

FATALITY RATES IN THE ALASKA COMMERCIAL FISHING INDUSTRY

by

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The Institute of Social and Economic Research is preparing a report on the effects of fisheries management on safety in the Alaska commercial fishing industry, with partial funding from the Alaska Sea Grant College Program. As part of this research effort, we have developed a data base on accidents in the Alaska commercial fishing industry. This paper is one of a series reporting on preliminary analyses of these data. For information about this research effort, please contact Gunnar Knapp, Associate Professor of Economics, (907) 786-7717.

SUMMARY

This study calculates fatality rates for the Alaska commercial fishing industry for the years 1981-1984. During this period, the number of fatalities in the Alaska commercial fishing industry almost equaled that for all other Alaska industries combined. The fatality *rate* for the Alaska commercial fishing was more than 20 times as high as the average for all other Alaska industries, and more than twice as great as the rate for the next most dangerous industry group (the lumber and wood products industry).

Fatalities, Employment, and Fatality Rates in Alaska, 1981-1984

	Commercial Fishing	All Other Industries	Lumber and Wood Products Industry
Average number of fatalities per year	25.8	28.3	2.8
Average annual employment (worker years)	8,057	187,203	1,945
Fatality rate (deaths per 100,000 worker years)	320	15	141

Introduction

Commercial fishing safety is of major national concern, partly because of well-publicized losses of crews and vessels, as well as high commercial fishing insurance costs.^{1 2} Legislation has recently passed the U.S. House of Representatives and is under consideration in the U.S. Senate which would establish minimum safety standards for commercial fishing vessels.³

Given the current level of concern over commercial fishing safety, it is important to develop data on how dangerous commercial fishing actually is. A crude measure of danger is provided by fatality rates, or the number of deaths per worker year. This paper presents estimates of fatality rates in Alaska commercial fisheries for the years 1981-1984.

We begin by reviewing previous estimates of commercial fishing fatality rates and comparisons with other industries. Next, we present data on fatalities in the Alaska commercial fishing industry and other Alaska industries. We then calculate fatality rates by dividing the number of fatalities by estimated employment in commercial fishing and other industries.

Previous Estimates of U.S. Commercial Fishing Fatality Rates

The primary problem in calculating fatality rates for commercial fishermen is the almost total lack of reliable data on commercial fishing employment. Most fishermen are considered self-employed, and are thus not included in data collected and published for wage and salary employment. Perhaps due to this problem, there has been relatively little analysis of commercial fishing fatality rates.

A frequently cited statistic is a 1984 U.S. Coast Guard calculation that the death rate for fishermen is seven times the national average for all industry groups.⁴ As shown in Table 1, the Coast Guard study estimated a commercial fishing fatality rate of approximately 85 per 100,000 worker years, compared with a rate of 12 per 100,000 for all industry groups. This rate was 50 percent higher than for the mining and quarrying industry.

¹ Incidents in Alaska commercial fisheries which received national attention included the loss of the *Western Sea* in August 1985, with the loss of six lives, and the capsizing of the *Altair* and the *Americus* in February 1983, each of which resulted in the loss of seven lives.

² For a discussion of the fishing vessel insurance crisis, see Dennis W. Nixon, "Recent Developments in U.S. Commercial Fishing Vessel Safety, Insurance, and Law," Journal of Maritime Law and Commerce, Vol. 17, No. 3 (July 1986).

³ H.R. 1841, "The Commercial Fishing Industry Vessel Safety Act of 1988," passed the House of Representatives on June 28, 1988. A copy of H.R. 1841 may be found in the Congressional Record for June 27, 1988, pages H4729-H4734.

⁴ Statement of John E. DeCarteret, Chief, Marine Safety Division, District Thirteen, United States Coast Guard, before the House Committee on Merchant Marine and Fisheries, Subcommittee on Coast Guard and Navigation and the Subcommittee on Fisheries, Wildlife Conservation and the Environment, July 27, 1985. Cited in National Transportation Safety Board, Safety Study: Uninspected Commercial Fishing Vessel Safety, NTSB/SS-87/02 (1987), page 3.

