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# NATIONAL REPORT OF U.S.A.
# (U.S.A. FISHERIES AND RESEARCH ON TUNA AND TUNA-LIKE FISHERIES IN THE NORTH PACIFIC OCEAN)

NOAA, National Marine Fisheries Service
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## SUMMARY

Various U.S.A. fishing fleets harvest tuna and tuna-like species in the North Pacific Ocean (NPO) from coastal waters of North America to the archipelagoes of Hawaii, Guam and the Commonwealth of the Northern Mariana Islands (CNMI) and American Samoa in the central and western Pacific Ocean (WCPO). Small-scale gillnet, harpoon, tropical pole-and-line, troll, and handline fleets operate primarily in coastal waters, whereas large-scale purse seine, albacore troll, and longline fleets, which account for most of the tuna catches, operate both within the U.S.A. Exclusive Economic Zones and on the high seas. Thousands of small-scale troll and handline vessels operate in waters around the tropical Pacific Islands; however, these fleets account for only a minor fraction of the total tuna catch.

Several HMS exempted fishing permit (EFP) fishery programs have been developed in recent years by NOAA Fisheries to evaluate alternative gears and methods to target swordfish and other highly migratory species (HMS) species in the Eastern Pacific Ocean (EPO). NMFS has been prioritizing EFPs for alternative gears that will have minimal bycatch and demonstrate potential for economically viable EPO HMS fisheries.

The National Oceanic and Atmospheric Administration (NOAA) Fisheries continued to conduct research in 2021 on Pacific tunas and associated species at its Southwest and Pacific Islands Fisheries Science Centers and also in collaboration with scientists from other organizations.

Fishery monitoring and socio-economic research was conducted on tunas, billfishes, and bycatch species in the U.S.A. Pacific coastal and high-seas fisheries. As in previous years, fishery monitoring and angler effort information were compiled in 2021, and economic performance indicators in the Hawaii longline and small-boat fisheries were assessed.

Stock assessment research on tuna and tuna-like species was conducted primarily through collaboration with participating scientists of the International Scientific Committee for Tuna and Tuna-Like Species in the North Pacific Ocean (ISC) and international Regional Fisheries Management Organizations (RFMOs).

NOAA Fisheries successfully completed biological and oceanographic research on tunas, billfishes, and sharks. Selected reports and research projects include: a comparison of length sampling programs for recreational fisheries of U.S. Pacific bluefin tuna from 2014 to 2020, natal origin and age-specific egress of Pacific bluefin tuna from coastal nurseries revealed with geochemical markers, albacore and broadbill swordfish diets in the California Current, report of the North Pacific albacore tuna management strategy evaluation, emergent research on shark and ray conservation, generalized linear model utilizing machine learning techniques, and shark bycatch estimation in purse seine fisheries.

## 1. INTRODUCTION

Various U.S.A. fleets harvest tuna and tuna-like species in the North Pacific Ocean. Large-scale purse seine, albacore troll, and longline fisheries operate both in coastal waters and on the high seas. Small-scale coastal purse seine, gillnet, harpoon, troll, handline and recreational hook and line fisheries, as well as commercial and recreational troll and hook and line fisheries, usually operate in coastal waters. Overall, the range of U.S.A. fisheries in the North Pacific Ocean is extensive, from coastal waters of North America to Guam and the Commonwealth of the Northern Mariana Islands (CNMI) and American Samoa in the western Pacific Ocean and from the equatorial region to the upper reaches of the North Pacific Transition Zone.

In the U.S.A., the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries or federal agency) shares monitoring responsibilities for tunas and billfishes with partner fisheries agencies in the states of California, Oregon, Washington, Hawaii, and territories of American Samoa, Guam, and the CNMI. NOAA's West Coast Regional Office (WCRO) and the Southwest Fisheries Science Center (SWFSC) in California, and the Pacific Islands Regional Office (PIRO) and the Pacific Islands Fisheries Science Center (PIFSC) in Hawaii conduct federal monitoring. NOAA Fisheries monitors the landings and sales records, federally-mandated logbook statistics on fishing effort and catch, observer data, and biological sampling data. In California, Washington, and Oregon, landings receipts are collected by state agencies and maintained in the Pacific Fisheries Information Network (PacFIN) system (http://pacfin.psmfc.org/). Some state agencies also collect logbook and size-composition data. In the WCPO, monitoring by partner agencies also involves market sampling and surveys of fishing activity and catch and is coordinated by the Western Pacific Fishery Information Network (WPacFIN) system (http:// http://www.pifsc.noaa.gov/wpacfin/), a federally funded program managed by the PIFSC. The SWFSC, WCRO, PIFSC, and PIRO share management of data in the U.S.A. Pacific fisheries for tuna and tuna-like species.

This report provides information on the number of active vessels by fleet and their catches of tunas and billfishes in the NPO based on the data available through 22 March 2022. Data for 2021 are considered preliminary and are subject to change. Although the report is focused on tunas and billfishes, many of the fisheries' catch includes catch of other pelagic fish important to the fishing fleets and local economies; catch data for these species are not included in this report but are included in the ISC data submissions.

NOAA Fisheries also conducts scientific research programs in support of marine resource conservation and management both domestically and internationally. These studies include stock assessments, biological and oceanographic studies, socio-economic analysis, and more. This report includes highlights of recent and ongoing scientific work by NOAA Fisheries of relevance to the ISC.

## 2. FISHERIES

### 2.1. Purse Seine

Currently, the U.S.A. purse seine fishery consists of two separate fleets, one composed of large purse-seine vessels that operate in the WCPO, and a small coastal purse-seine fleet that operates in the eastern Pacific Ocean (EPO). Figure 1 shows the spatial distribution of the U.S.A. Western Pacific purse-seine fishery. Historically, the purse-seine fishery started in the EPO in the mid- 1900s and most catch came from that ocean area until 1993 when vessels moved to the WCPO in response to dolphin conservation measures in the EPO. Vessels also moved to the WCPO because fishing access was granted by the South Pacific Tuna Treaty (SPTT) in 1987. The WCPO fleet operates mainly in areas between 10°N and 10°S latitude and 130°E and 150°W longitude, with the majority of the fishing effort south of the equator. The EPO fleet operates off the coast of Southern California. The number of unique U.S.A. purse-seine vessels (WCPO and EPO) fishing north of the equator decreased from a high of 74 in 1988 to 11 in 2006 and then increased to 46 in 2009. In 2021, there were 19 purse-seine vessels fishing in the North Pacific, down from 35 in last year. Prior to 1995, the fleet fished mainly on free-swimming schools of tunas in the WCPO and on schools associated with dolphins in the EPO. Since 1995, most catches have been made on fish aggregation devices and other floating objects in the WCPO. In 2021, there were the total of 3 California based EPO purse-seine vessels fished at EPO and caught 42 t Pacific bluefin tuna, down from 12 vessels and 116 t from previous year.

The Inter-American Tropical Tuna Commission (IATTC) monitors the purse-seine fleets fishing in the EPO. U.S.A. purse-seine vessels fishing in the WCPO have been monitored by NOAA Fisheries under the SPTT since 1988. Logbook and landings data are submitted as a requirement of the Treaty (100% coverage). Landings are sampled for species and size composition as vessels land their catches in American Samoa by NOAA Fisheries personnel and by SPC samplers in other ports (coverage approximately 1-2% of landings). The Forum Fisheries Agency (SPTT Treaty Manager) places observers on 100% of the vessel trips. In the EPO, logbooks are submitted by vessel operators to NOAA Fisheries or the IATTC, and landings are obtained for each vessel trip from canneries or fish buyers. IATTC observers are placed on all large purse-seine vessels in the EPO.

### 2.2. Longline

The U.S.A. longline fishery targeting tunas and tuna-like species in the NPO is made up of the Hawaii-based fleet, the California-based fleet, and the American Samoa-permitted fleet in the NPO. Vessels operated freely in an overlapping area managed by two domestic management regimes until 2000 when domestic regulations placed restrictions on moving between the two domestic management regimes. The Hawaii-based component of the U.S.A. longline fishery currently comprises a majority of the vessels, fishing effort, and catch.

Regulatory restrictions, due to interactions with endangered sea turtles, curtailed Hawaii-based longline effort for swordfish (*Xiphias gladius*) in 2000 and 2001 followed by a prohibition altogether in 2002 and 2003, during which the Hawaii-based longline fishery targeted tunas exclusively. The Hawaii-based fishery for swordfish (shallow-set longline) was reopened in April 2004 under a new set of regulations to reduce sea turtle interactions. The year 2005 was the first complete year in which the Hawaii-based longline fishery was allowed to target swordfish.

In the following year, the shallow-set longline fishery reached the annual interaction limit of 17 loggerhead sea turtles (*Caretta caretta*) and the fishery was closed on 20 March 2006. The majority of vessels that targeted swordfish converted to deep-set longline and targeted tunas for the remainder of the year. The Hawaii-based shallow-set longline fishery also closed on 18 November 2011 as a result of reaching the annual interaction limit of 16 leatherback turtles. In the Hawaii-based shallow-set longline fishery in 2012, the interaction limits for leatherback (*Dermochelys coriacea*) and loggerhead sea turtles were increased for the Hawaii shallow-set longline fishery to 26 and 34, respectively. Leatherback and loggerhead sea turtle interactions have been less than their respective limits since the levels were revised, though the fishery was closed in both 2019 and 2020 due to a court order that lowered the turtle-take limits back to the 2011 levels (17 loggerhead turtles annually) and the shallow set fishery reached the revised loggerhead turtle take limit. The sea turtle regulations changed on September 17, 2020 with the longline fleet limited to 16 annual leatherback turtle interactions. Also, if an individual vessel reached a trip limit of either 2 leatherback or 5 loggerhead sea turtles interactions, that vessel is required to immediately stop fishing, retrieve their fishing gear, and return to port.

The number of vessels in the California-based fishery has always been low compared to the Hawaii-based fishery, and is composed mainly of vessels that target swordfish. Most vessels with landings to California also participated in the Hawaii-based fishery. The California-based shallow-set longline fishery for swordfish was closed in 2004, resulting in relocation of most of those vessels back to Hawaii. Less than three West Coast permitted vessels fished between 2005 and 2018 using deep-set longline to target tunas. In 2021, 3 vessels participated under the West Coast permit.

In the North Pacific, the longline fishery extended from 125°W, just outside the U.S.A. West Coast EEZ to 175°W longitude and from 10°N to almost 40°N latitude in 2021 (Figures 2 and 3). The total number of vessels participating in the longline fishery increased from 36 in 1985 to a high of 149 in 2019, with 146 vessels participating in 2021. In Hawaii and California, swordfish are generally landed dressed (headed, tailed, and gutted). Tunas and large marlins are landed gilled and gutted while other bony fishes are usually landed whole. a relatively low volume of sharks are landed headed and gutted. In Hawaii, the landed catch biomass is the reported total fish weight by species recorded at the fish auction. Dressed weights are converted to whole weight for reporting of total catches using standard conversion factors.

Catch levels and catch-species composition in the U.S.A. longline fishery have changed over the past years in response to fishery and regulatory changes. The majority of the longline catch now consists of tunas and billfishes and exceeded 11,000 t from 2014. Bigeye tuna (*Thunnus obesus*) dominates the tuna catch with landings over 4,000 t during the past eighteen years. The 2021 bigeye tuna catch was 7,138 t. Swordfish was the dominant component of the longline catch from 1990 through 2000 peaking at 5,936 t in 1993 then trended to a low of 543 t in 2020 and was 690 t in 2021.

The Hawaii-based longline fishery is monitored by combined sampling efforts of the NOAA Fisheries and the State of Hawaii's Division of Aquatic Resources (DAR). Longline fishermen are required to complete and submit federal longline logbooks for each fishing operation. The logbook data include information on fishing effort, area fished, catch by species and amount, and other details of the fishing operations. Logbook coverage for the Hawaii-based longline fishery is at or near 100% coverage of vessels by trip. The Hawaii DAR also requires fish dealers to submit reports of landings data, and coverage for the longline fishery and the reporting rate for dealers are very close to 100%. DAR dealer data represent the majority of the fish kept by the longline fishery with individual fish weighed to the nearest pound (Figures 4 and 5). Observers contracted by NOAA Fisheries are also placed on longline vessels to monitor protected species interactions, vessel operations, and multi-species catches. These observers are required by court decree to be aboard Hawaii-based longline vessels at a rate of coverage of no less than 20% for deep-set (tuna-target) vessels and 100% for shallow-set (swordfish-target) vessels. Information on the sizes of fish caught in the Hawaii-based longline fishery indicate that, in general, a higher proportion of smaller tuna and tuna-like fish species are captured in the shallow-set longline fishery compared to the deep-set fishery (Figures 4 and 5).

The California-based longline fishery is monitored by NOAA Fisheries and the California Department of Fish and Wildlife (CDFW). Data are collected for 100% of longline landings by the CDFW. Logbooks, developed by the fishing industry (similar to the federal logbooks used in Hawaii), were submitted voluntarily to NOAA Fisheries until 1994 when logbooks became mandatory. Landed swordfish were measured for cleithrum to fork length by CDFW port samplers until 1999. NOAA Fisheries has placed observers on all California-based and non-Hawaii permit longline trips since 2002. The observers collect data on fishing location, protected species interactions, fish catch, disposition of catch and bycatch, and size measurements of catch and bycatch (retained catch and discards).

### 2.3. Albacore Troll and Pole-and-line

The U.S.A. albacore troll and pole-and-line fishery in the NPO started in the early 1900s. The fishery currently operates in waters between the U.S.A. West Coast and 160°W longitude. Fishing usually starts in June and ends in October or November. The fishery catches almost exclusively albacore with minor incidental catches of Pacific bluefin tuna (*Thunnus orientalis*), eastern Pacific bonito (*Sarda chiliensis lineolata*), yellowtail (*Seriola lalandi*), and mahi mahi (*Coryphaena hippurus*). In 2021, 311 vessels participated in the fishery, dropped from 404 vessels from previous year. Also, the albacore catch is 4209 t in 2021 compared with 7516 t of albacore was caught in 2020 and 7766 t in 2019.

In 2005, the Highly Migratory Species Fishery Management Plan required all U.S.A. troll and pole-and-line vessels to submit logbooks to NOAA Fisheries. NOAA Fisheries and various state fisheries agencies monitor the fleet's landings through sales receipts (fish tickets) and landings reported in logbooks. The proportion of US vessel catch in the high seas dropped from about 12.7 % in 2020 to about 6.4% in 2021 and the proportion caught in the Canada EEZ in increased from 9.5% in 2020 to 14% in 2021. Total of 719 t of albacore landed in Canada Port compared with 648 t from previous year. Spatial distribution of albacore catch and effort for 2021 are shown in Figures 7 and 8 respectively.

Since 1961, a port sampling program has been in place for collecting size data from albacore landings along the Oregon and Washington. Sizes of albacore caught in the albacore troll and pole-and-line fishery range between 55 cm fork length (8.5 pounds) and 90 cm (32 pounds). In 2021, a total of 12586 fish were measured, the average albacore sampling weight is 14.7 lb, compared to 17.1 lb from previous year. Weight distribution of the catch for 2021 is shown in Figure 9. State fishery personnel collect the size data according to sampling instructions provided by NOAA Fisheries, who maintain the database. In recent years, cooperative fishermen have also collected size data on selected fishing trips to augment data collected through the port sampling program.

