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## PLENARY 04

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## **NATIONAL REPORT ON CANADIAN TUNA AND TUNA-LIKE FISHERIES IN THE NORTH PACIFIC OCEAN IN 2022**

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**SUMMARY**

Canada has one fishery for highly migratory species in the Pacific Ocean, a troll fishery targeting juvenile north Pacific Albacore Tuna (*Thunnus alalunga*). Category I, II, and III data from the 2022 fishing season are summarized in this report. The Canadian fleet consisted of 118 vessels and operated primarily within the eastern Pacific Ocean, in 2022. No vessels from the Canadian fleet operated in the Central and western Pacific Ocean in 2022. The Canadian troll fishery continues to be largely coastal in its operations, occurring predominantly within the Canadian and United States exclusive economic zones (EEZ). Only a small proportion of catch and effort occurred outside the Canadian and US EEZs, in high seas waters, in 2022. The provisional 2022 estimates of catch and effort in the eastern Pacific Ocean are 3,639 metric tonnes (t) and 4,073 vessel-days, respectively, which represent a 50.4% increase in catch and 10.5% increase in effort relative to 2021. Although the 2022 catch and effort increased in the Canadian EEZ, the proportion of the total 2022 catch and effort in the Canadian EEZ decreased slightly to 67.7% and 69.9% from 70.1% and 72.3% in 2021, respectively. The proportion of the total catch and effort in the US EEZ in 2022 increased slightly to 31% and 27.8% from 27.9% and 25.4% in 2021, respectively. The remaining catch and effort occurred in adjacent high seas waters. Catch rate (CPUE) increased from 0.66 in 2021 to 0.89 in 2022, the highest since 2014. Approximately 89% of the Albacore catch occurred in the favorable water temperature band of 16-19 °C in 2022. Sixty (60) vessels measured 16,791 fork lengths in 2022 for a sampling rate of 2.8% of the reported catch. Fork lengths ranged from 52 to 93 cm, having a dominated mode around 68 cm corresponding to 2-year-old fish. Mean length was 68.4 cm, which is similar to the mean length observed in 2021.

## 1. INTRODUCTION

The Canadian fishery for highly migratory species uses troll gear with jigs to target juvenile north Pacific Albacore (*Thunnus alalunga*) in the surface waters of the Pacific Ocean. The majority of catch and effort by the Canadian fleet occurs within the exclusive economic zones (EEZ) of Canada and the United States. Access to the United States EEZ is permitted through a bilateral Treaty, which provides for access by Canadian-flagged and licensed vessels to fish for Albacore and to land Albacore at designated ports. Some of the larger Canadian vessels may follow Albacore into offshore waters and occasionally fish in the high seas of the central and western Pacific Ocean. The most recent management regulations for Canadian vessels fishing Albacore Tuna cover one year period from 01 April 2023 to 31 March 2024 are documented in the Albacore Tuna Integrated Fisheries Management Plan (IFMP; [Pacific region tuna IFMP \(publications.gc.ca\)](https://publications.gc.ca)). Historically, most of the Canadian effort and catch for north Pacific Albacore has occurred between early July and October.

This report summarizes Category I (annual catch and effort), Category II (monthly 1° x 1° catch and effort), and Category III (bycatch, catch size composition) data for vessels active in the Canadian north Pacific Albacore Tuna troll fishery in 2022.

## 2. DATA SOURCES

Data on Albacore Tuna catch and effort from 1995 through to the present are compiled from hail records, logbooks, and sales slips and stored in the Canadian Albacore Tuna Catch and Effort Relational Database (Stocker et al. 2007). This database contains the best available estimates of annual catch and effort by geographic zone (Canadian, US, and high seas waters) for the Canadian fishery. All Canadian fishing vessels are required to hail (call) a third party service provider when they intend to start fishing and stop fishing, and when they change fishing zones. Canadian vessels must also carry logbooks in which daily position, catch and effort (latitude, longitude, number of fish, estimated weight) are recorded for Albacore Tuna and non-target species. These data have the highest temporal and spatial resolution and are obtained when logbooks are returned in November after the fishing season is completed. The third data source, sales slips, record the weight of Albacore Tuna landed and bought by domestic buyers and provide the most accurate estimates of Albacore Tuna catch in weight since these data are the basis for payment to harvesters (Stocker et al. 2007). Logbooks and sales slips from domestic buyers (plus trans-shipment slips if applicable) are forwarded for entry into the Albacore Tuna catch database annually (Stocker et al. 2007).

Fork length data are collected through an on-board sampling program initiated in 2009, with a sampling goal of 1% of the reported catch. Harvesters record the lengths of the first 10 Albacore landed daily to randomize measurements. Size composition data were collected by port samplers from a portion of the Canadian catch landed in United States ports between 1981 and 2008. Size data reported by Canada since 2009 are from the domestic on-board sampling program only.

The fishery data provided in this report were taken from Canadian tuna database version 23.01.26. Figures up to and including 2021 are considered definitive and are derived from a reconciliation of logbook data (best estimates of effort, catch in pieces, and geographic location) and sales slip (best estimate of catch weight) data (Stocker et al. 2007). The 2022 data are preliminary at this time.