The denominator or employment estimate used for the Coast Guard calculation was based on multiplying an estimate of the number of commercial fishing vessels by an estimate of the number of persons per boat.⁵ A recent review of this study concluded:

The 1984 Coast Guard estimate of the commercial fishing industry fatality rate is a crude estimate, is likely inaccurate and is certainly outdated. If a reliable fatality rate is to be determined, comprehensive data on the total number of fishermen in the industry is needed. Until such data can be collected, or until an accurate means of extrapolating such data can be formulated, the calculation of any fishing industry fatality rate will be seriously flawed.⁶

We are not aware of any other calculations of fatality rates for the U.S. commercial fishing industry. A commercial fishing fatality rate of 137 fatalities per 100,000 worker years has been estimated for Norway, or 60 percent higher than the 1984 Coast Guard estimate for the United States (Table 2). As in the estimates for the United States, fatality rates in the Norwegian commercial fishing industry were higher than for any other industry, and more than nine times the average for "industry on land."

Occupational Fatalities in Alaska, 1981-1984

Table 3 presents figures for occupational fatalities in Alaska during the years 1981

⁵ LCDR Tony E. Hart and Frank Perrini, "Analysis of U.S. Commercial Fishing Vessel Losses, 1970-1982," Mimeograph (1984). The numerator for the calculation of fatality rates was the number of fatalities on documented marine fishing vessels in 1981 and 1982, as reported to the Coast Guard under federal regulations. Hart and Perrini described the calculation of the denominator, or employment estimates, as follows:

In order to develop fatality rates, statistics on the number of persons engaged in commercial fishing are needed. Unfortunately these statistics are lacking in sufficient detail. In this analysis, fatality rates for 1981 and 1982 were developed by estimating the total number of fishermen using casualty reports received by the Coast Guard. The number of persons onboard the vessel at the time of the casualty was noted along with the size of the vessel involved. Using this method, the number of fishermen onboard documented vessels was estimated to be approximately 83,000 for 1981 and 1982. From this, it is estimated that the fatality rate for fishermen was approximately 86 per 100,000 persons in 1981 and 83 per 100,000 in 1982.

Although the precise method by which the estimate of the number of fishermen was calculated is unclear, several problems are apparent. It appears that the estimate of participation was developed by multiplying an estimate of the total number of documented vessels by estimates of the number of fishermen per vessel. These were in turn obtained by counts of the number of persons on board vessels for which casualty reports were received by the Coast Guard.

One problem with this method is that vessels for which casualty reports were received are not necessarily representative of the commercial fishing fleet. A more significant problem is that the number of persons on board a vessel at a given time is not necessarily a good indicator of the total hours worked in a given year on the vessel. Not all vessels or fishermen fish year-round. However, while they are fishing, some fishermen work far longer hours than persons employed in other industries. Typically a full-time job is assumed to represent 2000 hours of work per year (50 weeks x 40 hours/week). Depending on whether a vessel fishes year-round or not, full-time equivalent employment per vessel may be less than or greater than the number of persons on board the vessel when it is fishing.

Hart and Perrini recognized these problems, stating that "a more accurate means of determining the number of fishermen that work on documented fishing vessels needs to be developed in order to generate more accurate fatality rates." They also noted that "work in other areas needs to be done such as the identification of losses based on geographic areas and specific fisheries."

⁶ Kristin L. Vehrs and Kathy Van Olst, "Examination of the Death Rate for Fishermen." Prepared for the National Council on Fishing Vessel Safety and Insurance (February 1988).

through 1984. The figures for commercial fishing fatalities are based on Coast Guard marine accident reports for this period. A full list of the incidents resulting in fatalities during this period is presented in Appendix Table A-1. The figures for fatalities in other industries are based on reports filed with the Alaska Division of Workers' Compensation.

The average number of commercial fishing fatalities was 25.8 per year during this period, compared with an average of 28.3 for all other industries combined.