### 2.4. Tropical Pole-and-line

The tropical pole-and-line fishery targets skipjack around the Hawaiian Islands. Hawaii DAR monitors the tropical pole-and-line fishery using Commercial Fish Catch reports submitted by fishers and Commercial Marine Dealer reports submitted by fish dealers. The number of vessels participating declined from a high of 27 in 1985 to a low of one in 2012. Skipjack tuna is usually the largest component of the catch by Hawaii pole-and-line vessels. The highest skipjack tuna catch for this fishery was 3,450 t in 1988. The highest yellowfin tuna catch for the pole-and-line fishery was 2,636 t, recorded in 1993. To protect data confidentiality, no catch data for the tropical pole-and-line fishery are reported for recent years.

### 2.5. Tropical Troll and Tropical Handline

Tropical troll fishing fleets for tuna and tuna-like species operate in Hawaii, Guam, and the CNMI. Tropical handline fishing fleets also operate in Hawaii. The vessels in these fisheries are relatively small coastal vessels (typically around 8 m in length) and primarily make one-day fishing trips in coastal waters. Historically, the number of U.S.A. troll and handline vessels combined ranged from 1,878 in 1988 to 2,502 in 1999, and there were 1,807 troll vessels and 388 handline vessels in 2021. The operations range from recreational, subsistence, and part- time commercial to full-time commercial. The small vessel catches generally are landed fresh and whole, although some catches are gilled and gutted.

Weights of individual fish were obtained from Hawaii DAR dealer data. The size distributions of tunas (skipjack, yellowfin, and bigeye) and marlins (striped marlin and blue marlin, *Kajikia audax* and *Makaira nigricans*, respectively) caught in the Hawaii fishery in 2021 are summarized in Figures 10 and 11.

The total retained catch from these tropical troll and handline fisheries combined ranged from 1,160 t in 1992 to 2,201 t in 2002. The majority of the catch was made up of yellowfin and skipjack tuna in 2021 followed by blue marlin.

The Guam Division of Aquatic and Wildlife Resources (DAWR) monitors the troll fishery using a statistically designed creel survey and commercial landings data. The Guam DAWR, with the assistance of NOAA Fisheries, extrapolated the creel survey data to produce estimates of total catch, fishing effort, and fishermen participation estimates by gear type. Similarly, the Hawaii tropical troll and handline fisheries catch and effort summaries are compiled from Hawaii DAR Commercial Fish Catch reports and Commercial Marine Dealer reports. The CNMI Division of Fish and Wildlife (DFW) monitors the tropical troll fishery in the CNMI region using creel surveys and commercial landings, and with the assistance of NOAA Fisheries, extrapolated the creel survey data to produce estimates of total catch, fishing effort, and fishermen participation estimates by gear type.

### 2.6. Drift Gillnet

The U.S.A. large mesh drift gillnet fishery targets swordfish and common thresher sharks in areas within the EEZ in California waters and historically off the coast of Oregon. Other pelagic sharks, and small amounts of tunas and other pelagic species are also caught in the large mesh drift gillnet fishery. The number of vessels participating in this fishery has steadily decreased from a high of 220 in 1986 to a low of 6 in 2021. Swordfish dominate the catch and peaked in 1985 at 2,990 t. Since then, swordfish catches have fluctuated while decreasing to a low of 62 t in 2010. The estimate of swordfish caught in the drift gillnet fishery for 2021 is 13 t, a decrease from 35 t caught in 2020, total of 55 t bluefin tuna caught in 2021, increased from 28 t in 2020. the total of 6 vessels participated in 2021, down from 12 vessels in 2020.

Gillnet fishery landings data (100% coverage) are collected by state agencies in California and Oregon (no landings have occurred in Oregon since 2004). Logbook data for gillnet fisheries are required to be submitted to SWFSC for all trips. CDFW collected length data for swordfish landings between 1981 and 1999 from less than 1% of the landings. NOAA Fisheries observers on large mesh drift gillnet vessels have collected data on fishing location, protected species interactions, fish catch, disposition of catch and bycatch, and length since 1990; observer coverage is about 20% of effort.

### 2.7. Harpoon

The harpoon fishery targets swordfish and operates in areas within the EEZ in California waters between 32°N and 34°N latitude. The number of vessels participating in the fishery greatly decreased from 113 in 1986 to 10 in 2012. Trends in swordfish catches have fluctuated from a high of 305 t in 1985 to 5 t in 2012, and 2015. In the last couple years there has been an increasing number of vessels switched from harpoon fishery to deep-set buoy gear fishery. The number of vessels decreased to 11 in 2021 from 17 in 2020 and the catch remained 6~7 t in the last two years.

Landings data for the harpoon fishery are collected by the CDFW and logbook data are managed by SWFSC. Length measurements were taken by CDFW between 1981 and 1999, covering less than 1% of swordfish landings.

### 2.8. Sport

Sport (recreational) catch and effort data are available from commercial passenger fishing vessels (CPFVs) and catch data are available from private vessels that target tunas and other pelagic fish. Logbook data for CPFVs are obtained from fisheries agencies in California while CPFV logbook data from vessels fishing out of Oregon and Washington are submitted to NOAA Fisheries.

Estimates of catch for CPFV and private vessels are obtained through logbooks and surveys and maintained in the Recreational Fisheries Information Network (RecFIN) database (http://www.recfin.org/) for California, Oregon, and Washington. Total sport catches of tunas, sharks and billfish are estimated from data obtained from RecFIN and augmented by state and federal logbook data sets where available. The majority of the highly migratory species (HMS) catch is albacore, yellowfin and Pacific bluefin tuna. The albacore catch by sport vessels was 253 t in 2021 similar to 260 t in 2020.

Sport catches of Pacific bluefin tuna are estimated differently from other species. From 1993 through 2012 the IATTC collected size samples from bluefin landed by CPFVs. In 2013 no sampling occurred and in 2014 NOAA Fisheries began collecting length samples from bluefin landed by CPFVs. A description of the size sampling and the procedure for estimating annual sport catches of Pacific bluefin are provided in the working paper: http://isc.fra.go.jp/pdf/ISC20/ISC20_ANNEX11_Stock_Assessment_Report_for_Pacific_Bluefin_Tuna.pdf. Catches vary and have ranged from a high of 809 t in 2013 to a low of 6 t in 1988. The 2021 catch was 1161 t compared to 716 t in 2020. Figure 11 shows the size distribution of Pacific bluefin tuna caught in the U.S. West Coast sportfishing industry in 2021.

## 3. RESEARCH

### 3.1 Natal Origin and Age-Specific Egress of Pacific Bluefin Tuna from Coastal Nurseries Revealed with Geochemical Markers

**Rooker et al. (2021)** constructed geochemical chronologies from otoliths of adult PBF to investigate the timing of age-specific egress of juveniles from coastal nurseries in the East China Sea or Sea of Japan to offshore waters of the Pacific Ocean. Element:Ca chronologies were developed for otolith Li, Mg, Mn, Zn, Sr, and Ba, and this assessment focused on the section of the otolith corresponding to the age-0 to age-1 + interval. Next, researchers applied a common time-series approach to geochemical profiles to identify divergences presumably linked to inshore-offshore migrations. Conspicuous geochemical shifts were detected during the juvenile interval for Mg:Ca, Mn:Ca, and Sr:Ca that were indicative of coastal-offshore transitions or egress generally occurring for individuals approximately 4–6 mo. old, with later departures (6 mo. or older) linked to overwintering being more limited. Change points in otolith Ba:Ca profiles were most common in the early age-1 period (ca. 12–16 mo.) and appear associated with entry into upwelling areas such as the California Current Large Marine Ecosystem following trans-Pacific migrations. Natal origin of PBF was also predicted using the early life portion of geochemical profile in relation to a baseline sample comprised of age-0 PBF from the two primary spawning areas in the East China Sea and Sea of Japan. Mixed-stock analysis indicated that the majority (66%) of adult PBF in the sample originated from the East China Sea, but individuals of Sea of Japan origin were also detected in the Ryukyu Archipelago. These findings are consistent with other studies and confirm the value of using otolith microchemistry to examine migrations and population dynamics.

### 3.2 Comparison of Length Sampling Programs for Recreational Fisheries of U.S. Pacific Bluefin Tuna from 2014 to 2020.

The U.S. recreational fishery for PBF is dominated by CPFVs, the landings of which are included in stock assessments. NOAA conducts a PBF Port Sampling Program (PSP) and supports the Sportfishing Association of California Fisheries Sampling Program (SAC) to collect length data to describe the length compositions of the commercial passenger fishing vessel (CPFV) fleet catch for use in the PBF stock assessment. The overall goal of **James et al. (2021)** was to determine whether the data generated by PSP and SAC were comparable and whether they reflected the CPFV fishery. To this end, the number of PBF, number of trips, geographic extent, and length compositions were compared between PSP and SAC. The PSP length data were incorporated into the 2020 stock assessment, however the SAC data were not investigated. This is the first comparison of the length data between PSP and SAC, and the results generated were in intended to provide guidance on the utility of the SAC dataset to the PBF stock assessment. The comparison of SAC and PSP identified similarities and differences in sampling design and catch-at-lengths.

### 3.3 Risk and Reward in Foraging Migrations of North Pacific Albacore Determined From Estimates of Energy Intake and Movement Costs.

In **Muhling et al. (in press)** the movements, physiology and ecology of albacore following different migratory pathways were examined. Data from 33 archival-tagged juvenile albacore, released along the West Coast between 2003 and 2011 in collaboration with fishing industry partners were used. Researchers used direct measurements of body temperature and ambient water temperature to estimate energy intake via the Heat Increment of Feeding (HIF): the increased internal heat production associated with digestion of food. Migratory movements in albacore are poorly understood and appear highly variable. Albacore have not been present in larger fishable aggregations off southern California for more than 10 years, and fishers report that fishing conditions offshore have been generally poor since the early 2000s. In the past 5 years, albacore landings have been historically low along the West Coast, imposing economic hardships on the fishing industry. When combined with other ongoing studies of diet composition and growth at the SWFSC, this study can help improve understanding of distribution and migration drivers in albacore and their accessibility to the surface fleet.

### 3.4 Examination of IUU Fishing in the Northeast Pacific

Marine fisheries around the globe are increasingly exposed to external drivers of social and ecological change. Though diversification and flexibility have historically helped marine resource users negotiate risk and adversity, much of modern fisheries management treats fishermen as specialists using specific gear types to target specific species. **Frawley et al. (2021)** describe the evolution of harvest portfolios amongst Pacific Northwest fishermen over 35+ years with explicit attention to changes in the structure and function of the north Pacific albacore (Scombridae) troll and pole-and-line fishery. This analysis indicates that recent social–ecological changes have had heterogenous impacts upon the livelihood strategies favored by different segments of regional fishing fleets. As ecological change and regulatory reform have restricted access to a number of fisheries, many of the regional small (<45 ft) and medium (45–60 ft) boat fishermen who continue to pursue diverse livelihood strategies have increasingly relied upon the ability to opportunistically target albacore in coastal waters while retaining more of the value generated by such catch. In contrast, large vessels (>60 ft) targeting albacore are more specialized now than previously observed, even as participation in multiple fisheries has become increasingly common for this size class. In describing divergent trajectories associated with the albacore fishery, one of the U.S. West Coast's last open-access fisheries, researchers highlighted the diverse strategies and mechanisms utilized to sustain fisheries livelihoods in the modern era while arguing that alternative approaches to management and licensing may be required to maintain the viability of small-scale fishing operations worldwide moving forward.

### 3.5 Nursery Origin and Population Connectivity of Swordfish (*Xiphias gladius*) in the North Pacific Ocean

**Wells et al. (2021)** used Element:Ca ratios in the otolith cores of young-of-the-year (YOY) swordfish as natural tracers to predict the nursery origin of sub-adult and adult swordfish from three foraging grounds in the North Pacific Ocean (NPO). First, the chemistry of otolith cores (proxy for nursery origin) was used to develop nursery-specific elemental signatures in YOY swordfish. Sagittal otoliths of YOY swordfish were collected from four regional nurseries in the NPO between 2000-2005: 1) Central Equatorial North Pacific Ocean (CENPO), 2) Central North Pacific Ocean (CNPO), 3) Eastern Equatorial North Pacific Ocean (EENPO), and 4) Western North Pacific Ocean (WNPO). Calcium ($^{43}Ca$), magnesium ($^{24}Mg$), strontium ($^{88}Sr$), and barium ($^{138}Ba$) were quantified in the otolith cores using laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS). Univariate tests indicated that three element:Ca ratios (Mg:Ca, Sr:Ca, and Ba:Ca) were significantly different among nurseries. Overall classification success of YOY swordfish to their nursery of collection was 72% based on quadratic discriminant analysis. Next, element:Ca ratios in the otolith cores of sub-adults and adults collected from three foraging grounds where targeted fisheries exist (Hawaii, California, and Mexico) were examined to calculate nursery-specific contribution estimates. Mixed-stock analysis indicated that the CENPO nursery contributed the majority of individuals to all three foraging grounds (Hawaii 45.6 ± 13.2%; California 84.6 ± 10.8%; Mexico 64.5 ± 15.9%). Results from this study highlight the importance of the CENPO nursery and provides researchers and fisheries managers new information on connectivity of the swordfish population in the NPO.

### 3.6 Isotopic Tracers Suggest Limited Trans-Oceanic Movements and Regional Residency in North Pacific Blue Sharks

**Madigan et al (2021)** used gradients of stable isotope ratios (i.e., regional isoscapes) to determine exchange rates of blue sharks between the East and West North Pacific Ocean. Discriminant analysis suggested low trans-Pacific exchange, categorizing all western (100%) and most eastern (95.3%) blue sharks as resident to their sampling region, with isotopic niche overlap of Western Pacific Ocean (WPO) and Eastern Pacific Ocean (EPO) highly distinct (0.01–5.6% overlap). Potential finer scale movement structure was observed within both eastern and western Pacific sub-regions, with mixing models suggesting potential region-specific residency and localized foraging. Considerations of species-specific isotopic dynamics and sample treatments, and their effects on these results and future studies, are discussed. These results suggest that blue shark population dynamics may be effectively assessed on a regional basis (i.e., WPO and EPO), though further studies are required to assess size- and sex-specific movement patterns based on empirical isotopic values from regional studies with large sample sizes. Strategically applied stable isotope approaches can continue to elucidate migration dynamics of migratory marine predators, complementing traditional approaches to fisheries biology and ecology.

These results, drawing upon published $\delta^{13}C$ and $\delta^{15}N$ data for blue sharks and prey sampled at multiple locations in the EPO and WPO, provide a new and replicable means to assess blue shark residency and migration dynamics in the North Pacific. The analyzed data provide strong evidence for limited direct migrations between the WPO and EPO, and reiterated the utility of $\delta^{15}N$ isoscapes for the reconstruction of migratory predator movements in the North Pacific Ocean. Regional structure in $\delta^{13}C$ and $\delta^{15}N$ data have promise for further quantification of finer-scale blue shark movements, increasing the resolutions of movement patterns suggested, but consideration of isotopic parameters (*e.g.*, accurate DTDFs), appropriate sample preparation of shark tissues, and length/sex metadata of sampled sharks are necessary. With emerging research showing varying residency and trans-regional movements in migratory predators, isoscapes can employ high sample sizes across a breadth of animal life stages, regions, and timeframes to reconstruct habitat use of highly migratory animals. Through these isotopic approaches, population-level estimates of movement dynamics are feasible on scales that may not be readily available from conventional tagging or telemetry studies.

