

**Unreported Discards Under IFQ Management:
Survey Responses of Alaska Halibut Fishermen**

by

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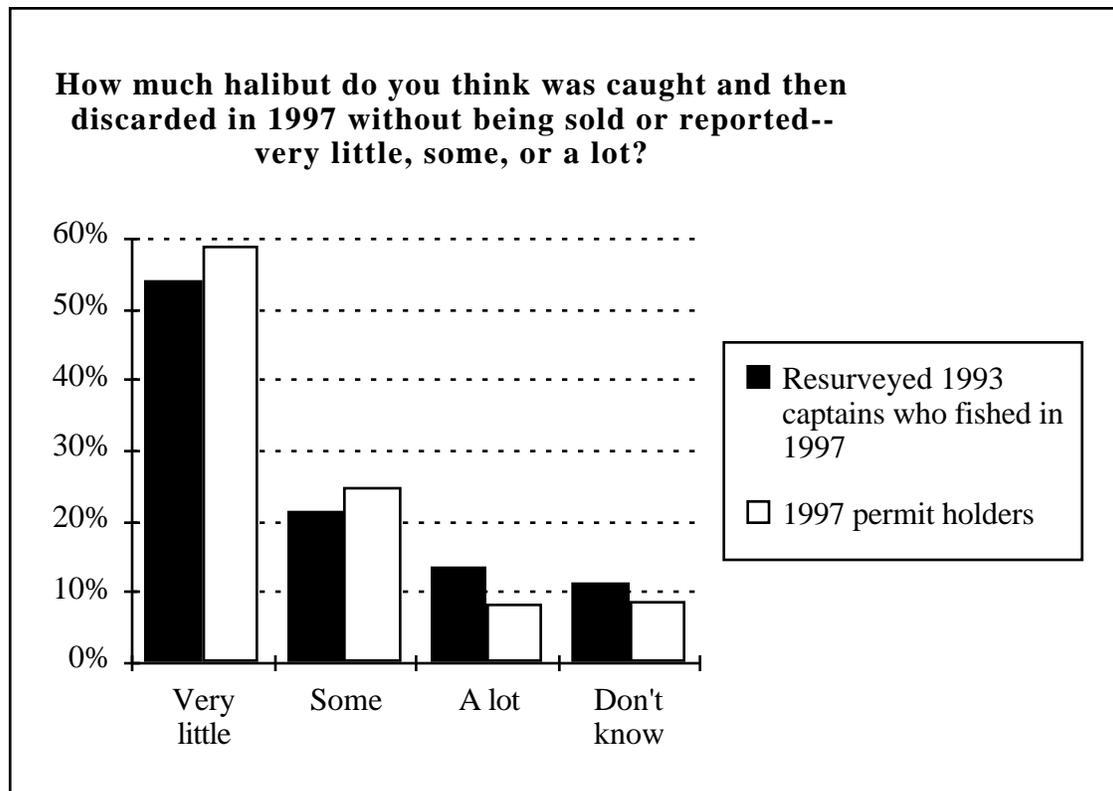
ISER Working Paper Series:
Surveys of Alaska Halibut Fishermen
About Effects of IFQ Management

