Blue shark (*Prionace glauca*) bycatch statistics in Canadian fisheries[1]

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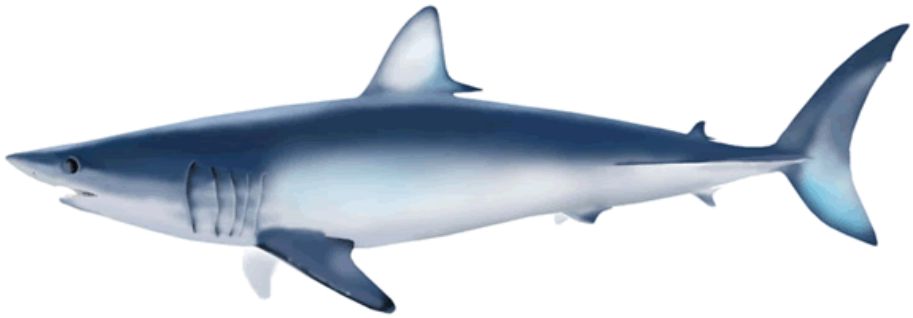

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[1]Working document submitted to the ISC Shark Working Group Workshop, 28 November – 3 December, NOAA Southwest Fisheries Science Center, La Jolla, California U.S.A.
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There are no targeted blue shark (*Prionace glauca*) fisheries conducted within Canadian waters, as such there are no landing statistics. All commercial fisheries in Canada are covered by a dockside monitoring program which provides validated landing statistics to verify zero landings of blue sharks. Blue shark are encountered as bycatch in a number of Canadian fisheries including groundfish trawl and longline fisheries, salmon (*Oncorhynchus* spp.) troll, gillnet and seine fisheries, tuna (*Thunnus alalunga*) troll fisheries and recreational fisheries. Currently, only the groundfish trawl and longline fisheries have 100% observer coverage, with either at-sea observers or electronic monitoring. Blue shark bycatch from other commercial fisheries rely solely on fisher logbook data. Recreational fisheries are monitored by creel survey programs.

Groundfish trawl and longline fisheries

Since 1996, all groundfish bottom and midwater trawl fisheries have 100% at-sea observer coverage. Blue shark are encountered year round in the groundfish trawl fishery, with the majority of encounters occurring in August and September. The catch is concentrated along the west and north coasts of Vancouver Island (Figure 1). From 1996-2010 there have been a total of 2.67 tonnes of blue sharks caught by the trawl fleet resulting in a mean of 0.18 tonnes annually (Table 1).

Longline gear is used to fish for rockfish (*Sebastes* spp.), sablefish (*Anoplopoma fimbria*), spiny dogfish (*Squalus suckleyi*) , lingcod (*Ophiodon elongatus*) and Pacific halibut (*Hippoglossus stenolepis*). The majority of blue shark captured by longline gear are encountered in the Pacific halibut fishery. The longline groundfish fleets are not permitted to fish for or retain blue sharks and therefore all catch records are from either logbook data filled out by fishers or in recent years from the observer program. Records for blue shark began in 1998. An observer program began in 2001 with a maximum coverage of 15% in the hook and line fisheries. In 2006, all longline vessels were required to utilize electronic video monitoring of catch for all fishing events. Generally, blue shark bycatch is recorded as a weight (kg), however for some fishing events that recorded bycatch in pieces those records were converted using the average recorded weight (21.07 kg).

Blue shark are encountered May through October, with the majority of encounters occurring in August and September. Blue shark are encountered along the shelf break, with the majority of longline bycatch occurring off the west coast of the Haida Gwaii (Figure 2). Bycatch varies greatly by year, with a maximum of approximately 19 tonnes in 2006 and a minimum of less than 1 tonne in several years (Table 1). Approximately 5.5 tonnes of blue shark are encountered by groundfish longline gear annually.

Salmon troll, gillnet and seine fisheries

Blue shark bycatch data in the salmon fisheries are available beginning in 2001. Bycatch is recorded as pieces, and the average weight recorded in the groundfish longline fisheries (21.07 kg) was used to convert to bycatch as weight. Estimates of bycatch are low in this fishery, with a mean of 0.24 tonnes annually.

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Tuna troll fisheries

Fisher logbook records for bycatch of sharks in general began in 1996, however only 7 records of shark bycatch have been reported through 2010. Only three records of blue shark bycatch have been made: 1 shark in 1999 in Oregon waters, and 2 sharks in 2003 – one in Oregon waters and one in British Columbia waters. It is highly unlikely that such as low levels of blue shark bycatch occurs in the tuna troll fishery, and these data should be viewed as incomplete. In 2011 all tuna fishers received a species identification guide to aid in the identification of shark species. Additionally, conditions of Marine Stewardship Certification requires accurate accounting of all bycatch species. In 2011, Canada made efforts to improve the recording of bycatch species in fisher logs. Preliminary bycatch statistics for the 2011 tuna troll fishery recorded 8 blue sharks captured and released.

