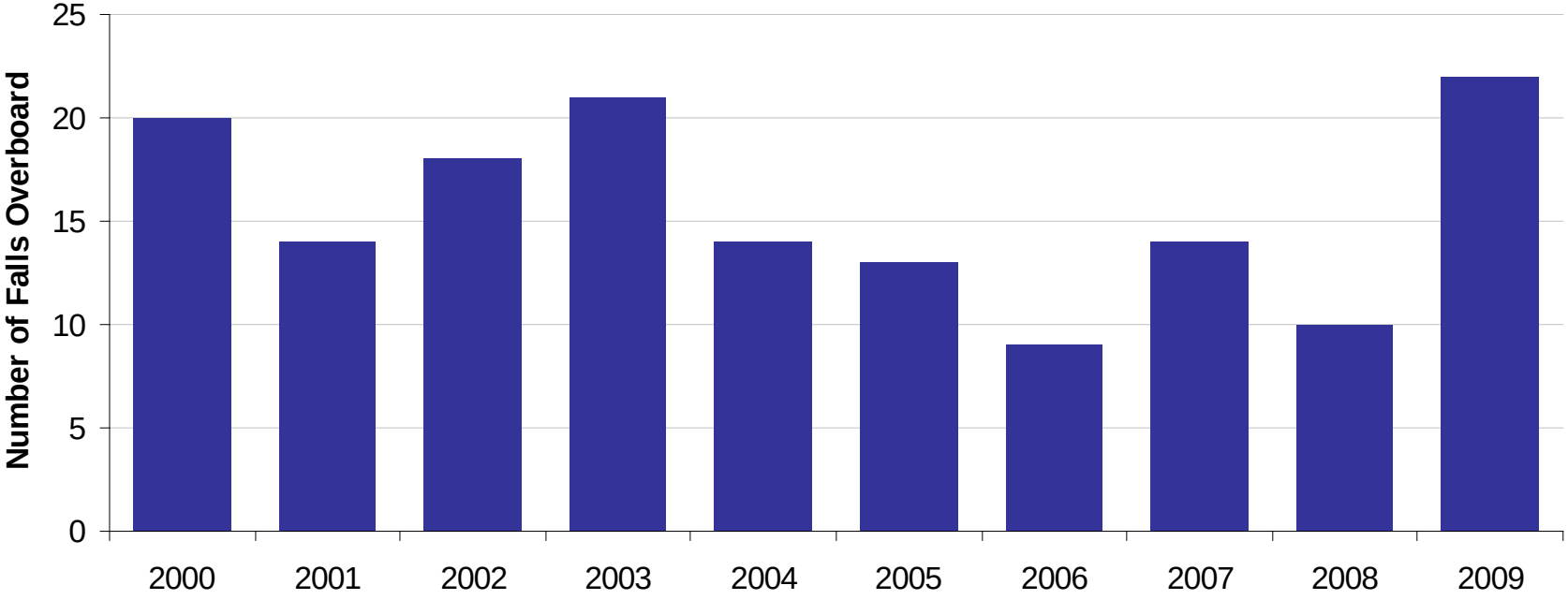
Personal Flotation Devices (PFDs) and Commercial Fishermen:
Preconceptions and Evaluations in Actual Use

The findings and conclusions in this presentation have not been formally disseminated by CDC/NIOSH and should not be construed to represent any agency determination or policy.

Falls Overboard: A Persistent Problem

- 155 deaths due to falls overboard in US during 2000-2009
- None of the victims wearing Personal Flotation Device (PFD)



