


MEMORANDUM

TO: Council, SSC and AP Members

FROM: Clarence G. Pautzke
Executive Director 

ESTIMATED TIME
1 Hour

DATE: June 2, 1995

SUBJECT: Halibut Discard Mortality Rate for the BSAI Pacific Cod Hook and Line Fishery

ACTION REQUIRED

Review in-season 1995 discard mortality rate for halibut in the BSAI Pacific cod hook and line fishery.

BACKGROUND

At the December 1994 meeting, the Council recommended that the assumed halibut discard mortality rates for the 1995 groundfish fisheries of the Bering Sea and Gulf of Alaska remain unchanged from 1994 and requested a review of the rates for the June 1995 Council meeting. NMFS implemented the rates that were recommended by the IPHC for all fisheries, with the exception of an assumed 12.5 percent rate for the first half of the 1995 BSAI Pacific cod hook and line fishery (Item D-2(a)(1)).

In the June 2nd Council mailing, we sent you the latest report from the IPHC on the halibut discard mortality rate for the BSAI Pacific cod hook and line fishery based on inseason observer data. The report indicates the fishery is exhibiting a discard mortality rate of 11.5%. Inseason data were not available to analyze the other gear fisheries.



AGENDA D-2(a)(1)
JUNE 1995
UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668
February 23, 1995

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Richard B. Lauber
Chairman, North Pacific Fishery
Management Council
P.O. Box 103136
Anchorage, Alaska 99510



Dear Rick,

At its December 1994 meeting, the North Pacific Fishery Management Council (Council) recommended that the assumed halibut discard mortality rates for the 1995 Alaska groundfish fisheries remain unchanged from those used in 1994. This action counters the recommendation of International Pacific Halibut Commission (IPHC) staff, who advocated assumed mortality rates that were generally higher based on 1992 - 1993 observer data. It also runs counter to the SSC supported practice of specifying fishery specific halibut mortality rate assumptions based on the average of the mortality rates calculated for the most recent two years data is available, unless there was convincing rationale to do otherwise.

Except for the BSAI Pacific cod hook-and-line gear fishery, we intend to use the mortality rate assumptions recommended by IPHC staff. We believe this approach better accommodates the best available information on halibut discard mortality rates and should be used to monitor the halibut bycatch mortality limits until new information is made available on which to base an adjustment to these assumptions.

For the BSAI hook-and-line cod fishery, we will use an assumed mortality rate of 12.5 percent during the first half of 1995, instead of the IPHC's recommended rate of 18 percent. We took this approach for the following reasons:

1. Vessels using hook-and-line or pot gear are allocated a specified portion of the BSAI Pacific cod total allowable catch;
2. The Council recommended that the halibut bycatch allowance apportioned to the BSAI Pacific cod hook-and-line fishery be apportioned among three seasons, with 28 percent of the annual apportionment allocated to the third season that starts September 1;
3. Mandatory careful release requirements are expected to result in reduced halibut discard mortality rates relative to the rates experienced in 1992 - 1993;



4. The BSAI hook-and-line fishery for Pacific cod has initiated a program to disseminate timely in-season data on halibut bycatch rates and individual vessel mortality rates that is anticipated to further reduce discard mortality rates within the fleet;
5. The NMFS Observer Program Office has indicated that 1995 in-season observer data and final 1994 observer data for the BSAI Pacific cod hook-and-line fishery will be available by mid-1995 to allow for an analysis of observed halibut discard mortality rates and an adjustment from the 12.5 assumed rate in time for the beginning of the third season (September 1). This reconsideration could result in an increase or decrease of the assumed rate; and
6. If the mid-1995 assessment of observer data indicates that the halibut mortality rate in the hook-and-line cod fishery has not declined to the extent anticipated, retroactive adjustments in the estimated 1995 halibut bycatch mortality would be accommodated within the third seasonal apportionment of the annual bycatch allowance specified for this fishery. Although an upward adjustment in estimated bycatch mortality may preclude a fishery for Pacific cod in the third season, we believe that the amount of halibut bycatch mortality apportioned to the third season should prevent the halibut bycatch limit from being exceeded.

