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The 2007 Canadian North Pacific Albacore Tuna Troll Fishery¹

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INTRODUCTION

Canadian fishermen have been fishing for albacore tuna (*Thunnus alalunga*) since the mid-1930s. The Canadian fishery started in the coastal waters off British Columbia and is a troll fishery using jigs to target albacore tuna in the surface waters of four areas of the Pacific Ocean in which the fleet operates: (1) British Columbia coastal, (2) British Columbia/United States coastal, (3) high seas north Pacific ocean, and (4) high seas south Pacific ocean. Although the Canadian fleet will follow albacore tuna concentrations into offshore waters, in recent years the majority of effort and catch has occurred in the coastal waters of Canada and the United States and this trend continued in 2007. Access by Canadian vessels to waters in the U.S. Exclusive Economic Zone (EEZ) is governed by a bilateral Canada-United States albacore tuna treaty, which enables Canadian and U.S. fishers to catch north Pacific albacore in each other's EEZ, and land albacore tuna at designated ports in Canada and the United States.

Canada is committed to providing detailed catch and effort statistics, logbook data, and fishing vessel information, as is required under the Highly Migratory Species Convention. Management regulations for Canadian vessels fishing albacore tuna in 2007 are documented in the *Pacific Region Integrated Fisheries Management Plan: Tuna - April 1, 2007 to March 31, 2008*. These regulations specify that Canadian fishers must obtain a licence to fish for albacore tuna and that they must maintain accurate records of daily harvest operations in the *Canadian Pacific Albacore Tuna Logbook*. Logbooks are purchased from the Canadian Highly Migratory Species Foundation and fishers are required to submit their logbooks within 7 days of their final landing or mid-November. The Canadian tuna fishery in the coastal waters of British Columbia and the United States and in high seas areas was open from 01 April 1 2007 to 31 March 2008, but all catch and effort in the North Pacific Ocean occurred between June and October 2007 when albacore tuna were available to the fleet.

The present report summarizes Category I (total annual catch and effort, catch per unit of effort (CPUE)), Category II (logbook catch and effort data summarized on 1° x 1° grid), and Category III (catch length frequencies) data for the Canadian north Pacific albacore troll fishery in 2007. Similar summaries for the 1995 to 2007 fisheries are presented by Shaw (1997, 1999), Shaw and Argue (1999, 2000), Argue and Shaw (2000), Shaw and Stocker (2002), Stocker and Shaw (2004a, 2004b, 2005), and Stocker (2006, 2007a). Sales slip records are the source of historical Canadian aggregated north Pacific albacore tuna catch data from 1945 to 1990 provided by Ware and Yamanaka (1991).

DATA SOURCES

Data on albacore tuna catch and effort are compiled from hauling records, logbooks, and sales slips from processing plants and stored in the *Canadian Albacore Tuna Catch and Effort Relational Database* (Stocker et al. 2007). This database contains all fishery-related scientific

data from 1995 to the present and provides the best estimate of total annual catch and effort by vessel and geographic area. All fishing vessels are required to hail out when they intend to start fishing and hail in when fishing ceases. Hail data from vessels fishing in Canadian waters are obtained from Marine Communications and Traffic Services, Canadian Coast Guard, and hail data for vessels fishing in U.S. waters are obtained from Ship.com. The hail data are used to estimate total vessels fishing (Stocker et al. 2007). Canadian vessels must also carry logbooks while fishing for highly migratory species in any waters of the Pacific Ocean. Daily catch and effort data at the highest temporal and spatial scales are obtained from completed copies of the logbooks submitted at the end of the fishing season. Shaw and Argue (1999) and Stocker et al. (2007) provide a full description of the type of information recorded in the logbooks. Sales slips records of landings provide the most accurate estimates of albacore landings (weight), although they underestimate total annual landings because they do not fully account for international sales, domestic public sales or take-home totals (Stocker et al. 2007). Logbooks, sales slips and at-sea trans-shipment slips, completed at the time fish are landed and sold, must be returned to Fisheries and Oceans Canada (DFO) for entry into the albacore catch database (Argue et al. 1999; Stocker et al. 2007). Port samplers in American ports designated by the Canada-United States albacore tuna treaty collect length-frequency data from the Canadian albacore tuna catch landed in those ports. Canada does not currently have a domestic program to collect these data from catch landed in Canadian ports.

