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PART 1: INFORMATION ON FISHERIES, RESEARCH, AND STATISTICS

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CANADA

*Table 1 Column B updated to match catches detailed in the body of the report.

2018 Annual Report to the Western and Central Pacific Fisheries Commission

Canada

PART I. INFORMATION ON FISHERIES, RESEARCH, AND STATISTICS (For 2017)

Fisheries and Oceans Canada
Ecosystems and Science Branch, Pacific Biological Station

Scientific data was provided to the Commission in accordance with the decision relating to the provision of scientific data to the Commission by 30 April 2018	**YES**
If no, please indicate the reason(s) and intended actions:	

1.0 SUMMARY

Canada has one fishery for highly migratory species in the Pacific Ocean, a troll fishery targeting juvenile north Pacific albacore (*Thunnus alalunga*). Catch and effort data from this fishery for 2017 are summarized in this document. Five Canadian flagged vessels entered the north Pacific WCPFC convention area to fish albacore, and no Canadian vessels targeting albacore entered the south Pacific WCPFC convention area in 2017. There was no reported bycatch of, and no reported interactions with pelagic sharks, sea birds, or turtles by this fishery in the WCPFC Convention Area in 2017.

The Canadian troll fleet has operated largely in the eastern Pacific Ocean east of 150°W and north of 30°N since 2007. The 2017 fishery primarily also occurred in the coastal waters of North America, with 10.8% and 3.0% of catch from high seas waters of the north Pacific Ocean beyond the exclusive economic zones (EEZ) of Canada and the United States and the north Pacific WCPFC conventional area, respectively. Annual Canadian catch and effort in the north Pacific within the WCPFC convention area has ranged from 11 to 1,007 metric tons (t) and 17 to 1,017 vessel-days, respectively, between 1995 and 2005. Catch and effort in the south Pacific Ocean by the Canadian albacore troll fleet has ranged between 0 and 313 t and 4 and 348 vessel-days, respectively, from 1995 to 2007. Catch and effort in the north Pacific WCPFC statistical area were negligible (< 1 t of catch and < 5 vessel-days effort annually) in years of 2006-2016. Canadian vessels have not participated in a south Pacific fishery since 2007. However, 55 t of albacore were harvested from the north Pacific WCPFC statistical area by five Canadian vessels fishing for 100 days altogether in 2017.

2.0 TABULAR ANNUAL FISHERIES INFORMATION

This report presents estimates of annual effort and catches of tunas and other highly migratory species (HMS) and vessel participation in Canadian fisheries operating in the Pacific Ocean from 1995 to 2017. The fishery data provided in this report were taken from Canadian Albacore Database version 18.03.21. The data up to 2016 are definitive while the 2017 data are provisional.

The Canadian HMS fishery is a troll fishery using jigs to target juvenile albacore in the Pacific Ocean. Catch and effort data for both the north and south Pacific components of this fishery are reported in Table 1. The preliminary catch and effort estimates for 2017 are 1,831 t of north Pacific albacore and 4,978 vessel-days of effort by 121 troll vessels. The estimated catch is 36% less than in 2015, and effort decreased 7.1% relative to 2016 (Table 1). No effort or catch were reported from the south Pacific Ocean in 2017 (Table 1; Fig. 3).

3.0 BACKGROUND

Canadians have been fishing for albacore in the Pacific Ocean since 1939, but catches were well below 1,000 t annually until the mid-1990s. The Canadian fishery has operated in the north Pacific Ocean between 20 and 55°N and from the North American coast as far west as 170°E and in the south Pacific Ocean between 30 and 45°S and 130-160°W. Although the Canadian fleet will follow albacore into offshore waters, the majority of effort and catch has occurred in the coastal waters of Canada and the United States in the 2000s (Figs. 4 and 5) and few Canadian vessels (< 3) operated in the WCPFC northern statistical area in 2005- 2016 (Fig. 2). Canadian participation in the south Pacific albacore fishery ceased after the 2007 season (Table 2; Fig. 2). Management regulations for Canadian vessels are documented in the Albacore Tuna Integrated Fisheries Management Plan (IFMP) http://waves-vagues.dfo-mpo.gc.ca/Library/40597386.pdf, which covers a 3 year period from 01 April 2017 to 31 March 2019.

4.0 FLAG STATE REPORTING OF NATIONAL FISHERIES

4.1 Canadian Albacore Troll Fishery

The Canadian troll fishery operating in the WCPFC statistical areas experienced a significant decline in participation in the 2000s (Table 2; Fig. 2), declining from 15 fishing vessels in 2003 to 1 vessel in 2005 (Fig. 2). No vessel participated in albacore fishing in the WCPFC statistical areas in most of the years between 2006 and 2016. Only one or two vessels fished there in 2011-2013, and reported minimal albacore catch (Fig. 1). However, 5 Canadian fishing vessels entered the north Pacific WCPFC convention area, altogether fishing for 100 days and catching 55 t of albacore in 2017. Participation in the south Pacific albacore fishery never exceeded five vessels and ceased after the 2007 fishing season (Table 2; Fig. 2).

Canada implemented a catch sampling program in 2009 to obtain size composition data from the Canadian troll fishery. These data are collected by harvesters who record the lengths of the first 10 fish landed on a daily basis. The target sampling rate is 1% of the total reported catch and has been achieved every year (Table 3). Forty-two (42) vessels participated in 2017 and turned in 10,517 fork length (FL) measurements of juvenile north Pacific albacore, for a sampling rate of 3.6%. The 2017 data are dominated by a mode at 66-68 cm FL.

4.2 Interactions with other Species in the WCPFC Convention Area

There were no reported interactions or bycatch of pelagic sharks, seabirds, or sea turtles by the Canadian fishery in the WCPFC convention area in 2017.

4.3 Swordfish

Canadian-flagged vessels or Canadian vessels under charter, lease or similar arrangements operating as part of the domestic Canadian fishery, did not fish for or catch swordfish (*Xiphias gladius*) south of 20°S during the 2000-2017 period.

5.0 COASTAL STATE REPORTING

Canada is not a coastal state within the WCPFC Convention Area.

6.0 SOCIO-ECONOMIC FACTORS

Vessels participating in the Canadian fishery are primarily salmon troll vessels and most are between 11 and 18 m in length. Fishing effort by these vessels occurs primarily within the Canadian and United States EEZs from the southern Oregon to the northern tip of Vancouver Island (Fig. 4 and 5). Several vessels greater than 18 m in length are able to access offshore waters and remain at sea for several months.

Fishing activity is dependent on price, ocean and weather conditions, availability of albacore, strength of other fisheries (particularly the salmon fishery) and fuel costs. Effort in the coastal fishery normally peaks in August and September, after the salmon troll season has wound down. High fuel prices coupled with an apparent increase in the availability albacore closer to North America and uncertainty concerning conditions in the mid- Pacific were probably factors in the contraction of the operational area that began in the 2000s. However, catch and catch rate are particularly low in the coastal waters in 2017, possibly resulting in an expansion of the operational area relative to the past few years (Fig. 4 and 5). Two Canadian vessels fished in waters off the South California coast in 2017.

