

# Pacific Halibut Bycatch in IPHC Area 2A in the 2007 Groundfish Trawl Fishery

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# 3 Factors Major Components Determining the Amount of Pacific Halibut Mortality

- Amount and distribution of fleet effort
- Bycatch rates
- Mortality rates for discarded halibut
  - Option 1: fixed 50% rate (status quo)
  - Option 2: rate based on observed viability of fish on deck (used by IPHC in Alaska)

# Changes in Trawl Fleet Effort

Latitude	Depth (fathoms)	Trawl effort (hours)		% change from 2006 to 2007
		2006	2007	
40.67° - 42.67°	0 - 150	356	359	1%
	150 - 700	2,536	3,334	31%
42.67° - 46.67°	0 - 150	11,848	6,466	-45%
	150 - 700	15,351	21,413	39%
46.67° - 47.67°	0 - 150	3,925	3,138	-20%
	150 - 700	1,635	2,707	66%
47.67° - 48.67°	0 - 150	3,701	873	-76%
	150 - 700	3,250	3,585	10%
Total	0 - 150	19,831	10,836	-45%
	150 - 700	22,772	31,038	36%
	All depths	42,603	41,874	-2%

# Changes in Halibut Bycatch Rates

Latitude		Depth		Observed halibut pounds per hour towed					
				January - August			September - December		
				2006	2007	% change	2006	2007	% change
40.67° - 42.67°		0 - 75 fm					1.4		
		76 - 150 fm							
		151 - 250 fm	3.8	5.9	55%	1.2	5.2	317%	
		251 - 700 fm	0.1	0.1	33%	1.1	0.2	-82%	
42.67° - 46.67°		0 - 75 fm	11.3	10.9	-4%	0.5	1.3	149%	
		76 - 150 fm	11.6	2.2	-81%	0.3		-100%	
		151 - 250 fm	2.8	4.5	64%	8.5	5.2	-39%	
		251 - 700 fm	0.6	1.5	174%	0.2	0.4	91%	
46.67° - 47.67°		0 - 75 fm	10.9	9.5	-13%	0.4	2.3	518%	
		76 - 150 fm	9.0	*					
		151 - 250 fm	4.3	13.4	213%	*	6.4		
		251 - 700 fm	0.3	0.7	174%	*	0.3		
47.67° - 48.67°		0 - 75 fm	40.9	84.8	107%	77.7	3.5	-95%	
		76 - 150 fm	35.0		-100%	15.3		-100%	
		151 - 250 fm	17.4	15.1	-13%	29.0	8.6	-70%	
		251 - 700 fm	3.3	9.2	177%	1.6	0.6	-64%	

# Observed Halibut Viability

- For a subset of all halibut caught, observers examine the condition of individual fish
- Using criteria established by the IPHC, fish are assigned to 1 of 3 categories
  - Dead; Poor; Excellent
- IPHC mortality rates for each category are based on experimental data

