
| Bandon | 363 | 107 | 461 | 168 | 207 | 399 | 7 | 173 | 152 | 108 | 168 |
| Port Orford | NS | NS | NS | NS | 56 | 0 | NS | NS | NS | NS | 0 |
| G. Beach | 42 | 0 | 76 | 0 | 108 | 0 | 6 | 0 | 51 | 4 | 12 |
| Brookings | 989 | 99 | 183 | 114 | 577 | 21 | 85 | 0 | 514 | 36 | 131 |
| Total | 12,030 | 7,105 | 10,367 | 11,311 | 10,787 | 16,012 | 9,434 | 12,042 | 11,932 | 9,830 | 11,085 |

NS indicates no port samplers present that year.

Table 10: Oregon recreational albacore catch* (number of fish) by port, 2007-2016.

| Port | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 10-Year Average |
|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-----------------|
| Astoria | 2,415 | 2,914 | 1,176 | 1,598 | 556 | 2,272 | 1,060 | 2,092 | 660 | 661 | 1,349 |
| Garibaldi | 5,046 | 4,291 | 4,203 | 10,734 | 683 | 6,841 | 6,373 | 6,597 | 4,800 | 3,874 | 5,697 |
| P. City | 1,814 | 397 | 771 | 1,476 | 383 | 1,712 | 163 | 872 | 637 | 1,026 | 882 |
| D. Bay | 10,222 | 3,301 | 4,011 | 5,001 | 3,114 | 10,336 | 5,271 | 6,401 | 5,523 | 2,730 | 6,052 |
| Newport | 16,700 | 8,605 | 12,298 | 11,536 | 8,043 | 21,512 | 7,026 | 9,143 | 12,746 | 6,837 | 11,453 |
| Florence | 64 | 287 | 27 | 22 | 11 | 36 | NS | 56 | 39 | 20 | 38 |
| W. Bay | 1,280 | 449 | 983 | 516 | 1,275 | 1,229 | 169 | 2,006 | 212 | 1,863 | 1,096 |
| Charleston | 8,475 | 2,422 | 12,733 | 5,016 | 11,166 | 15,558 | 817 | 17,913 | 7,519 | 19,261 | 12,214 |
| Bandon | 2,179 | 333 | 2,508 | 496 | 1,149 | 2,194 | 30 | 888 | 365 | 419 | 779 |
| Port Orford | NS | NS | NS | NS | 455 | 0 | NS | NS | NS | NS | 0 |
| G. Beach | 466 | 0 | 182 | 0 | 967 | 0 | 0 | 0 | 65 | 0 | 13 |
| Brookings | 4,481 | 205 | 225 | 187 | 1,546 | 9 | 176 | 0 | 1,590 | 50 | 365 |
| Total | 53,142 | 23,204 | 39,117 | 36,582 | 29,348 | 61,699 | 21,085 | 45,968 | 34,156 | 36,741 | 38,104 |
| CPUE | 4.4 | 3.3 | 3.8 | 3.2 | 2.7 | 3.9 | 2.2 | 3.8 | 2.9 | 3.7 | 3.4 |

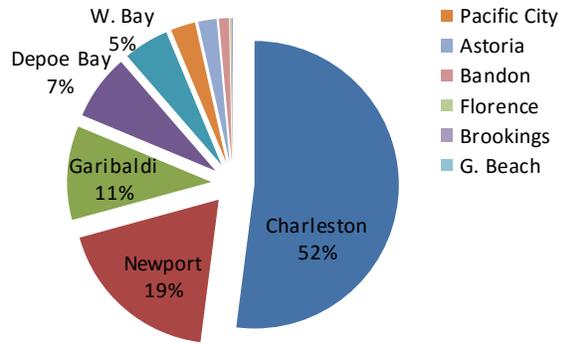
* Albacore caught from tuna-specific fishing trips.

NS indicates no port samplers present that year.

CPUE indicates catch-per-unit of effort (albacore per angler effort).

Table 11: Preliminary percentage of Oregon's recreational albacore catch* by port in 2016.

| Port | Landing % |
|--------------|-----------|
| Charleston | 52.0% |
| Newport | 18.7% |
| Garibaldi | 10.6% |
| Depoe Bay | 7.4% |
| W. Bay | 5.1% |
| Pacific City | 2.8% |
| Astoria | 2.1% |
| Bandon | 1.1% |
| Florence | 0.2% |
| Brookings | 0.1% |
| G. Beach | 0.0% |



* Albacore caught from tuna-specific fishing trips.