### 3.7 Emergent Research and Priorities for Shark and Ray Conservation

Over the past 4 decades there has been a growing concern for the conservation status of elasmobranchs (sharks and rays). In 2002, the first elasmobranch species were added to Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Less than 20 yr later, there were 39 species on Appendix II and 5 on Appendix I. Despite growing concern, effective conservation and management remain challenged by a lack of data on population status for many species, human−wildlife interactions, threats to population viability, and the efficacy of conservation approaches. Hutchinson and Cortes (2022) surveyed 100 of the most frequently published and cited experts on elasmobranchs and, based on ranked responses, prioritized 20 research questions on elasmobranch conservation. To address these questions, the authors then convened a group of 47 experts from 35 institutions and 12 countries. The 20 questions were organized into the following broad categories: (1) status and threats, (2) population and ecology, and (3) conservation and management. For each section, we sought to synthesize existing knowledge, describe consensus or diverging views, identify gaps, and suggest promising future directions and research priorities. The resulting synthesis aggregates an array of perspectives on emergent research and priority directions for elasmobranch conservation.

### 3.8 Net illumination reduces fisheries bycatch, maintains catch value, and increases operational efficiency

**Senko et al. (2022)** used controlled experiments along Mexico's Baja California peninsula to show that illuminating gillnets with green LED lights-an emerging technology originally developed to mitigate sea turtle bycatch-significantly reduced mean rates of total discarded bycatch biomass by 63%, which included significant decreases in elasmobranch (95%), Humboldt squid (81%), and unwanted finfish (48%). Moreover, illuminated nets significantly reduced the mean time required to retrieve and disentangle nets by 57%. In contrast, there were no significant differences in target fish catch or value. These findings advance our understanding of how artificial illumination affects operational efficiency and changes in catch rates in coastal gillnet fisheries, while illustrating the value of assessing broad-scale ecological and socioeconomic effects of species-specific conservation strategies.

### 3.9 Fishing trip cost modeling using generalized linear model and machine learning methods - A case study with longline fisheries in the Pacific

Fishing trip cost is an important element in evaluating economic performance of fisheries, assessing economic effects from fisheries management alternatives, and serving as input for ecosystem and bioeconomic modeling. However, many fisheries have limited trip-level data due to low observer coverage. **Chan and Pan (2021)** introduces a generalized linear model (GLM) utilizing machine learning (ML) techniques to develop a modeling approach to estimate the functional forms and predict the fishing trip costs of unsampled trips. GLM with Lasso regularization and ML cross-validation of model are done simultaneously for predictor selection and evaluation of the predictive power of a model. This modeling approach is applied to estimate the trip-level fishing costs using the empirical sampled trip costs and the associated trip-level fishing operational data and vessel characteristics in the Hawaii and American Samoa longline fisheries. Using this approach to build models is particularly important when there is no strong theoretical guideline on predictor selection. Also, the modeling approach addresses the issue of skewed trip cost data and provides predictive power measurement, compared with the previous modeling efforts in trip cost estimation for the Hawaii longline fishery. As a result, fishing trip costs for all trips in the fishery can be estimated. Lastly, this study applies the estimated trip cost model to conduct an empirical analysis to evaluate the impacts on trip costs due to spatial regulations in the Hawaii longline fishery. The results show that closing the Western and Central Pacific Ocean (WCPO) could induce an average 14% increase in fishing trip costs, while the trip cost impacts of the Eastern Pacific Ocean (EPO) closures could be lower.

### 3.10 Quantifying the accuracy of shark bycatch estimations in tuna purse seine fisheries

Estimating bycatch is essential for monitoring the ecological impacts of a fishery in order to set management and mitigation priorities. Purse seine vessels targeting tropical tunas incidentally catch pelagic sharks (mainly silky and oceanic whitetip sharks), which are brought onboard and can be observed on the upper and lower decks. Currently, single onboard observers can only be efficiently stationed on one of the two decks, and thus often rely on information provided by the crew to complement their bycatch estimations. In **Forget et al. (2021)**, NOAA used dedicated scientists strategically positioned during fishing sets in order to establish a reference count of captured sharks during conventional commercial fishing trips. They then assessed the accuracy of the counts made by (i) single observers onboard during the same fishing trips in the Pacific Ocean (where observers estimate catch of target species and bycatch estimation is a lower priority) and the Atlantic Ocean (where observers’ focus is on bycatch) and (ii) Electronic Monitoring System (EMS) in the Indian Ocean. A total of 74 fishing sets conducted during four purse seine fishing trips revealed that shark counts were underestimated for 50–100 percent of the sets, with the mean shark count underestimation, at the fishing trip level, ranging from 9 to 40 percent (onboard observers) and 65 percent for EMS. Given the importance of monitoring populations of vulnerable species, the authors strongly encourage specific studies during which the complementary counts of two onboard observers are used simultaneously to assess the accuracy of various EMS configurations, bearing in mind that single onboard observers appear to underestimate the number of captured sharks.

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## 6. FIGURES

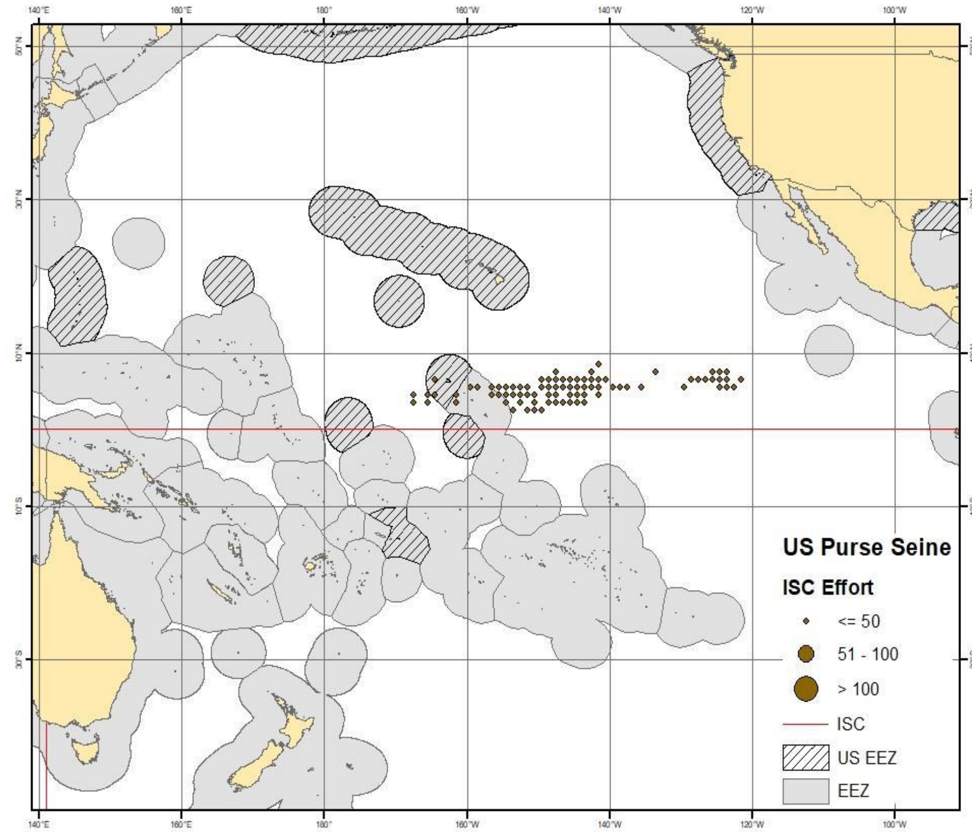



**Figure 1.** Spatial distribution of reported logbook fishing effort by the 2021 U.S. Western Pacific purse seine fishery in vessel-days. The size of circles is proportional to the amount of effort. Effort in some areas is not shown in order to preserve data confidentiality.

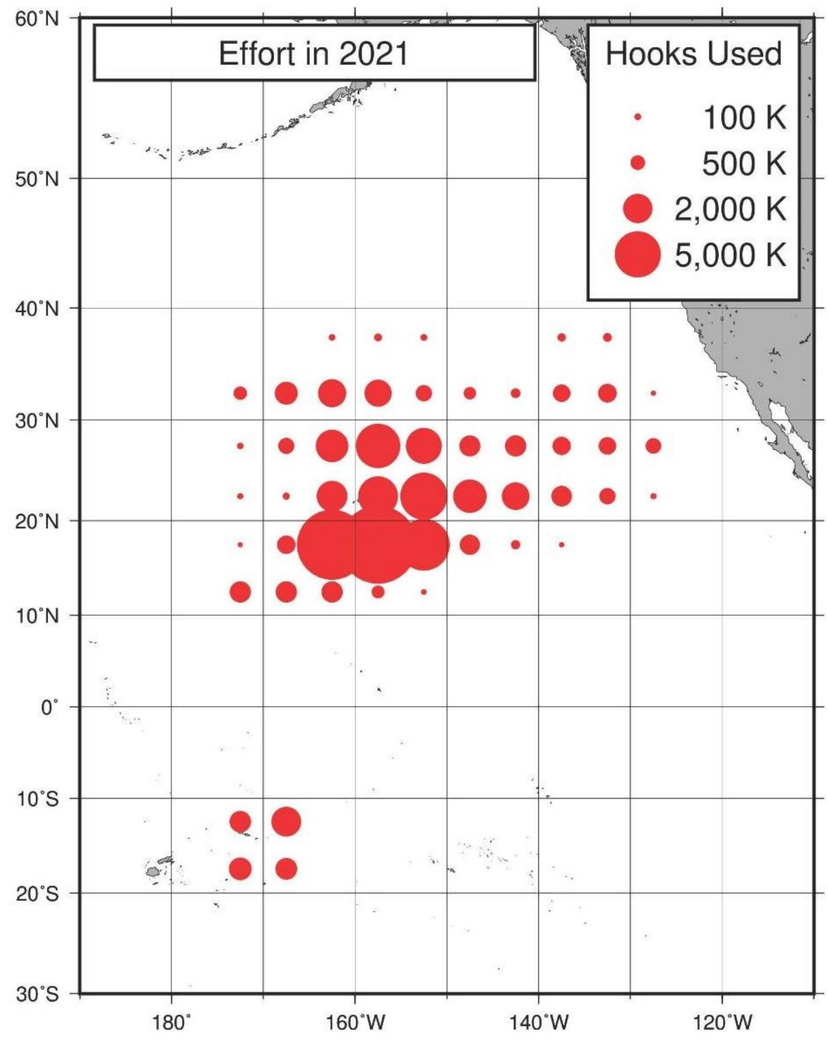



**Figure 2.** Spatial distribution of reported logbook fishing effort by the 2021 U.S. longline fishery in the Pacific Ocean, in 1,000s of hooks. The size of circles is proportional to the amount of effort. Effort in some areas is not shown in order to preserve data confidentiality.

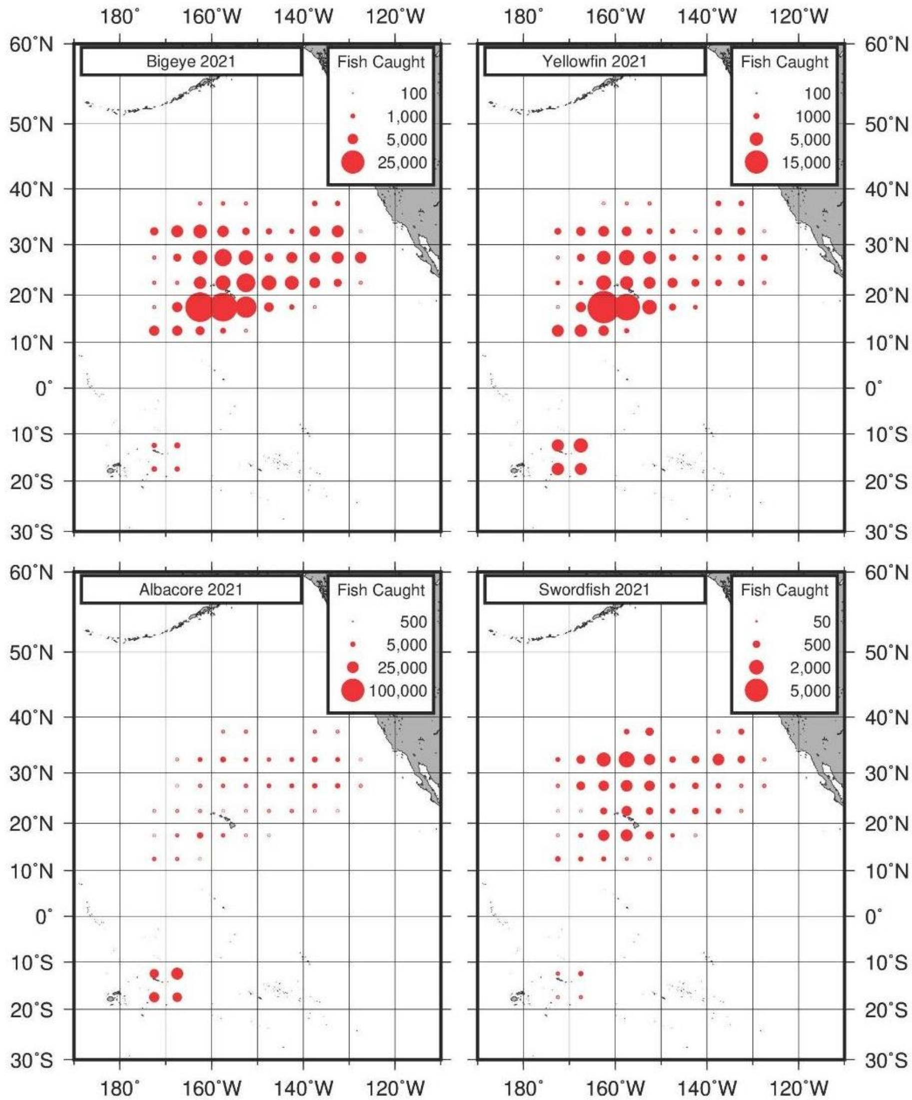



**Figure 3**. Spatial distribution of reported logbook fishing catch by the U.S. longline fishery in the Pacific Ocean, in numbers of fish, in 2021 for bigeye (*Thunnus obesus*), albacore (*Thunnus alalunga*), yellowfin (*Thunnus albacares*), and swordfish (*Xiphias gladius*). The size of circles is proportional to the amount of effort. Effort in some areas is not shown in order to preserve data confidentiality.