We hope that the Pacific cod hook-and-line fleet will actively work toward reduced halibut bycatch rates and mortality rates in 1995. If they don't, opportunity to harvest the third season allocation of Pacific cod will be jeopardized.

Sincerely,



Steven Pennoyer
Director, Alaska Region

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June 1, 1995

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**COPY FOR YOUR
INFORMATION**

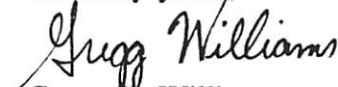
Dear Clarence:

Enclosed is our report which reviews and re-evaluates the halibut discard mortality rate in the 1995 BSA Pacific cod hook-&-line fishery using inseason observer data. As you recall, this re-evaluation was requested by the Council at the December, 1994 meeting. At that meeting, the Council instructed National Marine Fisheries Service (NMFS) to monitor bycatch in this fishery using a discard mortality rate of 12.5%, pending a review at the June, 1995 meeting of an IPHC re-evaluation of the fishery using inseason data.

We have just completed the re-evaluation. Our results indicate the fishery is exhibiting a discard mortality rate of 11.5%. This rate is more appropriate in estimating halibut bycatch mortality in the 1995 BSA Pacific cod hook-&-line fishery than the 12.5% rate used thus far in 1995.

I will be at the June meeting in Dutch Harbor and would be pleased to review our results with the Council at that time.

Sincerely yours,


Gregg H. Williams
Biologist

encl.

cc: Commissioners

Halibut Discard Mortality Rates in the 1995 BSA Pacific Cod Hook-&-Line Fishery: Results From Inseason Data Analysis

by

**Gregg H. Williams and Lauri L. Sadorus
International Pacific Halibut Commission
June 1, 1995**

Summary of Results

Analysis of halibut viability data reported inseason by BSA Pacific cod hook-&-line fishery observers resulted in a discard mortality rate of 11.5%, lower than has been noted during 1990-1993 and lower than was used by NMFS during management of halibut bycatch in the 1995 fishery. Data from 26 vessels collected by 32 observers were used in the analysis, representing 62% of the fleet and 60% of the groundfish catch by this fishery. Observers reported that sand flea (amphipod) predation was the main cause of dead halibut. The data also indicated that swivel gear had lower discard mortality rates, possibly by providing a halibut the opportunity of avoiding sand flea predation. Poor and dead condition halibut also resulted from inexperienced or rushed rollermen who could not or would not apply proper careful release techniques. **Based on this analysis, a discard mortality rate of 11.5% is more appropriate in estimating halibut bycatch mortality in the 1995 BSA Pacific cod hook-&-line fishery than the 12.5% rate used thus far in 1995.**

Introduction

Each year at its December meeting, the North Pacific Fishery Management Council (NPFMC) reviews the discard mortality rates recommended by the staff of the International Pacific Halibut Commission (IPHC) for use in monitoring halibut bycatch in the upcoming year's fisheries. For the BSA Pacific cod hook-&-line fishery, the NPFMC stipulated that halibut bycatch in this fishery would be initially monitored using a 12.5% discard mortality rate, but could be revised pending analysis of the inseason data and discussion at the June, 1995 meeting.

To accomplish the mid-year re-evaluation, IPHC staff have debriefed observers with an emphasis on determining the reliability of viability sampling and subsequent reporting of these data. This paper summarizes the data collected, the data not used and associated reasons, the method of calculating the discard mortality rate for the cod hook-&-line fishery, and the resulting discard mortality rates.

Description of Viability Data and Collection

Among the many tasks performed by observers is viability sampling. The goal of this sampling is to determine the condition of a bycaught halibut at the point the fish is returned to the water.

The data collected, in the form of Excellent/Poor/Dead condition factors assigned to each halibut in a subsample, are to represent all the injuries inflicted to the fish during capture and subsequent release by the rollerman back to the water.

Observers are instructed by IPHC staff in the criteria used to determine viability for sampled halibut. Each halibut is checked against the predetermined criteria (Table 1) and assigned a condition factor. The criteria focus on opercular and body movements, and the extent of physical injuries. Observers have used this same set of criteria since the inception of the Domestic Observer Program in 1990, although a 1994 revision made the criteria more explicit in description and provided examples.

