



INTERNATIONAL PACIFIC  
HALIBUT COMMISSION



## Biological and Ecosystem Science Program

# Electronically monitoring release method as a proxy for Pacific halibut discard mortality rates in the directed Pacific halibut longline fishery



### Introduction:

- Regulations require release of sublegal (<81.2cm, <32") Pacific halibut (*Hippoglossus stenolepis*) in the directed longline fishery.
- Potential release mortality in the fishery is currently estimated through the application of discard mortality rates (DMRs) derived from injury or vitality data provided by observer programs. In 2017, wastage in the fishery was estimated to be 453 t (1.1 M lbs).
- Alaska is currently developing electronic monitoring (EM) as a tool to monitor the small vessel fleet (<17.4 m, <57'), but determining vitality data requires handling of the animal, something that cannot be achieved with cameras.
- Permitted hook release methods include careful shake, hook straightening, or cutting the ganglion.
- Release methods can be easily assessed by EM, but the suite of injuries sustained by each hook release technique is unknown.

### Objectives:

- Develop an injury profile for different hook release methods, which can then be used to calculate DMRs on vessels carrying EM rather than observers.
- Assessment of post-release survival (short- vs long-term) in relation to hook release method, associated injury levels, physiological condition, and size of Pacific halibut released in excellent condition.

### Methods:

- Commercial longline vessel (24 m, 80') contracted to conduct test fishing with conventional fixed gear in western Gulf of Alaska in fall of 2017.
- EM system with 3 cameras, and hydraulic sensors installed.
- Standardized gear consisted of 550 m (1,800') skates with 100 #3 (16/0 Mustad) circle hooks, no snaps/swivels.
- Thirty-six (36) sets of eight skates of gear, with randomized hook release treatments were done:
  - Careful shake (5 skates/set).
  - Hook stripper (2 skates/set).
  - Ganglion cut (1 skate/set).
- All Pacific halibut were assessed for length, weight, physical injury, release condition.
- Pacific halibut  $\leq 83.8$  cm (33 inch) were tagged and released after physiological sampling (blood, non-invasive fat content).
- EM footage reviewed by analysts at the Pacific States Marine Fish Commission.
- 2,487 fish caught, of which 1,106 were tagged and released:
  - Short-term survival archival tags (79 sPAT releases scheduled for popup at 96 days after deployment).
  - Long-term survival tags (1,027 wire tag releases, dependent on fishery recoveries).

### Results:

- An almost perfect (95%-100%) agreement between the actual release method used and that captured by EM was observed (Figure 1).
- Assessment of injury profiles by release method evidenced that careful shake and ganglion cutting are the release methods resulting in the highest proportion of fish in excellent condition (> 70%) for both small and large Pacific halibut (Figures 2 & 3).