Recreational fisheries

Recreational fisheries do not target blue shark, and as of 2010 recreational fishers are not permitted to retain blue sharks. Recreational fisheries occur mainly in summer, and are executed relatively close to shore. However, off the west coast of Vancouver Island, some effort occurs as far as 40 nautical miles from shore. Recreational catches (retained and discarded) are estimated with creel survey programs, with dockside interviews. Aerial boat counts are used to expand interview data to provide annual catch estimates. However creel interviews collect limited information on blue shark bycatch and annual estimates cannot be made. From 2007-2010, 20 blue sharks were reported through creel interviews as captured and released off the west coast of Vancouver Island. No length or sex data are available.

Table 1: Bycatch (tonnes) and catch per unit effort (for encounters only) of blue shark in Canadian commercial fisheries by gear type (groundfish trawl, groundfish longline, salmon troll, gillnet and seine combined). Catch per unit effort is not available for the salmon fisheries.

	Trawl		Longline		Salmon
Year	Bycatch (tonnes)	CPUE (kg/hour)	Bycatch (tonnes)	CPUE (kg/100 hooks)	Bycatch (tonnes)
1996	0.34	0.25			
1997	0.37	0.59			
1998	0.46	0.16	0.93	92.7	
1999	0.26	0.16	0.42	10.3	
2000	0.44	0.12	0.74	8.0	
2001	0.09	0.11	3.79	63.3	0.86
2002	0.09	0.13	5.66	35.4	0.13
2003	0.04	0.13	7.76	43.2	0.32
2004	0.05	0.29	4.04	26.3	0.04
2005	0.01	0.01	0.08	1.7	0.08
2006	0.26	0.68	19.15	6.7	0.57
2007	0.13	0.06	8.9	6.4	0.25
2008	0		5.56	5.3	0

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2009	0		8.09	5.7	0.11
2010	0.12	0.43	7.02	6.5	0
Total	2.67		72.15		2.36
Mean	0.18		5.55		0.24
Max	0.46		19.15		0.86
Min	0		0.08		0

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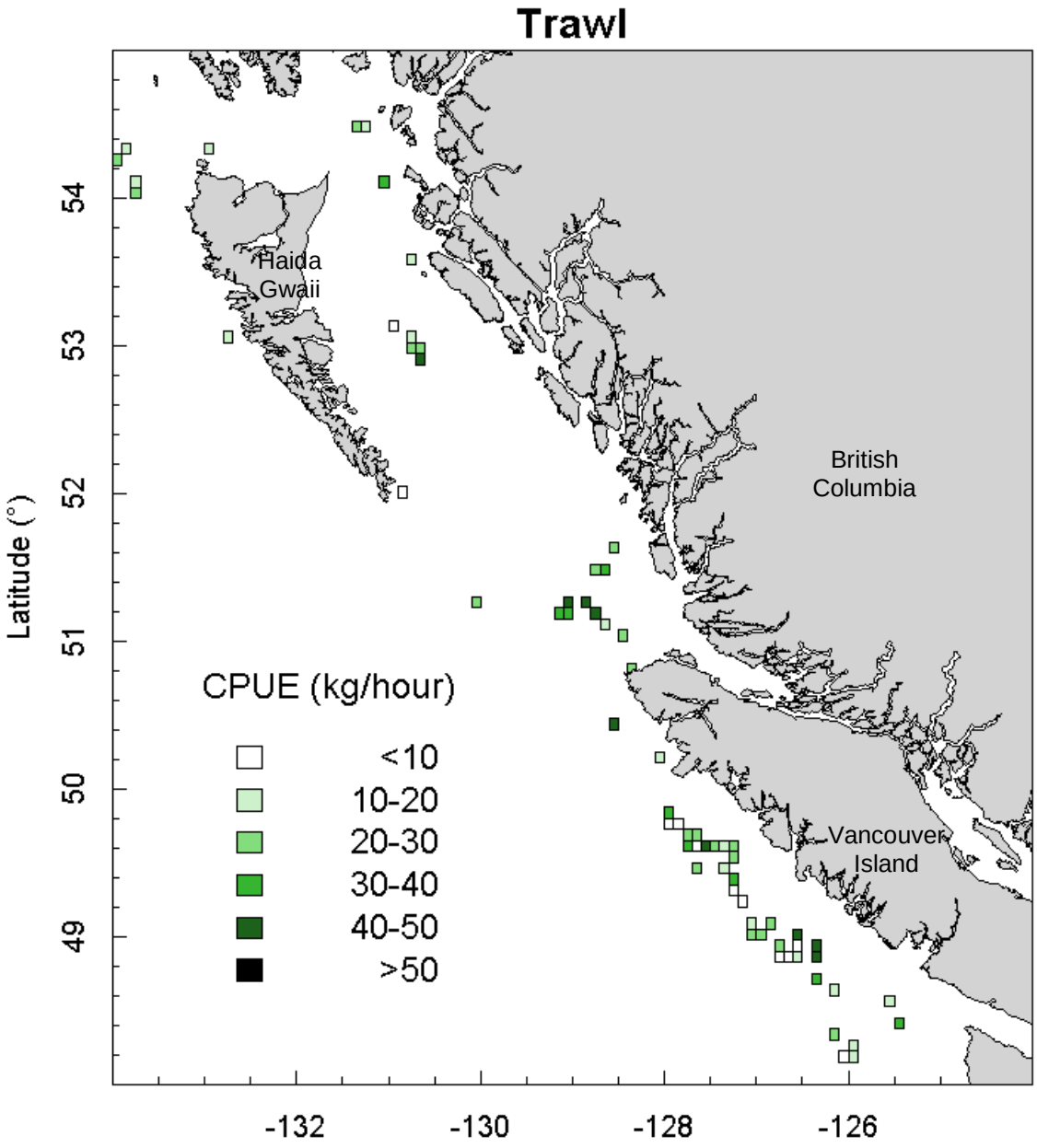