Viability data are collected and recorded by individual longline set. To report these data with their weekly reports of catch and bycatch, observers are required to sum the data from individual sets into totals for the reporting week. The weekly totals of the number of excellent, poor, and dead halibut are then transmitted to the NMFS Observer Program on a special form via FAX or other media. The Observer Program forwards the data to the IPHC staff.

Data Editing and Review

During debriefing, we checked the weekly sums of Excellent/Poor/Dead halibut reported by each observer against the information recorded from each set and made appropriate corrections. In general, we found that the reported weekly totals of sampled halibut were equal to or slightly less than the sum of the individual set totals. Errors appeared to be caused either by the absence of data from one or more sets, or from errors in addition. These types of errors were not unexpected, given the general conditions in which observers work and their extensive workload. Field data are usually reviewed and edited following collection, and errors are corrected at that point. From that standpoint, observer data is no different.

We also discussed with each observer the strategy used for viability sampling and subsequent success during the cruise. In particular, we wanted to ensure that (1) the viability criteria were being applied correctly and (2) the data were collected in a representative fashion. A failure in either of these two areas would cause the data to be thrown out.

The debriefing and data editing/review process required substantial IPHC staff time, approximately 75% of one person's time during the 16-week period from early February through May. Additional time spent by NMFS Observer Program staff was considered minimal.

Discard Mortality Rate Calculation

We used the same procedure for calculating the discard mortality rate as in past IPHC analyses, which employs the following information (Williams 1994). From past studies, it is known that (1) handling mortality of hook & line caught halibut in excellent condition ranges from 2 to 5% (Peltonen 1969), and (2) survival of poor condition fish is approximately half that of fish in excellent condition (Myhre 1974). Additionally, it is assumed that (1) all fish judged as dead actually die and (2) all fish judged as excellent survive, except for those killed through handling

mortality (2% to 5%).

Using these relationships, mortality rates were 2-5% for excellent condition fish, 51-53% for poor fish, and 100% for dead or likely-to-die fish. The discard mortality rate was calculated using the midpoint in the range for each condition category. This resulted in mortality rates of: 3.5% for excellent condition fish, 52% for fish in poor condition, and 100% for dead or likely-to-die fish.

Summary of 1995 Fishery, Inseason Data, and Discard Mortality Rates

The 1995 BSA Pacific cod hook-&-line fishery lasted for approximately 18 weeks, from January 1 through May 7. For this analysis, we have only used data reported through May 6. Table 2 lists pertinent information about the fishery, along with a summary of the viability data used in this analysis.

The Inseason Management Branch of the NMFS Alaska Region office has indicated that 42 freezer longliners took part in the 1995 cod fishery, not including any catcher boats that delivered to shoreside plants (G. Tromble, NMFS/AKR, pers. comm.). This provides a total of 538 vessel-weeks of potential fishery data.

Although most of the boats in the fishery fall into the "100% observer coverage", some of the boats are less than 125 feet in length and required only 30% observer coverage, so not all weeks on every vessel were observed. Data were collected by 55 observers from 35 boats, or 83% of the fleet. This yielded 402 vessel-weeks of data for (1) editing and (2) review with observers during debriefing.

The edited data set was comprised of 352 weeks of data, or 88% of the total observed weeks. Editing the data was only possible if the observer had finished their cruise and had turned in their individual set forms for comparison to the NMFS Observer Program office in Seattle.

The debriefing process provided an opportunity to discuss with each observer the method used to collect halibut viability data and other information relative to the survival of halibut bycatch. Data were considered for this analysis only if we were able to debrief the observer by May 25. This criterion excluded 4 observer cruises for which we had 32 vessel-weeks of edited data. From the 38 observers that were debriefed, it was determined that 6 observers, representing 50 vessel-weeks, did not collect viability data in a manner representative of the overall vessel operation, so we eliminated those data from the data set. The final data set contained information from 26 vessels collected by 32 observers, resulting in 270 vessel-weeks.