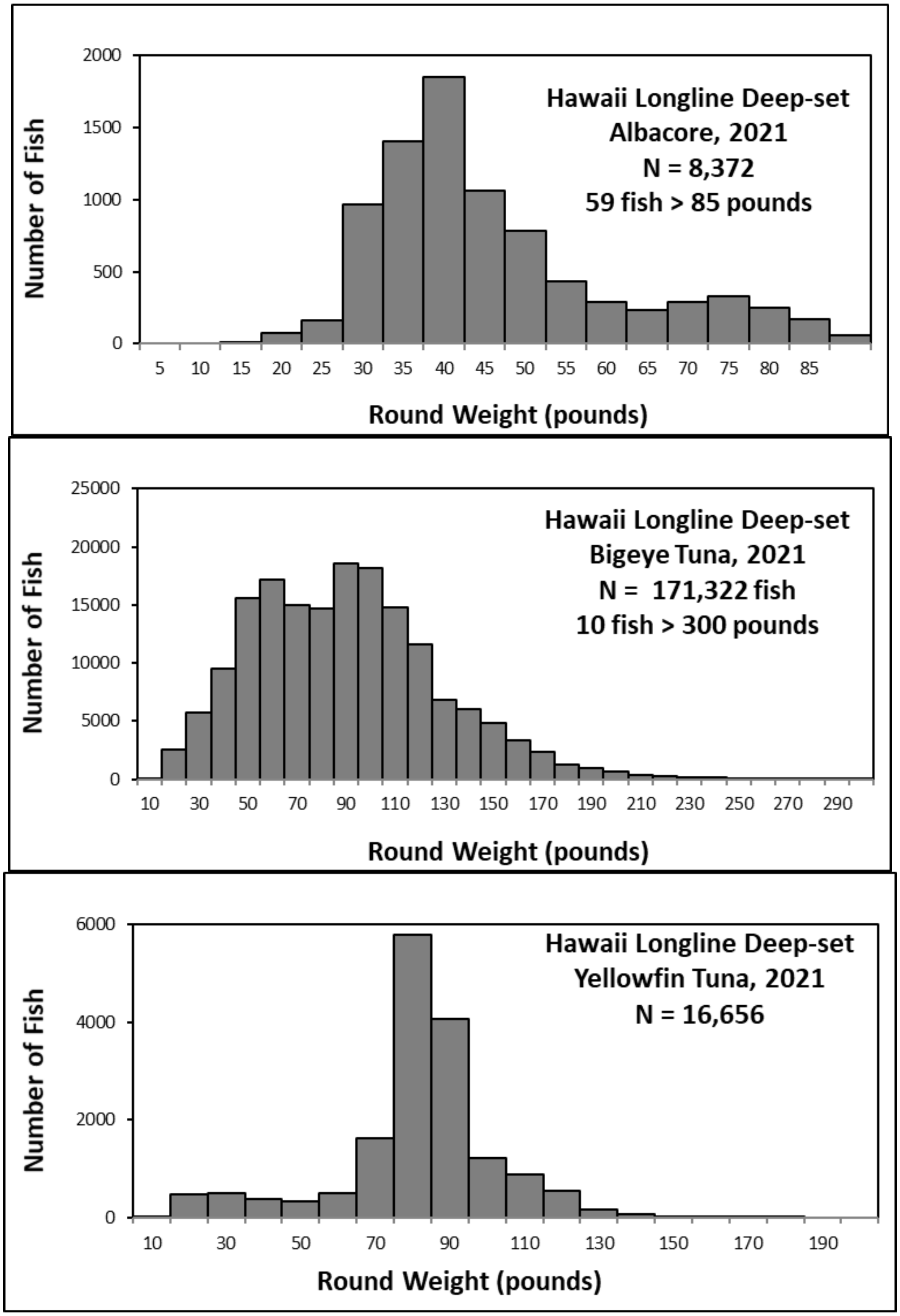



**Figure 4.** Size distribution of (A) albacore (*Thunnus alalunga*), (B) bigeye tuna (*Thunnus obesus*), and (C) yellowfin tuna (*Thunnus albacares*) caught by the Hawaii-based deep-set longline fishery in the north Pacific Ocean, 2020.

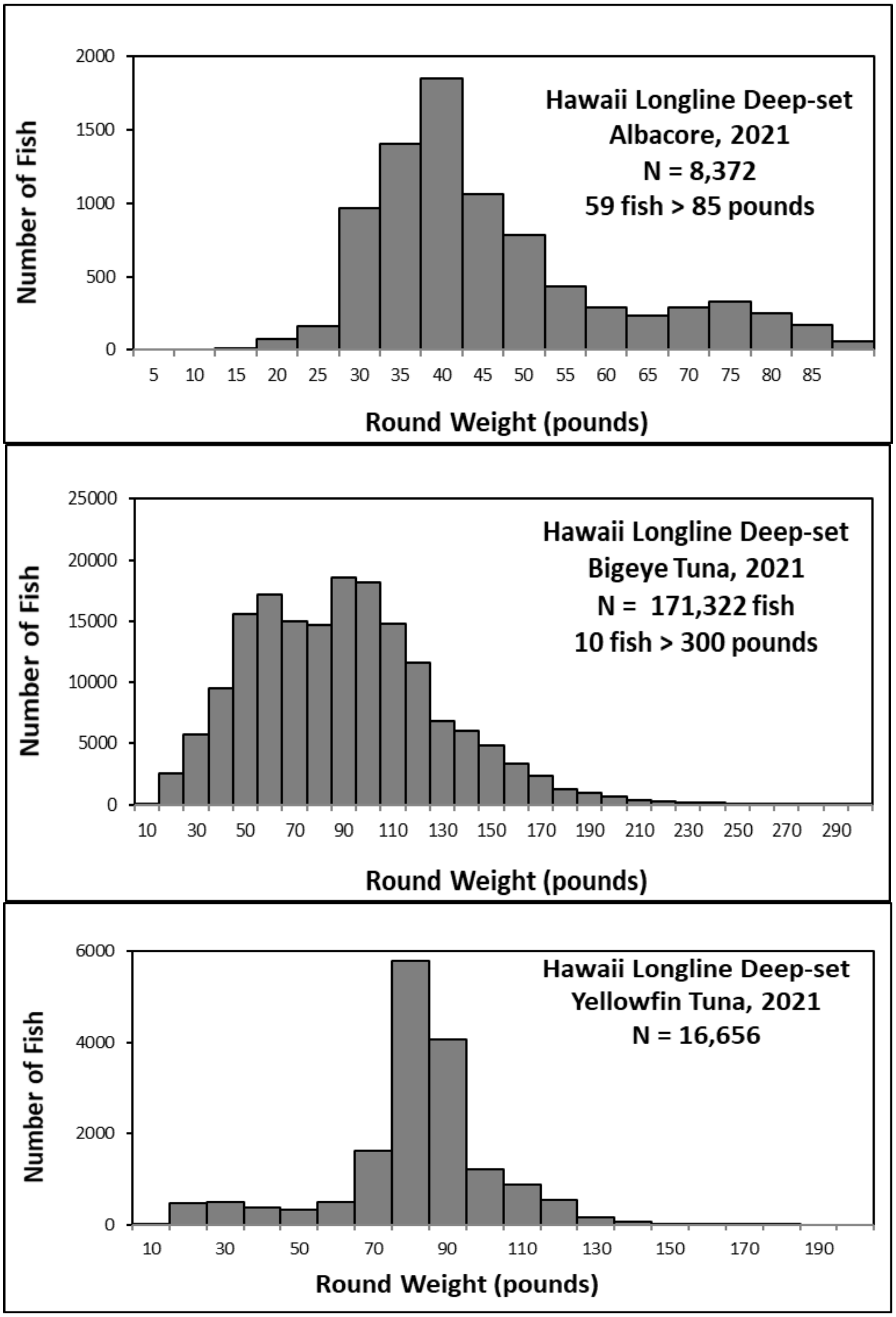
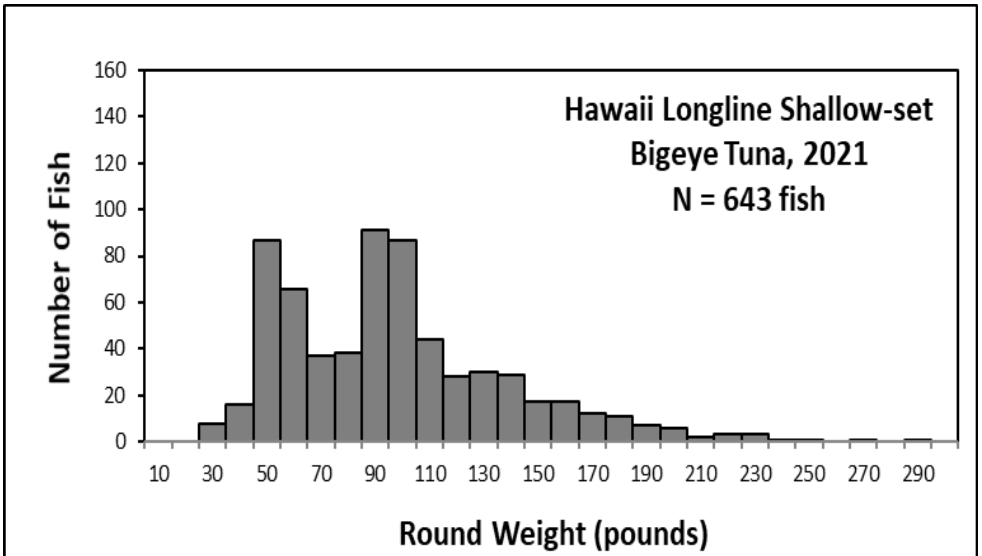



**Figure 5.** Size distribution of (A) swordfish (*Xiphias gladius*), (B) striped marlin (*Tetrapturus audax*), and (C) blue marlin (*Makaira nigricans*) caught by the Hawaii-based deep-set longline fishery in the Pacific Ocean, 2021.



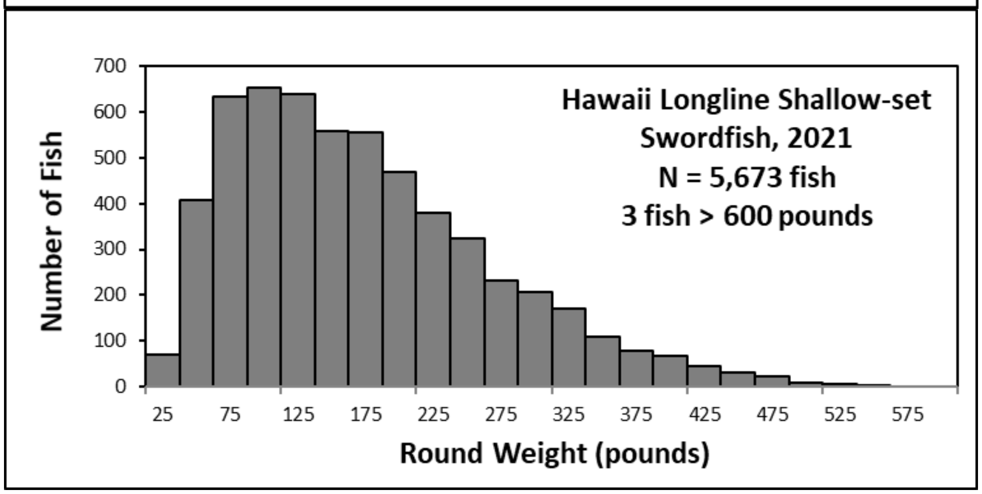




**Figure 6.** Size distribution of (A) bigeye tuna (*Thunnus obesus*), and (B) swordfish (*Xiphias gladius*) caught by the Hawaii-based shallow-set longline fishery in the Pacific Ocean, 2021.

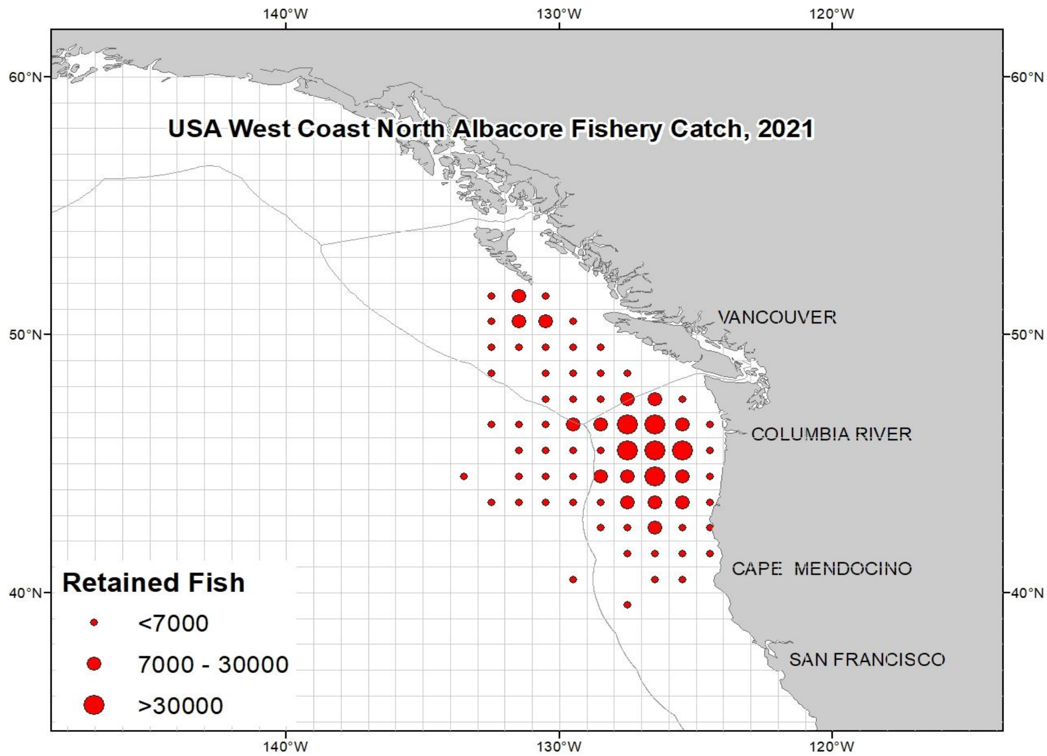



**Figure 7.** Spatial distribution of reported logbook catch by the 2021 U.S. albacore troll and pole-and-line fishery in number of fish. The size of circles is proportional to the amount of catch. Some catch areas are not shown in order to preserve data confidentiality.

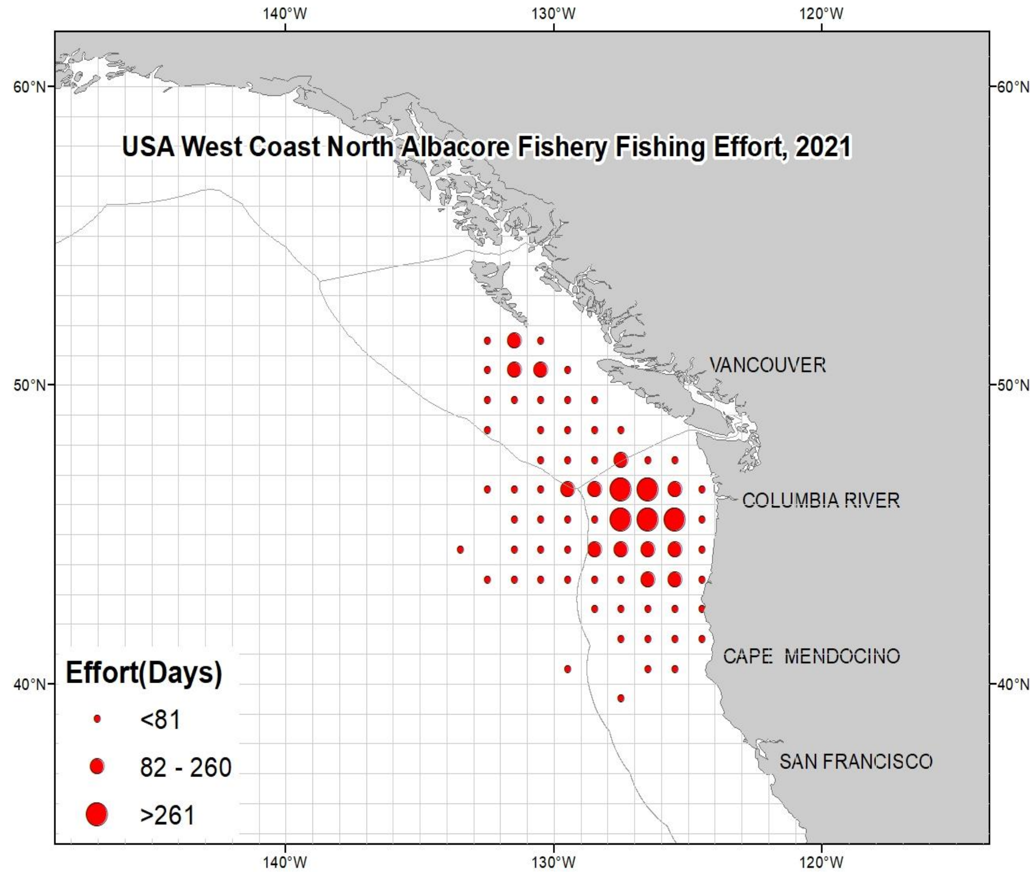



**Figure 8.** Spatial distribution of reported logbook fishing effort by the 2021 U.S. albacore troll and pole-and-line fishery in vessel days. The size of circles is proportional to the amount of effort. Some effort areas are not shown in order to preserve data confidentiality.