Source: Commercial Fishing Incident Database

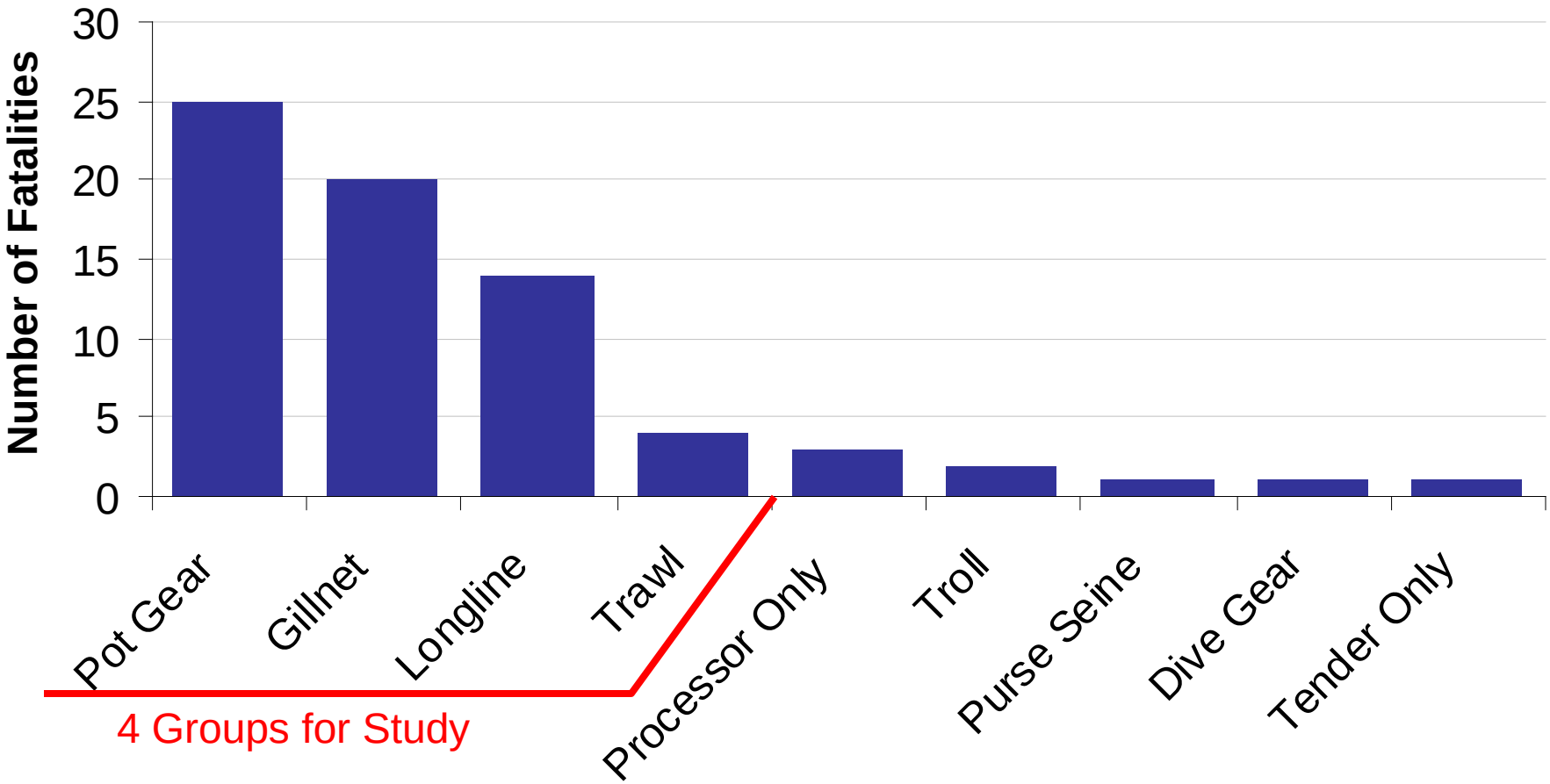
Most Commercial fishermen don't currently wear PFDs

- Evidence suggests that fishermen feel PFDs are:
  - Too heavy, hot, bulky, uncomfortable, and cumbersome.