The main factor affecting the operation of the Canadian albacore troll fishery are the terms of the fishing regime in the bilateral Canada-United States Albacore Treaty. The most recent fishing regime ended 31 December 2016 and was subsequently renewed with the same terms for a further three years (2017-2019). This fishing regime limits the number of Canadian vessels in US waters to 45 between June 15 and September 15 annually. The limited vessel entry and compressed fishing season have led to an increased emphasis on fishery operations in Canadian waters. For example, catch and effort were split primarily between the Canadian EEZ (55% of the catch and 64% of the effort) and US EEZ (44% of the catch and 35% of the effort) in 2016. However, the poor catch and catch rate appear to have altered this fishing pattern in 2017. Canadian harvesters spent, respectively, 27% and 58% of the total effort in the Canadian EEZ and the US EEZ, obtaining 11% and 75% of the total catch in these two EEZs, respectively.

7.0 DISPOSAL OF CATCH

Canadian troll vessels are equipped with freezers to blast freeze albacore for both foreign and domestic sashimi and loin markets. The majority of catch is off-loaded at domestic ports, with Victoria and Ucluelet handling over 70% of the total annual landings. Ports in the United States designated by the bilateral treaty, especially Ilwaco WA and Newport OR, handle the remaining landings. Small amounts of frozen fish (<<1 t) are occasionally sold directly to the public through dock-side sales or are kept for personal use. These sales are recorded in logbooks and included in catch estimates for this fishery.

8.0 ONSHORE DEVELOPMENTS

There were no notable developments in 2017.

9.0 FUTURE PROSPECTS OF THE FISHERY

In 2016, Canadian catch of north Pacific albacore decreased substantially despite an increase in effort relative to previous years. The 2017 fishery still saw a further decline in catch and catch rate. Both catch and catch rate are nearly as low as the lowest catch and catch rate observed since 1995. Canadian troll fishing area expanded in 2017 relative to the past few years. Five Canadian vessels fished in the north Pacific WCPFC convention area, and two Canadian vessels fished in waters off the South California coast in 2017.

The dominant demographic in the Canadian troll fishery is comprised of participants who are either retired or near retired and looking to get out of the fishery. The increasing importance of effort and catch in Canadian waters has resulted in new temporary participants, but a younger cohort of participants is not well developed in this fishery at present.

10.0 STATUS OF FISHERY DATA COLLECTION SYSTEM

10.1 Logbook Data Collection and Verification

Canadian albacore catch and effort data are compiled from hail records, logbooks, and sales slips from buyers and processing plants and stored in a relational database (Stocker et al. 2007). This database contains all fishery-related data from 1995 to the present and provides the best estimate of total annual catch and effort by temporal and geographic strata.

All vessels are required to hail (call) a third party service provider when they start and stop fishing and when they change zones, consisting of the Canadian EEZ, US EEZ, and the high-seas outside the EEZs. Hail data are used to estimate the number of vessels participating in the fishery and the approximate area of these activities in-season (Stocker et al. 2007).

Canadian vessels must carry logbooks and record daily catch (number of fish and estimated weight of both retained and released albacore), albacore length measurements, fishing location (stop and start latitudes and longitudes), and effort (number of jigs, hours fished). Catches and the disposition (retained or released) of non-target species are also recorded in logbooks Completed copies of the logbooks must be returned for data entry after fishing is terminated or by mid-November, whichever is first (see Stocker et al. 2007).

Sales slips provide the most accurate estimates of albacore catch weight because these data are the basis for payment. Harvesters record a sales slip ID number in their logbooks for each trip and once sales slips are returned by buyers and processors to Fisheries and Oceans Canada, they are matched against each trip using the ID number recorded in the logbook and substituted for the estimated weights recorded in logbooks. This reconciliation process is the primary tool used to verify logbook data.

The annual catch and effort data shown in Table 1 represent expanded (or raised) rather than reported values (see Stocker 2007) and were obtained from Version 18.03.21 of the Canadian database. The amount of expansion needed to arrive at these figures can be determined from the annual logbook coverage figures shown in Table 1. The vessel participation data (Table 2) represent the number of unique vessels as determined from the hail, logbook, and sales slip data

streams. Catch and effort distribution data (Figs. 3 and 4) are based on logbook data and are not expanded to account for non-reporting vessels.

10.2 Observer Programme

Canada does not have an observer program for its albacore troll fleet.

10.3 Port Sampling

Canada does not have a port sampling program to measure albacore fork lengths or other biological information during domestic off-loads. Prior to 2009, some vessels unloading in US ports had portions of their catch sampled by US port samplers and these data were made available to Canada. The record of port sampled length frequency data is discontinuous from 1984 to 2008.

10.4 Unloading/Transhipment

At-sea transshipment or in-port transshipment activities were not reported by the Canadian albacore troll fleet in 2017.

11.0 RESEARCH ACTIVITIES

A study was conducted to examine correlations between albacore catch rates from the Canadian fishery and two climatic indices, the North Pacific Gyre Oscillation (NPGO) and the Pacific Decadal Oscillation (PDO) (Zhang 2018). The NPGO and the PDO appear to combine to control low-frequency upwelling and alongshore transport dynamics in the North Pacific sector (Di Lorenzo et al. 2013). The NPGO also closely reflected inter-annual variations in ocean nutrients (Di Lorenzo et al., 2008). As a result, the NPGO may have a positive influence on the survival of small albacore. A positive and significant correlation was found between the catch rates and the NPGO indices with 4 or 5 years in a time lag. However, the NPGO only explains about 35% of the variation in catch rates. Correlations between catch rates and the PDO indices appeared to be negative but not statistically significant.

12.0 LITERATURE CITED

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Di Lorenzo, E., Schneider, N., Cobb, K.M., Franks, P.J.S., Chhak, K., Miller, A.J., McWilliams, J.C., Bograd, S.J., Arango, H., Curchitser, E., Powell, T.M., and Rivière, P. 2008. North Pacific Gyre Oscillation links ocean climate and ecosystem change. Geophys. Res. Lett., 35, L08607, doi:10.1029/2007GL032838.

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.

Zhang, Z. 2018. Correlations between Climatic indices (NPGO and PDO) and Abundance of Albacore Tuna in Waters off Northwest Coast of North America. ISC/18/ALBWG-01.

http://isc.fra.go.jp/reports/alb/alb_2018_1.html

Table 1. Catch and effort statistics for the Canadian troll fishery targeting albacore in the WCPFC convention area, 1995 to 2017. A 0 means no reported data.