### 3. AGGREGATED CATCH AND EFFORT DATA

#### 3.1. Catch

The preliminary estimate of the Canadian albacore tuna catch in the eastern Pacific Ocean, in 2022 was 3,639 metric tons (t), which was a 50.4% increase in catch relative to 2021 (Table 1; Figure 1). The total catch by the Canadian troll fishery has ranged from 1,761 t in 1995 to 7,857 t in 2004 and averaged  $4,474 \pm 1,775$  t ( $\pm$  sd) since 2003, the period when annual logbook coverage has exceeded 90% of all vessels participating in this fishery. The 2022 catch was achieved primarily in Canadian coastal waters (67.7%) and US coastal waters (31%). Catch in the Canadian EEZ slightly decreased by 2.4% and increased by 3.1% in the US EEZ, compared to 2021. The remaining small proportion (1.3%) of the eastern Pacific Ocean Canadian catch occurred in adjacent high seas waters. No vessels from the Canadian albacore troll fleet were active in the south Pacific Ocean in 2022.

The Canadian fleet caught and released 159 Albacore that were below marketable size (3.18 kg) in 2022, which was the lowest year in the timeseries (Table 2). The estimated mean weight of released Albacore was 3.23 kg in 2022, similar to the mean weight of 3.28 kg in 2021. The weight of released fish is not accounted for in Table 1, which records retained catch only.

#### 3.2. Effort

In 2022, the Canadian albacore tuna troll fleet consisted of 118 unique vessels, remaining well below the average participation of 160 vessels since 2003 (Table 1). Canadian vessels which fished the US EEZ decreased from forty-one (41) in 2021 to thirty-nine (39) in 2022. The 2022 estimate of total fishing effort for the Canadian fleet is 4,073 vessel-days (v-d) and is a 10.5% increase relative to the fishing effort in 2021 (Table 1; Figure 1). Fishing effort in 2022 occurred largely in Canadian coastal waters (69.9%) and US coastal waters (27.8%). Effort increased by 21% in the Canadian EEZ and by 6.9% in the US EEZ relative to 2021. A small proportion (2.2%) of the Canadian fleet effort was reported in adjacent high seas waters in 2022. No Canadian vessels from the albacore tuna fleet operated in the south Pacific in 2022.

#### 3.3. Catch Rate

Catch rate or catch per unit effort (CPUE) is calculated by dividing the catch in metric tons by the number of vessel days. Total CPUE for the Canadian fleet was relatively stable from 2018 to 2021, around 0.66 t/v-d. In 2022 the CPUE increased to 0.89 t/v-d (Figure 1). The CPUE in the Canadian EEZ and the US EEZ both increased in 2022 relative to 2021 to the highest rates seen in the last 7-8 years. The catch rates remain higher in US waters for the Canadian fleet in 2022 and the rates in the high seas were the lowest, similar to 2021. The peak of the catch rates varied by area in 2022 (Figure 2). The Canadian EEZ saw an unusual peak in catch rate in June 2022, at 1.3 t/v-d, and in the US EEZ the peak was seen in August, similar to previous years. In the high seas the peak in catch rates was observed in October.

### 4. SPATIAL DISTRIBUTION OF CATCH AND EFFORT DATA

In 2022, the Canadian troll fleet primarily operated within the Inter-American Tropical Tuna Commission (IATTC) convention area east of 150°W and north of the equator, with approximately 98% of the fishing effort and catch occurred within the Canadian and US EEZs. Catch and effort in adjacent the North Pacific high seas was relatively stable in 2022 relative to 2021.

A small amount of catch and effort occurred in June 2022 in the North Pacific primarily in the waters bordering the Canadian and US EEZ. The catch and effort in July and August were distributed in the Canadian and US EEZs with the majority occurring in US waters. As in previous

years, in September the effort and catch were predominantly concentrated in the Canadian EEZ and fishing only occurred in the Canadian EEZ in October due to conditions of licence. Small amounts of effort and catch took place just outside the Canadian and US EEZs in the adjacent North Pacific high seas between June and September in 2022 (Figures 3 and 4).

Albacore were caught in waters with sea surface temperatures ranging from 13 to 21 °C in 2022 (Figure 5). The proportion of fish caught in waters within the favourable 16-19 °C temperature band increased from 68% in 2021 to 89% in 2022.

## 5. BIOLOGICAL DATA

### 5.1. By-Catch

In 2022, the reported by-catch consisted of 86 fish and two sea birds of unidentified species (Table 3). All sea birds were released and only 33% of the fish by-catch were retained. Yellowtail Amberjacks (*Seriola lalandi*), had the highest amount of retained by-catch with 21 individuals, followed by five Pacific Bluefin Tuna (*Thunnus orientalis*), and two Skipjack Tuna (*Katsuwonus pelamis*). Other by-catch species that were released included Yellowfin Tuna (*Thunnus albacares*), Coho Salmon (*Oncorhynchus kisutch*) and Blue Shark (*Prionace glauca*).

### 5.2. Biological Sampling

Sixty (60) vessels measured 16,791 fork lengths in 2022 for a sampling rate of 2.8% of the reported catch. Fork lengths ranged from 52 to 93 cm, having a dominated mode around 68 cm corresponding to 2-year-old fish (Figure 6). Mean length was 68.4 cm, which is similar to the mean length observed in 2021.

