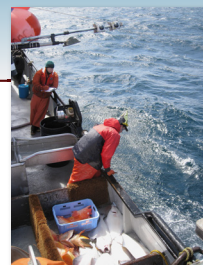


Bycatch Characterization in the Pacific Halibut Fishery: A Field Test of Electronic Monitoring Technology

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INTRODUCTION

The focus of our research is to improve our understanding of the ecosystem impacts of halibut fishing off Alaska through improved monitoring of halibut longline fishery bycatch and to provide data on mortality of bycatch species for input to stock assessments. The majority of vessels operating in this fishery are not required to carry observers; hence, estimates of bycatch are not based on direct observation of the fishery. We are conducting a study comparing and evaluating the effectiveness of electronic monitoring (EM) and the currently utilized National Marine Fisheries Service (NMFS), North Pacific Groundfish Observer Program (NPGOP) monitoring methods to operate effectively in a commercial longline (hook-and-line) setting. Previous research by one of the partners in this proposal documented successful electronic monitoring of Pacific halibut longline fishing conducted from chartered commercial vessels conducting research surveys. While this work supported the use of EM to monitor bycatch in numbers of fish, the current research focused on field implementation on a broader scale.

RESEARCH OBJECTIVES

The goal is to test the ability of EM systems to operate in a commercial setting by comparing estimates of bycatch based on video monitoring and standard NMFS / NPGOP observer sampling with a known census of harvest.

This study has two main objectives:

1. Estimation of catch and bycatch rates from data collected on commercial longline vessels using several methods
 - a. Electronic (video) monitoring
 - b. Standard NMFS observer sampling
 - c. Hook-specific documentation of fish species
2. Evaluations of the relative efficiency, cost, and bias of each of the two bycatch estimation methods (EM, observers) relative to a known standard (census)

PRELIMINARY RESULTS

We collected side-by-side EM and observer data on four vessels during the summer of 2008 with a total data collection of 13 trips and over 200 hauls sampled. Of the four vessels that participated in the study, one was under 60 ft and therefore not typically subject to observer coverage. The other three vessels would be subject to observer coverage requirements while fishing for sablefish, but not if they were fishing solely for halibut.

Three of the vessels fished in the Gulf of Alaska while one fished in the Bering Sea. This deviated somewhat from our original study plan to collect data balanced among areas and vessel sizes (observer coverage requirements), however, availability of vessels from the commercial fishery was a limiting factor.

Cooperation with the halibut industry was expected to result in a sufficient number of boats for the study. None of the vessel operators contacted declined to participate out of concern for having an EM system on board. For most, use of an EM system was welcomed or not an issue. Unfortunately, difficulties in obtaining commitments from vessel operators arose due to:

- Perception of inadequate space onboard by the vessel for a sampler (or samplers)
- Lack of remuneration for taking a sampler
- Unexpected changes in vessel schedules and fishing plans

EM Performance

We encountered EM technical difficulties and failures on the first two vessels that were involved in the study. On these vessels the EM functioned properly for 23 of the 58 monitored sets. We did not encounter the same problems on later trips. There appear to be several factors that affected the ability of the EM equipment to function during this study. The EM failure during the first trip in the study was due to a hard-drive error, potentially caused by power supply fluctuations to the computer equipment. Difficulties were also encountered resulting from incompatibilities in the computer software, which were later resolved.

Data Captured

F/V Gretchen S (37 ft LOA): Captain Dan Hull, Observer Mel Kahn

- 3 Trips with EM for 13 of the 19 longline sets. Observer sampled 17

F/V Sherrie Marie (65 ft LOA): Captain Norm Pille, Observers Paula Hartzell and Suzie Hanlan

- 2 Trips with EM for 10 of the 42 longline sets. Observer sampled 41.

F/V Kristiana (69 ft LOA): Captain Bill Sauer, Observer Mike Cox

- 2 Trips with EM for 12 of the 19 longline sets. Observer sampled 18

F/V Lisa Marie (78 ft LOA): Captain Jay Hebert, Observer Melany Haggard

- 6 Trips with EM for 166 of the 168 longline sets. Observer sampled 141.

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Research is cooperative with the commercial halibut fleet; vessel participation is voluntary. The participation and support of Captain Dan Hull (F/V Gretchen S), Captain Norm Pille (F/V Sherrie Marie), Captain Bill Sauer (F/V Kristiana), and Captain Jay Hebert (F/V Lisa Marie) was vital to the success of this study.

Fisheries Observers Mel Kahn, Paula Hartzell, Suzie Hanlan, Mike Cox, and Melany Haggard spent many hours collecting data.

Photos courtesy of Mel Kahn, Paula Hartzell, IPHC, and the Alaska Observer Program. Poster design, Karna McKinney, AFSC Graphics.

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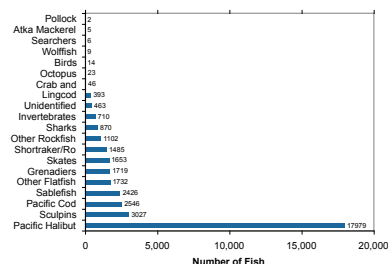
RESEARCH METHODS

- Monitor catch using three methods simultaneously
 - Census of catch, electronic monitoring, standard NPGOP sampling
 - One or two observers on each vessel
 - Video equipment on each vessel
- Conduct field activities for two months in the Gulf of Alaska and the Bering Sea
- Range of vessel sizes with emphasis on vessels less than 60 ft overall
- Time periods chosen to reflect major fishing patterns

On each vessel included in the study group, we placed a full EM system and a NMFS-certified observer to obtain observations of fish species for each hook on the retrieved gear. The hook-specific counts of each species provide a pseudo-census of the fish on the incoming gear.

Species Composition of Catch

Preliminary results from the 185 hauls that were completely monitored by the observer indicate a high diversity of catch. The predominant species in the catch were Pacific halibut and sablefish (the target species) and Pacific cod, based on the observer-collected data. Vessels were targeting either halibut or both halibut and sablefish. The non-predominant species observed in the catch of the four study vessels was diverse and included skates, rockfish, sharks, grenadiers and flatfish. These results reflect the fishing of these four vessels, and may not be indicative of the target and non-target catch of all vessels participating in the Pacific halibut fishery.



Observer EM Species Identification Comparisons

Preliminary analysis suggests that the identification of individual fish to species group (rockfish, flatfish, etc) was similar between observers and EM imagery. In general, observers were more likely to report catch at the species level, however, even at the species level the agreement between observers and EM data was high. Further analyses will be conducted to attempt to determine the factors contributing to misidentification of the species and differences in catch amounts.

SUMMARY

These preliminary results are based on a relatively small sample (4 vessels). The non-target species diversity of the catch was high. This species diversity was characterized by both the observers and the EM imagery.

The EM installations did not perform well on the first two trips, however the problems encountered were addressed and did not occur on subsequent trips. The costs of these two methods are similar, although these costs may not be representative because of additional analyses associated with this comparison.

While these are preliminary results, it appears that the correlation between the number of fish identified to species by the EM and by the observer is high. Additional analyses may show different trends, however, it appears that EM may provide a useful tool in monitoring bycatch in the Alaskan Pacific halibut fishery.



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