As shown in Table 2, over 19,000 halibut were examined by observers for release viability, with the following distribution of condition: 87% excellent, 10% poor, and 3% dead. Using the standard methodology outlined earlier, this yields a discard mortality rate of 11.5% for the 1995 winter/spring fishery. The weekly discard mortality rate ranged from 21% to 7% during the fishery, but were mostly in the 10% to 12% range. The discard mortality rate appeared to be lowest in the latter weeks of the fishery, when vessel effort was highest and the number of boats in the viability subsample was lowest.

Discussion and Recommendations

With hook-&-line fisheries, the main factor contributing to halibut discard mortality is the rollerman. Ultimately, this person's actions determine whether a bycaught halibut with only a minor hook wound will go back over the side no worse off than when it came up. The improvement seen in the discard mortality rate is likely due to the increased emphasis by the vessel captains and crew on improving halibut bycatch survival.

We examined the discard mortality rates by individual vessel, in order to determine if any vessels had inordinately high rates and found that most vessels were below 15%, with only a few above 20% (Figure 1). This is in contrast to a similar type of analysis conducted on the 1994 fishery, which showed several vessels exceeding a 30% discard mortality rate. We have included as Table 3 a list of the vessels in the 1995 fishery which provided data and the discard mortality rate calculated from those data.

Several important facts were uncovered during our observer debriefings. The first concerns the causes of poor and dead classifications during viability examinations. Roughly 75% of the observers noted that sand fleas were one reason that bycaught halibut were classified as dead and 45% noted that sand fleas were the only cause of dead category halibut. This is in line with previous reports by observers and our understanding of contributing factors. Fatal hook removal injuries caused by inexperienced crew also rated high.

During debriefing, some observers noted that swivel gear may offer halibut a chance to overcome sand fleas. With this gear, swivels are used where the gangion ties into the groundline or the gangion connects to the hook, and keeps a struggling halibut from twisting and winding the gangion around the groundline. Providing greater movement may enhance a fish's ability to avoid sandflea predation. Although the results are preliminary at this stage, our results indicate that boats that use swivel gear have a lower discard mortality rate (10%) than boats that do not use swivels (13%) (Figure 2).

On the other hand, halibut were usually in poor condition due to hooking and hook removal injuries. Hooking injuries are usually serious when the hook enters the right eye, making it difficult to extract the hook without causing further injury. Hook removal injuries seemed to be the most prevalent when the rollerman did not or could not take the necessary time to remove the hook.

In our opinion, the fleet gained considerable benefit from a voluntary program to monitor halibut discard mortality rates inseason on a vessel-by-vessel basis. This action provided feedback to the individual vessels when data suggested that improper handling was occurring. We encourage the industry to continue these efforts in the fall fishery.

Based on this analysis, a discard mortality rate of 11.5% is more appropriate in estimating halibut bycatch mortality in the 1995 BSA Pacific cod hook-&-line fishery than the 12.5% rate used thus far in 1995.

Acknowledgements

The cooperation of the NMFS Domestic Observer Program staff is greatly appreciated by the authors. In particular, the Debriefing staff was very helpful in coordinating debriefing interviews and allowing us access to observers, observer forms, and associated data. We also want to acknowledge the efforts of the observers in this fishery to collect the viability data and their willingness to discuss the pertinent aspects of their cruises.

