Economic Impacts of Lost Commercial Dungeness Crab Pots To Two North American Fisheries

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Introduction

Crab pot loss in Dungeness crab fisheries on the West Coast of the United States and Canada is widespread and ubiquitous. Lost crab pots not only continue to trap and kill target species, they threaten navigational safety and may play a role in the increasing numbers of reported large whale entanglements along the west coast. And lost pots have economic impacts to the fisheries themselves.

Estimating the economic costs of lost crab pots can be done in several ways. We present two methods to estimate economic costs in West Coast Dungeness crab fisheries. One method is taken from published research conducted in 2009, while the second relies on limited data available.

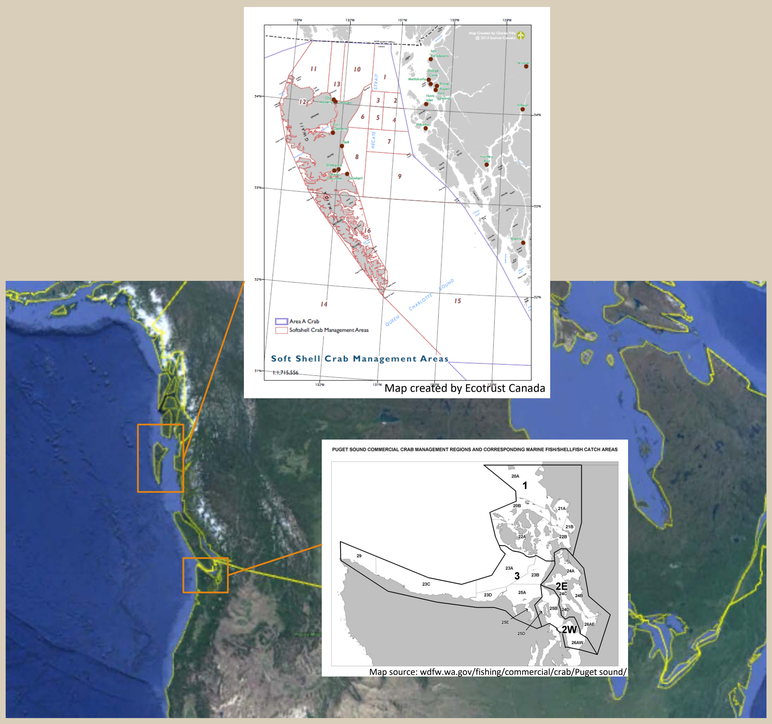
Method 1 was reported in Antonelis et al. (2011) combines commercial and recreational crab pot fisheries and takes advantage of a robust dataset, including results of controlled research in the US portion of the Salish Sea, referred to as Puget Sound.

Method 2 relies on commercial fisher-reported crab pot loss numbers from the Area A Dungeness crab fishery in British Columbia, Canada.

Study Areas

Method 1 Study Area was the US portion of the Salish Sea, referred to here as Puget Sound and encompassing the Puget Sound Commercial Crab Management Region. See Figure below.

Method 2 Study Area was the British Columbia Area A Crab Management Area. See Figure below.



Method 1

Lost crab pot fishing duration and mortality rates of male Dungeness crab caught in lost pots were determined during a field study simulating lost pots in two locations in Puget Sound.

Recreational pot loss rate was estimated from data collected by WDFW during dockside and telephone surveys of recreational Dungeness crab fishers in 2007 and 2008. Survey results provided estimates of the total number of recreational crab fishing trips and the number of pots lost per angler per trip. The recreational pot loss rate was estimated as the annual average of total crab fishing trips multiplied by the loss rate per angler trip for 2007 and 2008. commercial pot loss rate was estimated as the (5-Year) average number of replacement buoy tags issued by Washington Department of Fish and Wildlife to commercial fishers each year.

Pot loss rate (combined commercial and recreational), fishing duration, and crab mortality rates were used to calculate annual mortality of male Dungeness crab due to derelict pots in Puget Sound.

Yearly average landed values were used to determine the overall value of the crab loss. We determined the percentage of landed value lost in derelict crab pots by dividing the value of crab loss by the total landed value in Puget Sound.

Removing a lost crab pot from Area A Crab Fishery, British Columbia, Canada – June 2017

Method 2

Commercial pot loss was reported by each fisher on the annual Crab Pot Questionnaire required by the Department of Fisheries and Oceans Canada. We averaged these reported numbers over ten years (2004-2013). We multiplied the average number of lost pots by the cost of pot replacement at 2017 values to find the cost to the fishers of losing these pots. To find the rate of pot loss we divided the average number of pots lost by the maximum number of pots allowed to be deployed (35,000).

We estimated landed values in the Area A fishery by applying the Area A share of landings in British Columbia to the British Columbia landed values averaged from 2010-2013 and adjusted for inflation.* We determined the percentage of landed value lost through pot loss by dividing the cost of lost pots by the total landed value in Area A.

*Source: Fisheries and Oceans Canada and Ecotrust Canada

Results

	Puget Sound ($US)	Area A ($CA)
Average annual landed values	$16,700,000	$13,945,688
Number pots deployed		35,000
# pots lost/year	12,193	2,609
% rate of commercial crab pot loss	8.6%	7.45%
Cost of one pot setup		$250
Value of lost pots		$652,250
Value of crabs killed in lost pots	$744,296	Unk
% of annual landed value lost	4.5%	4.68%

Discussion

This study compares two very different approaches to quantify the economic costs of lost crab pots to Dungeness crab fisheries.

The first method, from Antonelis et al. 2011, combined field research results with fisheries data to determine a cost of $744,296 worth of crab killed in lost crab pots annually. This value is 4.5% of the average total landed value of Dungeness crab in Puget Sound at the time of the study. Antonelis, et al. (2011) also provided information about the variable cost of harvesting additional crab but we did not include that in our comparison.

The second method uses a much simpler approach by using fisher-reported data on crab pot loss to determine the numbers of lost crab pots in the Area A fishery. Multiplying that number by the cost to replace each pot setup yields a cost to the fishery of $652,250. This number is 4.68% of the total landed value of Dungeness crab in Area A. This method does not take into account any cost related to crabs killed in lost pots.

The first method is more robust and provides a better picture of lost harvest potential while the second method merely states the costs of the fishing gear lost. This latter method could be stating something that is obvious to fishers already. Certainly, in Area A, fishers are aware of how much their lost gear costs them. Nevertheless, looking at it as a cost to the fishery provides a different perspective and could motivate a more vigorous after-season removal program or more creative loss prevention actions.

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