Fisheries and Oceans Canada embarked on a program in March 1999 to reconcile past estimates of total Canadian catches of albacore from logbook, sales slip, phone-in and transshipment data, which culminated in the development and implementation of the *Canadian Albacore Tuna Catch and Effort Relational Database* (Stocker et al. 2007). During the process updates, based on new logbook and sales slip information, were made to catches and number of vessels as reported in earlier reports (Shaw and Argue 1999, Argue and Shaw 2000 and Argue et al. 1999). The catch and effort data up to 2006 in the present report are our best estimates and the 2007 data are considered preliminary.

The data presented in this report were obtained using codebase Version 8.02.05 to query and compile the data from Version 8.05.22 of the *Canadian Albacore Tuna Catch and Effort Relational Database*. The data in this report are definitive up to 2006 because they are derived from a reconciliation of trip log (best estimates of effort, catch in pieces, and geographic location) and sales slip (best estimate of catch weight) data (S + X report described in Stocker et al. 2007).

CATEGORY I

Catch

The preliminary estimate of north Pacific albacore tuna caught by the Canadian troll fishery in 2007 is 6,040 metric tons (t), which is a 3.6% increase over the 2006 (Table 1). The total catch of north Pacific albacore tuna by the Canadian troll fishery has ranged from 1,763 t in 1995 to 7,856 t in 2004 and averaged 4,673 t for the 1995 to 2007 period.

The majority of Canadian albacore tuna (6,039 t) were caught in FAO Statistical Area 67 in 2007 as in previous years (Table 2). Statistical Area 67 includes catches made by the Canadian fleet in

the US and Canadian EEZs under the bilateral albacore tuna treaty. Only 1 t of catch was reported from the high seas in FAO Area 77 in 2007, continuing the trend of no or minimal high seas catch by the Canadian fleet observed since 2005.

Effort

The Canadian albacore tuna troll fleet consisted of 196 unique vessels in 2007, representing an 11% increase in the size of the troll fleet operating in the Pacific Ocean since 2006 (Table 1). All but one Canadian vessel targeted the north Pacific albacore tuna stock exclusively. The Canadian troll fleet has ranged in size from 174 vessels in 2006 to 292 vessels in 1996 and has averaged 225 vessels in size since 1995.

Fishing effort in the Canadian tuna fishery is measured in number of vessel fishing days (v-d). The 2007 estimate of fishing effort expended in the north Pacific by the Canadian fleet is 7,062 v-d (Table 1). This estimate is a 13% increase in effort from 2006, but is well within the range of historical effort, which has varied from 4,324 v-d in 1997 to 10,021 v-d in 2001 and averaged 7,596 v-d since 1995. However, Canadian fishing effort has declined from high levels recorded in the 2000-2002 period which is consistent with the scientific advice, based on both the 2004 and 2006 stock assessments (Stocker 2005, 2007b), that countries not increase their fishing effort for north Pacific albacore tuna.

CPUE

The estimated catch per unit of effort (CPUE) of the Canadian fleet targeting north Pacific albacore tuna in 2007 was 855 kg/v-d, which is the second highest CPUE in the fleet time-series and well above the average value of 611 kg/v-d for the 1995 to 2007 period (Table 1). Historical variation in Canadian CPUE for north Pacific albacore tuna has ranged from a low of 297 kg/v-d in 1995 to a high of 934 kg/v-d in 2006. Both catch and CPUE follow an increasing trend over the period 1995-2004, a drop in 2005 and a resumption of the increasing trend in CPUE through 2007 (Figure 1). In contrast, fishing effort has declined since the 2002-2004 period.

CATEGORY II

Distribution of Catch

Canadian vessels fishing for north Pacific albacore tuna did not go as far offshore in 2007 as in previous years, ranging between 134° W and the North American coast and a latitudinal range of 37° N to 54° N (Figure 2). The area encompassed by these coordinates represents a contraction in the offshore extent of fishing and a northward expansion of fishing into Queen Charlotte Sound and around the Queen Charlotte Islands relative to 2006. The contraction in offshore range continues a trend that began with the 2006 fishing season.

More than 99% of the north Pacific albacore tuna caught by the Canadian fleet in 2007 was caught within the EEZs of Canada and the United States and only 5 t, representing < 1% of the catch was caught in the high seas area (Figure 2). The majority of Canadian catch (79% by weight) occurred in the United States EEZ, particularly in the coastal waters of Oregon, which accounted for 54.5% of the catch (by weight).