References Cited

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- Peltonen, Gordon J. 1969. Viability of tagged Pacific halibut. International Pacific Halibut Commission, Rep. 52, 25 p.
- Tromble, Galen. Memo to Gregg Williams, IPHC, May 26, 1995.
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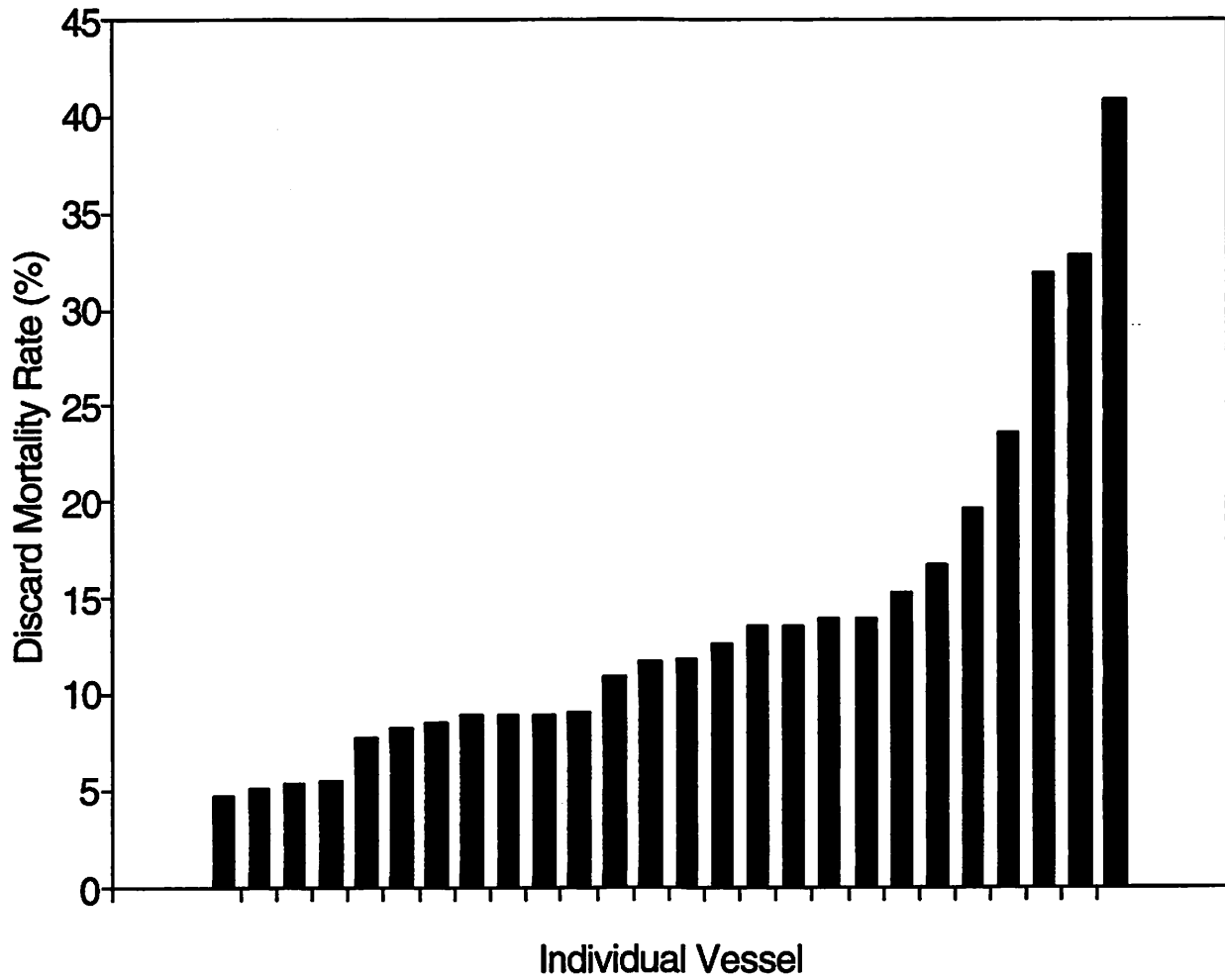


Figure 1. Distribution of halibut discard mortality rates in the 1995 BSA Pacific cod hook-&-line fishery by individual vessel.