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Summary

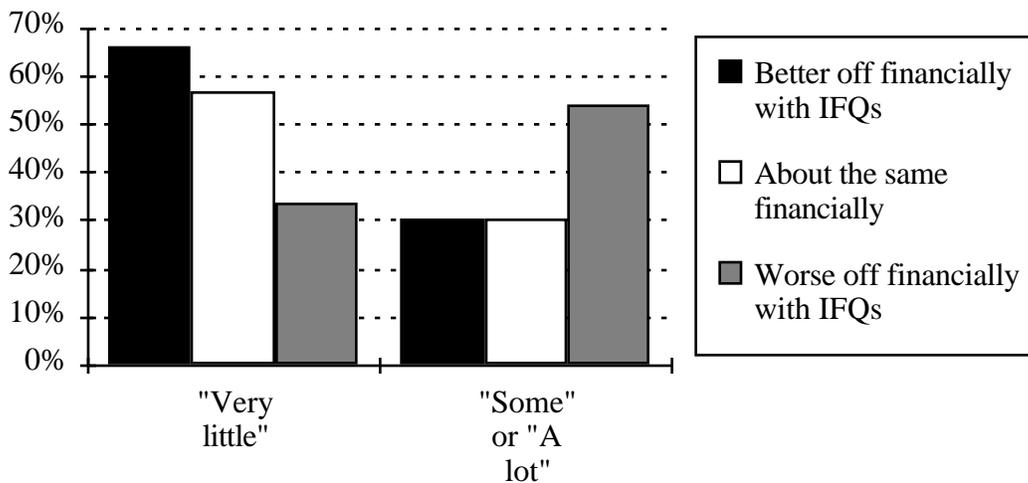
In 1998, the University of Alaska Institute of Social and Economic Research (ISER) conducted two telephone surveys of Alaska halibut fishermen about the effects of Individual Fishing Quota (IFQ) management of the Alaska halibut fishery. Funding for the surveys was provided by the Alaska Sea Grant College Program. This paper, one of a series reporting results of the surveys, discusses fishermen's responses about unreported discards of halibut under IFQ management.

The surveys included a series of questions about respondents' perceptions about the effects of IFQ management. One of these questions asked, "How much halibut do you think was caught and then discarded in 1997 without being sold or reported? Very little, some, or a lot?" Slightly more than half of halibut fishermen responded that "very little" halibut was caught and then discarded without being sold or reported, while about one-third answered "some" or "a lot."



Respondents who gave positive responses about other effects of the IFQ program were much more likely to give a positive response about unreported discards. For example, 66% of those who responded that the IFQ program made them better off financially responded "very little" about unreported halibut discards, while only 34% of those who responded that the IFQ program made them worse off financially responded "very little." It appears likely that responses about illegal discards were affected or biased in part by respondents' overall attitudes towards IFQ management. Thus it is difficult to draw definitive conclusions from the survey responses about fishermen's actual perceptions of the extent of unreported discards (as opposed to what they told survey interviewers).

How much halibut do you think was caught and then discarded in 1997 without being sold or reported-- very little, some, or a lot?



Note: "Don't know" responses not shown.

Among those fishermen who said there were "very few" unreported discards, the most frequently cited reasons were that there was no reason to discard halibut, that they were not aware of significant discards, and that fishermen follow the rules and are not wasteful. Of those who said that there were "some" or "a lot" of unreported discards, the most frequently cited reasons were high grading (the discarding of smaller or lower quality fish in order to allow quota to be used to land higher-priced larger or higher quality fish). Another reason was catches in excess of fishermen's individual quotas.

Whether or not fishermen have an incentive for high grading is affected by whether or not processors pay different prices for different sizes or grades of fish. In every area, more than 80% of respondents reported receiving different prices per pound either "usually" or "sometimes." In all but one area, more than half of respondents reported receiving different prices per pound "usually." This suggests that a price incentive for high grading for higher-priced sizes or grades is often present in the Alaska halibut fishery. However, this does not by itself necessarily mean that significant high grading occurs.

Although far from conclusive, the survey results suggests that unreported discards are neither insignificant nor a large-scale problem under IFQ management of the Alaska halibut fishery.

Introduction

In 1998, the University of Alaska Institute of Social and Economic Research (ISER) conducted two telephone surveys of Alaska halibut fishermen about the effects of Individual Fishing Quota (IFQ) management of the Alaska halibut fishery. Funding for the surveys was provided by the Alaska Sea Grant College Program. This paper, one of a series of working papers reporting results of the surveys, discusses fishermen's responses about the effects of IFQ management on the safety of the halibut fishery.^{1, 2}

The *Captains Resurvey* was a resurvey of halibut captains ISER surveyed in 1994, just before the IFQ program went into effect.³ The purpose of the Captains Resurvey was to gather information about how the introduction of IFQ management in the Alaska halibut fishery in 1995 had affected the halibut fishery and those who fished for halibut before the program was introduced.

