Halibut/Sablefish EM Pilot Project

A Collaboration Involving:

- Alaska Longline Fishermen's Assn
- Southeast Alaska Fishermen's Alliance
- Petersburg Vessel Owners Assn
- K-Bay Fishermens Assn
- Archipelago Marine Research
- NMFS AFSC

Funding provided by National Fish and Wildlife Foundation.

Project Goals

- Engage stakeholders in developing a workable at-sea monitoring program
- Field test EM hardware on a range of vessels and in varied fishing conditions to ensure system reliability
- Develop a cost effective means of deploying EM hardware among vessels and retrieving data
- Summarize study findings to inform development and implementation of the restructured N. P. Observer Program.

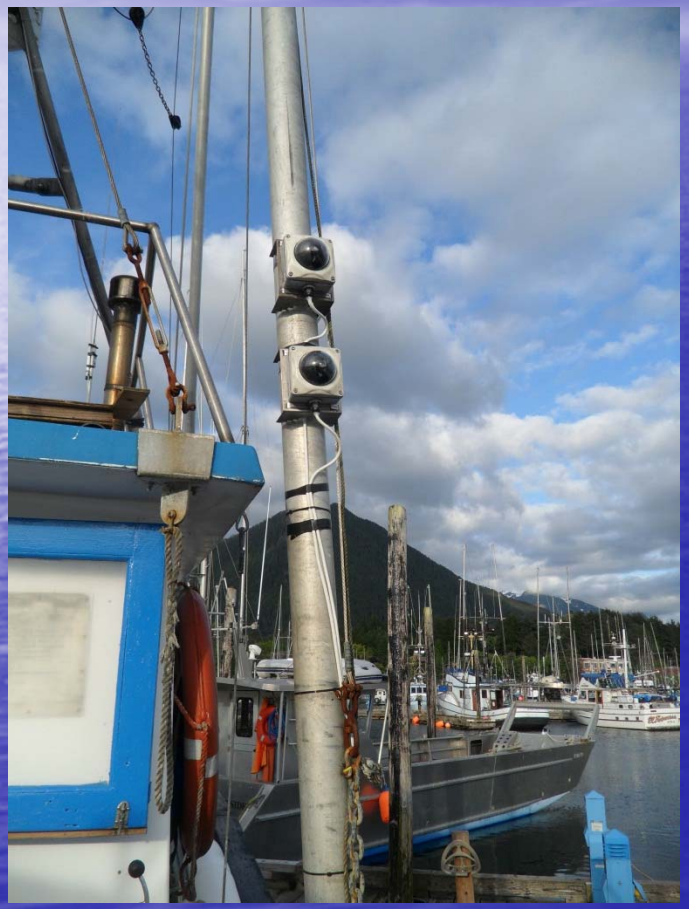
Objective 1: Engage Stakeholders in Developing At-sea Monitoring Program

- Engaged fishermen in Sitka, Juneau, Petersburg and Homer
  - Received input from more than 250 stakeholders on the restructured observer program
- Clear preference for EM over human observers:
  - EM is perceived as less intrusive and will allow normal fishing behavior
- Operator engagement is critical for successful program
  - Participants in Sitka and Homer “went the extra mile” to ensure EM success.