Distribution of Effort

More than 99% of the fishing effort by the Canadian albacore tuna troll fleet occurred in the coastal waters of Canada and the United States, as defined by the EEZs shown in Figure 3. This effort was located off of the west coast of Vancouver Island, Washington and Oregon. Minor effort was recorded in northern California waters. Some effort and catch occurred in the waters around the Queen Charlotte Islands and Queen Charlotte Sound (between 51° and 54° N), consistent with the availability of albacore tuna in these waters (Figures 2 and 3).

CATEGORY III

Biological

Port samplers in the United States measured the fork lengths of 500 albacore tuna landed by the Canadian fleet in U.S. ports in 2007. The fork lengths of these fish ranged from 56 cm (3.7 kg) to 82 cm (11.6 kg) (Figure 4). Weights were estimated from the length-weight relationship for both sexes reported by Clemens (1961):

$$W = 4.936 \times 10^{-8} \cdot L^{2.99},$$

where W is weight in pounds (lbs x 0.4536 = kg) and L is fork length in mm.

Two distinct modes at 64 cm (5.5 kg) and 75 cm (8.8 kg) are evident in the length frequency data. These modes, which are used to assess age composition of the catch, correspond to 3- and 4-yr old fish, respectively. As in past years, the largest proportion of the albacore tuna caught by the Canadian troll fleet are 3-year old fish. Canada does not have a domestic sampling program to obtain biological data from albacore tuna taken by the Canadian fleet, so size and age composition data from northern catches around the Queen Charlotte Islands and Queen Charlotte Sound (see Fig. 2) are not available.

RESEARCH ACTIVITIES

The *Canadian Albacore Tuna Catch and Effort Relational Database Management System* was developed by Fisheries and Oceans Canada to address the issues of tracking albacore catch and effort data from fishing logbooks and sales slips landings from the Canadian troll fleet operating in the Pacific Ocean. The design, implementation and capabilities of this database were documented by (Stocker et al. 2007).

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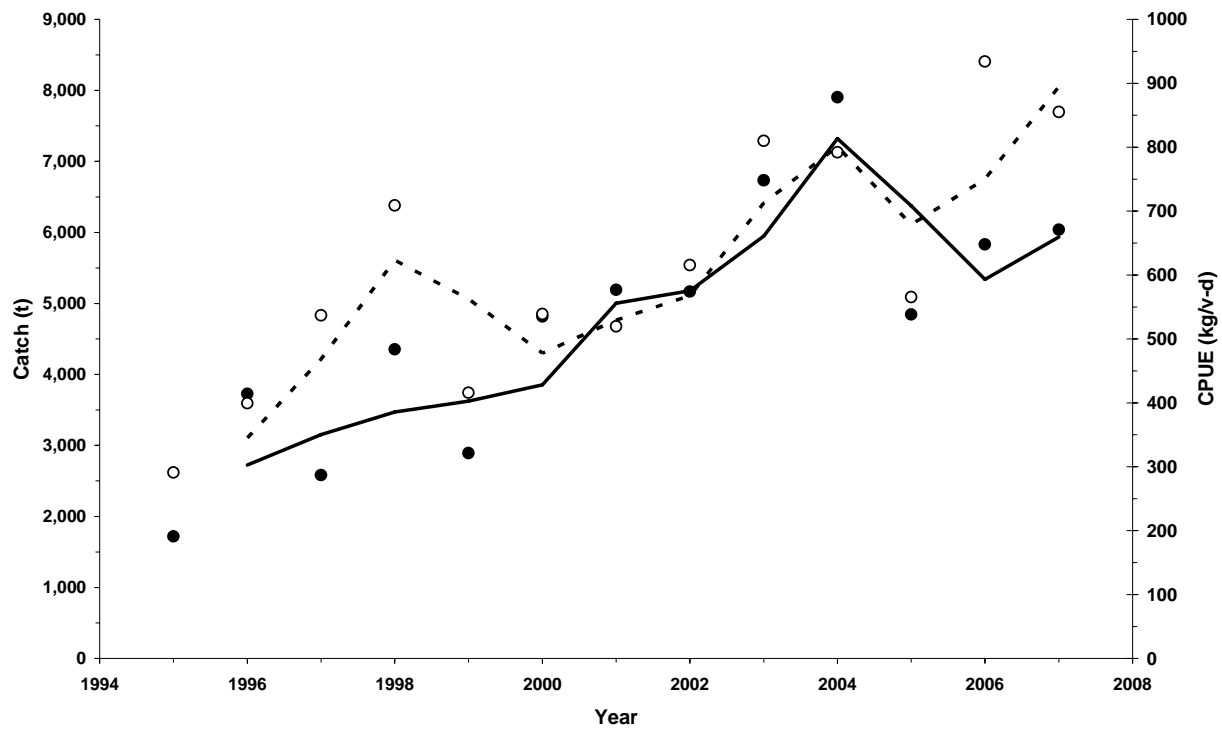


Figure 1. Canadian north Pacific albacore troll catch (●) and CPUE (○) from 1995 to 2007. Lines are 2 yr moving averages for catch (—) and CPUE (---).