The *Permit Holders Survey* was a survey of a random sample of 1997 State of Alaska halibut permit holders. The purpose of the Permit Holders Survey was to gather information about the 1997 halibut fishery from a random sample of participants, including persons who did not fish for halibut before IFQ management.⁴

Table 1 summarizes the sample sizes, response rates, and number of interviews for each survey. The survey results reported in this paper for the Captains Resurvey are based on only the 93 interviews conducted with captains who continued to fish for halibut in 1997. The samples for both surveys were stratified by vessel size. Except where noted otherwise, the survey results reported in this paper are weighted to adjust for this stratification.⁵

Table 1
Survey Sample Sizes, Response Rates, and Numbers of Interviews

	Captains Resurvey	Permit Holders Survey
Sample size	249	200
Respondents contacted	208	134
Response rate = (respondents contacted)/(sample size)	84%	67%
Number of interviews*		
Captains Resurvey, Total	208	
1993 captains who fished in 1997*	93	
1993 captains who did not fish in 1997	91	
1993 respondents were vessel owners but not captains	19	
1993 respondents who fished in 1997 under a CDQ allocation	5	
Permit Holders Survey, Total		134
1997 permit holders who fished vessels listed on their permits*		97
1997 permit holders who fished other vessels*		11
1997 permit holders who did not participate in IFQ fishery		26

*Only the responses of those groups marked with a * and with numbers shown in bold font, who fished for halibut in 1997 under IFQ management, are reported in this paper.
File: Survey summary.

Most of the questions asked in the two surveys were the same, except that the Captains Resurvey included questions about respondents' fishing in 1995 and 1996. In interpreting responses to the two surveys, keep in mind that the Captains Resurvey is representative only of 1993 halibut captains who continued to fish in 1997. In contrast, the Permit Holders Survey is representative of all 1997 permit holders.

An indication of how representative Permit Holder Survey respondents were of 1997 permit holders may be gained by comparing the actual 1997 harvest and the actual number of boats participating in the 1997 fishery (as reported by the International Pacific Halibut Commission) with estimates based on weighted survey responses. The estimated 1997 harvest based on survey responses was 90% of the actual harvest, while the estimated number of boats based on survey responses was 94% of the actual number of boats. This suggests that the survey respondents were reasonably, although not perfectly, representative of all 1997 permit holders.⁶

Responses About Unreported Discards Under IFQ Management

The surveys included a series of questions about respondents' perceptions about the effects of IFQ management. One of these questions asked, "How much halibut do you think was caught and then discarded in 1997 without being sold or reported? Very little, some, or a lot?" Table 2 summarizes responses to this question by survey, vessel size class, and 1997 harvest level.

Table 2
How much halibut do you think was caught and then discarded in 1997
without being sold or reported--very little, some, or a lot?

	Very little	Some	A lot	Don't know	Total	Number of responses
By Survey Group						
Resurveyed 1993 captains who fished in 1997	54%	21%	14%	11%	100%	93
1997 permit holders	59%	25%	8%	8%	100%	108
By vessel size class						
<i>Resurveyed 1993 captains who fished in 1997</i>						
Vessel class B (over 60')	40%	54%	6%	0%	100%	18
Vessel class C (35'-60')	62%	12%	14%	12%	100%	42
Vessel class D (under 35')	46%	30%	14%	9%	100%	33
<i>1997 permit holders</i>						
Vessel class B (over 60')	40%	50%	10%	0%	100%	10
Vessel class C (35'-60')	65%	17%	10%	9%	100%	70
Vessel class D (under 35')	53%	33%	4%	11%	100%	27
By 1997 harvest level						
<i>Resurveyed 1993 captains who fished in 1997</i>						
1-4,999 lbs	46%	27%	15%	11%	100%	18
5,000-19,999 lbs	67%	14%	7%	12%	100%	17
20,000 lbs or more	60%	18%	14%	7%	100%	22
<i>1997 permit holders</i>						
1-4,999 lbs	55%	21%	7%	17%	100%	29
5,000-19,999 lbs	66%	22%	10%	2%	100%	37
20,000 lbs or more	56%	31%	8%	6%	100%	38

Notes: All responses are weighted. "Don't know" includes "no answer" responses.