Purpose of this study: “Wearability”

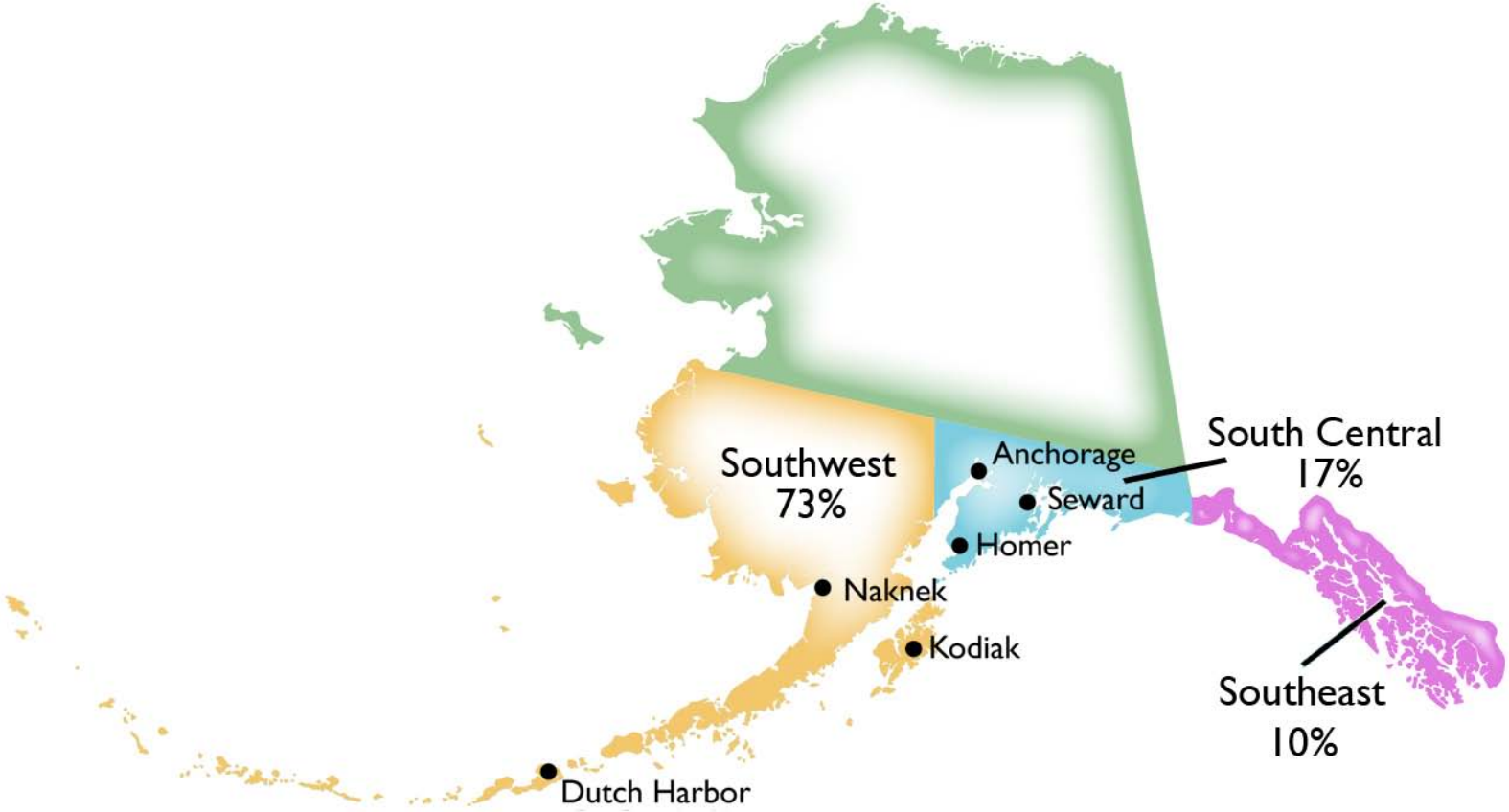
- Measure perceptions of risks for falling overboard and preconceptions about PFDs
- Evaluate new styles and types of PFDs for comfort while working
  - Are there new PFDs which overcome fishermen’s complaints?