Employment Estimates for the Alaska Commercial Fishing Industry

In Alaska, as in other states, most commercial fishermen are considered self-employed, and are not included in the regular employment statistics published by the Alaska Department of Labor. However, for years prior to 1984 the Alaska Department of Labor has estimated average monthly commercial fishing employment by multiplying the number of vessels making landings each month by "crew factors," or estimated crew sizes based on surveys for vessels in each size class and fishery. These estimates represent the best available measure of participation in commercial fishing for purposes of comparison with other industries, and make it possible to estimate fatality rates for the Alaska commercial fishing industry for years prior to 1984.⁷

Occupational Fatality Rates in Alaska, 1981-1984

Table 4 presents figures for average annual employment or worker years in Alaska during the years 1981 through 1984. Average annual employment in commercial fishing was 8,000, compared with 187,000 in all other industries. Thus the total number of worker years in other industries was more than 20 times as great as in commercial fishing.

Table 5 shows occupational fatality rates for commercial fishing and other industries calculated from the fatality and employment figures in Tables 2 and 3. The fatality rate in commercial fishing was 320 per 100,000 worker years, compared with a rate of 15 per 100,000 worker years for all other industries. Thus the fatality rate in commercial fishing was more than 20 times the average rate for all other industries.

The fatality rate for the Alaska commercial fishing industry was more than twice as high as for the next most dangerous industry groups, "lumber and wood products" and "metal mining," and almost four times as great as the rates for any other industry groups.⁸

The fatality rate for the Alaska commercial fishing industry was nearly four times as high as that estimated by the U.S. Coast Guard for the U.S. commercial fishing industry for 1981 and 1982, and more than twice as high as that which has been estimated for

⁷ Total worker years in the Alaska commercial fishing industry are less than the total number of persons working at some time during the year as commercial fishermen. Many people may participate in only one fishery, such as the salmon fishery or the halibut fishery, and may actually work on only a few days or during a few weeks of the year. However, while they are fishing they may work long or irregular hours.

⁸ Industry groups were defined in terms of two-digit SIC (Standard Industrial Classification) codes.

Norway.

The fatalities and employment data sources used in estimating the fatality rates for commercial fishing differ from the data sources for other industries. It is difficult to determine the extent to which these differences in data sources may bias the comparison of rates between industries. However, it is unlikely that any bias would be so great as to change the fundamental result that fatality rates in the Alaska fishing are very high.

Conclusions

The estimated fatality rate for the Alaska commercial fishing industry is extremely high in comparison with other Alaska industries and in comparison with other estimates of commercial fishing fatality rates. Commercial fishing accounted for almost half of all occupational fatalities in Alaska between 1981 and 1984.

References

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Table 1: Estimated U.S. Occupational Fatality Rates, 1981-1982
(Fatalities per 100,000 Worker Years)

	1981	1982
COMMERCIAL FISHING	86	83
OTHER INDUSTRIES	12	11
Mining and quarrying	55	55
Construction	40	40
Government	10	10

Source: LCDR Tony E. Hart and Frank Perrini, "Analysis of U.S. Commercial Fishing Vessel Losses, 1970-1982." Mimeograph (1984). ISER file FATAL1.WK1.

Table 2: Norwegian Occupational Fatality Rates, Selected Industries
(Fatalities per 100,000 Worker Years)

COMMERCIAL FISHING	137
INDUSTRY ON LAND	15
Mining	100
Shipping	100
Supply vessels	36
Construction/civil engineering	25

Source: Cited in National Transportation Safety Board, Safety Study: Uninspected Commercial Fishing Vessel Safety, NTSB/SS-87/02 (1987), page 4. Original source was Agenda Item 8, Safety of Fishing Vessels, Including Possible Revision of the Torremolinos Convention for the Safety of Fishing Vessels, 1977," submitted by Norway to the Maritime Safety Committee, International Maritime Organization, January 14, 1987. ISER file FATAL1.WK1.