Source: 1997 Captains Resurvey and 1997 Permit Holder Survey, Question L2.

File: Question L2.

Slightly more than half of halibut fishermen responded that "very little" halibut was caught and then discarded without being sold or reported, while about one-third answered "some" or "a lot." Responses were similar across vessel classes and 1997 harvest levels; differences in responses were not statistically significant except by vessel class among resurveyed 1993 captains who fished in 1997.⁷

Relationship Between Responses About Unreported Discards and Responses to Other Questions

Table 3 compares responses about unreported discards with responses to selected other questions about effects of IFQ management. Respondents who gave positive responses about other effects of the IFQ program were much more likely to give a positive response about unreported discards.⁸ For example, 66% of those who responded that the IFQ program made them better off financially responded "very little" about unreported halibut discards, while only 34% of those who responded that the IFQ program made them worse off financially responded "very little."

Table 3
**How much halibut do you think was caught and then discarded in 1997
without being sold or reported--very little, some, or a lot?**

	Very little	Some	A lot	Don't know	Total	Number of responses
<i>Do you think that IFQ management is better, worse, or about the same for conservation of the halibut resource?</i>						
Better	62%	24%	5%	10%	100%	136
About the same	36%	38%	22%	5%	100%	87
Worse	22%	33%	25%	19%	100%	36
<i>Do you think IFQs have made fishing for halibut safer?</i>						
Yes	52%	26%	13%	8%	100%	238
No	33%	46%	8%	13%	100%	24
<i>Do you think that the IFQ system allocated halibut fairly among the people who worked in the halibut fishery?</i>						
Yes	65%	20%	9%	7%	100%	91
No	38%	34%	17%	12%	100%	176
<i>Do you think that the IFQ program made you better off financially, worse off, or about the same?</i>						
Better	66%	24%	6%	4%	100%	82
About the same	57%	17%	13%	13%	100%	53
Worse	34%	35%	19%	12%	100%	133
<i>Overall, how would you describe your attitude toward the IFQ Management System for halibut?</i>						
Positive	68%	23%	4%	5%	100%	110
Mixed	41%	32%	16%	10%	100%	105
Negative	24%	32%	27%	17%	100%	63

Notes: Unweighted responses for 1997 Captains Resurvey and 1997 Permit Holders Survey combined.

Source: 1997 Captains Resurvey and 1997 Permit Holder Survey, Questions K2, K3, K4, L2, L5, L8.

File: Question L2.

Since there is no obvious other reason why responses about the extent of unreported discards should be correlated with responses about fairness of initial allocations or financial effects of IFQ management, it appears likely that responses about illegal discards were affected or biased in part by respondents' overall attitudes towards IFQ management. Put differently, whether fishermen liked or disliked IFQs for other reasons may have affected the extent to which they said that unreported discards occurred. Thus it is difficult to draw definitive conclusions from the survey responses about fishermen's actual perceptions of the extent of unreported discards (as opposed to what they told survey interviewers).

However, we can set approximate bounds on these perceptions, if we assume that fishermen's actual perceptions about specific effects of IFQs are neither more positive on average than those with positive attitudes towards IFQ management, nor more negative on average than those with negative attitudes towards IFQ management. Under this assumption, the ranges of responses between those with positive and negative attitudes suggests that between 24% and 68% of fishermen believe that "very little" unreported discards occurred, while between 27% and 59% believe that "some" or "a lot" of unreported discards occurred.

Reasons for Opinions about Unreported Discards

After asking the question "How much halibut do you think was caught and then discarded in 1997 without being sold or reported? Very little, some, or a lot?" the survey asked the open-ended follow-up question "Why do you think so?" The survey interviewers summarized the answers in short phrases. Subsequently the author grouped these answers into the broad categories of reasons shown in Table 4. Although this grouping was somewhat arbitrary, it provides a general indication of the reasons most frequently cited by fishermen for their opinions about unreported discards under IFQ management.