		North Pacific[A]		WCPFC CA[B]		South Pacific	
Year	Logbook Coverage (%)[D]	Catch (t)	Effort (v-d)	Catch (t)	Effort (v-d)	Catch (t)	Effort (v-d)
1995	18	1,761	5,923	23	17		
1996	24	3,321	8,164	811	523	82	168
1997	30	2,166	4,320	1,007	1,017	149	171
1998	50	4,177	6,018	752	455	167	111
1999	71	2,734	6,970	151	327	254	197
2000	68	4,531	8,769	586	608	313	348
2001	81	5,248	10,021	569	383	208	168
2002	74	5,379	8,323	259	250	144	158
2003	96	6,861	8,429	453	389	0	4
2004	92	7,857	9,942	123	159	63	67
2005	94	4,829	8,564	11	57	72	111
2006	95	5,833	6,243	0	0	135	105
2007	92	6,040	6,902	0	0	30	59
2008	93	5,464	5,774	0	0	0	0
2009	97	5,693	6,540	0	0	0	0
2010	96	6,527	7,294	0	0	0	0
2011	98	5,415	8,605	1	0	0	0
2012	99	2,498	6,005	<1	2	0	0
2013	99	5,090	6,469	<1	4	0	0
2014	100	4,780	4,745	0	0	0	0
2015	99	4,391	5,244	0	0	0	0
2016	100	2,842	5,359	0	0	0	0
2017[C]	100	1,831	4,978	55	100	0	0

A – Total catch and effort in the north Pacific, including catch and effort within the WCPFC convention area

B – North Pacific albacore catch and effort west of 150 °W longitude (inside the WCPFC convention area).

C – Provisional estimates from Canadian database version 18.03.21.

D - Logbook coverage is calculated as the number of vessels returning logbooks divided by the total number of vessels known to be fishing based on hail, sales slip and logbook records.

Table 2. Number of Canadian troll vessels active in the WCPFC Convention Area for 1995-2016.

Year	North Pacific[A]	North Pacific – WCPFC Statistical Area	South Pacific
1995	287	3	3
1996	295	25	3
1997	200	32	3
1998	214	27	3
1999	238	14	5
2000	243	12	5
2001	248	7	4
2002	232	7	4
2003	193	15	1
2004	221	5	1
2005	213	1	2
2006	174	0	2
2007	207	0	1
2008	134	0	0
2009	138	0	0
2010	159	0	0
2011	177	2	0
2012	175	2	0
2013	183	1	0
2014	160	0	0
2015	164	0	0
2016	152	0	0
2017[C]	121	5	0

A - Total number of Canadian vessels in the north Pacific Ocean, including vessels accessing the WCPFC Convention Area.
B – Canadian vessels that reported entering the WCPFC Convention Area.
C – Provisional estimates from Canadian database version 18.03.21.

Table 3. Summary of size (fork length, FL) sampling program results for the Canadian albacore troll fishery, 2009-2017. More than 99% of the fish measured were captured outside of the WCPFC Convention Area.

Year	Sample Size, N	Min FL (cm)	Mean FL (cm)	Max FL (cm)	Standard Deviation (cm)	Reported Catch (pieces)	Sampling Rate
2009	14,723	46.0	68.2	98.0	5.7	955,553	1.54%
2010	9,882	51.0	71.5	90.0	6.7	927,051	1.07%
2011	14,263	50.0	69.9	90.0	6.4	830,336	1.72%
2012	11,139	43.0	70.2	100.0	5.6	371,279	3.00%
2013	17,150	45.0	71.2	105.0	5.7	765,929	2.24%
2014	11,208	43.0	72.5	102.0	6.4	699,395	1.60%
2015	13,258	45.0	67.6	107.0	6.4	750,395	1.77%
2016	14,189	47.0	70.6	94.0	5.8	446,091	3.18%
2017	10,517	50.0	68.9	96.0	5.5	296,305	3.55%

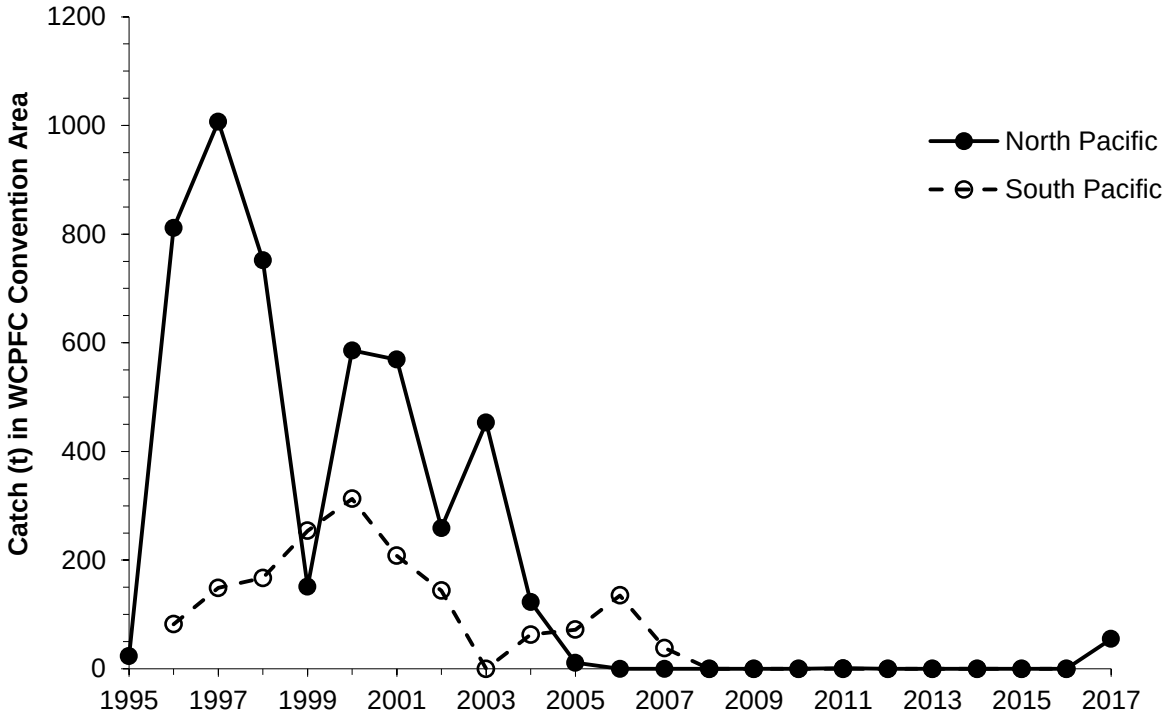

Figure 1. Historical annual catch of albacore by the Canadian troll fleet in the WCPFC Convention Area in the north Pacific Ocean west of 150°W and the south Pacific Ocean for 1995 to 2017. The provisional catch estimate for 2017 is 55 t. (see Table 1).