The proportion of large albacore in the sampled catch appeared to be lower in 2022 compared to 2021. Similar to previous years, the monthly mean length of fish in 2022 increased from June to September and decreased in October (Figure 7). Albacore caught from the Canadian EEZ had a slightly larger mean length than those caught in the US EEZ (Figure 8). The albacore caught in the high seas and measured by the Canadian fleet were, on average, slightly smaller than those harvested in the Canadian or US EEZ (Figure 8). Although the sample size in the high seas catch was much lower.

## 6. DISCUSSION

The total annual catches and catch rates for the Canadian Albacore fishery increased in 2022 relative to the past 3 years, to levels higher than the past ten year average. The total effort of the Canadian fleet also increased in 2022, however it was not as large of a proportional increase as seen in the catch. The proportion of the Canadian fleet fishing in the US EEZ decreased significantly due to the impacts of Covid-19 pandemic safety protocols in 2020. In 2021 and 2022 the proportion of the Canadian fleet catch and effort in the US EEZ have increased slightly, however the majority of the majority of the catch and effort is still occurring in the Canadian EEZ. The Canadian albacore catches 2014-2022 appear to be largely composed of Age 2 fish compared to the earlier years of 2009-2013, during which catches were mainly composed of Age 3-4 Albacore.

## 7. LITERATURE CITED

Stocker, M., H. Stiff, W. Shaw, and A.W. Argue. 2007. The Canadian albacore tuna catch and effort relational database. Canadian Technical Report of Fisheries and Aquatic Sciences 2701: vi+76 p.

**Table 1.** Fishery statistics from the Canadian troll fishery for north Pacific Albacore Tuna, 1995-2022. Catch and effort data are expanded or raised to account for vessels that do not report logbook data. The level of expansion can be determined by the logbook coverage figures.

<b>Year</b>	<b>Total Catch (t)</b>	<b>Effort (vessel-days)</b>	<b>Total Vessels</b>	<b>Logbook Coverage (%)</b>
1995	1,761	5,923	287	18%
1996	3,321	8,164	295	24%
1997	2,166	4,320	200	30%
1998	4,177	6,018	214	50%
1999	2,734	6,970	238	71%
2000	4,531	8,769	243	68%
2001	5,249	10,021	248	81%
2002	5,379	8,323	232	74%
2003	6,847	8,428	193	96%
2004	7,857	9,942	221	92%
2005	4,829	8,564	213	94%
2006	5,833	6,243	174	95%
2007	6,040	6,902	207	92%
2008	5,464	5,774	137	93%
2009	5,693	6,540	138	97%
2010	6,527	7,294	161	96%
2011	5,385	8,556	176	99%
2012	2,484	5,974	174	100%
2013	5,088	6,465	183	99%
2014	4,780	4,745	160	100%
2015	4,391	5,244	164	99%
2016	2,842	5,359	152	100%
2017	1,830	4,978	121	100%
2018	2,717	4,196	121	100%
2019	2,402	3,882	122	100%
2020	2,376	3,302	104	100%
2021	2,419	3,687	112	100%
2022 <sup>1</sup>	3,639	4,073	118	100%

<sup>1</sup> 2022 data are preliminary based on Ver. 23.01.26 of the *Canadian Albacore Tuna Catch and Effort Relational Database*. See Stocker et al. (2007) for a description of the database.

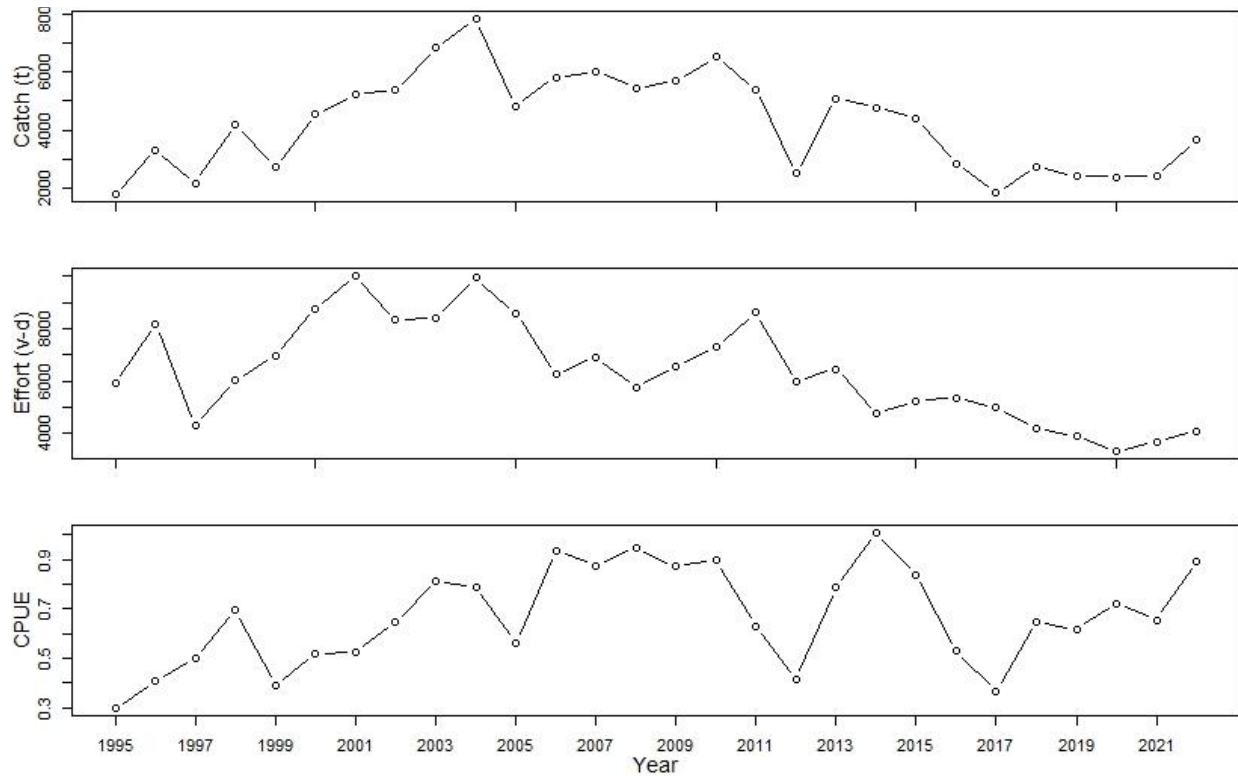
**Table 2.** Releases of Albacore below marketable size (3.18 kg) reported by the Canadian Albacore fishery in 2013-2022.