Table 3: Occupational Fatalities in Alaska, by Industry, 1981-1984

	1981	1982	1983	1984	Average, 1981-84

COMMERCIAL FISHING	29	17	46	11	25.8

OTHER ALASKA INDUSTRIES	39	30	21	23	28.3
Mining	1	3	3	2	2.3
Construction	7	6	5	9	6.8
Manufacturing	9	5	2	2	4.5
Trans. & Public Util.	13	7	4	4	7.0
Wholesale Trade	1			1	0.5
Retail Trade	2	3	1	1	1.8
Finance, Insur. & Real Estate			2		0.5
Services	5	2	2	3	3.0
State & Local Government	1	4	2	1	2.0

TEN ALASKA INDUSTRIES WITH HIGHEST FATALITY RATES, BY TWO-DIGIT SIC CODE	29	20	10	13	18.0
Lumber and Wood Products (24)	6	1	2	2	2.8
Metal Mining (10)	1	1		1	0.8
Transportation by Air (45)	11	6	1	1	4.8
Special Trade Contractors (17)	4	4	3	5	4.0
Building Mater. & Garden Supplies (52)		2	1		0.8
Trucking and Warehousing (42)		1	2	1	1.0
Water Transportation (44)	2				0.5
Transportation Services (47)				1	0.3
Heavy Construction Contractors (16)	2	1	1	2	1.5
Food and Kindred Products (20)	3	4			1.8

Sources: Fish harvesting: U.S. Coast Guard (see Tables A-1 and A-2). Other industries: Alaska Department of Labor, Occupational Injury and Illness Information, 1984, page 73. "Other industries" does not include agricultural industries (one fatality in 1981 and one fatality in 1982) or federal government. ISER file FATAL.WK1.

Table 4: Average Annual Employment in Alaska, by Industry, 1981-1984

	1981	1982	1983	1984	Average, 1981-84

COMMERCIAL FISHING	7869	8255	7988	8115	8057

OTHER INDUSTRIES	167295	182004	195092	204419	187203

Mining	8565	8965	8181	8702	8603
Construction	12941	16780	20770	20336	17707
Manufacturing	13965	12679	11891	11289	12456
Trans. & Public Util.	18279	18320	18572	18893	18516
Wholesale Trade	6492	7222	8013	8673	7600
Retail Trade	26731	30438	33395	35769	31583
Finance, Insur. & Real Estate	8301	9048	10169	11095	9653
Services	32275	35730	37950	40836	36698
State & Local Government	38335	40817	44032	46411	42399

TEN OTHER INDUSTRIES WITH HIGHEST FATALITY RATES, BY TWO-DIGIT SIC CODE	31319	33314	35730	34843	33802

Lumber and Wood Products (24)	2179	2060	1841	1701	1945
Metal Mining (10)	547	570	559	461	534
Transportation by Air (45)	5783	5590	5819	6064	5814
Special Trade Contractors (17)	4707	6735	7958	8594	6999
Building Mater. & Garden Supplies (52)	1239	1635	1879	2043	1699
Trucking and Warehousing (42)	2402	2415	2145	2265	2307
Water Transportation (44)	1410	1322	1345	1351	1357
Transportation Services (47)	599	669	852	995	779
Heavy Construction Contractors (16)	4345	5349	6994	5609	5574
Food and Kindred Products (20)	8108	6969	6338	5760	6794

Sources: Fishing employment: Rick Focht, Employment and Gross Earnings in Alaska's Commercial Fisheries, CFEC Report No. 86-8 (Juneau, Commercial Fisheries Entry Commission, 1986), page 27. Wage and salary employment: Alaska Department of Labor, Occupational Injury and Illness Information, 1984, page 32. Original source Alaska Department of Labor, Statistical Quarterly. Employment data for "metal mining" and "transportation services" obtained from ISER MAP data base of Statistical Quarterly data. "Other industries" does not include agricultural industries or federal government. ISER file FATAL.WK1.

Table 5: Occupational Fatality Rates in Alaska, by Industry, 1981-1984
(Fatalities per 100,000 Worker Years)