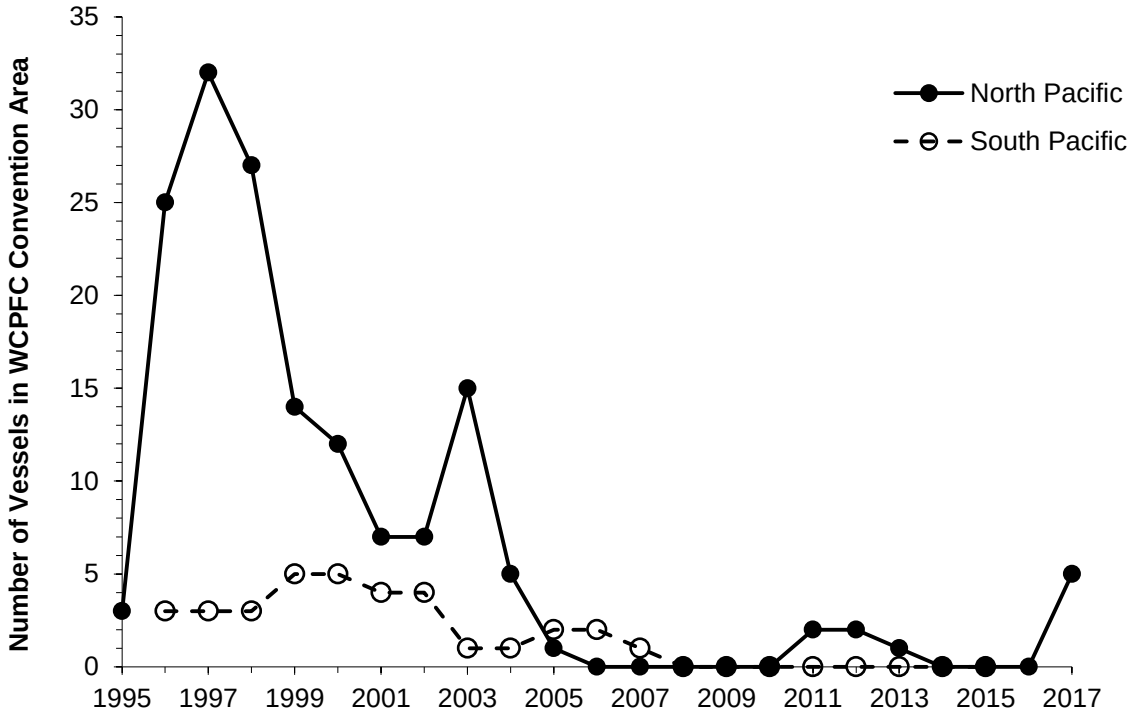

Figure 2. Historical annual vessel numbers for the Canadian troll fleet targeting albacore in the WCPFC Convention Area in the north Pacific Ocean west of 150°W and the south Pacific Ocean for 1995 to 2017. Canadian vessels have not reported fishing in the south Pacific Ocean since 2006.

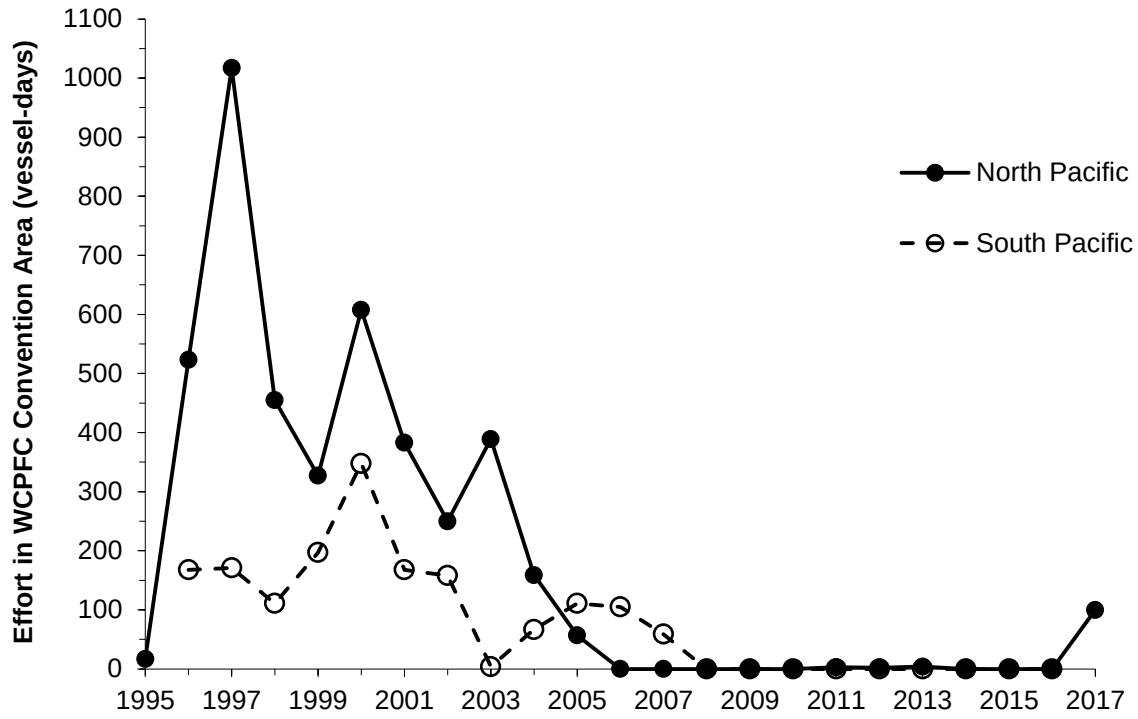

Figure 3. Historical annual fishing effort for the Canadian troll fleet targeting albacore in the WCPFC Convention Area in the north Pacific Ocean west of 150°W and the south Pacific Ocean for 1995 to 2017. Canadian vessels have not reported fishing in the south Pacific Ocean since 2006.