<b>Year</b>	<b>Number of Fish</b>	<b>Total Weight (kg)</b>
2013	289	918
2014	2,214	7,153
2015	4,295	14,271
2016	562	2,134
2017	545	1,660
2018	5,508	18,291
2019	4,093	12,929
2020	668	2,082
2021	6,624	21,709
2022	159	514

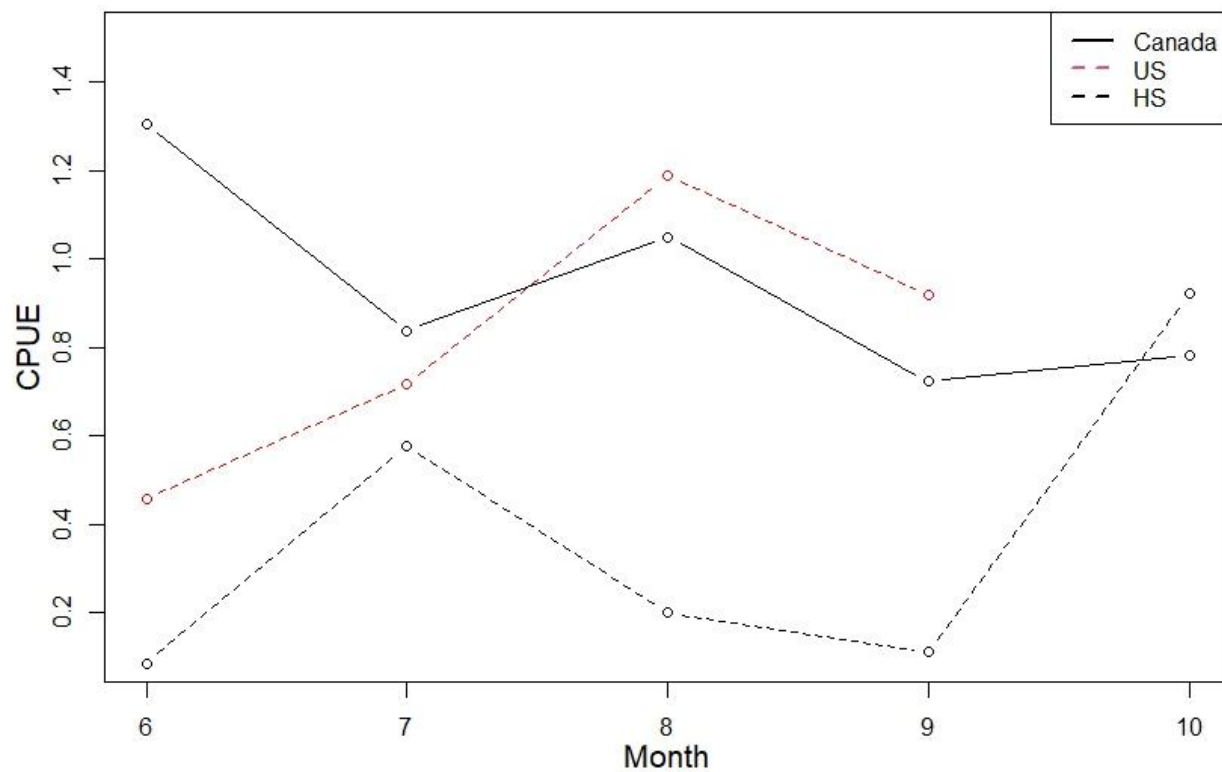
**Table 3.** Reported catch of non-target species (by-catch) by the Canadian Albacore Tuna troll fishery in 2022.