	1981	1982	1983	1984	Average, 1981-84
----- FISH HARVESTING	369	206	576	136	320
----- OTHER ALASKA INDUSTRIES	23	16	11	11	15
Mining	12	33	37	23	26
Construction	54	36	24	44	38
Manufacturing	64	39	17	18	36
Trans. & Public Util.	71	38	22	21	38
Wholesale Trade	15	0	0	12	7
Retail Trade	7	10	3	3	6
Finance, Insur. & Real Estate	0	0	20	0	5
Services	15	6	5	7	8
State & Local Government	3	10	5	2	5
----- TEN OTHER ALASKA INDUSTRIES WITH HIGHEST FATALITY RATES, BY TWO-DIGIT SIC CODE	93	60	28	37	53
Lumber and Wood Products (24)	275	49	109	118	141
Metal Mining (10)	183	175	0	217	140
Transportation by Air (45)	190	107	17	16	82
Special Trade Contractors (17)	85	59	38	58	57
Building Mater. & Garden Supplies (52)	0	122	53	0	44
Trucking and Warehousing (42)	0	41	93	44	43
Water Transportation (44)	142	0	0	0	37
Transportation Services (47)	0	0	0	101	32
Heavy Construction Contractors (16)	46	19	14	36	27
Food and Kindred Products (20)	37	57	0	0	26

Sources: Calculated from Tables 3 and 4. ISER file FATAL.WK1.

Table A-1: Fatalities on Alaska Commercial Fishing Vessels, 1981-1985

Coast Guard Case Number	Date (Year- Month Day)	Vessel Name	Number of Fatalities	Vessel Length (feet)	Primary Nature of Incident
2431SEA81	810116	Sigfried K	1	81	
5114ANC81	810122	Karen Lynn	1	114	Victim fell into water
9454ANC81	810309	Courageous	1		
5646ANC81	810331	Discovery	1		Victim fell into water
5115ANC81	810508	Sadie Ann	1	28	Victim fell into water
5123ANC81	810508	Enterprise	1	130	Victim struck by falling obj
3943VAL81	810619	(Unnamed)	1	10	Skiff capsized
6088ANC81	810808	(Unnamed)	1		Victim fell into water
2223ANC81	810820	Northern King	2	96	Vessel capsized
5162VAL81	810820	Rocket	2	32	Vessel capsized
5929UN81	811030	Gem	1	54	Vessel ran aground and sank
5802AND81	811108	Golden Pisces	1	194	Victim fell into water
5134VAL81	811110	Orca	1	42	Victim fell into water
6103JUN81	811115	Commander	4		
5662ANC81	811129	Saint Patrick	10	138	Crew abandoned vessel
0012ANC82	820209	Pacific Invader	1	82	Victim fell into water
0022ANC82	820414	Virgo	1	93	Victim fell into water
0010VAL82	820521	Camelot	1	29	Vessel capsized
0012VAL82	820522	Nasty Habit	1	26	Vessel capsized
0105ANC82	820529	(Unknown)	1	32	Victim fell into water
0073ANC82	820611	Fort Yukon	1	197	Victim slipped and fell
0061ANC82	820630	Miss Demptha	1	32	Victim fell into water
0037JUN82	820715	Captain Nemo	1	36	
0008ANC82	820814	Teddy	1	152	Victim fell into water
0007ANC82	820816	Terry J	1	29	Victim fell into water
0132ANC82	820823	Dave Randy	1	28	Victim fell into water
0106ANC82	820901	Smaragd	1	85	Victim fell into water
0031JUN82	820916	Barbie I	2	42	Vessel swamped and sank
0099ANC82	821006	Lady Ann	1	106	
0118ANC82	821117	Commodore	1	93	
0412ANC82	821229	Dawn	1	37	
0006JUN83	830124	White Gull	3	43	Vessel sank
0031ANC83	830227	Flyboy	1	48	Vessel sank
0038ANC83	830312	Sea Hawk	1	68	Vessel capsized
0209ANC83	830312	Magnum Force	1	51	Victim fell into water
0002HQS82	830314	Americus	7	123	Vessel capsized and sank
0002HQS82	830314	Altair	7	123	Vessel capsized and sank
0009JUN83	830416	Aloha	3	58	Vessel sank
0165JUN83	830516	Noreen Ann	2	35	Vessel sank
0096LOS83	830710	Thomas S	1	32	
0177JUN83	830717	Pamela Rae	1	49	Victim struck by falling obj
0023VAL83	830724	Alaskan Swede	1	49	Vessel caught fire
0167JUN83	830813	Providence	3	26	Vessel sank
0088ANC83	830814	Ocean Grace	4	98	Vessel sank
0053SEA83	830824	Saint Peter	1	68	
0095ANC83	830901	Golden Viking	2	97	Vessel capsized
0198JUN83	830904	Katrina Marie	1	26	Victim fell overboard