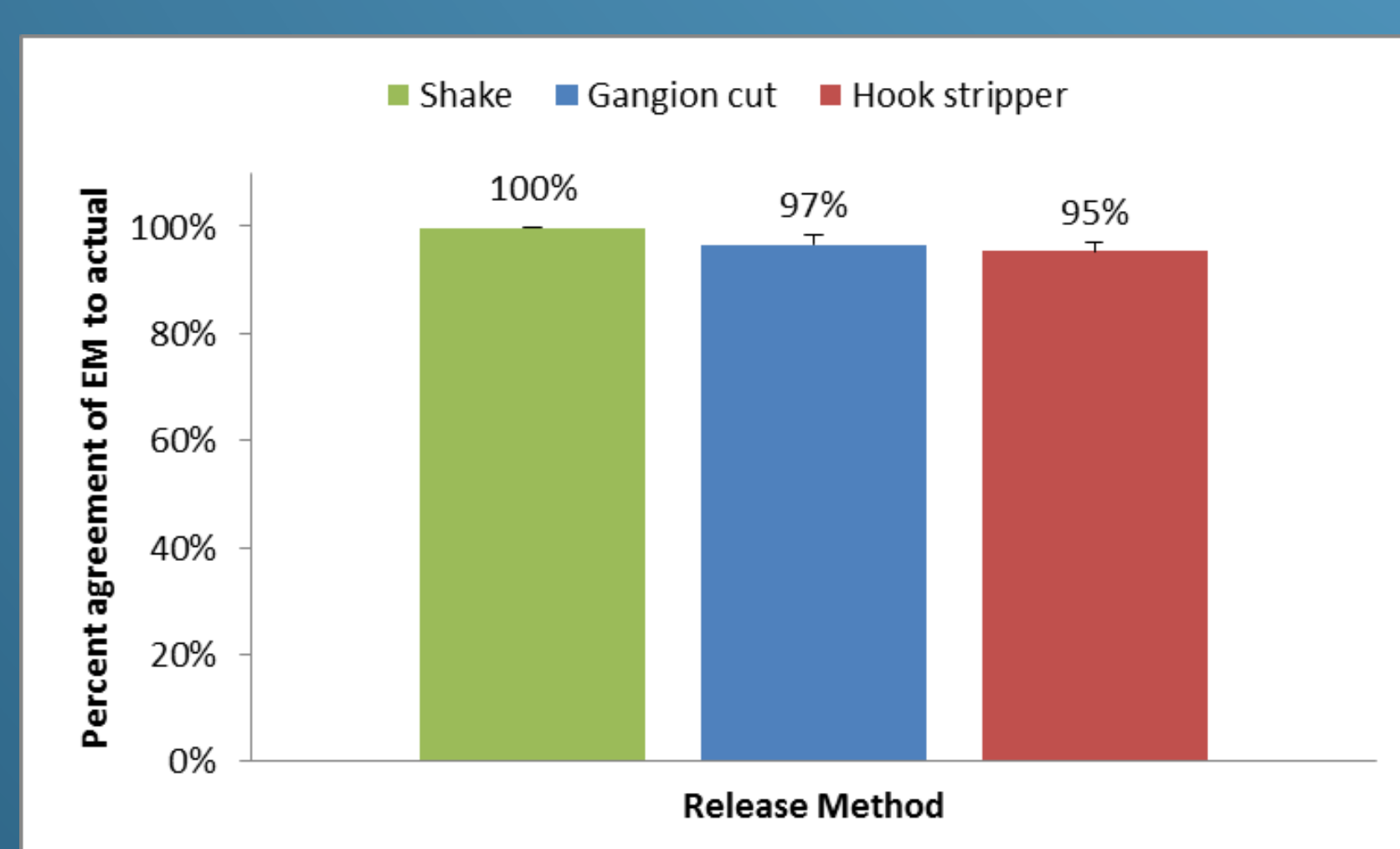


Figure 1. Comparison of EM determined release method to actual.