<b>Month</b>	<b>Common name</b>	<b>Scientific Name</b>	<b>Catch (in Numbers)</b>	
			<b>Retained</b>	<b>Released</b>
July	Yellowtail Amberjack	<i>Seriola lalandi</i>	3	1
	Pacific Bluefin Tuna	<i>Thunnus thynnus</i>	2	
August	Sea Bird	N/A		2
	Blue Shark	<i>Prionace glauca</i>		1
	Yellowtail Amberjack	<i>Seriola lalandi</i>	6	4
	Skipjack Tuna	<i>Katsuwonus pelamis</i>	1	
	Pacific Bluefin Tuna	<i>Thunnus thynnus</i>	2	
	Yellowfin Tuna	<i>Thunnus albacares</i>		1
	Coho Salmon	<i>Oncorhynchus kisutch</i>		6
September	Yellowtail Amberjack	<i>Seriola lalandi</i>	11	3
	Skipjack Tuna	<i>Katsuwonus pelamis</i>	1	
	Pacific Bluefin Tuna	<i>Thunnus thynnus</i>	1	
	Coho Salmon	<i>Oncorhynchus kisutch</i>		42
October	Yellowtail Amberjack	<i>Seriola lalandi</i>	1	
<b>TOTALS</b>			<b>28</b>	<b>60</b>