Table 4
Reasons for Responses About Unreported Discards

Code\name	Number of Respondents			Total
	How much halibut do you think was caught and then discarded in 1997 without being sold or reported?			
	Very little	Some	A lot	
No reason to discard halibut	25			25
Don't know of it	15			15
Fishermen follow the rules	7			7
Fishermen are not wasteful	5			5
Happens only occasionally	5			5
Less gear in use	4			4
Minor discards when over limits	4			4
Very little, unspecified	4	1		5
Discards of flea-bitten fish	1	3		4
Other reasons for few discards	21	3		24
Halibut bycatch in other fisheries	5	3	2	10
High grading, general	2	9	3	14
High grading, price driven	1	6	7	14
Lower quality fish discarded		2	1	3
Small fish discarded		6		6
Due to catches above limit		7	1	8
Have seen or heard about it		4	2	6
Big problem, general		3	1	4
Other reasons, general		4	4	8
TOTAL	99	51	21	171

Note: Based on open-ended responses to Question L2a ("Why do you think so?"), which followed question L2 ("How much halibut do you think was caught and then discarded in 1997 without being sold or reported?") Grouping into different reasons is based on author's judgment. Table shows number of respondents who mentioned each reason. Some respondents mentioned more than one reason. File: Question L2a open ended.

Among those fishermen who said there were "very few" unreported discards, the most frequently cited reasons were that there was no reason to discard halibut, that they were not

aware of significant discards, and that fishermen follow the rules and are not wasteful. Of those who said that there were "some" or "a lot" of unreported discards, the most frequently cited reasons were high grading (the discarding of smaller or lower quality fish in order to allow quota to be used to land higher-priced larger or higher quality fish). Another reason was catches in excess of fishermen's individual quotas.

Responses about reasons for opinions about unreported discards are listed below, as summarized by the survey interviewers and grouped by the author. These responses provide more insight into the opinions of fishermen about these effects.

No reason to discard halibut

Almost none, no reason for it.

Because we have a lot of time to harvest fish we are not setting more gear than is necessary to meet our quota.

Can't think of reason to dump halibut.

High prices for halibut last year people kept all they caught.

It is so easy to monitor yourself.

It's a function of time and money. Catch fish to sell and not throw back.

Most fishermen are thrifty.

Most fishermen work too hard to not take care of their fish.

Most people target halibut, no reason.

No reason to catch them and not keep them.

No reason to discard it.

No reason to discard. (*two responses*)

No reason to!

No reason to. People can judge more what they need to catch.

No reason, need, why, how?

Price was good that year, people wouldn't discard at good price.

The guys I know don't do it. Its pretty easy to stay within your quota.

Too hard to get without throwing it away.

Too much \$

What would be the advantage of it?

Why bother catching it if your just going to throw it away?

Why discard fish when its money value.

Why throw catch away.

You know what you want.

Don't know of it

Don't know of any, we do report our chickens when we fill out our reports.

Don't know of any.

Don't know of anyone who is doing it

From my boat, I don't see it.
Haven't heard (*two responses*)
Haven't heard of any.
Haven't seen or heard of much.
I haven't heard of any myself.
I haven't heard of any of this either.
I haven't heard of any. (*two responses*)
I haven't heard of this at all.
I haven't seen any.
I really don't know of any of this going on. Also now we're not going so fast to damage halibut and lose a lot of gear.

Fishermen follow the rules

I don't think people fish over their limits for the most part.
I suspect most people are fishing legally.
Most people will come in short rather than go over quota.
Not so much the crooks people make us out to be.
Only discard undersized halibut and anything legal is brought back.
Very good about record keeping, don't overfish.
We count every small one we catch and release, the fine isn't worth it.

Fishermen are not wasteful

Halibut was generally put to good use, it wasn't wasted.
Most fisherman are pretty thrifty.
Most fisherman use all the fish.
Most long liners are very conservation minded.
Us personally, self conserve to return "subs" to ocean alive and take care how taken off line.