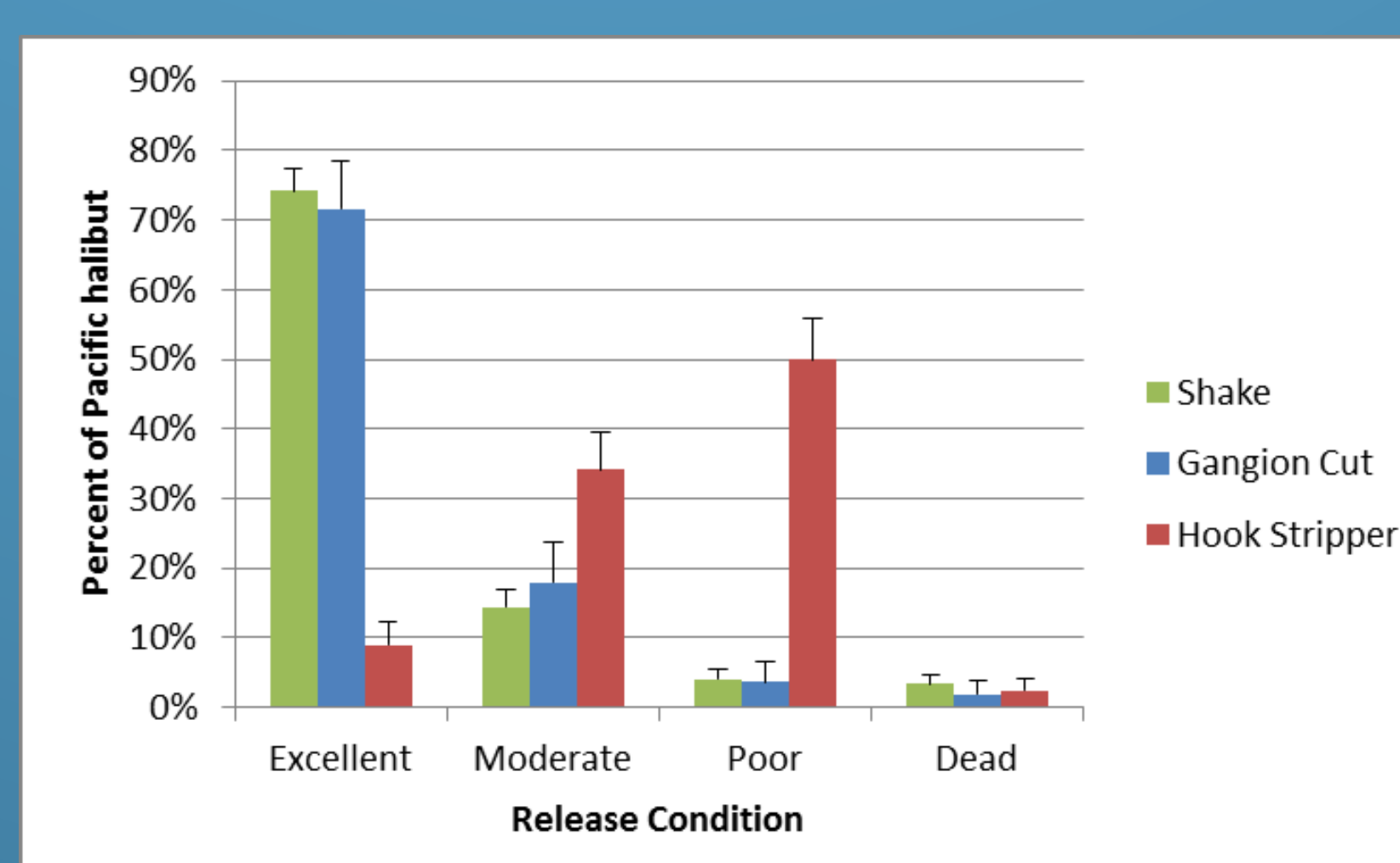


Figure 2. Release condition of small ( $\leq 83.8$  cm/ 33 inch) Pacific halibut by release method (shake, ganglion cut, hook stripper).