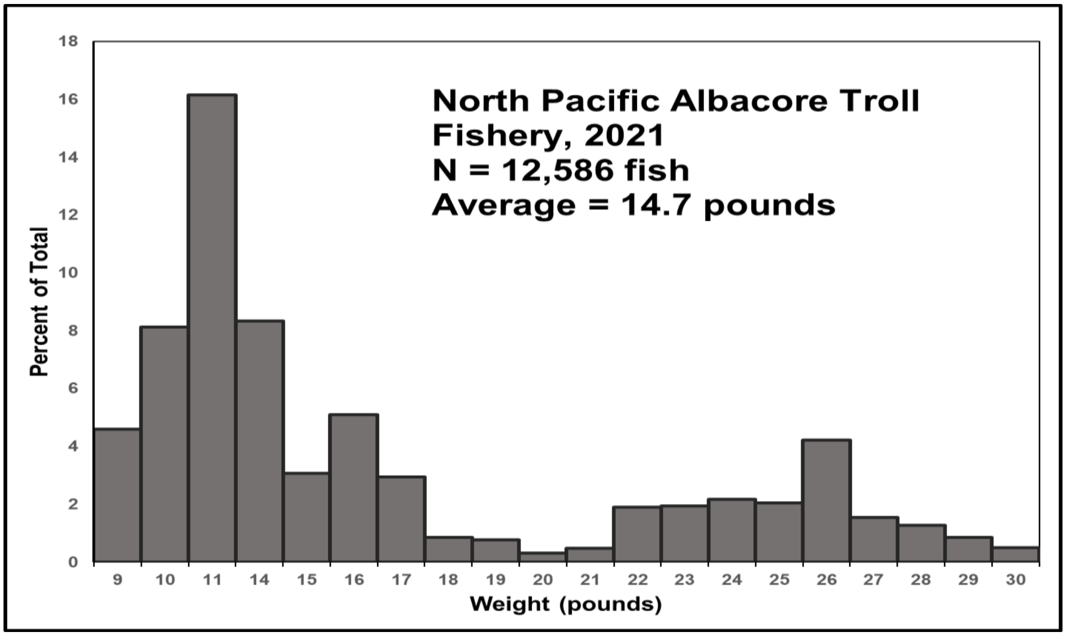



**Figure 9.** Size distribution of albacore (*Thunnus alalunga*) caught by the 2021 U.S. albacore troll and pole-and-line fishery.

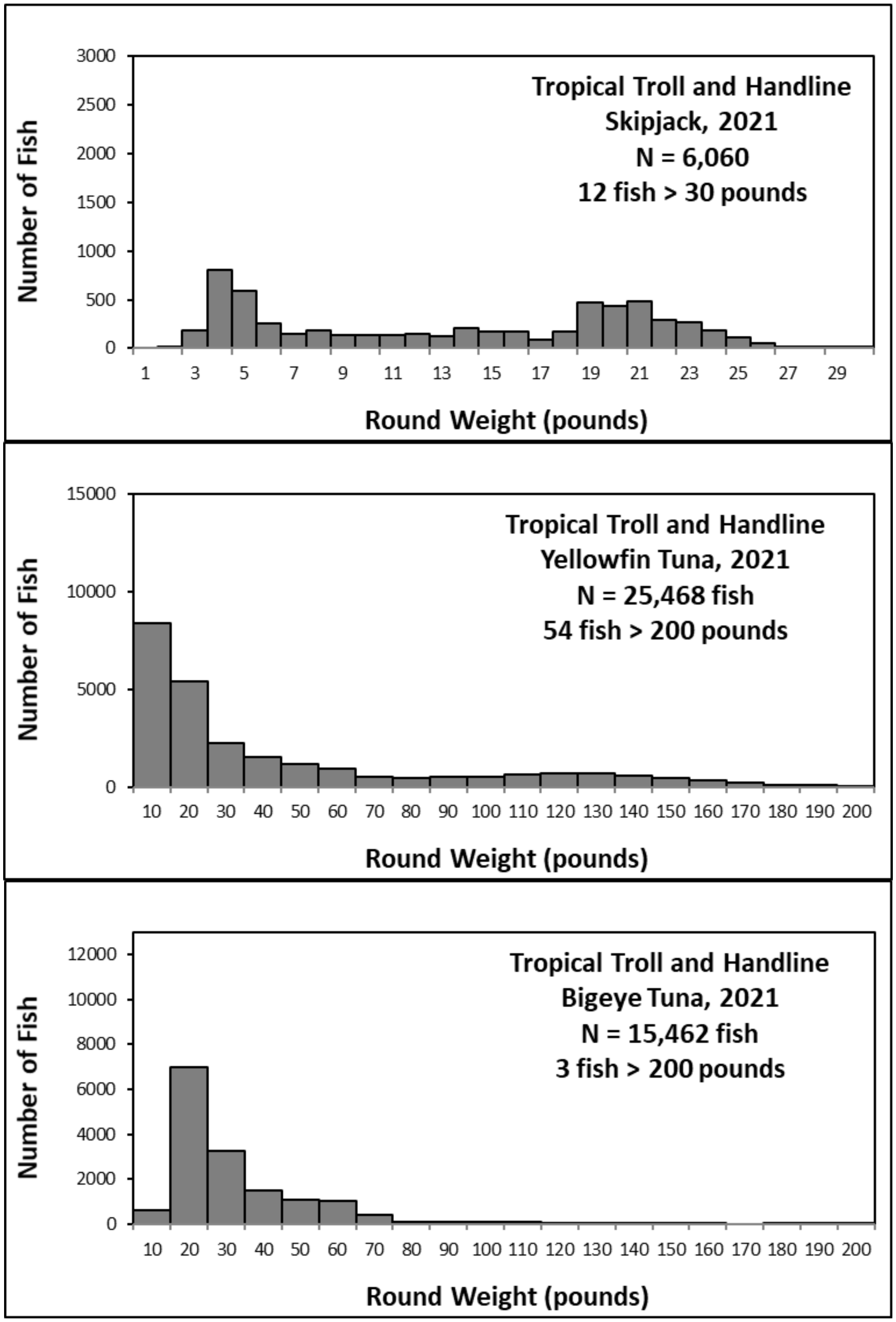



**Figure 10.** Size distribution of (A) skipjack tuna (*Katsuwonus pelamis*), (B) yellowfin tuna (*Thunnus albacares*), and (C) bigeye tuna (*Thunnus obesus*) caught by the Hawaii troll and handline fisheries, 2021.

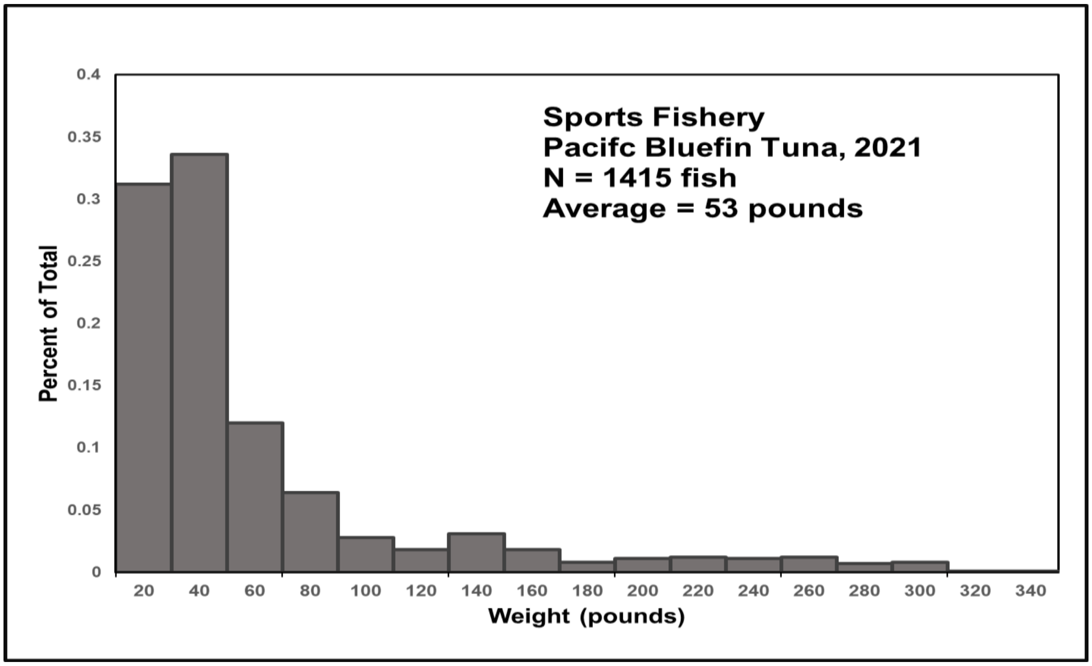



**Figure 11.** Size distribution of Pacific Bluefin Tuna (*Thunnus orientalis*) caught by the 2021 U.S. Sports Fishery.

## 7. TABLES

**Table 1.** Number of vessels fishing in the North Pacific Ocean in various U.S. fisheries. Data for 2021 are preliminary. -- indicates data are not available.

| | Purse Seine (1) | Longline | Albacore Troll and Pole-and-Line | Tropical Pole and Line | Tropical Troll (2) | Tropical Handline | Gillnet | Harpoon | Surface Hook and Line |
|---|---|---|---|---|---|---|---|---|---|
| **1985** | 53 | 36 | 792 | 27 | | | 210 | 99 | |
| **1986** | 51 | 39 | 419 | 19 | | | 220 | 113 | |
| **1987** | 47 | 37 | 486 | 18 | 1,899 | | 210 | 98 | |
| **1988** | 74 | 50 | 531 | 17 | 1,878 | | 192 | 83 | |
| **1989** | 73 | 88 | 338 | 18 | 2,002 | | 158 | 44 | |
| **1990** | 71 | 138 | 368 | 12 | 2,042 | | 146 | 49 | |
| **1991** | 59 | 141 | 172 | 12 | 2,117 | | 123 | 32 | |
| **1992** | 72 | 124 | 602 | 11 | 2,160 | | 113 | 48 | |
| **1993** | 68 | 122 | 608 | 13 | 2,132 | | 105 | 44 | |
| **1994** | 72 | 127 | 721 | 11 | 2,210 | | 112 | 49 | |
| **1995** | 65 | 116 | 471 | 11 | 2,387 | | 127 | 39 | |
| **1996** | 61 | 114 | 676 | 9 | 2,411 | | 100 | 30 | |
| **1997** | 68 | 117 | 1,172 | 9 | 2,400 | | 104 | 31 | |
| **1998** | 68 | 122 | 841 | 9 | 2,370 | | 87 | 26 | |
| **1999** | 42 | 140 | 776 | 9 | 2,502 | | 78 | 30 | |
| **2000** | 40 | 130 | 645 | 7 | 2,229 | | 77 | 26 | |
| **2001** | 43 | 125 | 860 | 9 | 2,208 | | 64 | 23 | |
| **2002** | 31 | 123 | 644 | 13 | 2,045 | | 45 | 29 | |
| **2003** | 29 | 128 | 729 | 14 | 1,960 | | 37 | 34 | |
| **2004** | 28 | 126 | 695 | 11 | 2,012 | | 33 | 29 | |
| **2005** | 23 | 126 | 541 | 10 | 1,917 | | 37 | 24 | |
| **2006** | 11 | 128 | 601 | 11 | 1,916 | | 45 | 24 | |
| **2007** | 22 | 130 | 676 | 3 | 1,869 | 424 | 49 | 28 | |
| **2008** | 36 | 130 | 525 | 3 | 1,978 | 475 | 51 | 32 | |
| **2009** | 46 | 128 | 687 | 6 | 2,083 | 552 | 35 | 28 | |
| **2010** | 37 | 125 | 635 | 2 | 2,042 | 480 | 26 | 26 | |
| **2011** | 39 | 129 | 656 | 2 | 2,100 | 508 | 22 | 17 | |
| **2012** | 40 | 129 | 841 | 1 | 2,084 | 576 | 17 | 10 | |
| **2013** | 40 | 136 | 703 | 2 | 2,185 | 534 | 18 | 13 | |
| **2014** | 46 | 141 | 615 | 2 | 2,115 | 499 | 20 | 15 | 81 |
| **2015** | 44 | 143 | 574 | 2 | 1,957 | 478 | 19 | 15 | 123 |
| **2016** | 41 | 141 | 568 | 2 | 1,915 | 475 | 21 | 23 | 89 |
| **2017** | 41 | 145 | 517 | 2 | 1,866 | 494 | 18 | 21 | 82 |
| **2018** | 46 | 143 | 452 | 2 | 1,840 | 429 | 21 | 14 | 98 |
| **2019** | 41 | 149 | 556 | | 1,809 | 443 | 16 | 16 | 101 |
| **2020** | 35 | 147 | 404 | | 1,656 | 394 | 12 | 17 | 129 |
| **2021** | 19 | 146 | 311 | | 1,807 | 388 | 6 | 11 | 156 |

(1) Number of Purse Seine vessels include vessels from the WCPO and EPO fleets
(2) Number of tropical troll vessels for 1987-2006 include tropical handline vessels

**Table 2.** U.S. catches (metric tons) of tunas and tuna-like species by fishery in the North Pacific Ocean, north of the equator. Data for 2020 are preliminary. Species codes: ALB = albacore, YFT = yellowfin tuna, SKJ = skipjack tuna, BET = bigeye tuna, PBF = Pacific bluefin tuna, SWO = swordfish, BUM = blue marlin, MLS = striped marlin, BIL = other billfish, TUN = other tunas, ALV = common thresher shark, PTH = pelagic thresher shark, BTH = bigeye thresher shark, SMA = shortfin mako shark, BSH = blue shark, SKH = other sharks. Zeros indicate less than 0.5 metric tons. -- indicates data are not available.