Happens only occasionally

High grading some. But I haven't heard much about it.
I guess some fishermen discarded smaller fish occasionally.
Only incentive would be if there was a price split and they fell into a lot of small fish.
Only saw it once.
Some high grading but that's expensive too so very little I would think.

Less gear in use

Not setting too much gear.
People use less gear and they can be more careful when they are picking it.
Set less gear now. Before there were miles of gear, they'd cut gear and leave it with dead fish.

Shake off undersized ones. Speak for myself - lessen gear as goes

Discards of flea-bitten fish

Bad halibut eaten out by sand flies, etc. Not good quality.

Flea bitten fish are usually discarded.

Sand fleas, etc.

You can get into areas where there are fleas and because no derby you may leave your gear set longer.

Minor discards when over limits

I guess some people probably dump some when they are over the limit.

Only if they were over their quota.

Only those fishermen that realized they were over the limit and had to throw some smaller ones back.

There is always some. I don't set a lot out in case a lot is caught. But I threw back about 500. Report only if asked when enforcement comes on board.

Very little, unspecified reasons

Doesn't happen much

Keep the fish

Most people wouldn't.

Not much at all!

Very little in undersized 10-15% illegally, small percentage of people who do it - I'd say less than 5%.

Other reasons for few discards

A lot don't pull gear up, waste of fish.

Always been less than quota. It can happen. It happened to me, I throw for testing. You don't put all your gear in. Test before you lay all gear.

Because of method of openers plan ahead and know market and prices.

Discarded in a way that the fish survive. Before they were discarded and dead.

Don't target small ones so don't get them.

Easy to keep track of how you're progressing to your quota.

Fish spoiling was a real problem.

I don't know

IFQ system makes it less likely to start with, old system has more gear set initially, a lot more before IFQ, relative to old system, less is discarded. I inquired of International Halibut Commission staff about the size break down of fish. They said the distribution of fish sizes is the same as prior, where if they were discarded now, a larger average of sizes would have shown up and they didn't.

Incidental catch or dead loss. Able to fish when you want in weather you want. We fish smarter.

Keep them and sell them, undersize alive when release.

Lots of red snapper waste though. People got paid to catch halibut.
Maybe some of the sport fishermen.
Maybe the problem is with the sport fishing.
Most fishermen don't do this, maybe the sport fishermen do.
Most people keep what comes aboard.
My experience in catching fish.
Now with circle hooks to hold them, J hooks killed more fish in the past let them go easy and alive.
Only in the Cook Inlet. Not enough fish locally to do that.
Overfished quota shaking last fish, home pack last bit, 10% average and underage.
People certainly think there is a lot of that going on, but I really couldn't say one way or another.
People who went over would find someone else to sell the fish.
Some of fishermen during derbys did not take very good care of their fish.
Unless you leave gear too long and sand fleas get to it. Doesn't happen much anymore because you can pick your weather.

Halibut bycatch in other fisheries

A lot of halibut discarded by trawlers not very much discarded by long liners.
A lot of halibut discarded from trawlers as by-catch. Long liners don't do it.
A lot of reasons, maybe people aren't fishing for halibut but catching cod or something and don't want halibut. The way the cod fishery is now its not helping halibut (pacific cod not black cod) crucifiers are legal in the pacific cod fishery and they cat
By-catch by trawlers way too much.
Caught in trawls and not recorded in the log book.
Some by-catch
Some is discarded as by-catch.
The draggers are killing and dumping a bunch.
Trawler by-catch mainly.
Trawlers waste a lot due to by product catch.

High grading, general

Boats that throw back smaller fish to high grade for bigger fish.
High grading (*four responses*)
High grading is part of it. Bad weather means gear left behind.
High grading, throwing back smaller fish.
High grading and leaving gear out in storms.
Large lot - high grading.
People get rid of smaller halibut.

People targeting black cod didn't want to deal with halibut. High grading for bigger fish equals more money for fishermen.