Falls Overboard by Gear Type, Alaska, 1990-2005, (n=71)



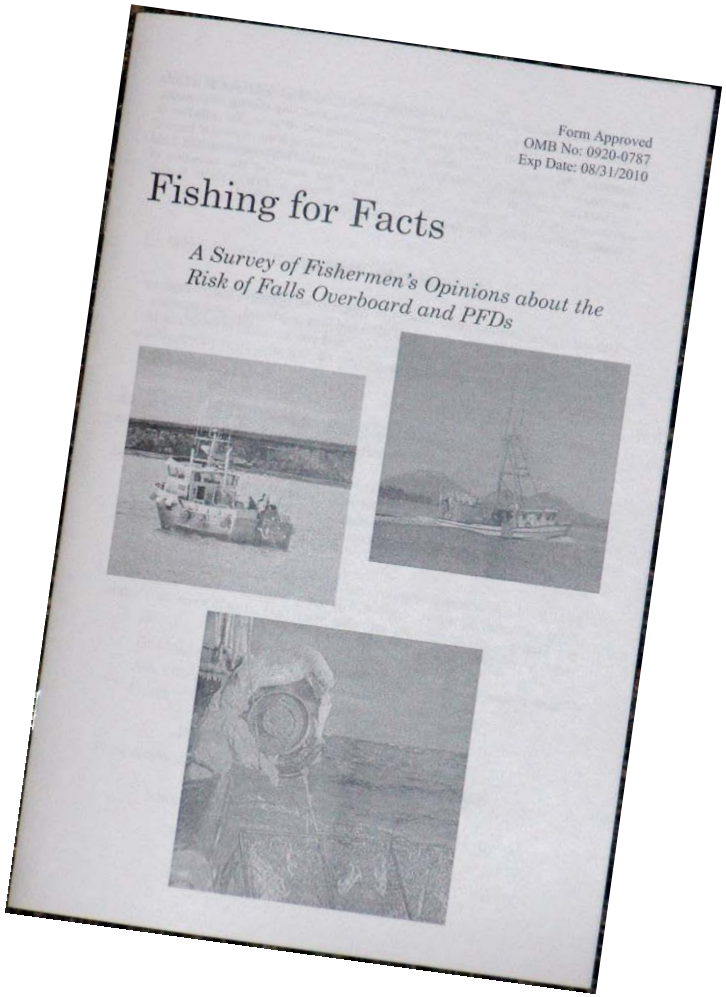
Source: Alaska Occupational Injury Surveillance System

Falls Overboard by Region, Alaska, 1990-2005 (n=71)



Source: NIOSH

Phase 1 Questionnaire



Form Approved
OMB No: 0920-0787
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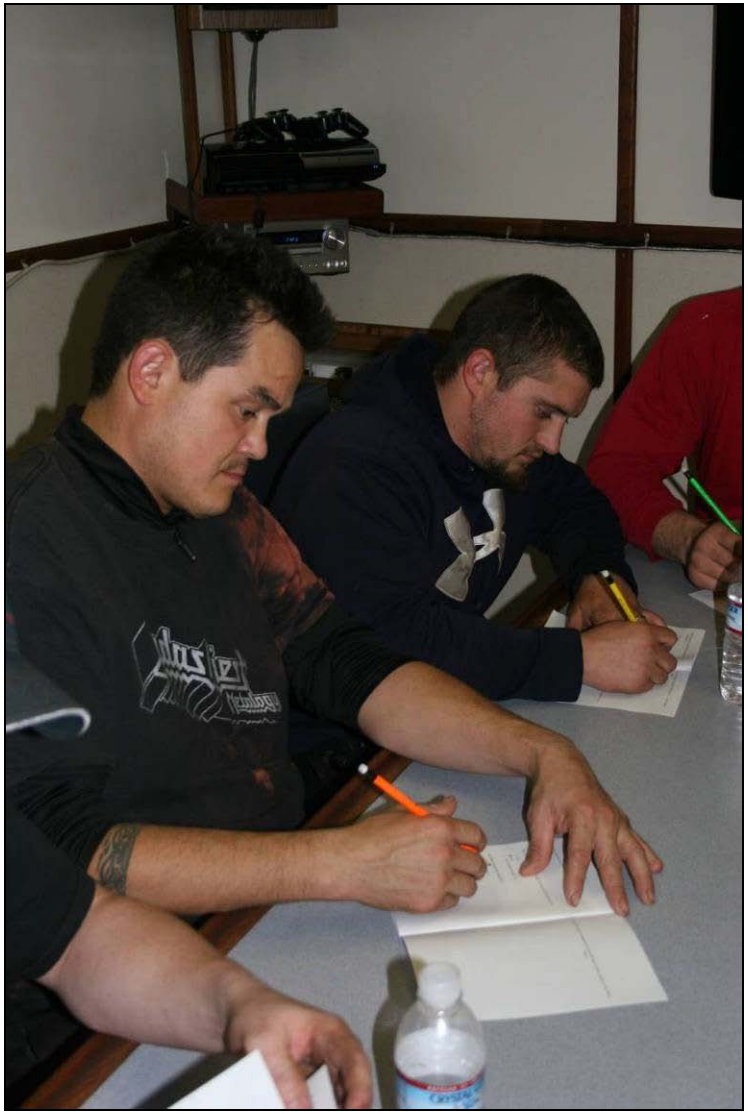
Fishing for Facts