Objective 2: Field Test EM Hardware on a Range of Vessels to Ensure Reliability

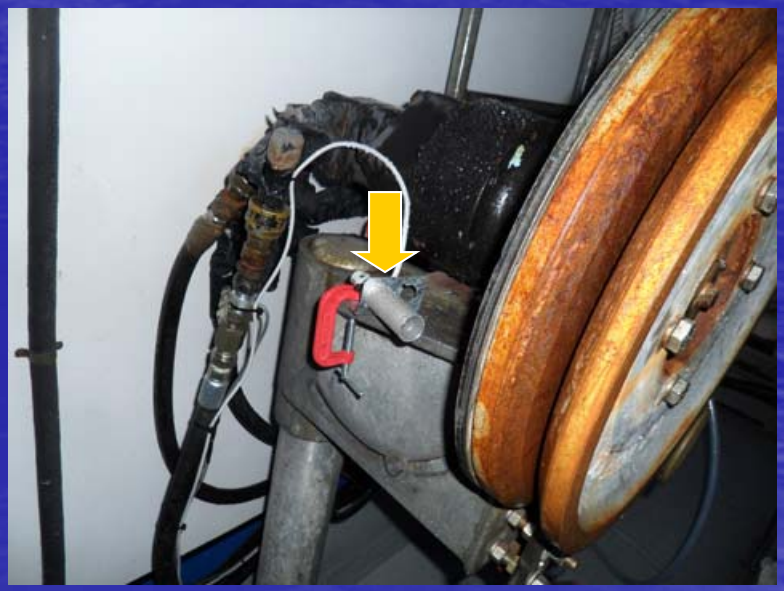
- Project total to date:
  - Phase 1
    - 2 vessels
    - 4 trips/16 sea days
    - 20 hauls
  - Phase 2
    - 10 vessels
    - 21 trips/73 sea days
    - 76 hauls

Installation Challenges: Cameras

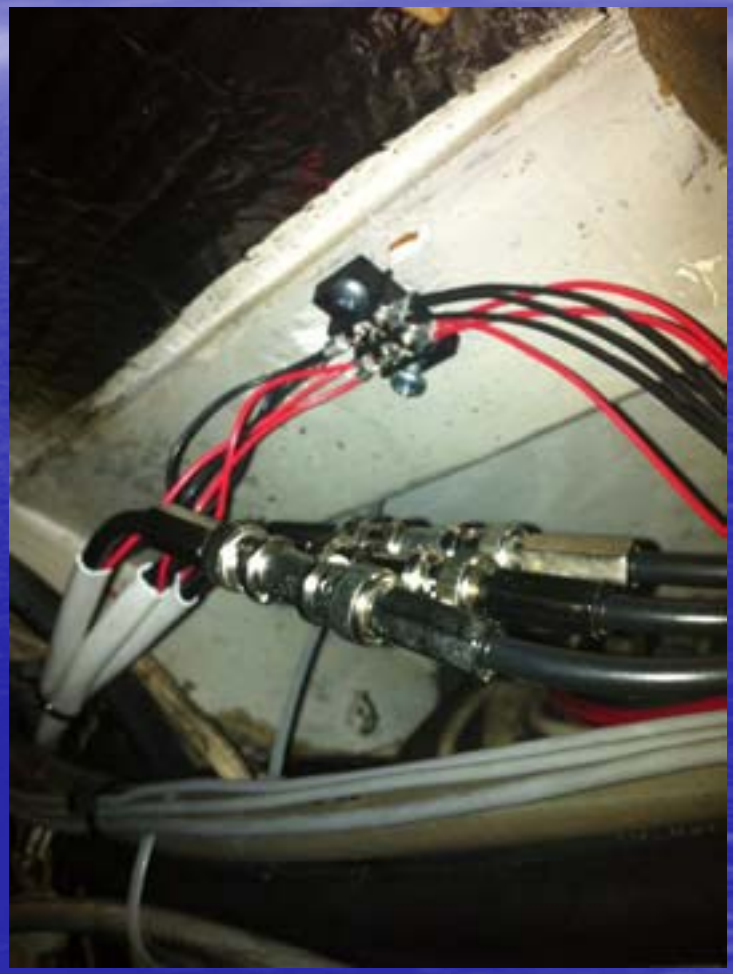


Installation Challenges: Cameras

Installation Challenges: Sensors



Installation Challenges: Plug and Play



System Reliability Phase 1 & 2

Sensor	# of sets	% reliability
Hydraulic Pressure	96	100%
Drum Rotation on Snap vessels	25	100%
Sheave Rotation on Conventional vessels	71	40%
GPS Sensor* (*does not include night time gaps)	96	95%
Video capture of Hauls	76	99%