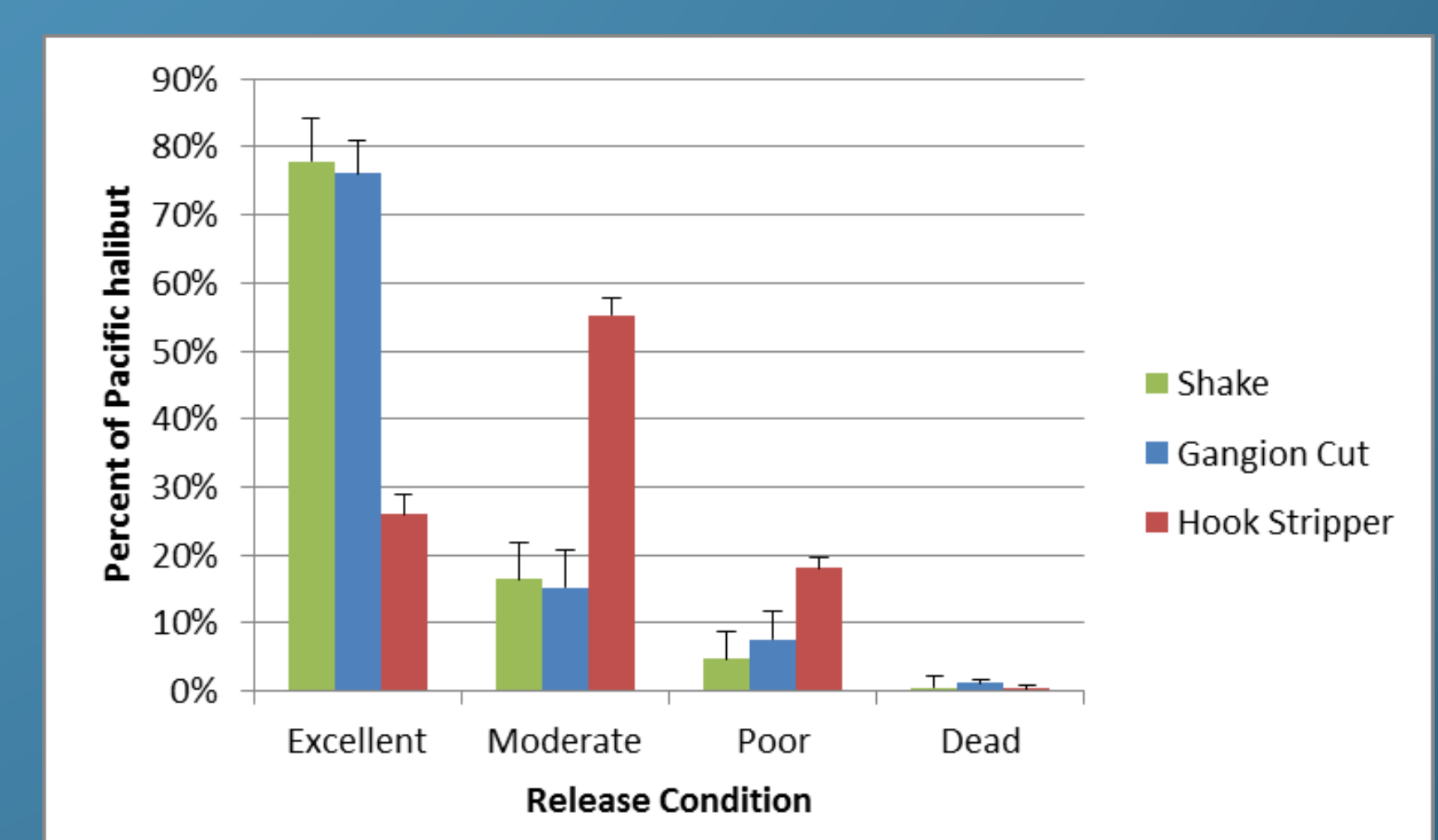


Figure 3. Release condition of large (> 83.8 cm/ 33 inch) Pacific halibut by release method (shake, ganglion cut, hook stripper).

### Conclusions:

- EM was effective at capturing hook release method (Figure 4).
- Injury profiles for different sizes were developed and can be used as a proxy for DMR in the future.

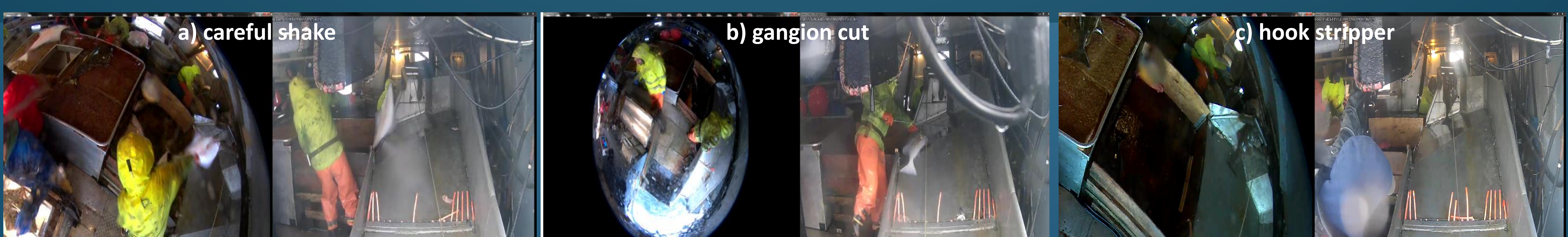


Figure 4. EM capture of hook release methods: a) careful shake, b) ganglion cut, and c) hook stripper.



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