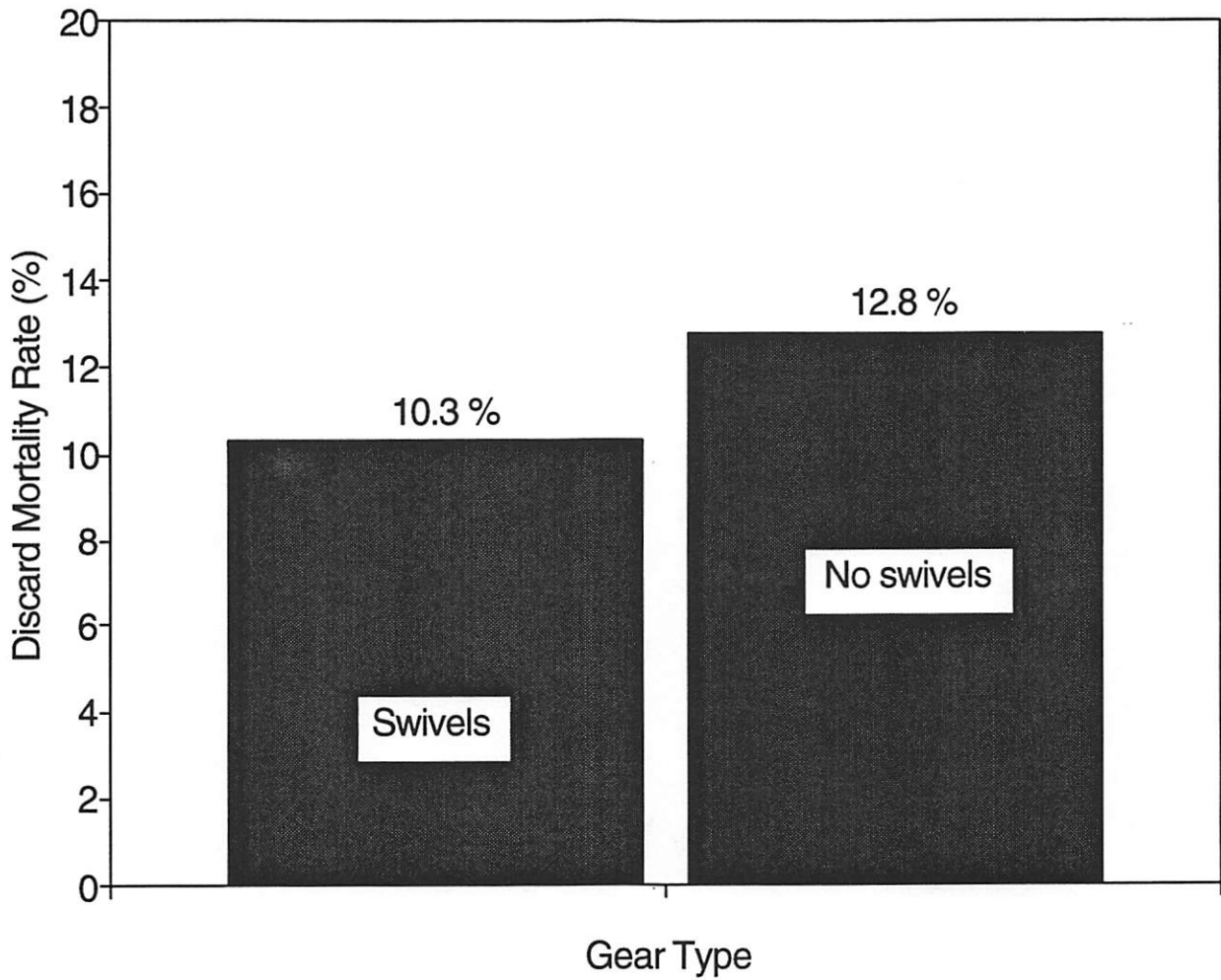


Figure 2. Comparison of halibut discard mortality rates between vessels using swivel gear to those not using such gear.

Table 1. Criteria used by NMFS observers to determine release condition of halibut caught on hook-&-line gear.

EXCELLENT: NO SIGN OF STRESS

1. Hook injuries are minor (limited to the hook entrance/exit hole, torn lip) and located in the jaw or cheek.
2. Bleeding, if present, is minor and limited to jaw area.
3. No penetration of the body by sand fleas (check eyes, fins, anus).
4. Muscle tone or physical activity is strong.
5. Gills are deep red.