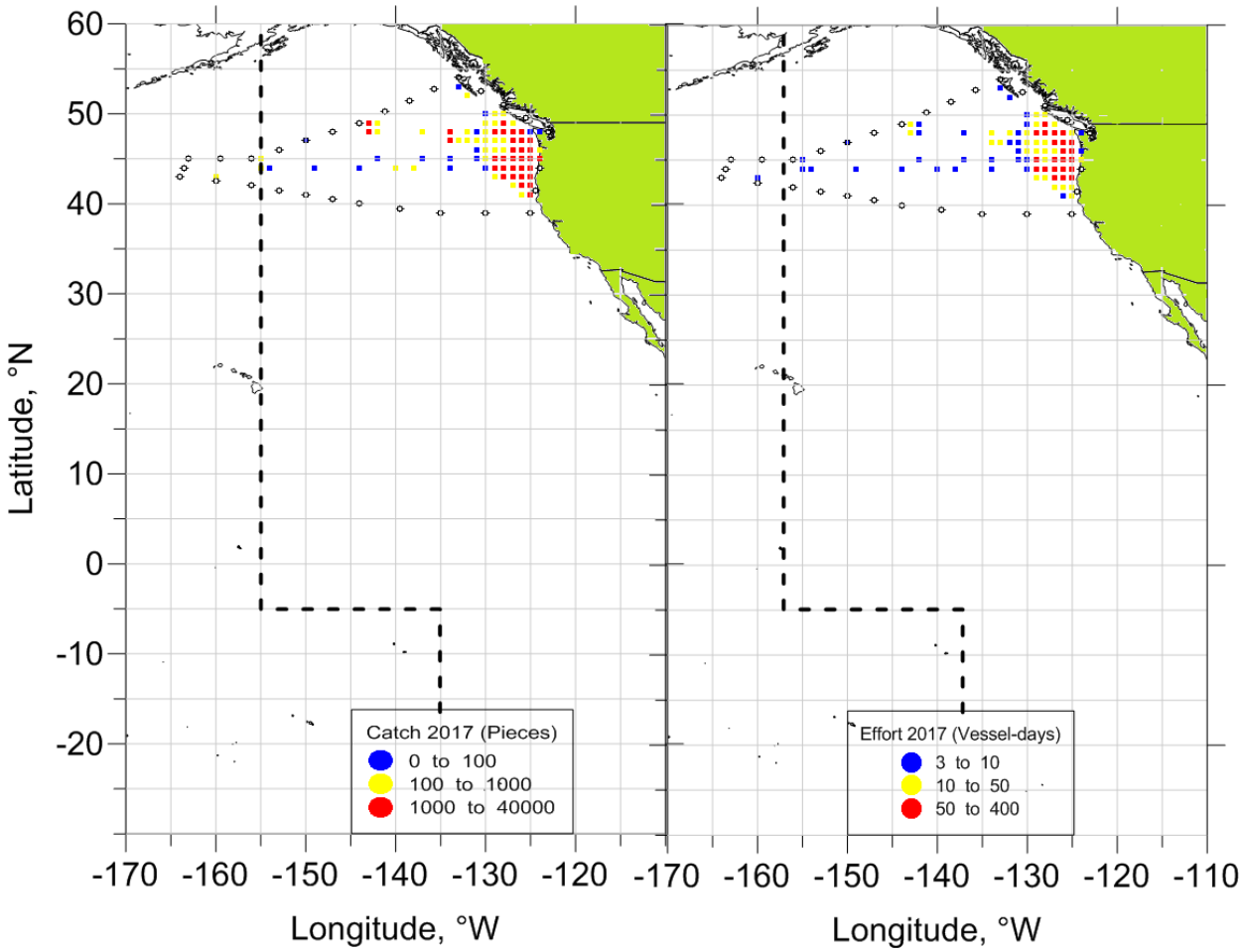

Figure 4. Annual distribution of albacore catch (left) and effort (right) by the Canadian troll fleet active in the Pacific Ocean for 2017. Data are plotted on a 1° x 1° grid with symbols located on the bottom-right corner of each cell. Cells in which fewer than three vessels reported are not shown to preserve data confidentiality. Empty dots approximate the border line of the operational area of the Canadian fishery in 2017. Dashed line is the WCPFC Convention Area boundary.

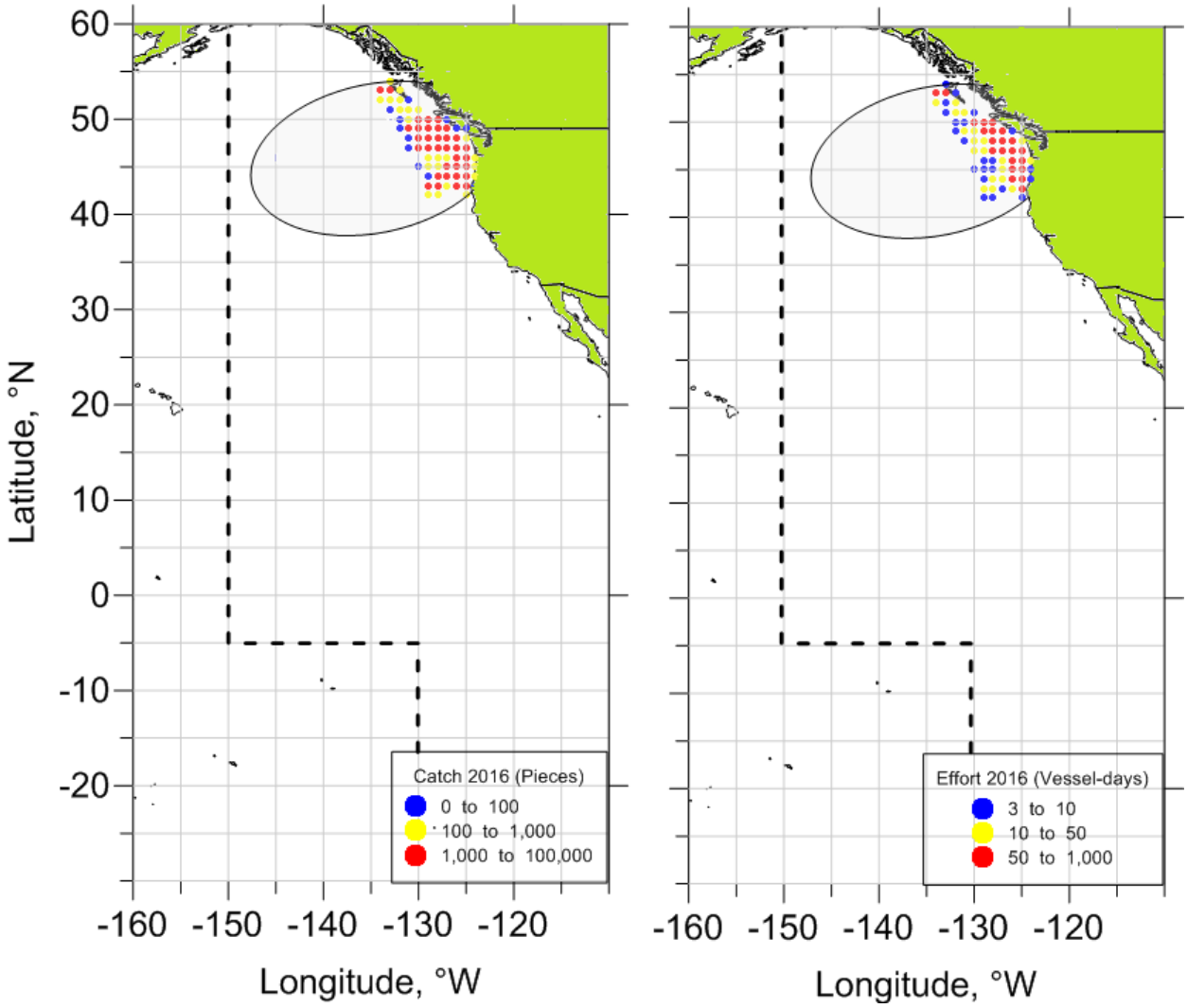

Figure 5a. Annual distribution of albacore catch (left) and effort (right) by the Canadian troll fleet active in the Pacific Ocean for 2016. Data are plotted on a 1° x 1° grid with symbols located on the bottom-right corner of each cell. Cells in which fewer than three vessels reported are not shown to preserve data confidentiality. Grey area is the approximate operational area of the Canadian fishery in 2016. Dashed line is the WCPFC Convention Area boundary.