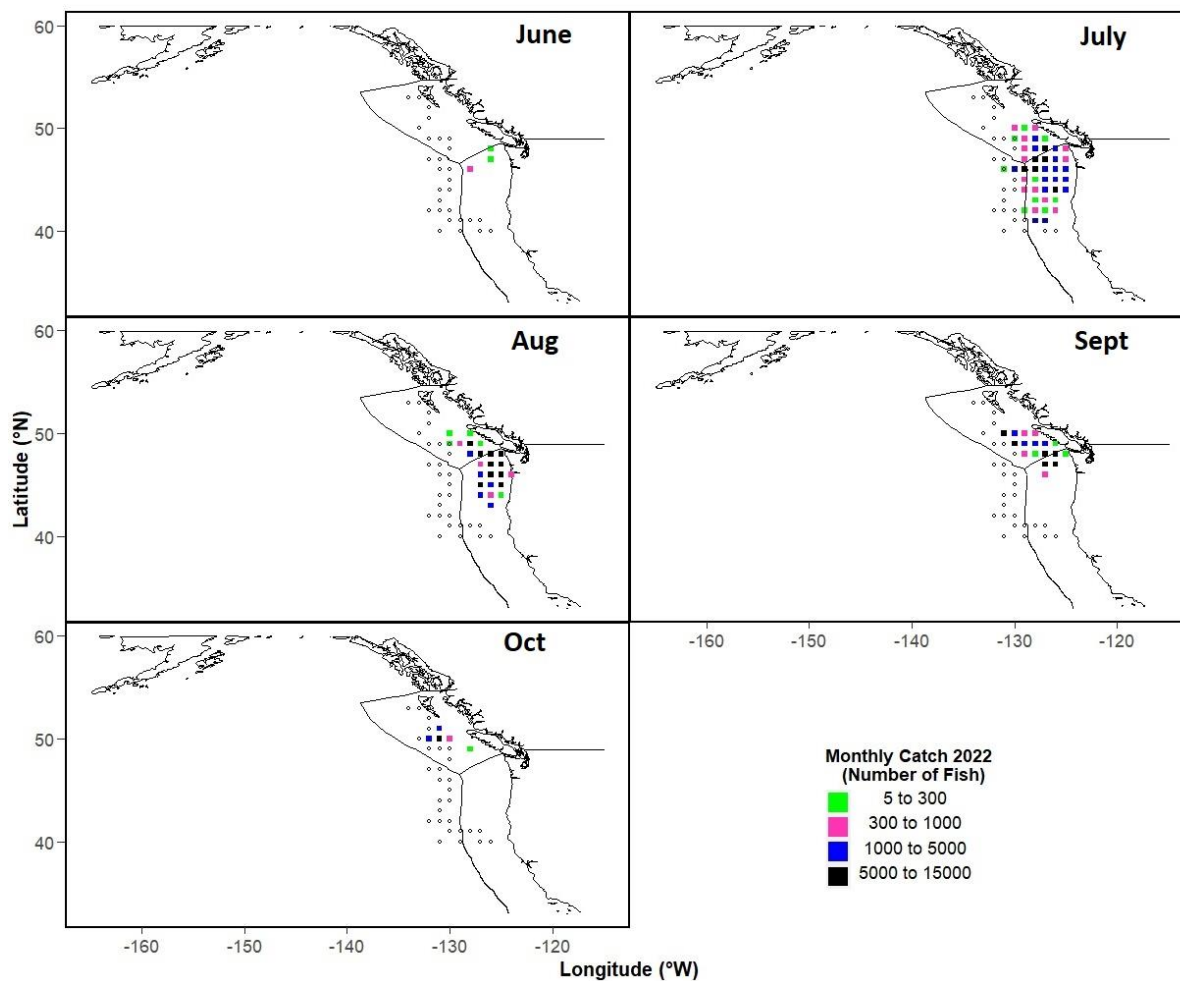




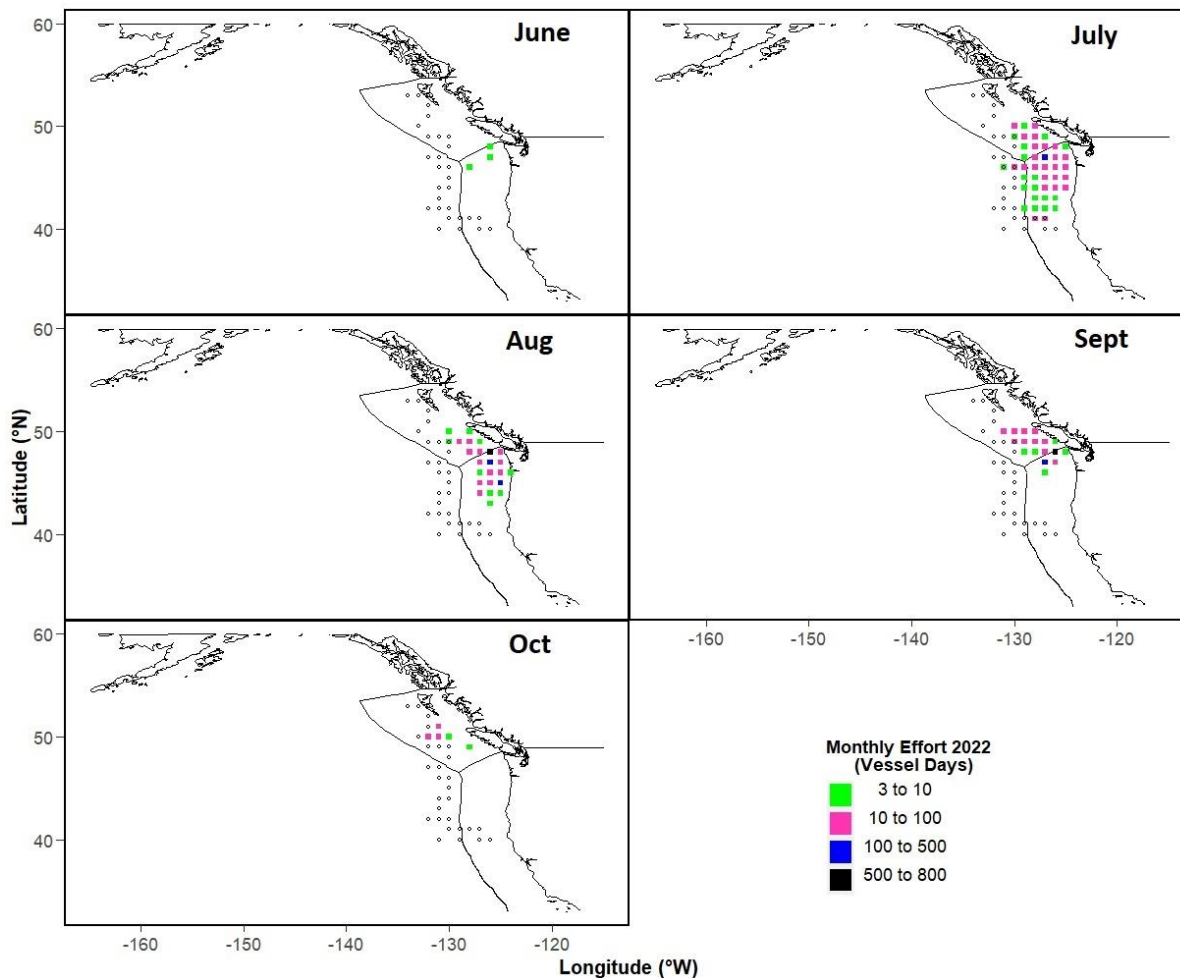
**Figure 1.** Historical trends in expanded catch (metric tonnes, t), effort (vessel-days, v-d) and catch per unit effort (CPUE, t/vessel-day) in the Canadian troll fishery for north Pacific Albacore Tuna from 1995 to 2022.



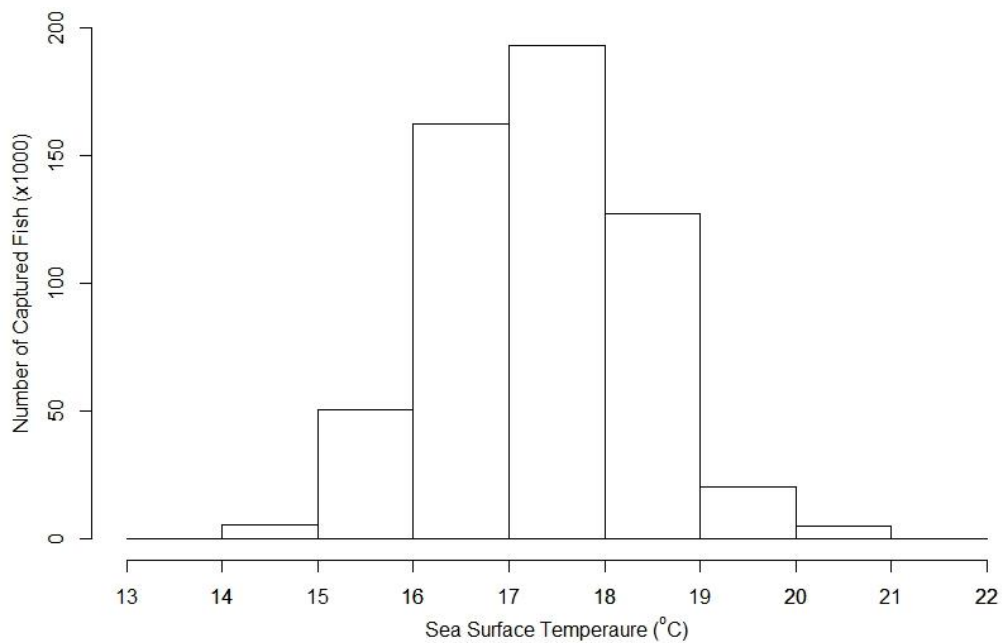
**Figure 2.** Monthly catch per unit effort (CPUE, t/vessel-day) in the Canadian and U.S. EEZs for Canadian Albacore Tuna troll fishery in 2022.