| FISHERY/YEAR | ALB | YFT | SKJ | BET | PBF | TUN | SWO | BUM | MLS | BIL[5] | ALV[6] | PTH | BTH | SMA[6] | BSH | SKH | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Purse Seine [1]** | | | | | | | | | | | | | | | | | |
| 1985 | 26 | 92,623 | 47,634 | 1,751 | 3,320 | | | | | | | | | | | | 145,354 |
| 1986 | 47 | 102,736 | 52,817 | 264 | 4,851 | | | | | | | | | | | | 160,715 |
| 1987 | 1 | 123,044 | 48,667 | 222 | 861 | | | | | | | | | | | | 172,795 |
| 1988 | 17 | 88,302 | 78,250 | 1,120 | 923 | | | | | | | | | | | | 168,612 |
| 1989 | 1 | 77,744 | 35,671 | 516 | 1,046 | | | | | | | | | | | | 114,978 |
| 1990 | 71 | 63,722 | 53,213 | 674 | 1,380 | | | | | | | | | | | | 119,060 |
| 1991 | | 26,789 | 50,107 | 415 | 410 | | | | | | | | | | | | 77,721 |
| 1992 | | 29,668 | 74,234 | 3,709 | 1,928 | | | | | | | | | | | | 109,539 |
| 1993 | | 23,805 | 60,485 | 3,035 | 580 | | | | | | | | | | | | 87,905 |
| 1994 | | 10,516 | 30,183 | 2,472 | 906 | | | | | | | | | | | | 44,077 |
| 1995 | | 16,934 | 60,036 | 5,803 | 657 | | | | | | | | | | | | 83,430 |
| 1996 | 11 | 6,653 | 20,646 | 6,884 | 4,639 | | | | | | | | | | | | 38,833 |
| 1997 | 2 | 20,866 | 37,525 | 8,702 | 2,240 | | | | | | | | | | | | 69,335 |
| 1998 | 33 | 20,831 | 25,258 | 3,645 | 1,771 | | | | | | | | | | | | 51,538 |
| 1999 | 48 | 4,989 | 18,710 | 3,236 | 184 | | | | | | | | | | | | 27,167 |
| 2000 | 4 | 1,670 | 5,508 | 454 | 693 | | | | | | | | | | | | 8,329 |
| 2001 | 51 | 5,362 | 17,794 | 1,122 | 292 | | | | | | | | | | | | 24,621 |
| 2002 | 4 | 6,612 | 4,002 | 580 | 50 | | | | | | | | | | | | 11,248 |
| 2003 | 44 | 3,562 | 21,212 | 3,528 | 22 | | | | | | | | | | | | 28,368 |
| 2004 | 1 | 3,810 | 6,860 | 1,437 | | | | | | | | | | | | | 12,108 |
| 2005 | | 6,792 | 19,171 | 3,992 | 201 | | | | | | | | | | | | 30,156 |
| 2006 | | 1,112 | 5,075 | 1,492 | | | | | | | | | | | | | 7,679 |
| 2007 | 77 | 1,112 | 5,075 | 1,492 | 42 | | | | | | | | | | | | 7,797 |
| 2008 | | 2,725 | 11,045 | 555 | | | | | | | | | | | | | 14,325 |
| 2009 | 31 | 3,694 | 14,378 | 512 | 410 | | | | | | | | | | | | 19,025 |
| 2010 | | 7,136 | 41,523 | 1,557 | | | 0 | 1 | 1 | 15 | | | | | | 34 | 50,267 |
| 2011 | | 3,996 | 30,348 | 1,893 | | 65 | | 6 | 0 | 10 | | | | 0 | | 30 | 36,348 |
| 2012 | | 5,837 | 42,479 | 1,038 | | | | | | | | | | | | | 49,354 |
| 2013 | | 4,658 | 62,904 | 1,988 | | | | | | | | | | | | | 69,550 |
| 2014 | 0 | 6,624 | 57,474 | 855 | 401 | | 0 | 1 | | 0 | | | | | | | 65,355 |
| 2015 | | 10,501 | 42,658 | 752 | 86 | | | 0 | | 2 | | | | | | | 53,999 |
| 2016 | | 6,462 | 52,859 | 1,663 | 316 | | | 0 | | 1 | | | | | | | 61,301 |
| 2017 | | 10,673 | 45,964 | 3,435 | 466 | | | 3 | | | | | | | | | 60,541 |
| 2018 | | 10,112 | 55,662 | 5,269 | 12 | | | 2 | | | | | | | | | 71,057 |
| 2019 | | 10,035 | 62,460 | 3,135 | 226 | 1 | | 3 | 1 | | | | | | | | 75,861 |
| 2020 | | 8,079 | 49,360 | 6,354 | 116 | | | 3 | | | | | | | | | 63,912 |
| 2021 | | 2,961 | 34,994 | 4,734 | 43 | | | 2 | | | | | | | | | 42,734 |

Table 2. Continued

| FISHERY/YEAR | ALB | YFT | SKJ | BET | PBF | TUN | SWO | BUM | MLS | BIL[5] | ALV[6] | PTH | BTH | SMA[6] | BSH | SKH | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Longline [2]** | | | | | | | | | | | | | | | | | |
| 1985 | | | | | | | 2 | | | | | | | | | | 2 |
| 1986 | | | | | | | 2 | | | | | | | | | | 2 |
| 1987 | 150 | 261 | 1 | 815 | | | 24 | 51 | 272 | 45 | | | | | | | 1,619 |
| 1988 | 307 | 594 | 4 | 1,239 | | | 24 | 102 | 504 | 68 | | | | | | | 2,842 |
| 1989 | 248 | 986 | 10 | 1,442 | | | 218 | 356 | 612 | 132 | | | | | | | 4,004 |
| 1990 | 177 | 1,098 | 5 | 1,514 | | | 2,437 | 378 | 538 | 58 | | | | | | | 6,205 |
| 1991 | 312 | 733 | 30 | 1,555 | 2 | | 4,535 | 297 | 663 | 69 | | | | | | | 8,196 |
| 1992 | 334 | 346 | 22 | 1,486 | 38 | | 5,762 | 347 | 459 | 142 | | | | | | | 8,936 |
| 1993 | 438 | 633 | 36 | 2,124 | 42 | | 5,936 | 339 | 471 | 100 | | | | | | | 10,119 |
| 1994 | 544 | 610 | 53 | 1,827 | 30 | 5 | 3,807 | 362 | 326 | 99 | | | | | | | 7,663 |
| 1995 | 882 | 984 | 101 | 2,099 | 29 | | 2,981 | 570 | 543 | 182 | | | | | | | 8,371 |
| 1996 | 1,185 | 634 | 41 | 1,846 | 25 | 2 | 2,848 | 467 | 418 | 115 | | | | | | | 7,581 |
| 1997 | 1,653 | 1,143 | 106 | 2,526 | 26 | 2 | 3,393 | 487 | 352 | 143 | | | | | | | 9,831 |
| 1998 | 1,120 | 724 | 76 | 3,274 | 54 | 9 | 3,681 | 395 | 378 | 172 | | | | | | | 9,883 |
| 1999 | 1,542 | 477 | 99 | 2,820 | 54 | 10 | 4,329 | 357 | 364 | 242 | | | | | | | 10,294 |
| 2000 | 940 | 1,137 | 93 | 2,708 | 19 | | 4,834 | 314 | 200 | 152 | | | | | | | 10,397 |
| 2001 | 1,295 | 1,029 | 211 | 2,418 | 6 | | 1,969 | 399 | 351 | 136 | | | | | | | 7,814 |
| 2002 | 525 | 572 | 127 | 4,396 | 2 | | 1,524 | 264 | 226 | 160 | | | | | | | 7,796 |
| 2003 | 524 | 809 | 207 | 3,618 | 1 | | 1,958 | 363 | 538 | 248 | | | | | | | 8,266 |
| 2004 | 361 | 715 | 142 | 4,339 | 1 | 9 | 1,185 | 283 | 376 | 200 | | | | | | | 7,611 |
| 2005 | 296 | 712 | 91 | 4,999 | 1 | | 1,622 | 337 | 511 | 216 | | | | | | | 8,785 |
| 2006 | 270 | 958 | 94 | 4,466 | 1 | | 1,211 | 409 | 611 | 174 | | | | | | | 8,194 |
| 2007 | 250 | 844 | 93 | 5,822 | 0 | 0 | 1,735 | 262 | 276 | 160 | 44 | | | 128 | 8 | 7 | 9,629 |
| 2008 | 354 | 875 | 120 | 5,959 | 0 | 0 | 2,014 | 349 | 427 | 238 | 41 | | | 133 | 7 | 4 | 10,521 |
| 2009 | 203 | 527 | 136 | 4,628 | 1 | 0 | 1,817 | 360 | 258 | 124 | 30 | | | 120 | 9 | 6 | 8,219 |
| 2010 | 421 | 568 | 153 | 5,440 | 0 | 0 | 1,676 | 306 | 165 | 131 | 18 | | | 94 | 7 | 3 | 8,982 |
| 2011 | 708 | 937 | 207 | 5,701 | 0 | 0 | 1,623 | 373 | 362 | 249 | 19 | | | 68 | 13 | 2 | 10,262 |
| 2012 | 660 | 887 | 245 | 5,873 | 0 | 0 | 1,395 | 298 | 282 | 173 | 14 | | | 68 | 16 | 1 | 9,912 |
| 2013 | 317 | 736 | 233 | 6,493 | 1 | 0 | 1,270 | 406 | 398 | 227 | 6 | | | 52 | 1 | 0 | 10,141 |
| 2014 | 208 | 658 | 187 | 7,131 | 0 | | 1,665 | 535 | 426 | 238 | 7 | | | 53 | | | 11,108 |
| 2015 | 243 | 921 | 212 | 8,774 | 0 | 0 | 1,516 | 631 | 493 | 279 | 7 | | | 59 | | | 13,135 |
| 2016 | 248 | 1,512 | 240 | 8,229 | 0 | 0 | 1,092 | 554 | 390 | 361 | 4 | | | 70 | 0 | 0 | 12,701 |
| 2017 | 95 | 2,594 | 221 | 7,993 | 1 | 0 | 1,618 | 687 | 406 | 1 | | | | 71 | 0 | 0 | 13,687 |
| 2018 | 87 | 2,500 | 150 | 7,593 | 1 | 0 | 1,052 | 664 | 465 | 1 | | | | 60 | 0 | | 12,573 |
| 2019 | 104 | 2,029 | 261 | 7,699 | 2 | 0 | 734 | 901 | 545 | 1 | | | | 47 | 0 | | 12,323 |
| 2020 | 163 | 1,761 | 167 | 7,505 | 2 | 0 | 543 | 531 | 336 | 2 | | | | 16 | 0 | | 11,026 |
| 2021 | 236 | 2,519 | 151 | 7,138 | 1 | 0 | 690 | 382 | 250 | 1 | | | | 5 | 0 | | 11,373 |

Table 2. Continued

| FISHERY/YEAR | ALB | YFT | SKJ | BET | PBF | TUN | SWO | BUM | MLS | BIL[5] | ALV[6] | PTH | BTH | SMA[6] | BSH | SKH | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Albacore Troll and Pole-and-Line** | | | | | | | | | | | | | | | | | |
| 1985 | 6,415 | 5 | | | | | | | | | | | | | | | 6,420 |
| 1986 | 4,708 | 1 | | | | | | | | | | | | | | | 4,709 |
| 1987 | 2,766 | 76 | | | | | | | | | | | | | | | 2,842 |
| 1988 | 4,212 | 7 | | | | | | | | | | | | | | | 4,219 |
| 1989 | 1,860 | 1 | | | | | | | | | | | | | | | 1,861 |
| 1990 | 2,718 | | | | | | | | | | | | | | | | 2,718 |
| 1991 | 1,845 | | | | | | | | | | | | | | | | 1,845 |
| 1992 | 4,572 | | | | | | | | | | | | | | | | 4,572 |
| 1993 | 6,254 | 137 | 62 | | | 1 | | | | | | | | | | | 6,454 |
| 1994 | 10,978 | 769 | 352 | | | | | | | | | | | | | | 12,099 |
| 1995 | 8,125 | 211 | 1,157 | | | | | | | | | | | | | | 9,493 |
| 1996 | 16,962 | 606 | 393 | | 2 | | | | | | | | | | | | 17,963 |
| 1997 | 14,325 | 4 | 2 | | 1 | | | | | | | | | | | | 14,332 |
| 1998 | 14,489 | 1,246 | 2 | | 128 | | | | | | | | | | | | 15,865 |
| 1999 | 10,120 | 52 | 16 | | 20 | | | | | | | | | | | | 10,208 |
| 2000 | 9,714 | 3 | 4 | | 1 | 1 | | | | | | | | | | | 9,723 |
| 2001 | 11,349 | 1 | 1 | | 6 | | | | | | | | | | | | 11,357 |
| 2002 | 10,768 | | | | 1 | | | | | | | | | | | | 10,769 |
| 2003 | 14,161 | | 2 | | | | | | | | | | | | | | 14,163 |
| 2004 | 13,473 | 1 | | | | | | | | | | | | | | | 13,474 |
| 2005 | 8,479 | | | | | | | | | | | | | | | | 8,479 |
| 2006 | 12,547 | | | | | | | | | | | | | | | | 12,547 |
| 2007 | 11,908 | | | | | | | | | | | | | | | | 11,908 |
| 2008 | 11,761 | | | | | | | | | | | | | | | | 11,761 |
| 2009 | 12,340 | | 0 | | 0 | | | | | | | | | 0 | | | 12,340 |
| 2010 | 11,689 | | 0 | | | | | | | | | | | | | | 11,690 |
| 2011 | 10,143 | | 0 | | 0 | | | | | | | | | | | | 10,143 |
| 2012 | 14,149 | | 0 | | 0 | | | | | | | | | | | | 14,149 |
| 2013 | 12,310 | | 0 | | 0 | | | | | | | | | | 0 | | 12,310 |
| 2014 | 13,398 | 0 | | | 0 | | | | | | | | | | | | 13,398 |
| 2015 | 11,595 | | 0 | | | | | | | | | | | 0 | | 0 | 11,595 |
| 2016 | 10,777 | | | | 0 | | | | | | | | | | | | 10,777 |
| 2017 | 7,431 | 0 | 0 | | 0 | | | | | | | | | 0 | | | 7,431 |
| 2018 | 7,728 | | 0 | | 0 | | | | | | | | | 0 | | | 7,728 |
| 2019 | 7,766 | | | | 0 | | | | | | | | | 0 | | | 7,766 |
| 2020 | 7,516 | | | | 0 | | | | | | | | | 0 | | | 7,516 |
| 2021 | 4,209 | 0 | 2 | | 0 | | | | | | | | | 0 | | | 4,211 |

Table 2. Continued

| FISHERY/YEAR | ALB | YFT | SKJ | BET | PBF | TUN | SWO | BUM | MLS | BIL[5] | ALV[6] | PTH | BTH | SMA[6] | BSH | SKH | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Tropical Pole-and-Line** | | | | | | | | | | | | | | | | | |
| 1985 | | 472 | 1,328 | | | | | | | | | | | | | | 1,800 |
| 1986 | | 554 | 1,367 | | | 1 | | | | | | | | | | | 1,922 |
| 1987 | | 1,861 | 2,087 | | | | | | | | | | | | | | 3,948 |
| 1988 | | 1,140 | 3,450 | 5 | | | | | | | | | | | | | 4,595 |
| 1989 | | 1,318 | 2,456 | | | 3 | | | | | | | | | | | 3,777 |
| 1990 | | 154 | 553 | | | 2 | | | | | | | | | | | 709 |
| 1991 | | 942 | 1,840 | | | | | | | | | | | | | | 2,782 |
| 1992 | | 1,928 | 1,744 | | | 2 | | | | | | | | | | | 3,674 |
| 1993 | | 2,636 | 2,850 | | | 5 | | | | | | | | | | | 5,491 |
| 1994 | | 1,844 | 2,422 | | | 18 | | | | | | | | | | | 4,284 |
| 1995 | | 394 | 2,393 | | | | | | | | | | | | | | 2,787 |
| 1996 | | 696 | 1,331 | | | 1 | | | | | | | | | | | 2,028 |
| 1997 | | 468 | 1,755 | | | | | | | | | | | | | | 2,223 |
| 1998 | | 2,206 | 1,067 | | | | | | | | | | | | | | 3,273 |
| 1999 | | 57 | 601 | 4 | | | | | | | | | | | | | 662 |
| 2000 | | 3 | 320 | 1 | | | | | | | | | | | | | 324 |
| 2001 | | 4 | 448 | | | | | | | | | | | | | | 452 |
| 2002 | | 2 | 420 | | | 2 | | | | | | | | | | | 424 |
| 2003 | | 35 | 587 | | | 4 | | | | | | | | | | | 626 |
| 2004 | | 18 | 279 | | | | | | | 1 | | | | | | | 298 |
| 2005 | | 68 | 353 | | | 1 | | | | | | | | | | | 422 |
| 2006 | | 4 | 294 | | | 3 | | | | | | | | | | | 301 |
| 2007 | | 23 | 272 | | | 1 | | | | | | | | | | | 296 |
| 2008 | | 23 | 293 | | | 4 | | | | | | | | | | | 320 |
| 2009 | | 17 | 214 | | | 1 | | | | | | | | | | | 232 |
| 2010 | | | | | | | | | | | | | | | | | - |
| 2011 | | | | | | | | | | | | | | | | | - |
| 2012 | | | | | | | | | | | | | | | | | - |
| 2013 | | | | | | | | | | | | | | | | | - |
| 2014 | | | | | | | | | | | | | | | | | - |
| 2015 | | | | | | | | | | | | | | | | | - |
| 2016 | | | | | | | | | | | | | | | | | - |
| 2017 | | | | | | | | | | | | | | | | | - |
| 2018 | | | | | | | | | | | | | | | | | - |
| 2019 | | | | | | | | | | | | | | | | | - |
| 2020 | | | | | | | | | | | | | | | | | - |
| 2021 | | | | | | | | | | | | | | | | | - |