POOR: ALIVE BUT SHOWING SIGNS OF STRESS

1. Hook injuries may be severe: broken jaw; punctured eye.
2. Vital organs are not injured.
3. Bleeding may be moderate but not from gills.
4. No penetration of the body by sand fleas (check eyes, fins, anus).
5. Muscle tone or physical movement may be weak or intermittent; little, if any, response to stimuli.
6. Gills are red.

DEAD: NO SIGN OF LIFE OR, IF ALIVE, LIKELY TO DIE FROM SEVERE INJURIES

1. Vital organs may be damaged: torn gills; gaff wound to head or body; jig injury to viscera; side of face torn loose or missing jaw.
 2. Sand fleas have penetrated the body (they usually attack the eyes first, but also fins and anus).
 3. Severe bleeding may occur, especially from the gills.
 4. No sign of muscle tone; physical activity absent or limited to fin ripples or twitches.
 5. Gills may be red, pink, or white.
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Table 2. Summary of fishery and observer viability data for the 1995 BSA hook-&-line Pacific cod fishery.

Week Ending Date	1995 FISHERY			VIABILITY SUBSAMPLE								
	No. of FRZR/LL ¹	Groundfish Catch (mt)	Halibut Bycatch (mt)	No. of Boats	No. of Obsvrs.	Groundfish Catch (mt)	Halibut Bycatch (mt)	# Halibut Examined	% Exc	% Poor	% Dead	Discard Mort. Rate
1/07	26	4,499	239	15	15	3,087	195	1,041	75	13	12	21.1
1/14	28	4,915	216	16	16	3,518	149	1,043	86	10	4	12.1
1/21	26	3,500	164	14	14	2,311	122	1,059	83	14	3	12.8
1/28	27	3,885	156	14	14	2,206	103	678	86	12	2	11.7
2/04	28	3,462	164	17	17	2,602	121	1,242	88	9	3	11.0
2/11	30	6,101	175	17	17	4,665	132	1,266	86	12	2	11.4
2/18	28	4,569	165	19	19	3,374	128	1,110	87	11	2	11.0
2/25	27	4,552	131	18	19	3,431	108	1,404	87	10	3	10.8
3/04	28	4,901	181	19	20	3,982	150	1,438	84	12	4	12.8
3/11	30	4,453	187	20	20	3,442	147	1,498	84	13	3	12.9
3/18	31	5,545	165	22	22	3,824	132	1,389	81	14	5	15.2
3/25	34	4,624	158	19	19	3,001	115	1,051	86	11	3	12.0
4/01	32	4,391	166	13	13	2,123	107	942	91	7	2	8.9
4/08	33	4,816	208	12	12	1,971	132	752	94	5	1	7.1
4/15	32	4,592	200	10	10	1,380	114	917	92	7	1	7.5
4/22	33	4,956	251	9	9	1,583	119	1,062	93	6	1	6.9
4/29	35	4,787	220	8	8	1,429	97	743	91	8	1	8.5
5/06	30	4,716	266	8	8	1,712	96	628	94	5	1	6.8
OVERALL	42	83,264	3,412	26	32	49,641	2,267	19,263	87	10	3	11.5

¹No. of FRZR/LL represents the number of freezer longliners and does not include the number of catcher vessels delivering to shore plants. As the amount of groundfish catch delivered to shore plants was less than 1% of the total groundfish caught in this fishery, the number of catcher vessels was probably quite low.

Table 3. Discard mortality rates by individual vessel in the 1995 BSA Pacific cod hook-&-line fishery.

Vessel Name	Discard Mortality Rate	Vessel Name	Discard Mortality Rate
Alaska Challenge	5	Lilli Ann	14
Alaska Mist	9	Maria N	20
Alaska Patriot	33	New Star	13
Alaska Pioneer	24	Northern Aurora	12
Alaskan Leader	17	Norton Sound	11
Alaskan Shores	9	Ocean Prowler	5
Beauty Bay	41	Pacific Pearl	32
Deep Pacific	14	Pathfinder	14
Diamond Star	9	Prowler	5
Frontier Explorer	8	Seattle Star	15
Frontier Mariner	8	Sonya S	11
Frontier Spirit	6	Storfjord	9
Hessafjord	12	Yukon Princess	9