Video Quality

Video Quality

High Quality

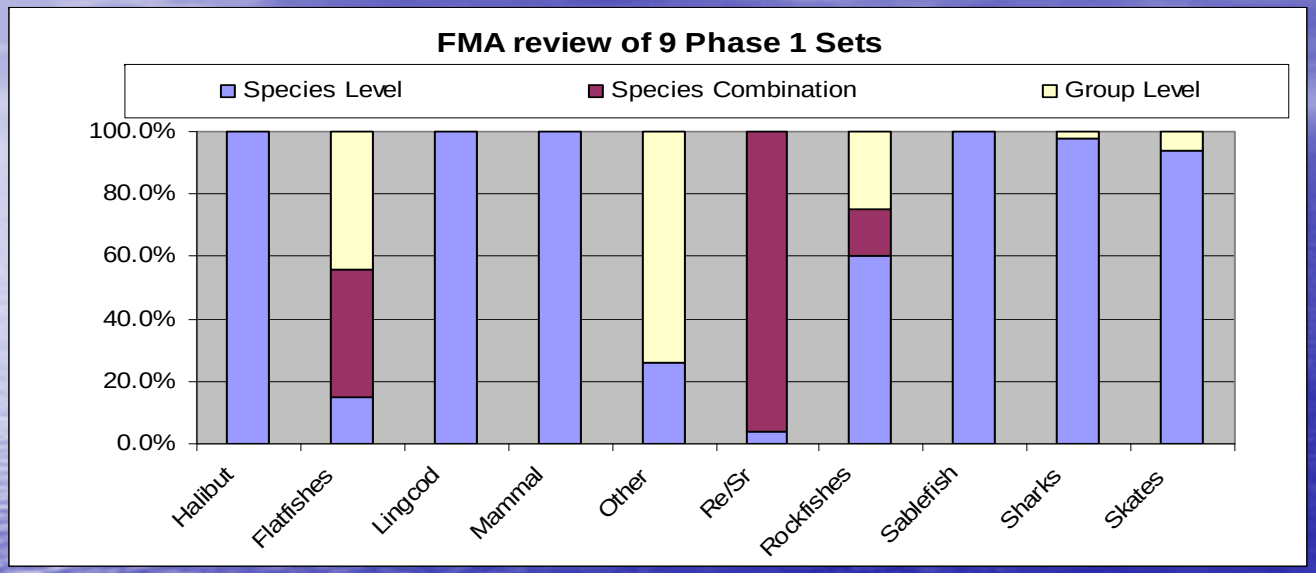
Med Quality

Low Quality

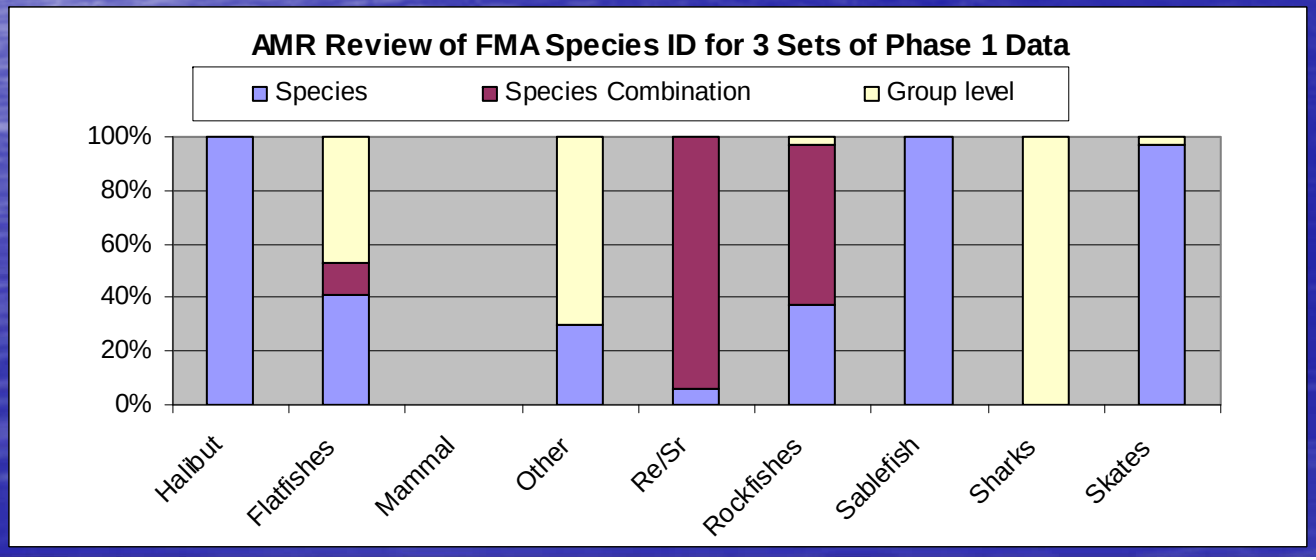
Video Quality: Phase 2

Video Quality	# of sets	%
High Quality	40	66%
Medium Quality	21	34%
Low Quality	0	0%

Species Identification

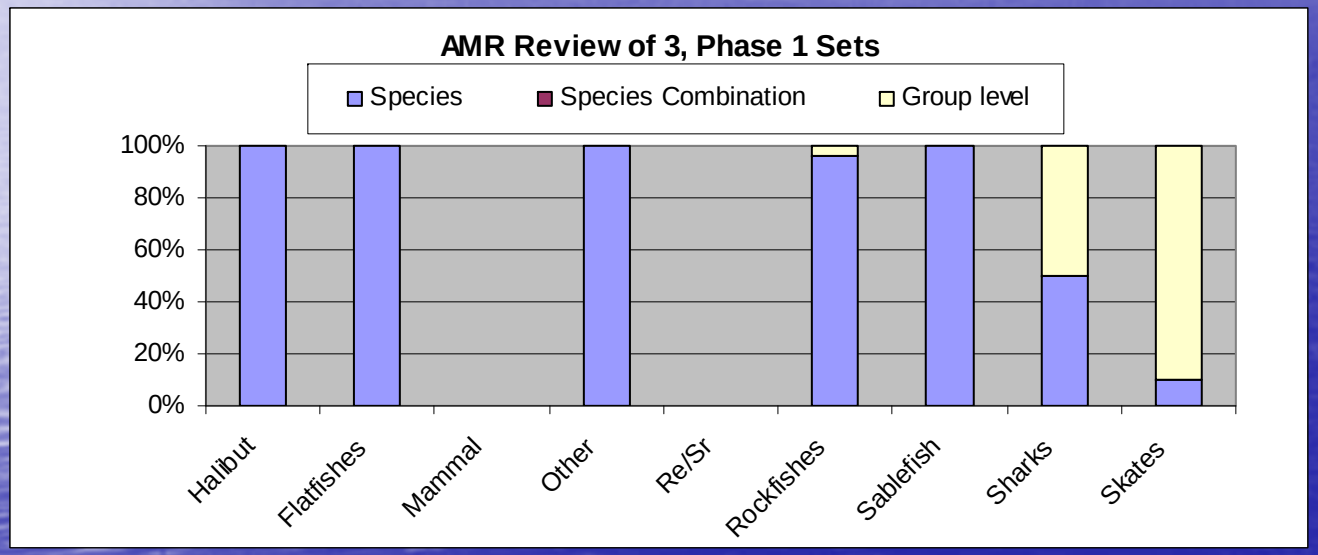


- 90.4% id to species



- 93.2% id to species

Species Identification



- 96.6% id to species

Objective 3: Develop a Cost Effective Deployment Program

Initial Cost Effectiveness Straw man

Hardware Costs

- Control Box, Monitor, 2 Cameras, Power supply.....$8,100
- Extra cameras..... $ 800

  Total..... $9,600

- 5 Year Deprecation = $1,920/yr.
- Pilot Program Goal—Rotate EM unit to 3 vessels for minimum of 8 sea days/vessel (24 total/unit)
- **$80/sea day hardware cost**

Vessel Costs

- Sensor Package..... $ 700
- Technician Time (6 hrs)..... $ 450
  - Installation package total..... $ 1.150
- Hardware cost for 8 sea days..... $640