Table 2. Continued

| FISHERY/YEAR | ALB | YFT | SKJ | BET | PBF | TUN | SWO | BUM | MLS | BIL[5] | ALV[6] | PTH | BTH | SMA[6] | BSH | SKH | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Tropical Troll** | | | | | | | | | | | | | | | | | |
| 1985 | 7 | 967 | 101 | 8 | | 2 | | 145 | 18 | 12 | | | | | | | 1,260 |
| 1986 | 5 | 1,493 | 120 | 5 | | 4 | | 220 | 19 | 14 | | | | | | | 1,880 |
| 1987 | 6 | 1,616 | 137 | 8 | | 11 | | 261 | 29 | 20 | | | | | | | 2,088 |
| 1988 | 9 | 941 | 172 | 17 | | 11 | | 266 | 54 | 20 | | | | | | | 1,490 |
| 1989 | 36 | 828 | 153 | 14 | | 11 | | 326 | 24 | 23 | | | | | | | 1,415 |
| 1990 | 15 | 891 | 138 | 25 | | 11 | | 295 | 27 | 17 | | | | | | | 1,419 |
| 1991 | 72 | 802 | 237 | 25 | | 9 | | 346 | 41 | 25 | | | | | | | 1,557 |
| 1992 | 54 | 602 | 167 | 13 | | 10 | | 260 | 37 | 17 | | | | | | | 1,160 |
| 1993 | 71 | 861 | 157 | 3 | | 6 | | 311 | 67 | 20 | | | | | | | 1,496 |
| 1994 | 90 | 870 | 138 | 7 | | 8 | | 298 | 35 | 22 | | | | | | | 1,468 |
| 1995 | 177 | 978 | 152 | 20 | | 7 | | 315 | 52 | 29 | | | | | | | 1,730 |
| 1996 | 188 | 934 | 224 | 7 | | 5 | | 409 | 53 | 18 | | | | | | | 1,838 |
| 1997 | 133 | 770 | 196 | 26 | | 4 | | 378 | 37 | 17 | | | | | | | 1,561 |
| 1998 | 88 | 766 | 143 | 9 | | 6 | | 242 | 26 | 19 | | | | | | | 1,299 |
| 1999 | 331 | 1,019 | 181 | 24 | | 4 | | 293 | 27 | 33 | | | | | | | 1,912 |
| 2000 | 120 | 1,080 | 415 | 207 | | 15 | | 235 | 15 | 20 | | | | | | | 2,107 |
| 2001 | 194 | 878 | 523 | 226 | | 13 | | 291 | 44 | 32 | | | | | | | 2,201 |
| 2002 | 235 | 632 | 355 | 586 | | 6 | | 225 | 30 | 13 | | | | | | | 2,082 |
| 2003 | 85 | 735 | 268 | 213 | | 25 | | 210 | 29 | 18 | | | | | | | 1,583 |
| 2004 | 157 | 746 | 251 | 381 | | 45 | | 188 | 31 | 23 | | | | | | | 1,822 |
| 2005 | 175 | 679 | 259 | 295 | | 14 | | 187 | 20 | 15 | | | | | | | 1,644 |
| 2006 | 95 | 508 | 296 | 303 | | 12 | | 160 | 21 | 14 | | | | | | | 1,409 |
| 2007 | 3 | 501 | 266 | 63 | | 8 | 1 | 127 | 13 | 12 | | | | | | | 994 |
| 2008 | 1 | 451 | 481 | 74 | | 7 | | 198 | 14 | 14 | | | | | | | 1,240 |
| 2009 | 3 | 471 | 412 | 59 | | 12 | 0 | 15 | 10 | 8 | | | | | | | 990 |
| 2010 | 2 | 426 | 416 | 118 | | 25 | | 148 | 19 | 12 | | | | | | 1 | 1,167 |
| 2011 | 4 | 496 | 385 | 110 | | 16 | | 199 | 16 | 18 | | | | | | 1 | 1,245 |
| 2012 | 3 | 644 | 381 | 155 | | 18 | 1 | 141 | 11 | 16 | | | | | | 1 | 1,371 |
| 2013 | 2 | 528 | 535 | 148 | | 5 | 1 | 137 | 8 | 16 | | | | | | 1 | 1,381 |
| 2014 | 3 | 579 | 364 | 143 | | 14 | 1 | 159 | 12 | 12 | 1 | | | | | 1 | 1,289 |
| 2015 | 2 | 556 | 398 | 59 | | 15 | 1 | 196 | 11 | 17 | | | | | | 1 | 1,256 |
| 2016 | 1 | 531 | 402 | 34 | | 5 | | 161 | 12 | 20 | | | | | | 1 | 1,167 |
| 2017 | | 466 | 389 | 37 | | 16 | | 155 | 6 | | | | | | | 1 | 1,070 |
| 2018 | 1 | 593 | 531 | 27 | | 5 | 1 | 166 | 12 | | | | | 0 | | 1 | 1,337 |
| 2019 | 1 | 455 | 477 | 35 | | 3 | 0 | 176 | 13 | | | | | | | 0 | 1,160 |
| 2020 | 0 | 330 | 344 | 18 | | 1 | 0 | 111 | 10 | | | | | | | 0 | 814 |
| 2021 | 1 | 383 | 506 | 12 | | 2 | 0 | 127 | 8 | | | | | | | 0 | 1,039 |

Table 2. Continued

| FISHERY/YEAR | ALB | YFT | SKJ | BET | PBF | TUN | SWO | BUM | MLS | BIL[5] | ALV[6] | PTH | BTH | SMA[6] | BSH | SKH | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Tropical Handline** | | | | | | | | | | | | | | | | | |
| 1985 | | | | | | | 4 | | | | | | | | | | 4 |
| 1986 | | | | | | | 4 | | | | | | | | | | 4 |
| 1987 | | | | | | | 4 | | 1 | | | | | | | | 5 |
| 1988 | | | | | | | 6 | | | | | | | | | | 6 |
| 1989 | | | | | | | 7 | | 0 | | | | | | | | 7 |
| 1990 | | | | | | | 5 | | 0 | | | | | | | | 5 |
| 1991 | | | | | | | 6 | | 0 | | | | | | | | 6 |
| 1992 | | | | | | | 1 | | 1 | | | | | | | | 2 |
| 1993 | | | | | | | 4 | | 1 | | | | | | | | 5 |
| 1994 | | | | | | | 4 | | 0 | | | | | | | | 4 |
| 1995 | | | | | | | 6 | | 0 | | | | | | | | 6 |
| 1996 | | | | | | | 5 | | 1 | | | | | | | | 6 |
| 1997 | | | | | | | 7 | | 1 | | | | | | | | 8 |
| 1998 | | | | | | | 7 | | 0 | | | | | | | | 7 |
| 1999 | | | | | | | 9 | | 1 | | | | | | | | 10 |
| 2000 | | | | | | | | | | | | | | | | | - |
| 2001 | | | | | | | | | | | | | | | | | - |
| 2002 | | | | | | | | | 0 | | | | | | | | - |
| 2003 | | | | | | | 10 | | 0 | | | | | | | | 10 |
| 2004 | | | | | | | 7 | | 2 | | | | | | | | 9 |
| 2005 | | | | | | | 5 | | 0 | | | | | | | | 5 |
| 2006 | | | | | | | 4 | | 0 | | | | | | | | 4 |
| 2007 | 94 | 254 | 7 | 324 | | 1 | 5 | 1 | | | | | | | | | 686 |
| 2008 | 28 | 227 | 9 | 148 | | 1 | 6 | 1 | | | | | | | | | 420 |
| 2009 | 97 | 317 | 11 | 136 | | 3 | 5 | 1 | | | | | | | | | 570 |
| 2010 | 53 | 265 | 7 | 340 | | 4 | 3 | 2 | | | 1 | | | 1 | | | 676 |
| 2011 | 84 | 357 | 9 | 296 | | 1 | 5 | 2 | | | | | | | | | 754 |
| 2012 | 253 | 381 | 12 | 298 | | 1 | 6 | 2 | | | 1 | | | 1 | | | 955 |
| 2013 | 46 | 442 | 14 | 393 | | 1 | 6 | 3 | | | 1 | | | | | | 906 |
| 2014 | 49 | 385 | 8 | 206 | | 2 | 7 | 4 | | | | | | | | | 661 |
| 2015 | 62 | 401 | 5 | 202 | | 1 | 5 | 3 | | | 1 | | | | | | 680 |
| 2016 | 24 | 269 | 5 | 183 | | 2 | 4 | 2 | | | | | | 1 | | | 490 |
| 2017 | 35 | 400 | 6 | 106 | | 2 | 6 | 4 | 0 | 0 | | | | | | | 559 |
| 2018 | 20 | 340 | 5 | 117 | | 1 | 3 | 3 | | | | | | | | | 489 |
| 2019 | 10 | 249 | 10 | 226 | | 1 | 3 | 5 | | | | | | | | | 504 |
| 2020 | 3 | 243 | 5 | 145 | | 1 | 2 | 3 | | | | | | | | | 402 |
| 2021 | 5 | 276 | 5 | 121 | | 1 | 1 | 3 | | | | | | | | | 412 |

Table 2. Continued

| FISHERY/YEAR | ALB | YFT | SKJ | BET | PBF | TUN | SWO | BUM | MLS | BIL[5] | ALV[6] | PTH | BTH | SMA[6] | BSH | SKH | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Gillnet** | | | | | | | | | | | | | | | | | |
| 1985 | 2 | 12 | | 2 | 8 | | 2,990 | | | | 856 | 0 | 90 | 129 | 0 | | 4,089 |
| 1986 | 3 | 14 | | 3 | 16 | 4 | 2,069 | | | | 455 | 0 | 34 | 250 | 1 | | 2,849 |
| 1987 | 5 | 3 | | 6 | 2 | 5 | 1,529 | | | | 354 | 2 | 18 | 208 | 1 | | 2,133 |
| 1988 | 15 | 7 | | 5 | 4 | 2 | 1,376 | | | | 352 | 1 | 7 | 106 | 0 | | 1,875 |
| 1989 | 4 | 1 | 5 | | 3 | 3 | 1,243 | | | | 430 | 0 | 16 | 117 | | | 1,822 |
| 1990 | 29 | 1 | 1 | 1 | 11 | 2 | 1,131 | | | | 266 | 1 | 30 | 229 | 0 | | 1,702 |
| 1991 | 17 | 1 | 3 | 3 | 4 | 3 | 944 | | | | 542 | | 31 | 125 | 0 | | 1,673 |
| 1992 | | 4 | 1 | 1 | 9 | 6 | 1,356 | | | | 256 | 0 | 18 | 118 | 1 | | 1,770 |
| 1993 | | 7 | 2 | | 32 | 9 | 1,412 | | | | 243 | 1 | 41 | 87 | 0 | | 1,834 |
| 1994 | 38 | | | | 28 | 2 | 792 | | | | 292 | 0 | 32 | 80 | 0 | | 1,264 |
| 1995 | 52 | 2 | 70 | 1 | 20 | 1 | 771 | | | | 234 | 5 | 30 | 79 | 0 | | 1,265 |
| 1996 | 83 | 2 | 2 | | 43 | | 761 | | | | 298 | 1 | 20 | 85 | 0 | | 1,295 |
| 1997 | 60 | 3 | 2 | 5 | 58 | | 708 | | | | 291 | 35 | 29 | 118 | 0 | | 1,309 |
| 1998 | 80 | 2 | 3 | 4 | 40 | 2 | 931 | | | | 332 | 2 | 11 | 85 | 0 | | 1,492 |
| 1999 | 149 | | | 2 | 22 | 1 | 606 | | | | 285 | 10 | 5 | 52 | 0 | | 1,132 |
| 2000 | 55 | 1 | | 2 | 30 | | 649 | | | | 252 | 3 | 4 | 64 | 0 | | 1,060 |
| 2001 | 94 | 5 | 1 | | 35 | | 375 | | | | 319 | 1 | 1 | 30 | | | 861 |
| 2002 | 30 | 1 | | | 7 | | 302 | | | | 271 | 2 | | 69 | | | 682 |
| 2003 | 16 | | 9 | 6 | 14 | | 216 | | | | 280 | 4 | 6 | 57 | 0 | | 608 |
| 2004 | 12 | 1 | | | 10 | | 182 | | | | 94 | 2 | 5 | 38 | | | 344 |
| 2005 | 20 | 2 | | | 5 | | 220 | | | | 167 | 0 | 10 | 25 | | | 449 |
| 2006 | 3 | 1 | 2 | | 1 | 1 | 443 | | | | 132 | 0 | 4 | 38 | | | 625 |
| 2007 | 4 | 0 | 0 | | 2 | | 490 | | | | 184 | 2 | 5 | 37 | 9 | | 733 |
| 2008 | 1 | 0 | 0 | | 1 | | 405 | | | | 128 | | 6 | 27 | | | 568 |
| 2009 | 4 | 1 | 0 | | 3 | | 253 | | | | 38 | | 7 | 21 | | | 326 |
| 2010 | 5 | | | | 1 | | 62 | | | | 41 | | 1 | 10 | | | 120 |
| 2011 | 5 | | 0 | | 18 | | 119 | | | | 55 | 0 | 1 | 8 | | | 206 |
| 2012 | 8 | | 1 | 0 | 4 | | 118 | | | | 37 | | | 9 | | 1 | 177 |
| 2013 | 5 | | 0 | | 7 | | 95 | | | | 48 | | 1 | 16 | | 0 | 172 |
| 2014 | 0 | | 0 | 0 | 5 | | 127 | | | | 26 | 6 | 1 | 7 | | | 171 |
| 2015 | 1 | 1 | 0 | | 4 | | 99 | | | | 31 | 2 | 0 | 7 | | | 145 |
| 2016 | 1 | 0 | 0 | | 9 | 0 | 173 | | | | 28 | 0 | 1 | 12 | | 0 | 225 |
| 2017 | 0 | 1 | 0 | 0 | 1 | | 179 | | | | 42 | 4 | 1 | 13 | | 0 | 241 |
| 2018 | | 0 | 1 | | 18 | | 148 | | | | 26 | 0 | 1 | 11 | | 0 | 205 |
| 2019 | | 0 | 0 | | 10 | | 52 | | | | 25 | 4 | 0 | 7 | | | 98 |
| 2020 | | | | | 28 | | 35 | | | | 31 | | | 3 | | | 97 |
| 2021 | | | 0 | | 55 | | 13 | | | | 3 | | | 4 | | | 75 |