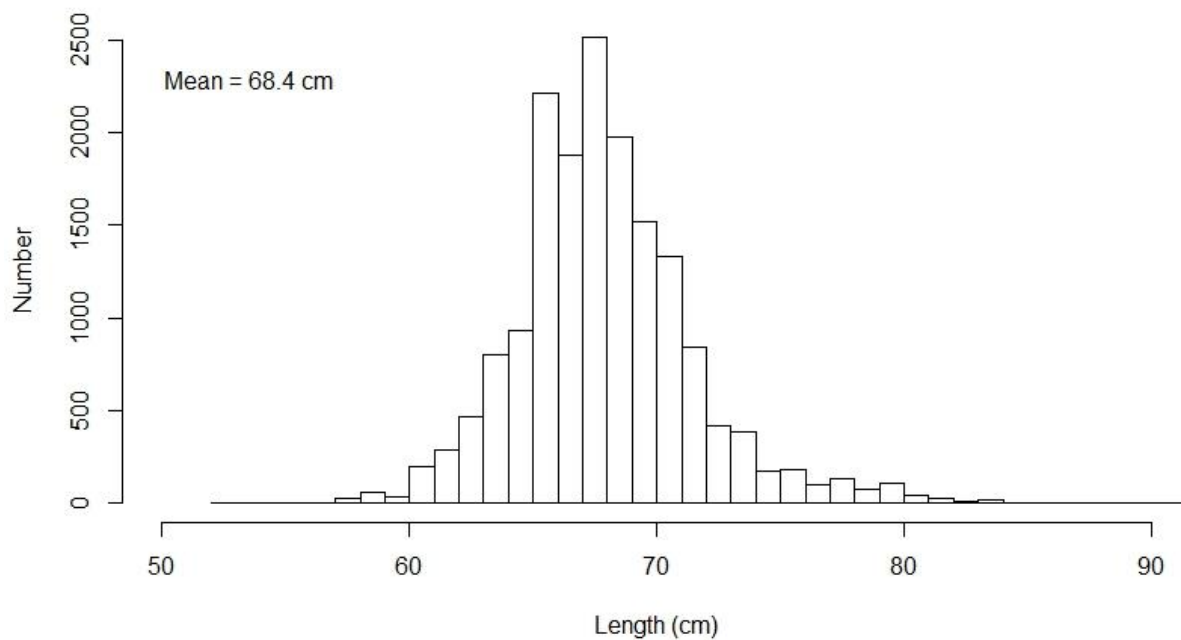
**Figure 3.** Monthly spatial distribution of reported catch in Canadian Albacore Tuna troll fishery in 2022. Data are plotted on a  $1^\circ \times 1^\circ$  strata with symbols located on the bottom-right corner. Data in locations with less than 3 unique vessels operating are excluded due to domestic privacy rules. Strata in which fewer than three vessels reported are not shown. Empty dots approximate the border line of the operational area of the Canadian fishery in 2022.



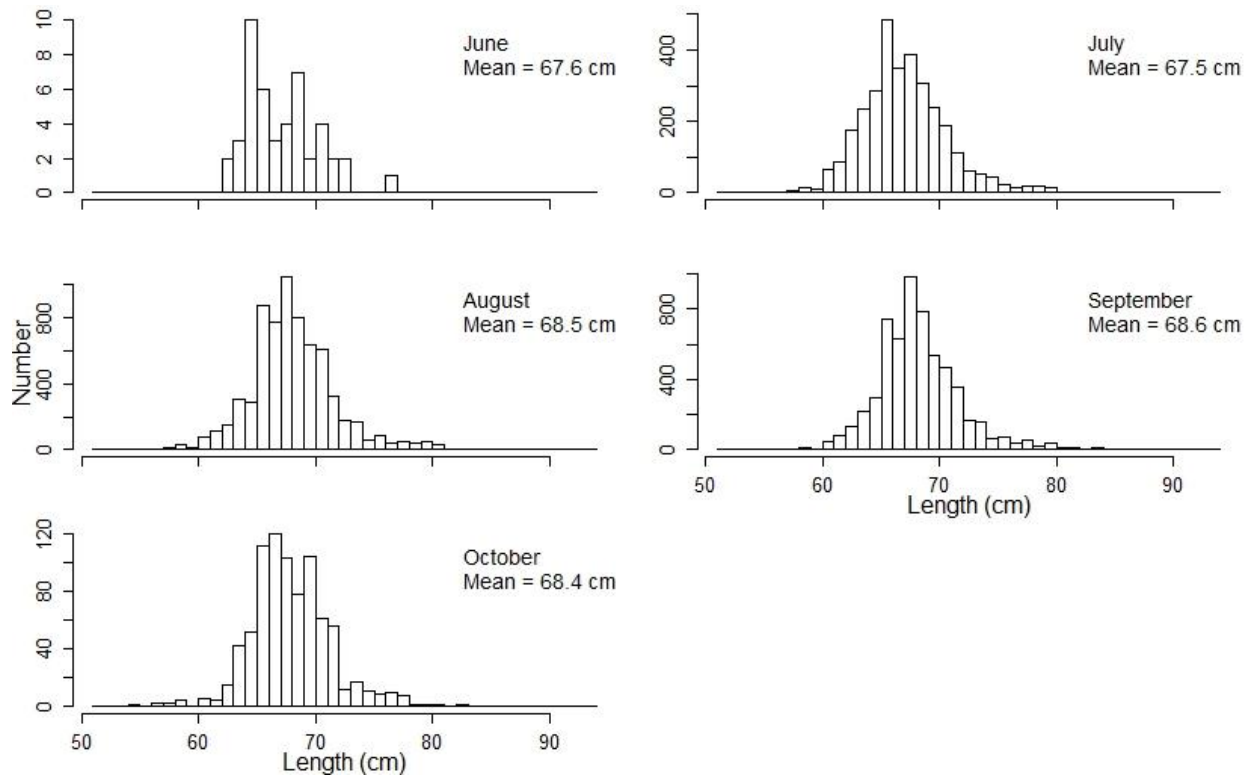
**Figure 4.** Monthly spatial distribution of effort by the Canadian Albacore Tuna troll fishery in 2022. Data in locations with less than 3 unique vessels operating are excluded due to domestic privacy rules. Data are plotted on  $1^\circ \times 1^\circ$  strata with symbols located on the bottom-right corner. Empty dots approximate the border line of the operational area of the Canadian fishery in 2022.