  Total..... $1,790
- **$224/sea day**

Analysis Costs

- 10 sets @ 2 hrs each = 20 hrs video
- Review Speed = 2X
- Technician Time (10 hrs @ $25/hr).....$250
- **$32/sea day**

Pilot Program Results

Sitka System 1-- 35 Sea Days
•$55/day hardware cost

Vessel S1 Costs*

- Vessel Installation (Sensors + Labor).... $1,150
- Rotation Costs (1.5 hr)..... $ 38
- Hardware cost for 12 sea days.....$ 660

Total.....$1,848

- **$154/sea day**

Vessel S4 Costs

- Vessel Installation (Sensors + Labor).... $1,300
- Rotation Costs (2 hr)..... $ 50
- Hardware cost for 11 sea days.....$ 605

Total..... $1,955

- **$178/sea day**

Vessel S5 Costs*

- Vessel Installation (Sensors + Labor).... $1,300
- Rotation Costs (4 hr)..... $ 100
- Hardware cost for 16 sea days.....$ 880

Total.....$ 2,280

- **$143/sea day**

Sitka System 2-- 39 Sea Days
•$49/day hardware cost

Vessel S2 Costs*

- Vessel Installation (Sensors + Labor).... $1,150
- Rotation Costs (1 hr)..... $ 25
- Hardware cost for 8 sea days..... $ 392

Total..... $1,567

- **$196/sea day**

Vessel S3 Costs

- Vessel Installation (Sensors + Labor).... $1,150
- Rotation Costs (1 hr)..... $ 25
- Hardware cost for 18 sea days..... $ 882

Total..... $2,057

- **$114/sea day**

Vessel S6 Costs*

- Vessel Installation (Sensors + Labor).... $1,225
- Rotation Costs (2 hr)..... $ 50
- Hardware cost for 9 sea days..... $ 441

Total..... $1,716

- **$191/sea day**

* Indicates split season vessels

Objective 4: Summarize Findings and Outreach

Lessons Learned: Stakeholder Engagement

- Strong stakeholder support for EM in lieu of human observers
- Vessels need flexibility to accommodate short-notice crew/QS holder changes
- Vessels need flexibility to accommodate short-notice trip decisions
- Nobody wants 100% coverage
- A local port coordinator is essential for success!

Objective 4: Summarize Findings and Outreach

Lessons Learned: System Reliability

- Existing technology proved to be reliable and adaptive with a wide variety of fishing conditions and vessels configurations
- Existing video quality allowed identification to species level of 90+% of species encountered in hook and line fisheries
- Initial recommendations:
  - Recommend using 2nd hydraulic sensor for redundancy in vessels using only a sheave (conventional gear)
  - Recommend developing "sleep mode" capabilities based on oil pressure or alternator activity
  - Recommend developing low cost GPS data loggers for position redundancy.
  - Recommend using education to further improve operational compliance and video quality (Canadian Approach)
  - Recommend systematic evaluation of improvements with species identification associated with increased camera resolution and frame rate capture

Objective 4: Summarize Findings and Outreach
Lessons Learned: Cost Effectiveness

- Buy equipment, don't lease!!!
  - Multi year contract for equipment provider allows amortization of equipment costs
- Center EM programs around specific ports for programmatic and technical support
  - Train local technicians for installation and technical support
  - Use local program personnel for equipment rotation, hard drive collection and stakeholder outreach (lower cost, different focus)
- Define explicit data and cost goals, then tailor deployment plan to achieve sea days necessary to meet these goals.
  - Pre-wiring vessels allows control boxes to rotate among vessels to maximize deployment days
  - Need flexible deployment periods to allow port coordinator to maximize use
- Use existing data to evaluate cost effective video review methods

Next Steps

- Review and incorporate Homer data
- Summarize and distribute pilot program results to QS holders
- Work with Stakeholder to inform NP observer program restructuring
- Work with NMFS to further develop and integrate EM as an independent alternative for at-sea monitoring