

Crab bycatch handling mortality rates for groundfish fisheries

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Crab Plan Team presentation

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Table 6 History of mortality rate calculations for crab bycatch in groundfish fisheries, in research studies and Council analyses

Study		King crab			Tanner/snow crab			Notes/rationale
		Trawl	Pot	Longline	Trawl	Pot	Longline	
1987 trawl comparison research study on bycatch in BSAI joint venture fishery targeting yellowfin sole, rock sole, Pacific cod	Stevens 1990	78%			79%			Red king crab and Tanner crab study. Mortality rate directly proportional to captivity time (which in study may have been longer than is normal in fishery), esp for king crab (at 3 hours captivity, 0% mortality, at 17 hours, 100% mortality).
1990 Observer Program study of condition factor of crab bycatch	Guttormsen et al 1992	20.1% (+27.5% poor)	0% (+0% poor)		37.5% (+32.0% poor)	1.3% (+1.4% poor)	7.5% (+21.7% poor)	Observers identified 3 condition factors: excellent, poor, dead. No estimate available for longline king crab bycatch.
BSAI groundfish FMP amendment 24 (Pacific cod gear allocations)	NMFS 1993	80%	37%	37%	80%	30%	45%	Trawl mortality rate based on Stevens 1990; pot and longline rates proportionally adjusted from Guttormsen et al 1992, so that trawl = 80% as per Stevens 1990.
BSAI groundfish FMP amendment 37 (Bristol Bay nearshore closure)	NPFMC 1996	80%	8%	37%	80%	30%	45%	Mortality rates supposedly based on NMFS 1993, no explanation for change in pot king crab rate.
BSAI crab FMP amendment 11 (Tanner crab rebuilding)	NPFMC 2000				80%	35%	35%	Mortality rate for combined fixed gear, based on NPFMC 1996; assumes average 2/3 of bycatch from pot gear (30% mortality rate) and 1/3 from longline gear (45% mortality rate)
BSAI crab FMP amendment 14 (Snow crab rebuilding)	NPFMC 2000				80%	20%	20%	Mortality for combined fixed gear, no rationale in analysis for change in mortality rate
BSAI crab FMP amendment 15 (St Matthew blue king crab rebuilding)	NPFMC 2000	80%	8%	37%				Mortality rates based on NPFMC 1996
Chapter on BSAI bycatch in Council's BSAI Crab SAFE reports	NPFMC 2001-2007	80%	20%	20%	80%	20%	20%	No rationale in analysis for choice of mortality rates. May have averaged fixed gear rates for king crab from NPFMC 1996, and used fixed gear rate from NPFMC 2000 (snow crab rebuilding) for Tanner/snow crab.
BSAI bycatch considered as part of stock assessments in BSAI Crab SAFE reports	NPFMC 2008-2009	80%	80%	80%	80%	80%	80%	Crab Plan Team directive in 2008 SAFE report to use 80% for bycatch in groundfish fisheries (presumably because most bycatch was assumed to be from trawl)
BSAI bycatch considered as part of stock assessments in BSAI Crab SAFE report	NPFMC 2010	80%	50-80%	50-80%	80%	50-80%	50-80%	Pribilof Is red, blue, and golden king crab, Al golden king crab, and Adak red king crab assessments use 50% mortality for fixed gear; others use 80%

**Crab Bycatch in the Bering Sea/
Aleutian Islands Fisheries**

Staff Discussion Paper

May 2010

**NPFMC
2010**

- Trawl = 80%
 - Primarily based on Stevens (1990)
- Trawl research study conducted in 1987 in the BSAI joint venture fisheries. Species targeted were yellowfin sole, rock sole, and Pacific cod.
- 21% of the king crabs and 22% of the Tanner crabs captured incidentally in BSAI trawl fisheries survived at least two days following capture.
- Earlier studies also looked at bycatch mortality in the trawl fisheries (Blackburn and Schmidt 1988, Owen 1988, Fukuhara and Worlund 1973, Hayes 1973),
 - soft shell crab are much more vulnerable to impacts from trawling than hard shell crab, and that mortality appears to be directly correlated with time out of water.

Fixed
(longline
and pot
gear) =
50%

No direct research studies conducted on mortality of crab caught as bycatch in the longline or pot groundfish fisheries.

30-45% used in various council analyses based on approximations combined with Stevens (1990) results

Since 2008 (Crab OFLs and annual assessments) 50% rate applied when splitting bycatch between fixed and trawl gear