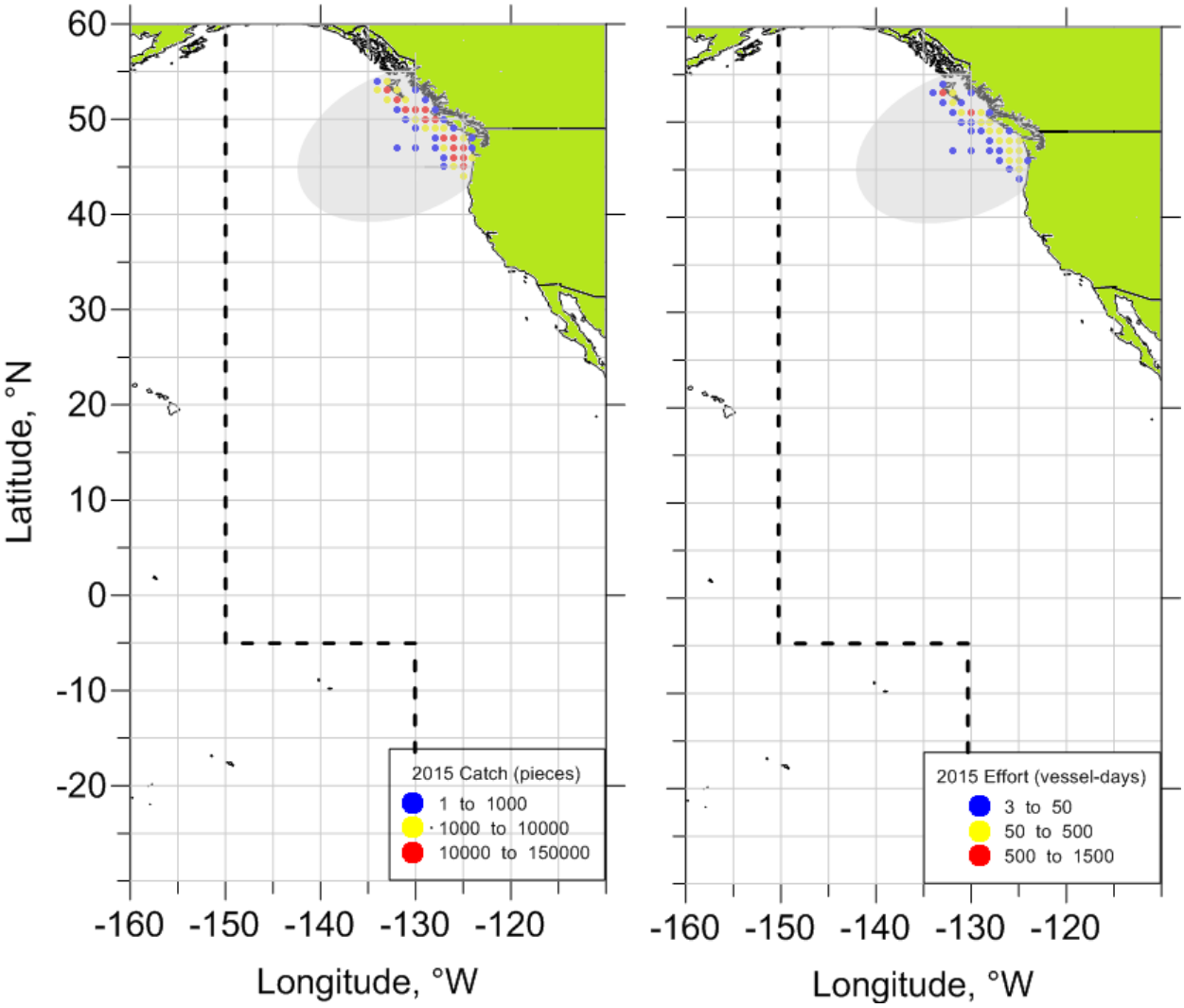

Figure 5b. Annual distribution of albacore catch (left) and effort (right) by the Canadian troll fleet active in the Pacific Ocean for 2015. Data are plotted on a 1° x 1° grid with symbols located on the bottom-right corner of each cell. Cells in which fewer than three vessels reported are not shown to preserve data confidentiality. Grey area is the approximate operational area of the Canadian fishery in 2015. Dashed line is the WCPFC Convention Area boundary.