A Survey of Fishermen's Opinions about the Risk of Falls Overboard and PFDs

- Survey of fishermen
- 32 closed-ended questions
  - Perceptions of risk
  - Attitudes and beliefs about PFDs
  - Experiences with falls overboard
- 400 fishermen; 4 different types of vessels
- Phase 1 ends with invitation to Phase 2



Phase 1 Response Rate

- Crab fishermen = 100%
- Trawl fishermen = 94%
- Longline fishermen = 95%
- Gillnet fishermen = 97%

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Phase 2 PFD Evaluations

- Commercial fishermen evaluated a variety of modern PFDs
- Wore the PFD for one month
- Completed evaluation form 2 times – after day 1 & day 30
- The six PFD models were randomly assigned to fishermen
- 216 fishermen participated in Phase 2 (54 on each gear type)

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PFDs Incorporated into Rain Gear

Guy Cotten rain gear
- PFD built into suspenders
- Auto inflate
- Rubberized cover

Stormy Seas inflatable
- Clips into Grundens bibs
- Auto inflate
- Lightweight, low profile

Regatta rain gear
- PFD built into bibs
- Foam in chest and back
- High visibility

Stand-alone PFDs

Stearns inflatable PFD
- Auto inflate
- Low profile
- Less expensive

Stearns vest
- Foam buoyancy
- Mesh ventilation
- Less expensive

Mustang inflatable PFD
- Auto inflate
- Hydrostatic activation
- Rubberized cover

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Results

- Fishermen were very willing to participate.
- 89% of fishermen who participated completed and returned the evaluation forms.
- Reported wearing the PFDs 65% of the time while working on deck.
- Preferences for PFDs were different among the four gear types.
- In general, fishermen have positive thoughts about PFDs, but don’t regularly wear them (except trawlers).
- Six unintentional inflations were reported from those evaluating an inflatable PFD.

Mustang MD3188 Inflatable PFD with HIT

Overall Rating: ★★★★☆

The Mustang inflatable was the highest rated PFD among the fishermen. Its lightweight design, innovative easy to clean fabric, and hydrostatic activation system made it a favorite on deck. It was the most expensive stand-alone PFD with a price tag of $230

Lightweight: ★★★★½

Not Tight: ★★★★☆

Non-Constricting: ★★★★☆

Non-Chafing: ★★★★½

Not Bulky: ★★★★☆

No Snagging ★★★★☆

Ease of Donning: ★★★★★

Keeps Clean: ★★★★½

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Regatta Rain Gear with Foam Flotation

Overall Rating: ★★★½☆

Regatta is a Norwegian company that offers a set of rain gear with foam flotation built into the bibs. They were designed with input from commercial fishermen in Norway and are not yet available in US, but could be ordered via the company's website for around $200.