Table 2. Continued

| FISHERY/YEAR | ALB | YFT | SKJ | BET | PBF | TUN | SWO | BUM | MLS | BIL[5] | ALV[6] | PTH | BTH | SMA[6] | BSH | SKH | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Harpoon** | | | | | | | | | | | | | | | | | |
| 1985 | | | | | | | 305 | | | | 0 | | | 1 | | | 306 |
| 1986 | | | | | | | 291 | | | | | | 0 | 1 | | | 292 |
| 1987 | | | | | | | 235 | | | | | | 0 | 3 | | | 238 |
| 1988 | | | | | | | 198 | | | | 0 | | | 3 | | | 201 |
| 1989 | | | | | | | 62 | | | | | | | 1 | | | 63 |
| 1990 | | | | | | | 64 | | | | 0 | | | 3 | | | 67 |
| 1991 | | | | | | | 20 | | | | 0 | | | 1 | | | 21 |
| 1992 | | | | | | | 75 | | | | 0 | | | 3 | | | 78 |
| 1993 | | | | | | | 168 | | | | | | | 1 | | | 169 |
| 1994 | | | | | | | 157 | | | | 0 | | | 1 | | | 158 |
| 1995 | | | | | | | 97 | | | | 0 | | | 1 | | | 98 |
| 1996 | | | | | | | 81 | | | | 0 | | | 1 | | | 82 |
| 1997 | | | | | | | 84 | | | | | | | 3 | | | 87 |
| 1998 | | | | | | | 48 | | | | 0 | | 0 | 1 | | | 49 |
| 1999 | | | | | | | 81 | | | | | | | 0 | | | 81 |
| 2000 | | | | | | | 90 | | | | | | | 0 | | | 90 |
| 2001 | | | | | | | 52 | | | | | | | 1 | | | 53 |
| 2002 | | | | | | | 90 | | | | 0 | | | 0 | | | 90 |
| 2003 | | | | | | | 107 | | | | | | | 0 | | | 107 |
| 2004 | | | | | | | 69 | | | | | | | 1 | | | 70 |
| 2005 | | | | | | | 77 | | | | | | | 1 | | | 78 |
| 2006 | | | | | | | 71 | | | | 2 | | | 0 | | | 73 |
| 2007 | | | | | | | 59 | | | | | | | 0 | | | 59 |
| 2008 | | | | | | | 48 | | | | | | | 1 | | | 49 |
| 2009 | | | | | | | 50 | | | | 0 | | | 1 | | | 51 |
| 2010 | | | | | | | 37 | | | | 0 | | | 0 | | | 37 |
| 2011 | | | | | | | 24 | | | | 0 | | | 0 | | | 24 |
| 2012 | | | | | | | 5 | | | | 0 | | | 0 | | | 5 |
| 2013 | | | | | | | 6 | | | | | | | 0 | | | 6 |
| 2014 | | | | | | | 6 | | | | | | | 0 | | | 7 |
| 2015 | | | | | | | 5 | | | | 0 | | | | | | 5 |
| 2016 | | | | | | | 25 | | | | | | | 0 | | | 26 |
| 2017 | | | | | | | 28 | | | | | | | 0 | | | 28 |
| 2018 | | | | | | | 10 | | | | | | | | | | 10 |
| 2019 | | | | | | | 11 | | | | | | | | | | 11 |
| 2020 | | | | | | | 6 | | | | | | | 1 | | | 7 |
| 2021 | | | | | | | 7 | | | | | | | 0 | | | 7 |

Table 2. Continued

| FISHERY/YEAR | ALB | YFT | SKJ | BET | PBF | TUN | SWO | BUM | MLS | BIL[5] | ALV[6] | PTH | BTH | SMA[6] | BSH | SKH | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Surface Hook and Line [3]** | | | | | | | | | | | | | | | | | |
| 1985 | | | | | | | | | | | | | | | | | - |
| 1986 | | | | | | | | | | | | | | | | | - |
| 1987 | | | | | | | | | | | | | | | | | - |
| 1988 | | | | | | | | | | | | | | | | | - |
| 1989 | | | | | | | | | | | | | | | | | - |
| 1990 | | | | | | | | | | | | | | | | | - |
| 1991 | | | | | | | | | | | | | | | | | - |
| 1992 | | | | | | | | | | | | | | | | | - |
| 1993 | | | | | | | | | | | | | | | | | - |
| 1994 | | | | | | | | | | | | | | | | | - |
| 1995 | | | | | | | | | | | | | | | | | - |
| 1996 | | | | | | | | | | | | | | | | | - |
| 1997 | | | | | | | | | | | | | | | | | - |
| 1998 | | | | | | | | | | | | | | | | | - |
| 1999 | | | | | | | | | | | | | | | | | - |
| 2000 | | | | | | | | | | | | | | | | | - |
| 2001 | | | | | | | | | | | | | | | | | - |
| 2002 | | | | | | | | | | | | | | | | | - |
| 2003 | | | | | | | | | | | | | | | | | - |
| 2004 | | | | | | | | | | | | | | | | | - |
| 2005 | | | | | | | | | | | | | | | | | - |
| 2006 | | | | | | | | | | | | | | | | | - |
| 2007 | | | | | | | | | | | | | | | | | - |
| 2008 | | | | | | | | | | | | | | | | | - |
| 2009 | | | | | | | | | | | | | | | | | - |
| 2010 | | | | | | | | | | | | | | | | | - |
| 2011 | | | | | | | | | | | | | | | | | - |
| 2012 | | | | | | | | | | | | | | | | | - |
| 2013 | | | | | | | | | | | | | | | | | - |
| 2014 | | 8 | 0 | | 2 | 0 | 0 | | | | 2 | | | 3 | | | 16 |
| 2015 | | 15 | 1 | | 7 | 0 | 1 | | | | 2 | | | 1 | | | 27 |
| 2016 | | 5 | 0 | | 31 | | 11 | | | | 5 | | | 1 | | | 52 |
| 2017 | | 4 | 0 | | 18 | 0 | 1 | | | | 5 | | | 1 | | | 29 |
| 2018 | | 5 | 1 | | 31 | | 0 | | | | 1 | | | 1 | | | 39 |
| 2019 | | 6 | 0 | | 36 | | 1 | | | | 1 | | | 1 | | | 45 |
| 2020 | | 6 | 0 | | 87 | | 1 | | | | 1 | | | 1 | | | 96 |
| 2021 | | 0 | 1 | 0 | 115 | | 2 | | | | 0 | | | 1 | | | 119 |

Table 2. Continued

| FISHERY/YEAR | ALB | YFT | SKJ | BET | PBF | TUN | SWO | BUM | MLS | BIL[5] | ALV[6] | PTH | BTH | SMA[6] | BSH | SKH | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sport** | | | | | | | | | | | | | | | | | |
| 1985 | 1,176 | | | | 89 | | | | 42 | | | | | | | | 1,307 |
| 1986 | 196 | | | | 12 | | | | 19 | | | | | | | | 227 |
| 1987 | 74 | | | | 34 | | | | 28 | | | | | | | | 136 |
| 1988 | 64 | | | | 6 | | | | 30 | | | | | | | | 100 |
| 1989 | 160 | | | | 112 | | | | 52 | | | | | | | | 324 |
| 1990 | 24 | | | | 65 | | | | 23 | | | | | | | | 112 |
| 1991 | 6 | | | | 92 | | | | 12 | | | | | | | | 110 |
| 1992 | 2 | | | | 110 | | | | 25 | | | | | | | | 137 |
| 1993 | 25 | | | | 283 | | | | 11 | | | | | | | | 319 |
| 1994 | 106 | | | | 86 | | | | 17 | | | | | | | | 209 |
| 1995 | 102 | | | | 245 | | | | 14 | | | | | | | | 361 |
| 1996 | 88 | | | | 40 | | | | 20 | | | | | | | | 148 |
| 1997 | 1,018 | | | | 131 | | | | 21 | | | | | | | | 1,170 |
| 1998 | 1,208 | | | | 422 | | | | 23 | | | | | | | | 1,653 |
| 1999 | 3,621 | | | | 408 | | | | 12 | | | | | | | | 4,041 |
| 2000 | 1,798 | | | | 319 | | | | 10 | | | | | | | | 2,127 |
| 2001 | 1,635 | | | | 344 | | | | 0 | | | | | | | | 1,979 |
| 2002 | 2,357 | | | | 613 | | | | 0 | | | | | | | | 2,970 |
| 2003 | 2,214 | | | | 355 | | | | 0 | | | | | | | | 2,569 |
| 2004 | 1,506 | | | | 50 | | | | 0 | | | | | | | | 1,556 |
| 2005 | 1,719 | | | | 73 | | | | 0 | | | | | | | | 1,792 |
| 2006 | 385 | | | | 94 | | | | 0 | | | | | | | | 479 |
| 2007 | 461 | | | | 12 | | | | 0 | | | | | | | | 473 |
| 2008 | 418 | | | | 63 | | | | | | | | | | | | 481 |
| 2009 | 944 | 766 | 2 | | 156 | | | | | | | | | | | | 1,868 |
| 2010 | 862 | 276 | | | 88 | | | | | | | | | | | | 1,226 |
| 2011 | 421 | 324 | | | 225 | | | | | | | | | | | | 970 |
| 2012 | 1,212 | 708 | | | 400 | | | | | | | | | | | | 2,320 |
| 2013 | 839 | 433 | 4 | | 809 | | | | | | | | | | | | 2,085 |
| 2014 | 1,042 | - | | | 420 | | | | | | 1 | | | | 0 | | 1,463 |
| 2015 | 932 | - | | | 399 | | | | | | 1 | | | | 0 | | 1,331 |
| 2016 | 675 | | | | 368 | | | | | | 2 | | | 0 | 0 | | 1,045 |
| 2017 | 372 | | | | 451 | | | | | | 1 | | | | | | 824 |
| 2018 | 381 | | | | 513 | | | | | | 1 | | | | | | 895 |
| 2019 | 1,364 | | | | 479 | | | | | | 1 | | | 0 | | | 1,844 |
| 2020 | 260 | | | | 716 | | | | | | | | | | | | 976 |
| 2021 | 253 | | | | 1,161 | | | | | | 0 | | | | | | 1,414 |

Table 2. Continued

| FISHERY/YEAR | ALB | YFT | SKJ | BET | PBF | TUN | SWO | BUM | MLS | BIL[5] | ALV[6] | PTH | BTH | SMA[6] | BSH | SKH | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Other [4]** | | | | | | | | | | | | | | | | | |
| 1985 | 118 | 58 | 5 | 1 | 20 | 468 | 104 | | | | 332 | | 5 | 19 | 1 | | 1,131 |
| 1986 | 66 | 227 | | 6 | 41 | 6 | 109 | | | | 93 | | 14 | 59 | 1 | | 622 |
| 1987 | 139 | 2,159 | 633 | 1 | 18 | 67 | 31 | | | | 116 | | 1 | 188 | 1 | | 3,354 |
| 1988 | 76 | 936 | 372 | 1 | 46 | 2 | 64 | | | | 67 | | 2 | 214 | 3 | | 1,783 |
| 1989 | 10 | 849 | 103 | | 18 | | 56 | | | | 65 | | 1 | 137 | 6 | | 1,245 |
| 1990 | 20 | 508 | 147 | | 81 | 1 | 43 | | | | 90 | | 0 | 141 | 20 | | 1,051 |
| 1991 | 20 | 235 | 137 | | 0 | | 44 | | | | 42 | | 0 | 91 | 1 | | 570 |
| 1992 | 40 | 1,119 | 1,014 | | 14 | 2 | 47 | | | | 35 | | 3 | 19 | 1 | | 2,294 |
| 1993 | 194 | 2,031 | 2,279 | | 29 | | 161 | | | | 25 | | 2 | 32 | 0 | | 4,753 |
| 1994 | 66 | 3 | | | 1 | | 24 | | | | 37 | | 4 | 46 | 12 | | 193 |
| 1995 | 4 | 5 | 263 | | 0 | | 29 | | | | 34 | | 1 | 14 | 5 | | 355 |
| 1996 | 10 | | | 4 | 0 | | 15 | | | | 21 | | 0 | 9 | 0 | | 59 |
| 1997 | 12 | | 83 | | 48 | | 11 | | | | 27 | 0 | 3 | 11 | 0 | | 195 |
| 1998 | 15 | 43 | | | 59 | 1 | 19 | | | | 22 | 0 | 0 | 12 | 1 | | 172 |
| 1999 | 61 | | | | 88 | | 27 | | | | 32 | 1 | 0 | 9 | 0 | | 218 |
| 2000 | 24 | 1 | | | 11 | | 33 | | | | 44 | 0 | 0 | 12 | 0 | | 125 |
| 2001 | 39 | | | | 1 | | 19 | | | | 40 | 1 | 0 | 10 | 0 | | 110 |
| 2002 | 13 | 27 | 1 | | 2 | 1 | 3 | 1 | | | 30 | | | 12 | 0 | | 90 |
| 2003 | 8 | 8 | 2 | 3 | 3 | | 11 | | | | 21 | | 0 | 9 | 0 | | 65 |
| 2004 | 3 | 27 | 2 | 132 | 0 | | 44 | 5 | | | 21 | | 0 | 13 | 0 | | 247 |
| 2005 | 1 | | | | 1 | | 5 | | | | 11 | 0 | | 8 | 0 | | 26 |
| 2006 | 0 | 349 | 12 | | 0 | | 5 | | | | 24 | 0 | 0 | 7 | 0 | | 397 |
| 2007 | 0 | 0 | 0 | | 0 | | | | | | 20 | 0 | 0 | 6 | 0 | | 26 |
| 2008 | 0 | 2 | 0 | 5 | 0 | | 19 | | | | 19 | 0 | 0 | 5 | | | 50 |
| 2009 | | 7 | 1 | | 2 | | 0 | | | | 66 | 0 | 1 | 7 | 1 | | 85 |
| 2010 | 0 | 0 | | | 0 | | | | | | 55 | | 0 | 10 | 0 | | 65 |
| 2011 | 0 | 1 | | | 100 | 0 | | | | | 20 | | 0 | 8 | 0 | | 130 |
| 2012 | 2 | 0 | 0 | | 38 | | 1 | | | | 30 | 1 | | 11 | 0 | | 84 |
| 2013 | 0 | 2 | 1 | | 3 | | 7 | | | | 18 | 6 | 0 | 12 | 0 | | 49 |
| 2014 | | 0 | 0 | | 0 | | 4 | | | | 12 | | | 6 | 0 | | 22 |
| 2015 | 2 | 1 | 0 | | 0 | | 13 | | 0 | | 24 | 0 | 1 | 4 | 0 | | 46 |
| 2016 | 0 | 2 | 0 | 1 | 0 | 0 | 42 | | | | 16 | 0 | 1 | 4 | 0 | | 68 |
| 2017 | 14 | 0 | | 5 | 0 | | 44 | | | | 19 | | 1 | 5 | 1 | | 89 |
| 2018 | | | 5 | | 4 | | 67 | | | | 18 | | | 4 | 3 | | 101 |
| 2019 | 4 | 0 | | 1 | 1 | | 186 | | | | 31 | | 0 | 20 | 14 | | 257 |
| 2020 | 8 | 0 | | | 0 | | 125 | | | | 28 | 0 | 1 | 2 | 3 | | 167 |
| 2021 | 64 | 0 | | | 4 | | 53 | | | | 28 | | 0 | 2 | 2 | 0 | 153 |

1 Purse Seine catches include EPO and WCPO fisheries. Bluefin catches are from EPO only.
2 Longline includes American Samoa, Hawaii, and California fisheries.
3 Tropical troll 1985-2006 includes tropical handline catches.
4 Other catches include incidental catches, non-HMS fisheries, and Buoy Gear Fishery
5 BIL catches for Tropical Troll, Purse Seine, and Longline include Black Marlin, Sailfish, Spearfish, and other billfish.
6 Thresher and mako shark catches are not reported at the species level in the Longline, Tropical Troll and Tropical Handline fisheries but are listed under ALV and SMA, respectively.
7 Sports catches includes Oregon and Washington only, except PBF catch.