Table A-1: Fatalities on Alaska Commercial Fishing Vessels, 1981-1985 (continued)

Coast Guard Case Number	Date (Year-Month Day)	Vessel Name	Number of Fatalities	Vessel Length (feet)	Primary Nature of Incident
0097ANC83	830923	Endeavor	4	81	Vessel sank
0106ANC83	831031	Enterprise	1	130	Victim fell into water
0038JUN83	831203	Spirit	2	30	Vessel sank
0002JUN84	840122	Mary Lou	2	90	
0016ANC84	840412	Friedrich	1	304	Victim fell into water
0158JUN84	840415	Thelma	1	40	
0051ANC84	840713	Lisa Ann	1	47	Victim fell into water
0036VAL84	840826	Five O	1	27	Victim fell into water
0059ANC84	840921	Lady C	1	30	Vessel sank
0083ANC84	840930	Curlew	3	41	Vessel sank
MC84000101	841120	Dotty G	1	31	Vessel capsized
MC85000852	850114	K Jo	1	34	
MC83001630	850214	Alert	5	70	Vessel capsized and sank
MC85002053	850307	Ocean Bounty	1	132	Victim fell into water
MC85002628	850402	Vestfjord	1	75	Victim fell into water
MC85002780	850411	Northern G	1	201	Victim struck by falling obj
MC85003563	850516	Anna-O	1	31	Vessel sank
MC85003572	850520	Kimberly	1	101	Vessel sank
MC85005598	850612	(Unnamed)	1	18	Skiff sank
MC85004818	850716	Pandad	1	65	Victim fell into water
MC85006132	850816	(Unnamed)	1	22	Victim fell into water
MC85005381	850820	Western Sea	6	49	Vessel sank
MC85006601	851028	Sundowner	1	68	Victim fell into water

All incidents

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Notes: The primary data source for this table was the Coast Guard CAS data tape summarizing Coast Guard marine accident reports for District 17 (Alaska waters) for which the vessel service was coded as "fishing." The table includes incidents listed on the PCAS (personal casualty) file resulting in fatalities or missing persons as well as incidents on the CAS (vessel casualty) file involving fatalities, and other incidents located in Coast Guard accident reports in which fatalities occurred in association with commercial fishing. The Coast Guard's vessel service coding does not distinguish between commercial and recreational fishing. In order to exclude incidents related primarily to recreational fishing, only incidents involving vessels more than 25 feet in length were included, unless the incident was specifically known to be related to commercial fishing. Some incidents may be included which were not related to commercial fishing; however some commercial fishing incidents may have been excluded. Where "primary nature of incident" is left blank, no information is available as to the nature of the incident. The authors would appreciate any information about commercial fishing fatalities not included in this table, incidents included in the table which were not related to commercial fishing and which should not be included, and any other corrections or additions to the table. ISER data file PCAS02.WK1.

Table A-2: Overview of Alaska Commercial Fishing Vessel Incidents Involving Fatalities, 1981-1985

	Number of Incidents	Number of Fatalities	Percentage of Incidents	Percentage of Fatalities
ALL INCIDENTS	70	124	100	100

YEAR				
1981	15	29	21	23
1982	16	17	23	14
1983	19	46	27	37
1984	8	11	11	9
1985	12	21	17	17

PRIMARY NATURE OF INCIDENT				
Victim fell into water	25	28	36	23
Victim struck by falling object	3	3	4	2
Vessel capsized or sank	26	64	37	52
Other or unknown	16	29	23	23

NUMBER OF FATALITIES RESULTING FROM INCIDENT				
1	51	51	73	41
2	7	14	10	11
3	4	12	6	10
4	3	12	4	10
5 or more	5	35	7	28

VESSEL LENGTH				
Less than 25' (a)	3	3	4	2
25' to 49'	30	45	43	36
50' to 74'	9	15	13	12
75' to 99'	10	19	14	15
100' or greater	14	35	20	28
Unknown	4	7	6	6

Source: See Table A-1. ISER data file PCAS03.WK1
(a) Number may be understated. See notes to Table 1.