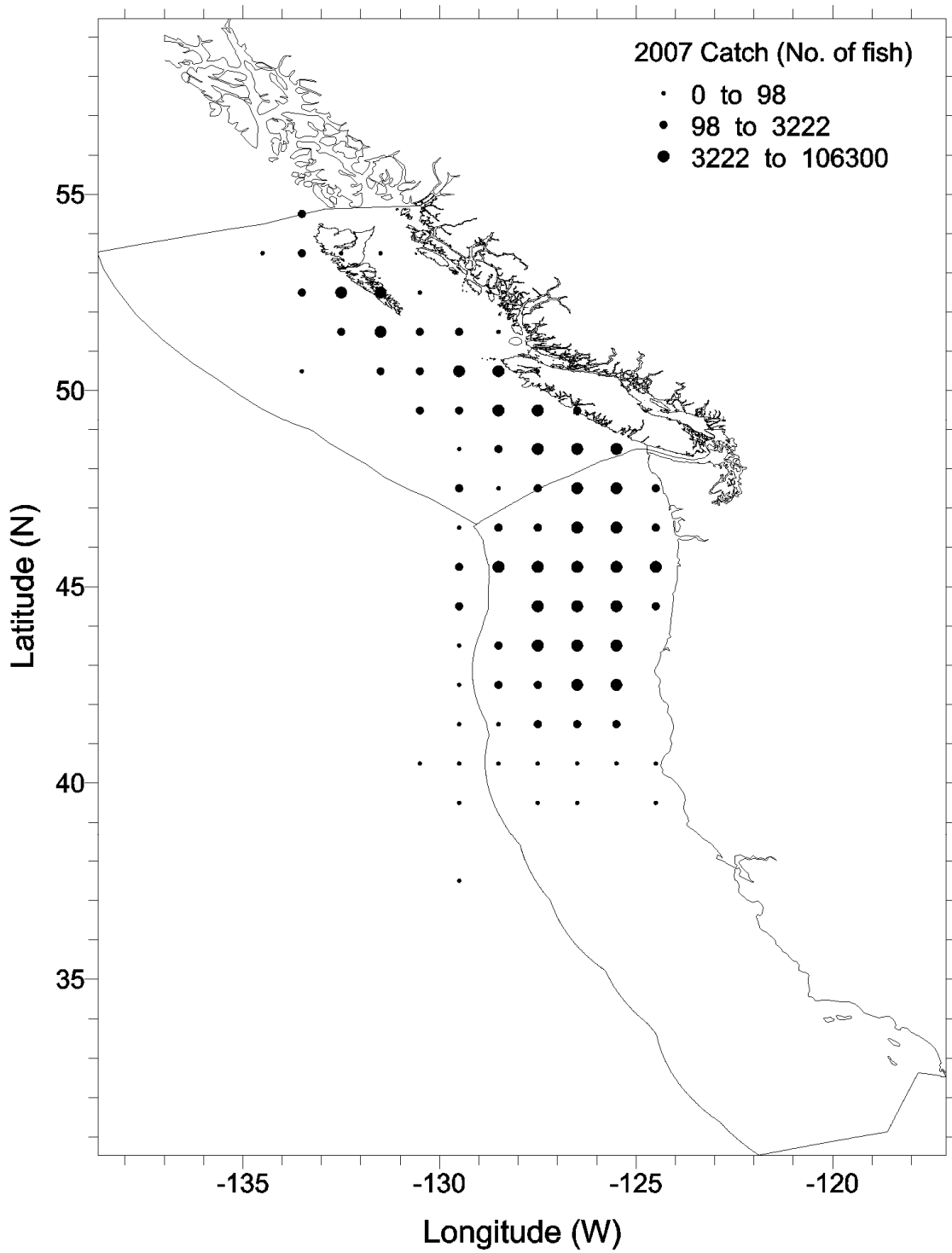


Figure 2. Distribution of Canadian north Pacific albacore tuna catch (number of fish) in 2007. Symbols are centered in 1° x 1° grid. The map also shows the Exclusive Economic Zones (EEZ) of Canada and the United States.