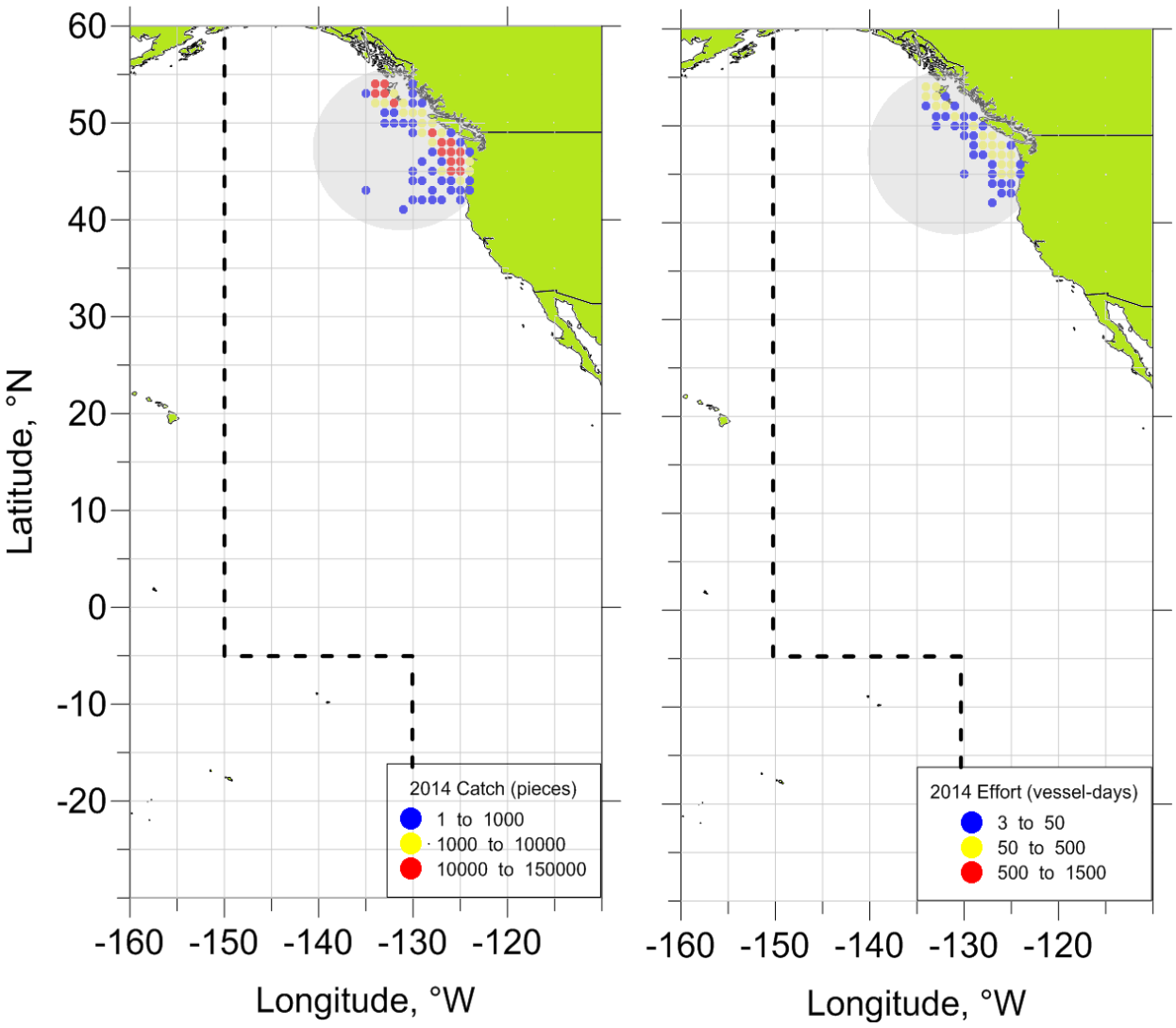

Figure 5c. Annual distribution of albacore catch (left) and effort (right) by the Canadian troll fleet active in the Pacific Ocean for 2014. Data are plotted on a 1° x 1° grid with symbols located on the bottom-right corner of each cell. Cells in which fewer than three vessels reported are not shown to preserve data confidentiality. Grey area is the approximate operational area of the Canadian fishery in 2014. Dashed line is the WCPFC Convention Area boundary.

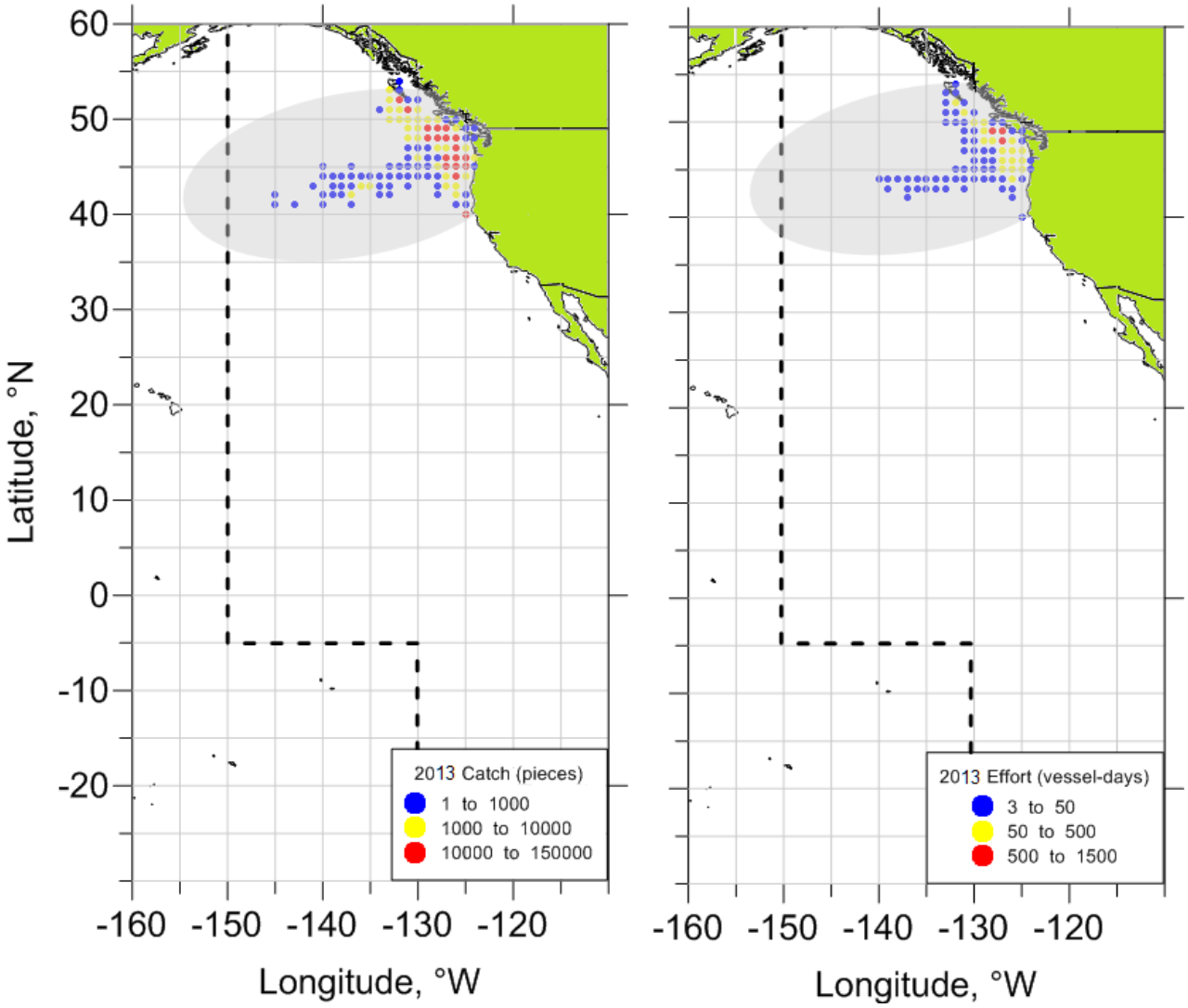

Figure 5d. Annual distribution of albacore catch (left) and effort (right) by the Canadian troll fleet active in the Pacific Ocean for 2013. Data are plotted on a 1° x 1° grid with symbols located on the bottom-right corner of each cell. Cells in which fewer than three vessels reported are not shown to preserve data confidentiality. Grey area is the approximate operational area of the Canadian fishery in 2013. Dashed line is the WCPFC Convention Area boundary.