Lightweight:	★★★½☆
Not Tight:	★★½☆☆
Non-Constricting:	★★½☆☆
Non-Chafing:	★★★★☆
Not Bulky:	★★½☆☆
No Snagging	★★★½☆
Ease of Donning:	★★★★☆
Keeps Clean:	★★★★½

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Stearns Manual/Automatic Inflatable PFD 1339

Overall Rating: ★★★½☆

A low profile inflatable PFD that can be activated manually with a pull tab or automatically via a dissolvable pill and CO_2 cartridge. This PFD was the least expensive of the inflatable types tested with a price of $125.

Lightweight: ★★★★½

Not Tight: ★★★★½

Non-Constricting: ★★★★☆

Non-Chafing: ★★★½☆

Not Bulky: ★★★★☆

No Snagging ★★★★½

Ease of Donning: ★★★★½

Keeps Clean: ★★★★☆

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Stormy Seas Inflatable Yoke PFD

Overall Rating: ★★★☆☆

A long-time innovator in fishermen focused PFD design, Stormy Seas makes an inflatable suspender system that clips directly into Grundens rain pants. It has the option to inflate automatically when submerged in water and costs $190.

Lightweight: ★★★½☆

Not Tight: ★★★★☆

Non-Constricting: ★★★☆☆

Non-Chafing: ★★★½☆

Not Bulky: ★★☆☆☆

No Snagging ★★★★½

Ease of Donning: ★★★★☆

Keeps Clean: ★★★★½

Stearns Comfort Series Foam Vest I424

Overall Rating: ★★★☆☆

A basic type III PFD designed with mesh shoulders and chest for comfort and ventilation. SOLAS reflective tape on the shoulders increase visibility and a zipper front and two body straps ensure a proper fit. This PFD was the least expensive option coming in at $50

Lightweight: ★★★½☆

Not Tight: ★★★☆☆

Non-Constricting: ★★☆☆☆

Non-Chafing: ★★★½☆

Not Bulky: ★½☆☆☆

No Snagging ★★½☆☆

Ease of Donning: ★★★★☆

Keeps Clean: ★★½☆☆

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Guy Cotten X-Trapper Bibs with Inflatable Suspenders

Overall Rating: ★★½☆☆

This PFD is integrated into a pair of Guy Cotten rain pants. This PFD can be inflated manually or automatically. The inflatable suspenders are designed to be worn under a specially designed smock style jacket. Cost for the whole set is around $300.

Lightweight:	★½☆☆☆
Not Tight:	★★☆☆☆
Non-Constricting:	★★☆☆☆
Non-Chafing:	★★★☆☆
Not Bulky:	★½☆☆☆
No Snagging	★★★★½
Ease of Donning:	★★☆☆☆
Keeps Clean:	★★★★½

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Differences Between Gear Types

- Crabber's Top Three for Overall Satisfaction*
  - Mustang (Inflatable), Regatta (Foam), Stearns (Foam)
- Trawler's
  - Mustang (Inflatable), Regatta (Foam), Stearns (Foam)
- Longliner's
  - Regatta (Foam) & Stearns (Inflatable) same highest score
  - Mustang (Inflatable) & Stormy Seas (Inflatable) same 2nd highest
- Gillnetter's
  - Regatta (Foam), Mustang (Inflatable), Guy Cotten (Inflatable)

*Based on results from 2nd evaluation form (filled out after one month wearing PFD)

Results will be shared with:

- Fishermen
  - Give them guidance and motivation for choosing and wearing a PFD that will meet their expectations.
- Marine safety organizations
  - Help them understand and resolve the barriers that fishermen have regarding wearing PFDs.
- PFD manufacturers
  - Help them modify or design new PFDs that better meet the needs of commercial fishermen.
- Scientific Community
  - Contribute to the body of scientific knowledge surrounding commercial fishing safety and drowning prevention, evaluating Personal Protective Equipment with workers.

Questions & Discussion

- How should NIOSH distribute results of this study?
- What types of communication products will be most effective?