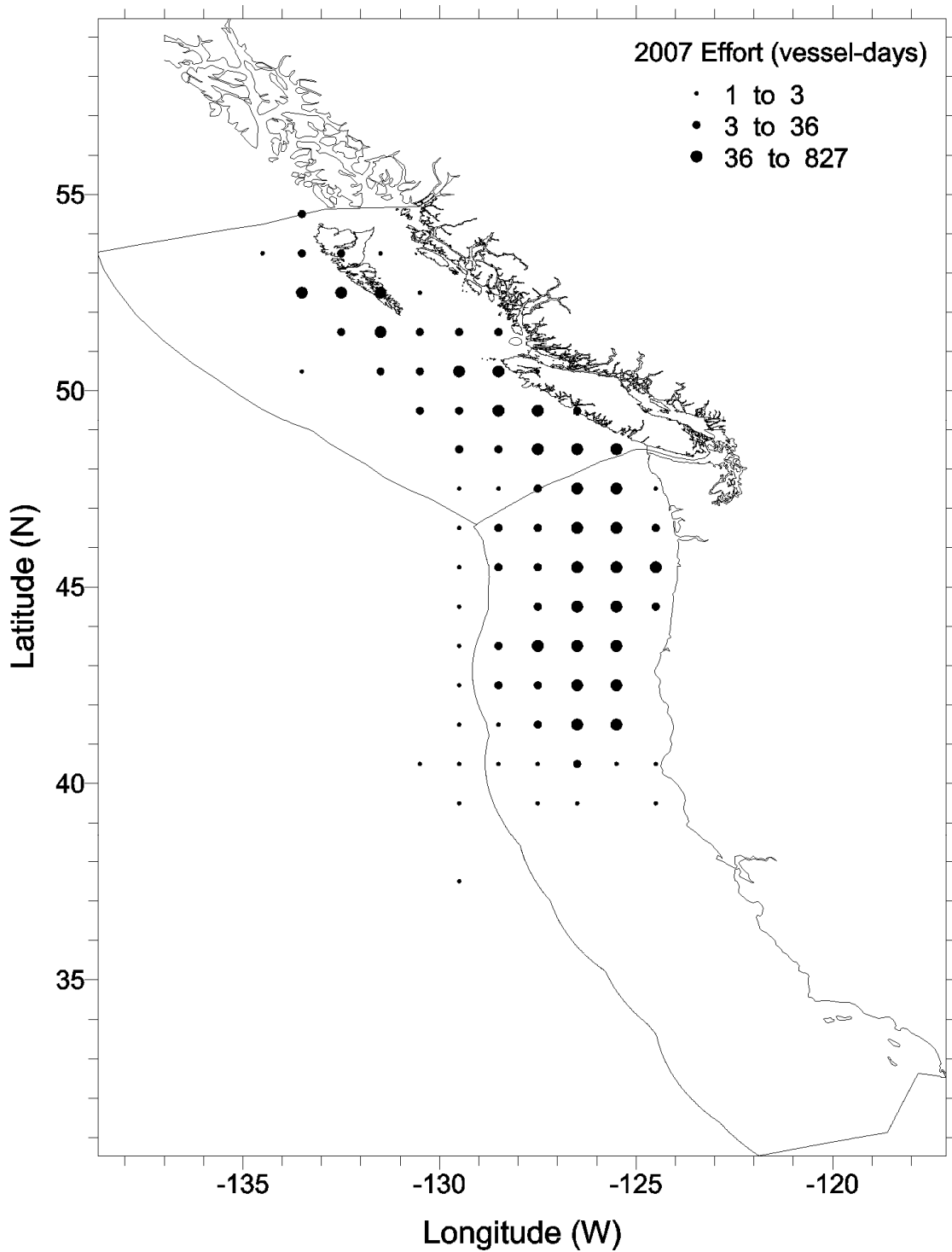


Figure 3. Distribution of the Canadian north Pacific albacore tuna troll effort (vessel-days) in 2007. Symbols are centered in 1° x 1° grid. The map also shows the Exclusive Economic Zones (EEZ) of Canada and the United States.