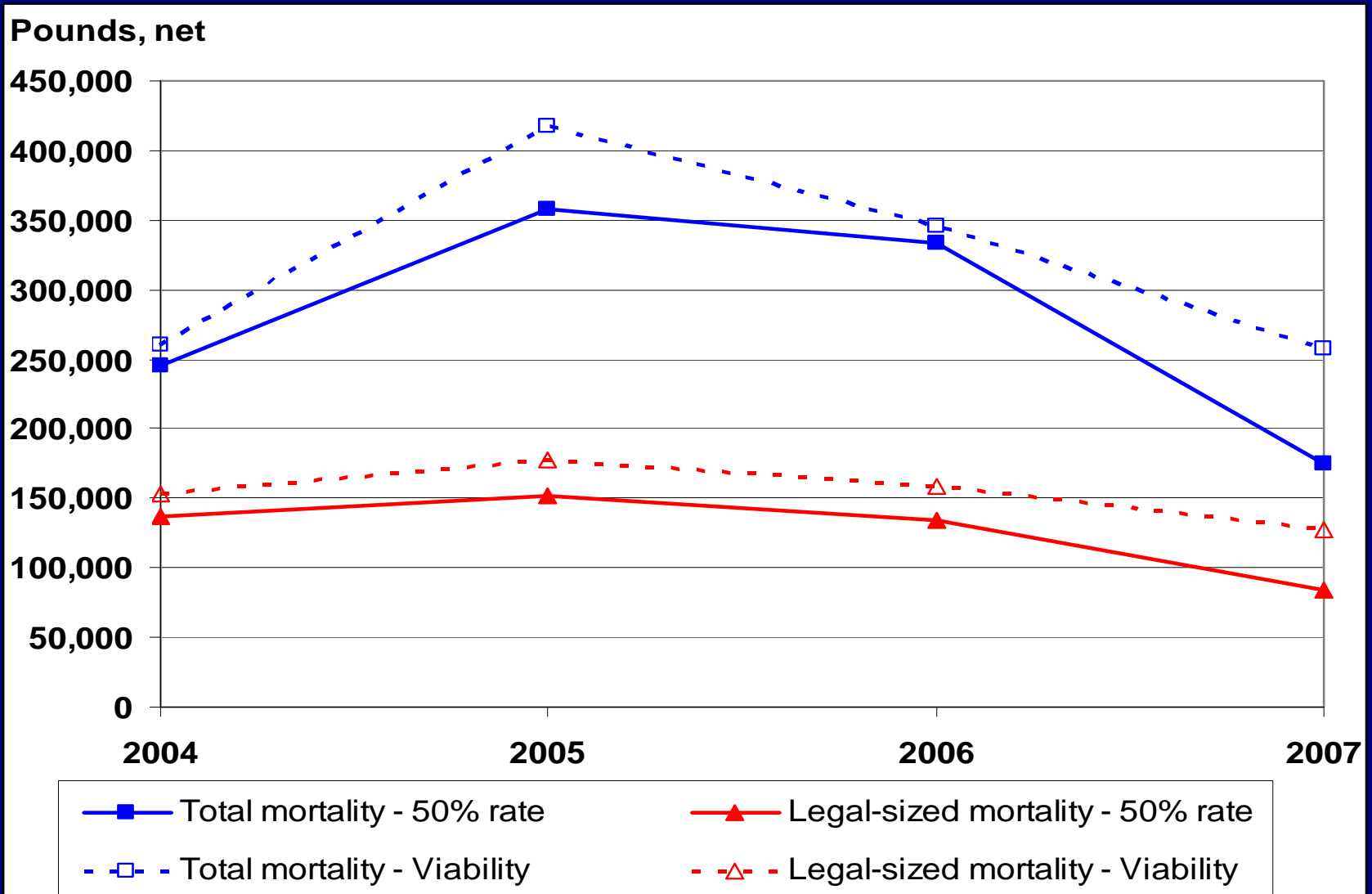
# Summary of Viability Data

	Total observed pounds	% with viability assignment	Distribution of lbs, by category			Average mortality rate	
			Dead	Poor	Excellent		
<b>Percent dead, by category</b>			<b>90%</b>	<b>55%</b>	<b>20%</b>		
<b>2004</b>	<b>All depths</b>	<b>164,508</b>	<b>16%</b>				
	0 - 75 fm	731,196	13%	23%	25%	51%	0.45
	76 - 150 fm	18,598	6%	47%	29%	24%	0.63
	151 - 250 fm	53,218	25%	61%	21%	18%	0.70
	251 - 700 fm	19,496	13%	75%	9%	17%	0.75
<b>2005</b>	<b>All depths</b>	<b>221,609</b>	<b>24%</b>				
	0 - 75 fm	99,455	20%	43%	24%	34%	0.58
	76 - 150 fm	75,722	20%	37%	32%	31%	0.57
	151 - 250 fm	36,130	42%	63%	18%	19%	0.70
	251 - 700 fm	10,302	37%	60%	24%	16%	0.70
<b>2006</b>	<b>All depths</b>	<b>152,943</b>	<b>14%</b>				
	0 - 75 fm	104,680	12%	33%	18%	49%	0.49
	76 - 150 fm	21,674	6%	52%	18%	30%	0.63
	151 - 250 fm	22,067	27%	67%	12%	21%	0.71
	251 - 700 fm	4,522	55%	80%	8%	12%	0.79
<b>2007</b>	<b>All depths</b>	<b>86,088</b>	<b>22%</b>				
	0 - 75 fm	32,217	19%	64%	9%	27%	0.68
	76 - 150 fm	156	34%	68%	0%	32%	0.67
	151 - 250 fm	37,806	29%	79%	8%	12%	0.78
	251 - 700 fm	15,909	11%	78%	13%	9%	0.79

# Mortality Estimates

Year	Trawl Effort	Estimated Halibut Bycatch	Estimated Total Halibut Mortality	Estimated Mortality per Trawl Hour	Halibut Mortality / Total Halibut Bycatch	Estimated Legal-Sized Halibut Mortality	
	(hours)	(lb, net)	(lb, net)	(lb, net)	proportion	(lb, net)	proportion of total
<b>Fixed 50% mortality rate</b>							
2004	37,495	489,882	244,941	6.5	0.5	136,691	0.56
2005	39,377	715,752	357,876	9.1	0.5	152,264	0.43
2006	42,602	666,782	333,391	7.8	0.5	134,394	0.40
2007	41,874	350,266	175,133	4.2	0.5	84,036	0.48
<b>Viability-based mortality rate</b>							
2004	37,495	489,882	260,590	6.9	0.53	153,804	0.59
2005	39,377	715,752	417,863	10.6	0.58	178,218	0.43
2006	42,602	666,782	345,648	8.1	0.52	158,570	0.46
2007	41,874	350,266	257,338	6.1	0.73	127,677	0.50

# Comparison of mortality estimates using fixed and viability-based rates



# Future Research

- The influence of various factors on the observed viability of halibut
  - Tow duration and the total amount of catch appear well-correlated with average mortality rate, at the stratum level
  - Other factors such as temperature, depth, and species composition should also be examined
- Work with the IPHC to refine methods for estimating fixed-gear mortality