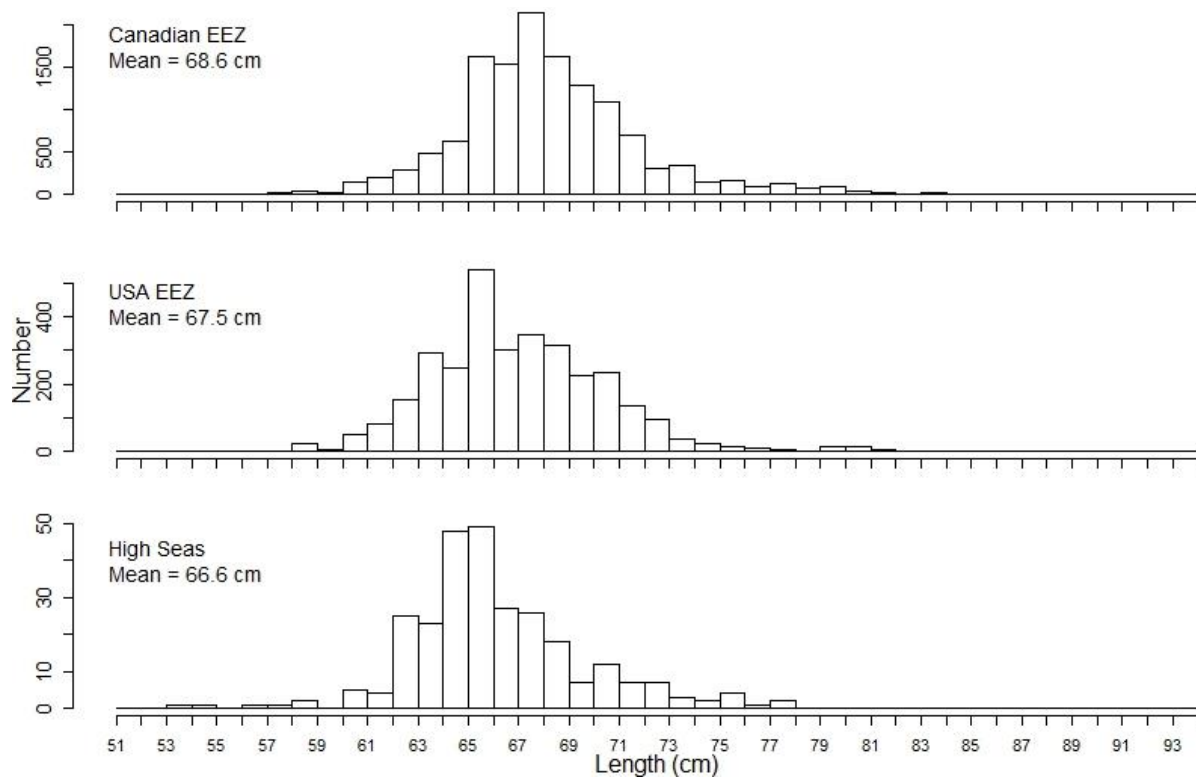
**Figure 5.** Number of north Pacific Albacore Tuna caught by the Canadian troll fishery in 2022 at various sea surface temperatures.



**Figure 6.** Distributions of fork lengths (cm) of north Pacific Albacore Tuna harvested by the Canadian troll fishery in 2022.



**Figure 7.** Monthly fork length (cm) distributions of north Pacific Albacore Tuna harvested by the Canadian troll fishery in 2022.



**Figure 8.** Distributions of fork lengths (cm) of north Pacific Albacore Tuna harvested by the Canadian troll fishery in 2022 in Canadian EEZ, USA EEZ and High Seas.