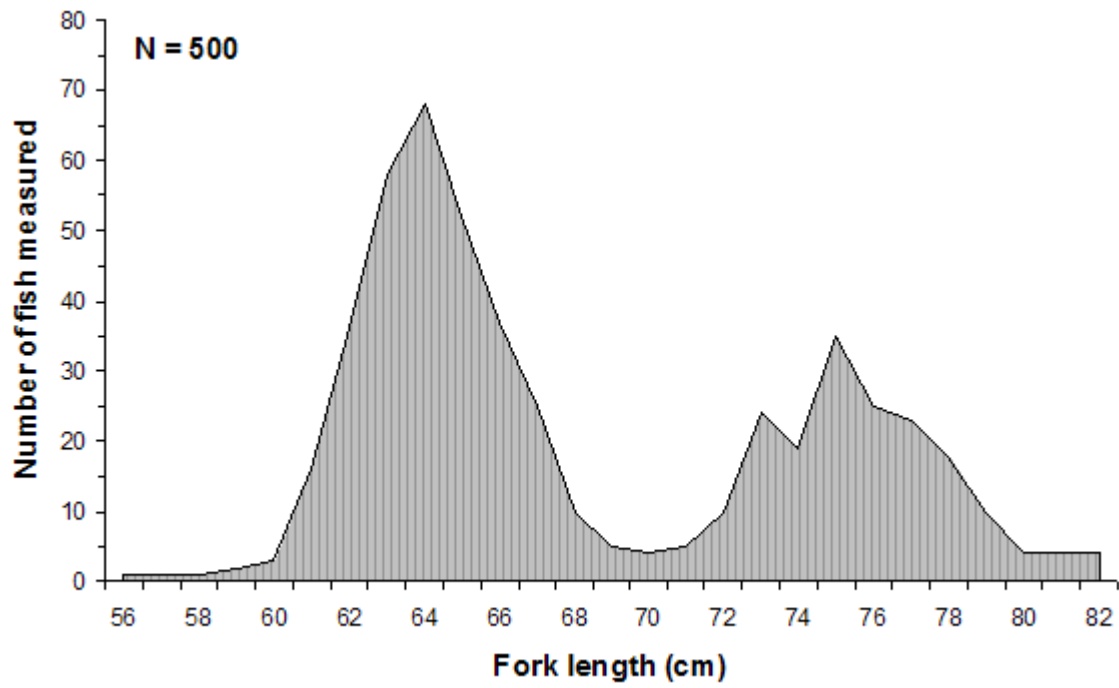


Figure 4. Size composition data of albacore tuna caught in 2007 by the Canadian troll fleet and landed in the United States at ports designated by the bi-lateral Canada-United States tuna treaty. Lengths were obtained from frozen fish by U.S. port samplers.

Table 1. Fishery statistics for the Canadian north Pacific albacore tuna fishery, 1995-2007.

Fishing Season	Total Catch (metric tonnes)	Effort (vessel-days)	Total Unique Vessels	CPUE (kg/v-d)	Logbook Coverage²
1995	1,763	5,930	284	297	22%
1996	3,316	8,151	292	407	28%
1997	2,168	4,324	197	501	38%
1998	4,177	6,018	213	694	51%
1999	2,734	6,969	233	392	74%
2000	4,531	8,769	238	517	70%
2001	5,248	10,021	244	524	81%
2002	5,379	8,323	228	646	81%
2003	6,861	8,429	192	814	98%
2004	7,856	9,943	220	790	95%
2005	4,845	8,565	213	566	94%
2006	5,832	6,243	174	934	99%
2007 ¹	6,040	7,062	196	855	96%
Mean	4,673	7,596	225	611	78%
Maximum	7,856	10,021	292	934	99%
Minimum	1,763	4,324	174	297	22%

¹ 2007 data are preliminary based on v08.05.22 of the *Canadian Albacore Tuna Catch and Effort Relational Database* and v08.02.05 of the codebase.

² (Logbook (reported) Catch/Total Catch) x 100

Table 2. Total Canadian catch (t) of north Pacific albacore tuna in FAO Statistical Areas.

FAO Area	Year					
	2002	2003	2004	2005	2006	2007 ¹
NE Pacific (67)	5,089	6,429	7,696	4,834	5,832	6,039
NW Pacific (61)	152	341	44	11	0	0
EC Pacific (77) ²	138	91	102	0	0	1
Total	5,379	6,861	7,842	4,845	5,832	6,040

¹ Preliminary 2007 data obtained with codebase Version 8.02.05 and Version 8.05.22 of the *Canadian Albacore Tuna Catch and Effort Relational Database*.

² Excludes catch data from south of the equator.