Table 12: Oregon's preliminary 2016 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 ^o | Charter | Total | Private ^o | Charter | Total | Private ^o | Charter | Total |
| Astoria | 580 | 81 | 661 | 107 | 57 | 164 | 5.4 | 1.4 | 4.0 |
| Garibaldi | 3,726 | 148 | 3,874 | 1,455 | 131 | 1,586 | 2.6 | 1.1 | 2.4 |
| Pacific City | 1,026 | 0 | 1,026 | 239 | 0 | 239 | 4.3 | NA | 4.3 |
| Depoe Bay | 2,035 | 695 | 2,730 | 708 | 228 | 936 | 2.9 | 3.0 | 2.9 |
| New port | 5,644 | 1,193 | 6,837 | 2,207 | 553 | 2,760 | 2.6 | 2.2 | 2.5 |
| Florence | 20 | 0 | 20 | 7 | 0 | 7 | 2.9 | NA | 2.9 |
| W. Bay | 1,863 | 0 | 1,863 | 520 | 0 | 520 | 3.6 | NA | 3.6 |
| Charleston | 18,670 | 591 | 19,261 | 3,300 | 170 | 3,470 | 5.7 | 3.5 | 5.6 |
| Bandon | 220 | 199 | 419 | 69 | 39 | 108 | 3.2 | 5.1 | 3.9 |
| G. Beach | 0 | 0 | 0 | 4 | 0 | 4 | 0.0 | NA | 0.0 |
| Brookings | 50 | 0 | 50 | 36 | 0 | 36 | 1.4 | NA | 1.4 |
| Total | 33,834 | 2,907 | 36,741 | 8,652 | 1,178 | 9,830 | 3.9 | 2.5 | 3.7 |

^o Very minimal private effort and catch reflects "guides", or charters without a fixed station. In 2016, an estimated additional 388 albacore were caught on non-tuna-specific fishing trips. NA indicates not applicable.

Recreational Length Frequency Analysis

Length frequency information was collected on 931 recreationally caught albacore by Ocean Recreational Boat Survey (ORBS) port samplers in 2016. Figure 14 shows the length frequency distribution of non-sorted, randomly sampled albacore during the 2016 recreational season. The length data suggests a bi-modal distribution, where the primary mode represents the age-class of approximately four year-old tuna (Suda 1966).

For a direct comparison to the commercially harvested albacore of 2016, we set the size for the small fish at 50 to 58 cm (small grade), the medium fish at 59 to 72 cm (medium grade), and the large fish at 73 to 97 cm (large grade). Modal analysis using a mixed distribution model calculated the average length for small fish at 55.9 ±1.9 cm representing 2.1% of all sampled tuna, medium fish at 67.5 ±3.0 cm representing 62.3% of all sampled tuna, and large fish at 80.1 ±4.8 cm representing 35.6% of all sampled tuna. Using length to weight approximations from Clemens (1961), the average weight in 2016 for small fish is 8.3 pounds, 14.4 pounds for medium fish, and 23.9 pounds for large fish.

Albacore harvested from commercial and recreational vessels show little difference regarding average lengths per grade designation. Small grade is 56.4 cm for commercial tuna and 55.9 cm for recreational tuna, medium grade is 67.8 cm for commercial tuna and 67.5 cm for recreational tuna and the large grade is 80.3 cm for commercial tuna and 80.1 cm for recreational tuna. The difference between the fisheries is the higher percentage of large grade tuna in the recreational fishery. Almost a quarter (23.3%) of the commercial tuna sampled were larger than 72 cm, but over a third (35.5%) of the recreational tuna sampled were larger than 72 cm.