People wanted to keep larger, toss out small.

Some fisherman targeting bigger ones.

Whether they're alive or dead, I don't know, but there is high grading going on. People looking for higher prices.

Price-driven high grading

Because going after big fish that pay more and throwing out smaller ones.

Because of price structure of the canneries you get involved in high grading especially larger boats.

Because of the price differential.

High grading for a better price.

If get little ones, get less price, so some are throwing little ones back, I've never seen, but thought it.

Just because people are up against the price break.

Keep large fish for money.

No one wanted smaller ones that weren't money fish, they threw them back and kept the larger money fish.

Paying more for bigger fish so small are discarded.

People wanted to keep the large money fish. They threw back the smaller ones.

Small fish and some canneries pay better for bigger fish. High grading.

Small fish were sacrificed for large money fish.

Some people will throw some back if over the limit also some people do high grade for a higher price.

Threw back little ones, cannery wouldn't buy.

Lower quality fish discarded

#2 fish

I threw away some; spoiled on me.

The number one big price difference if halibut has gaff mark. Also, halibut in water too long because it didn't get pulled out soon after caught is thrown out. Higher prices for better.

Small fish discarded

A lot of fish are undersized.

Catch little ones and throw back.

Got in area with small fish and made mistake.

Releasing chickens, and last sets over quota.

Some fish are too small

Sometimes catch fish too small and throw them back.

Due to catches above limit

Max out IFQ pounds.

Over catch

Overages, problems, and shaking fish.

People worry about ? for going over quota. Going over 80 lbs treated like criminal.

Set too much gear.

They catch over amount, I got 4000 and could only keep 1700 - they are starting to keep better track as you fish. Not so much now.

We have to shake them if we fished our quota.

When you pull your lines they're on the hooks you have to get rid of the surplus if you've got your quota. I know there is discard because the officer asks how much you had to throw back.

Have seen or heard about it

I know a lot of people are high grading to get a higher price per pound.

I've heard some stories where people threw back small and kept big ones.

Report of dumping halibut overboard in Sitka.

Saw 20 K lbs being dumped.

Seen them and am suspicious. They high grade!

We heard a boat threw away 2000 lbs.

Big problem, general

A large amount!

I know that happens.

It's everywhere.

Know there is some.

Other reasons, general

"Horning" is gaffing halibut in the head and holding it there till you take the hook out, by then its just crab meat. They can't survive the gaff to their bodies. We are so upset by the waste now. We used to bring all the small gaffed fish back to the

Because I know fisherman. Big boat fleets have crucifiers made legal again. All baby salmon have their lips ripped at a minimum so they'll never grow up to be big halibut because they can't eat right.

Can see poundage breakdown on internet where brokers post info. This happens more often then you'd think.

Can't sell it can't bring in to give away. Bad systems tons of wastage. Stupid people.

I see evidence fish cut up, cheeks ripped especially from the black cod industry. Its very obvious, but no one is monitoring.

Just knowing human nature, people are hungry. Maybe the small boats do it.

People are taking home pack I guess

Size, measure, weight, they die, they throw over.

Price Differential Incentives for High Grading

Whether or not fishermen have an incentive for high grading is affected by whether or not processors pay different prices for different sizes or grades of fish. One survey question asked "When you delivered halibut, how often did you receive a different price per pound for different sizes or grades of halibut? Usually, sometimes, or never?" Responses to this question are shown in Table 5.

Table 5
When you delivered halibut, how often did you receive a different price per pound for different sizes or grades of halibut?

	Usually	Sometimes	Never	Total	Number of responses
Resurveyed 1993 captains who fished in 1997					
Area 2C	54%	27%	19%	100%	27
Area 3B	63%	30%	8%	100%	38
Area 3C	50%	50%	0%	100%	9
Area D	67%	33%	0%	100%	7
1997 permit holders					
Area 2C	41%	42%	16%	100%	52
Area 3B	57%	30%	13%	100%	63
Area 3C	74%	20%	6%	100%	18
Area D	92%	8%	0%	100%	7

Note: Responses are weighted.