Figure 1. Mean catch per unit effort (CPUE, kg per hour) with 0.2º by 0.2º grid of blue shark in the Canadian groundfish trawl fishery from 1996-2010.

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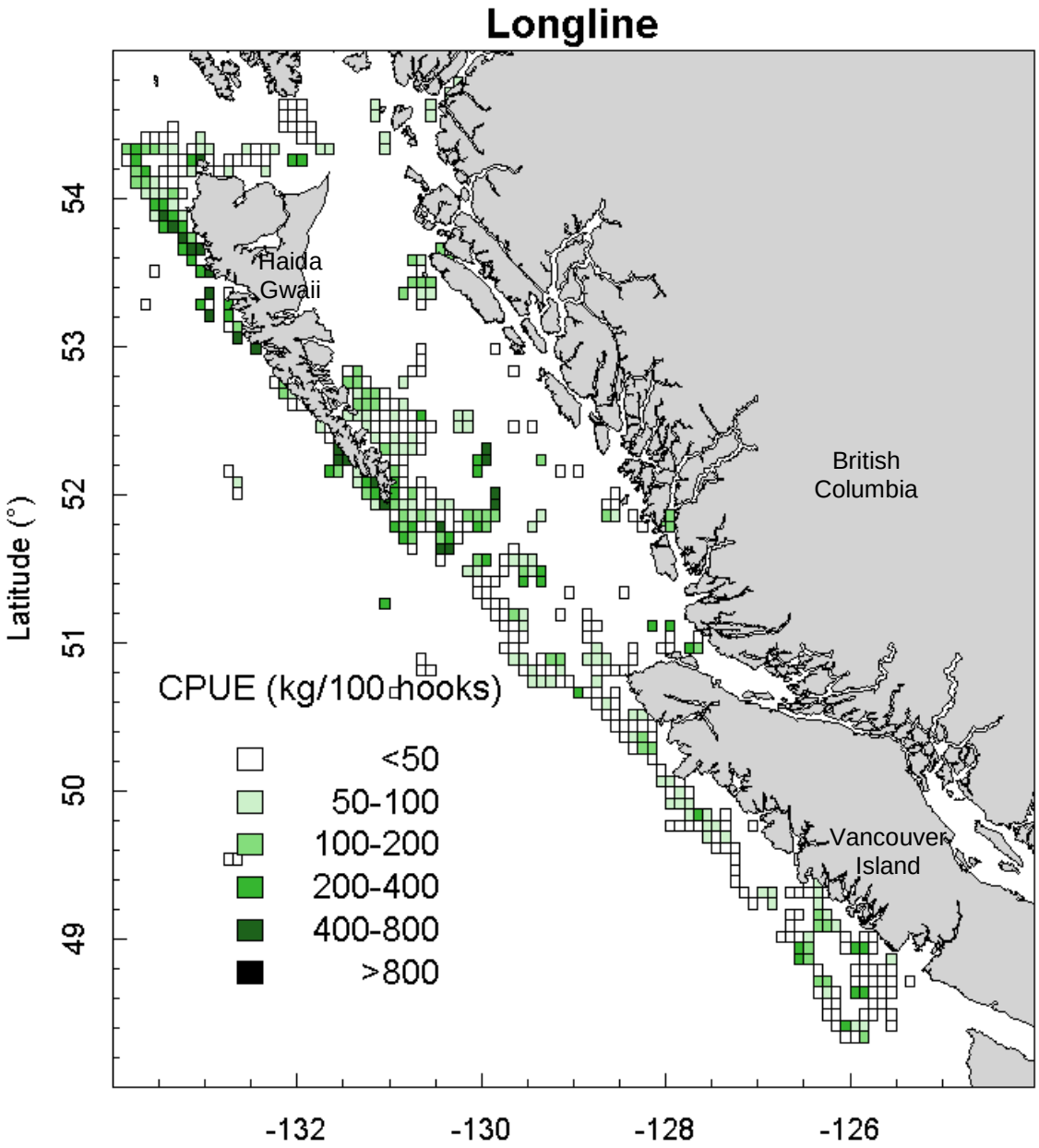

Figure 2. Mean catch per unit effort (CPUE, kg per 100 hooks,) with 0.2º by 0.2º grid of blue shark in the Canadian groundfish longline fishery from 1998-2010.

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