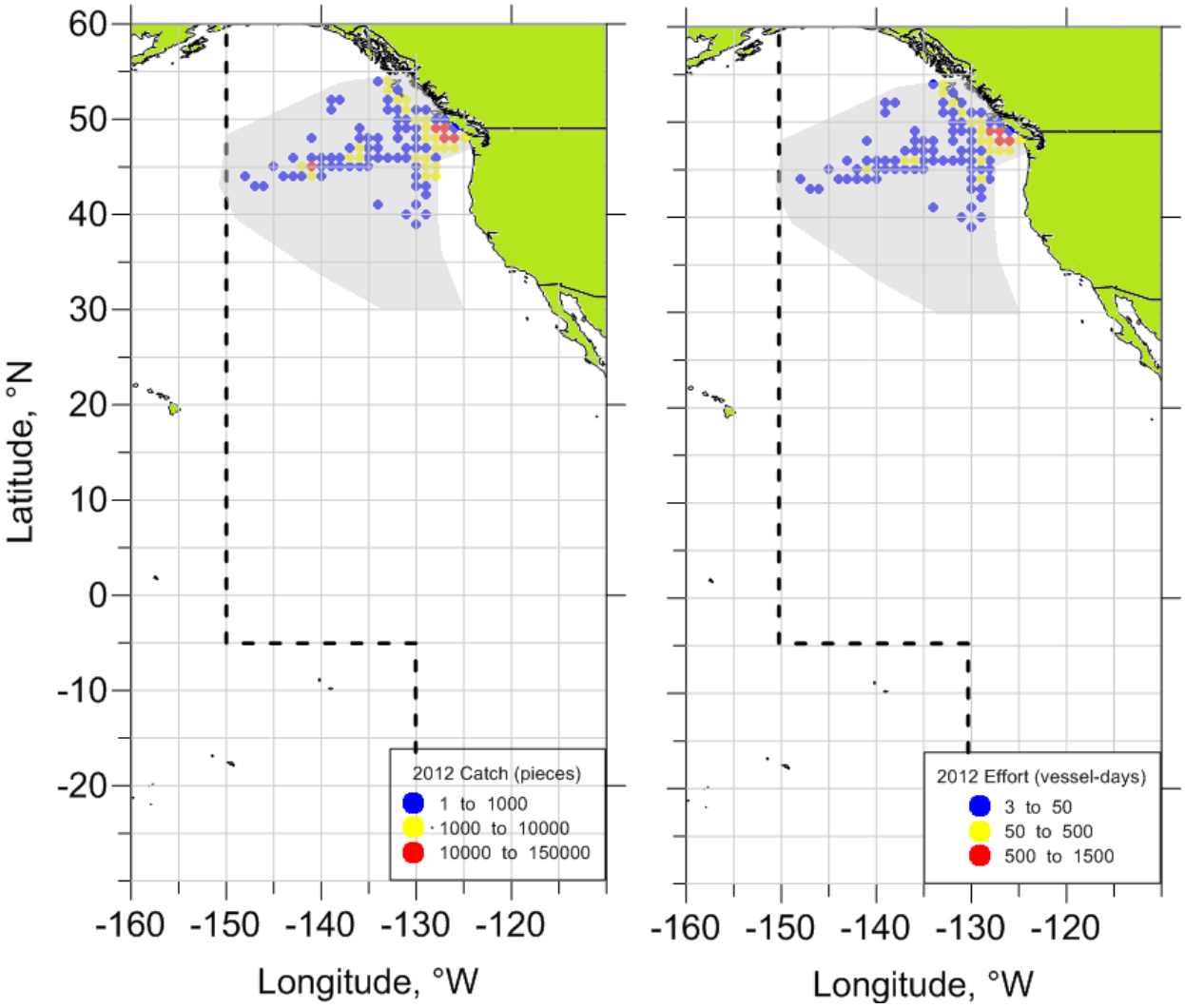

Figure 5e. Annual distribution of albacore catch (left) and effort (right) by the Canadian troll fleet active in the Pacific Ocean for 2012. Data are plotted on a 1° x 1° grid with symbols located on the bottom-right corner of each cell. Cells in which fewer than three vessels reported are not shown to preserve data confidentiality. Grey area is the approximate operational area of the Canadian fishery in 2012. Dashed line is the WCPFC Convention Area boundary.

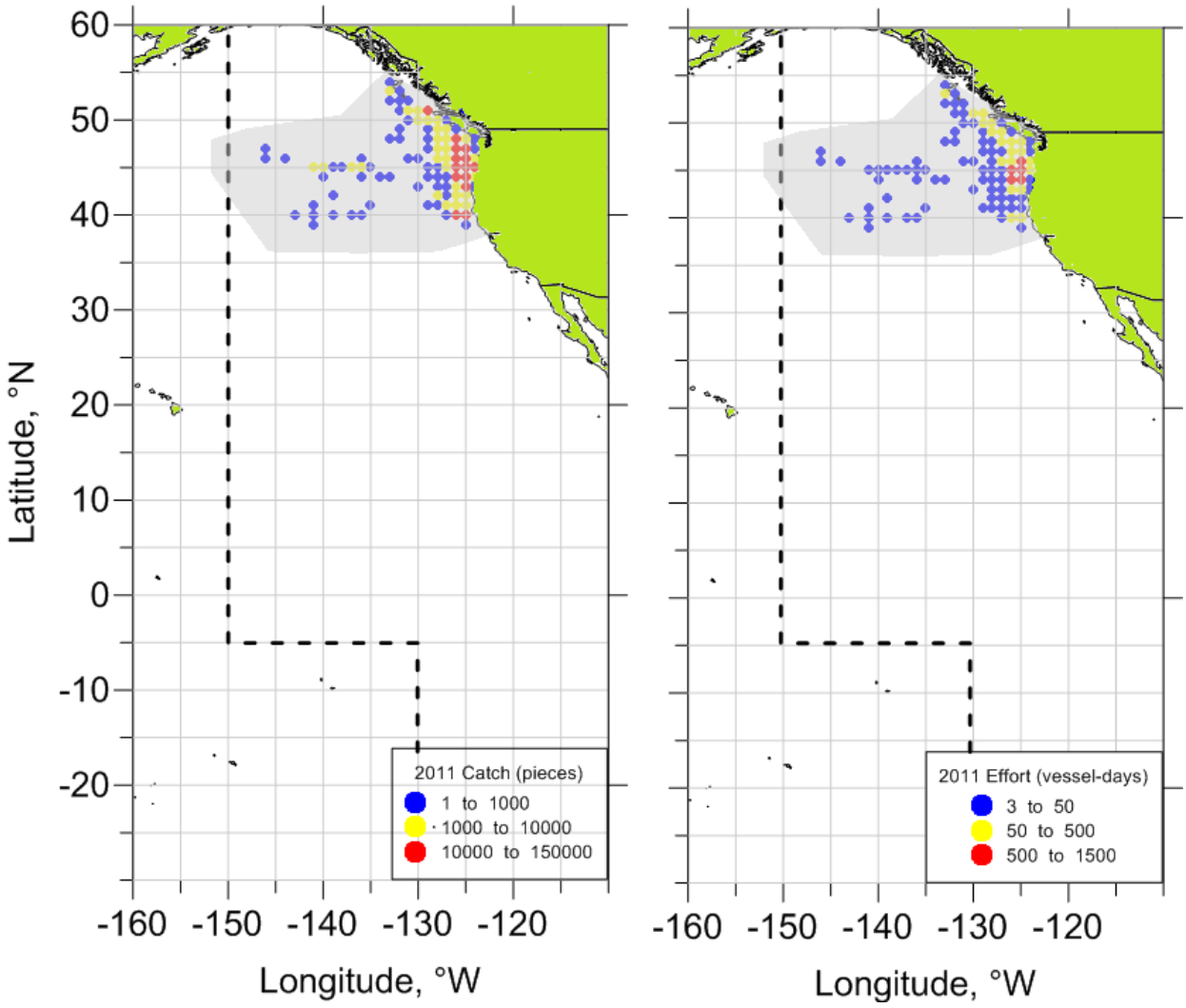

Figure 5f. Annual distribution of albacore catch (left) and effort (right) by the Canadian troll fleet active in the Pacific Ocean for 2011. Data are plotted on a 1° x 1° grid with symbols located on the bottom-right corner of each cell. Cells in which fewer than three vessels reported are not shown to preserve data confidentiality. Grey area is the approximate operational area of the Canadian fishery in 2011. Dashed line is the WCPFC Convention Area boundary.