2016 Albacore Tuna Length Frequency

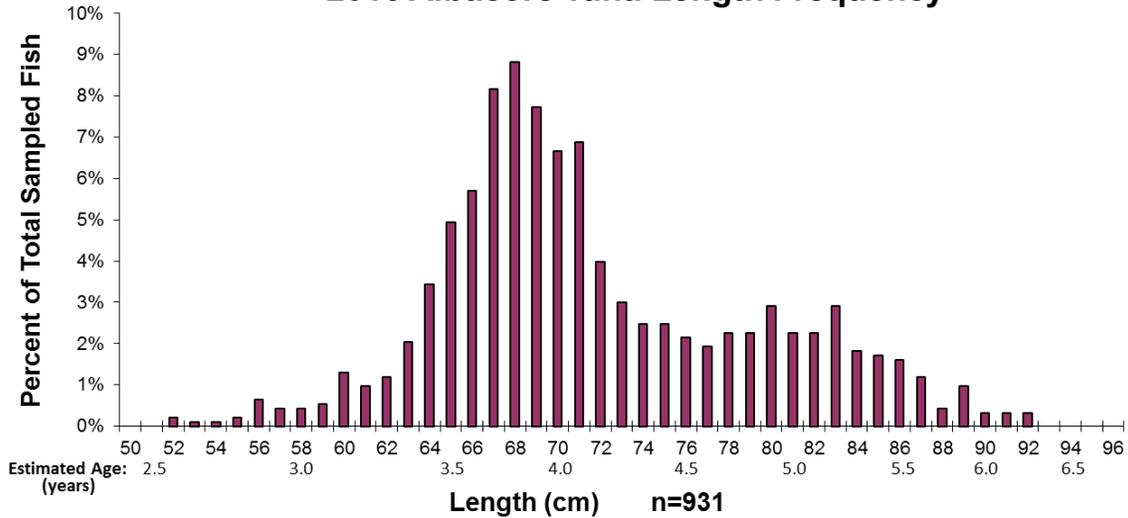


Figure 14: Length frequency data for all ports sampled for tuna by ORBS in 2016. Average Length = 71.7cm, n = 1,446.

SUMMARY

Oregon’s preliminary commercial albacore landings in 2016 totaled 7,241,768 pounds, a 4.5% decrease from the 2015 landings, and 22.7% lower than the ten-year average (2007-2016). Ex-vessel revenues from albacore totaled \$12,486,210, a significant increase of 35.4% from the 2015 season, and less than 1% lower than the ten-year average (2007-2016). Sampling exceeded the goals for the three primary ports, and Oregon overall.

Three Canadian vessels landed 134,112 total pounds of albacore in Oregon on four total landings in Astoria and Newport during the 2016 tuna season, a decrease of 24% from 2015. Offloads of Canadian vessels in Oregon have remained steady the past three years, with only a few Canadian vessels participating in the US and Canada “Fishing Regime” agreement. Canadian albacore landed in Oregon consisted of high quality blast frozen fish which totaled to \$270,463.

Recreational tuna fishers had a sub-par fishing season, landing a total of 37,129 estimated tuna (from all types of recreational effort and vessels) weighing approximately 633,421 pounds. This is 6.4% below the ten-year average of tuna harvested recreationally from 2007 to 2016.

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APPENDIX A

2016 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 | 7 | 0 | 13 | 0 | 11 | 0 | 0 | 31 |
| LBS LANDED BY COMMERCIAL SAMPLED VESSELS | 945,018 | 8,390 | 1,886,485 | 0 | 780,920 | 13,389 | 0 | 3,634,202 |
| NO. FISH MEASURED | 1,877 | 20 | 9,665 | 0 | 3,953 | 55 | 0 | 15,570 |
| NO. COMMERCIAL TRIPS SAMPLED FOR LENGTH-FREQUENCY | 70 | 1 | 207 | 0 | 112 | 1 | 0 | 391 |
| TOTAL NO. OF COMMERCIAL TRIPS/LANDINGS | 205 | 66 | 521 | 56 | 443 | 13 | 33 | 1,337 |
| TOTAL NO. OF COMMERCIAL VESSELS* | 85 | 26 | 179 | 14 | 139 | 8 | 17 | 373 |
| LBS LANDED BY COMMERCIAL JIG/TROLL VESSELS | 1,917,729 | 103,119 | 2,720,593 | 127,867 | 2,004,740 | 69,425 | 31,083 | 6,974,556 |
| LBS LANDED BY COMMERCIAL BAIT VESSELS | 0 | 0 | 41415 | 0 | 26,966 | 0 | 0 | 68,381 |
| LBS LANDED BY COMMERCIAL JIG&BAIT VESSELS | 0 | 0 | 62668 | 0 | 135,942 | 0 | 0 | 198,610 |
| LBS LANDED BY COMMERCIAL GILLNET VESSELS | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL LBS LANDED BY COMMERCIAL VESSELS | 1,917,742 | 103,119 | 2,824,676 | 127,867 | 2,167,648 | 69,425 | 31,083 | 7,241,560 |
| LBS LANDED BY SPORT VESSELS** | 11,263 | 66,013 | 116,502 | 31,746 | 328,207 | 852 | 71,482 | 626,067 |
| LBS LANDED BY COMMERCIAL TRAWL OTHER VESSELS | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| PERCENT COMMERCIAL SAMPLING COVERAGE (weight) | 49.3% | 8.1% | 66.8% | 0.0% | 36.0% | 19.3% | 0.0% | 50.2% |
| PERCENT COMMERCIAL SAMPLING COVERAGE (trips) | 34.1% | 1.5% | 39.7% | 0.0% | 25.3% | 7.7% | 0.0% | 29.2% |

* 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.