Source: 1997 Captains Resurvey and 1997 Permit Holder Survey, Question D11.

File: Question D11.

In every area, more than 80% of respondents reported receiving different prices per pound either "usually" or "sometimes." In all but one area, more than half of respondents reported receiving different prices per pound "usually."

These responses suggest that a price incentive for high grading for higher-priced sizes or grades is often present in the Alaska halibut fishery. However, this does not necessarily mean that high-grading is profitable, given the costs of catching more fish and discarding lower priced fish. Nor, even if high grading is profitable, would it necessarily mean that high-grading occurs frequently, given regulations against this practice as well as ethical principles of many fishermen against wasting fish.

Endnotes

¹A list of working papers in this series may be found at the ISER web site at <http://www.iser.uaa.alaska.edu>. Copies of these papers may be downloaded from this site in pdf format.

²A growing body of research discusses effects of IFQ management in Alaska and elsewhere. In these working papers, we do not attempt to describe this research, or to compare results of the ISER surveys with other sources of information about effects of IFQ management. Our purpose is simply to report the results of the ISER surveys. At the end of this paper, we have included a list of references about the Alaska IFQ program.

³The earlier survey, which we refer to as the "1993 survey", was a survey of a random sample of 1993 permit holders. Most but not all of these permit holders were vessel captains in 1993: responses for the Captains Resurvey reported in this paper are only those of 1993 vessel captains. Funding for the 1993 survey was provided under Saltonstall-Kennedy program grant #NA37FD0184. A description of the 1993 halibut fishery, based largely on that survey, is provided in a 20-page report by ISER researchers Matthew Berman and Linda Leask entitled "On the Eve of IFQs: Fishing for Alaska's Halibut and Sablefish (1994). Copies of the report by Berman and Leask are available upon request from the author of this paper.

⁴All vessels participating in Alaska halibut longline fisheries are required to have a State of Alaska halibut permit holder aboard. The permit holder is usually, although not always, the vessel captain. The State of Alaska requirement to have a permit holder on board is unrelated to (and predates by many years) the IFQ management system, which is a federal program. Under the IFQ management system, vessel halibut landings are limited by IFQ holdings of persons on board (or, in some cases, hired captains). IFQ holders are not necessarily permit holders, or vice versa.

⁵A separate working paper (*Methodology for ISER Surveys of Alaska Halibut Fishermen*) provides a detailed discussion of sample stratification, weighting, and other technical issues for both surveys.

⁶Slight underestimates were to be expected because the estimates are based only on responses of the 97 permit holders who fished vessels listed on their permits.

⁷In chi-squared tests of homogeneity, the null hypothesis of homogeneity among survey groups, vessel classes, or harvest level groups was not rejected at the 10% significance level for all of the groupings shown in Table 2 except resurveyed 1993 captains who fished in 1997, by vessel size class. Pearson chi-squared statistics, degrees of freedom, and significance levels were as follows for the groupings shown above. By survey group: 1.36, 3, .716. By vessel size class, for resurveyed 1993 captains who fished in 1997: 13.58, 6, .035. By vessel size class, for 1997 permit holders: 9.00, 6, .174. By 1997 harvest level, for resurveyed 1993 captains who fished in 1997: 2.03, 6, .465. By 1997 harvest level, for 1997 permit holders: 5.79, 6, .447.

⁸In chi-squared tests of independence, the null hypothesis of independence among survey responses was rejected at the 1% significance level for "better for conservation of the halibut resource," "made you better off financially," and "attitude towards IFQ management," and at the 5% level for "allocated halibut fairly." It was not rejected at the 10% level for "made fishing for halibut safer." Pearson chi-squared statistics, degrees of freedom, and significance levels were as follows for the groupings shown above. Better for conservation of the halibut resource: 26.35, 6, .000. Made fishing for halibut safer: 6.08, 3, .414. Allocated halibut fairly: 14.29, 3, .027. Better off financially: 20.55, 6, .002. Attitude towards IFQ management: 26.61, 6, .000.

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