Developing a camera chute to assess halibut bycatch of Alaska’s trawl fisheries

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The Need
- Pacific halibut (Hippoglossus stenolepis) bycatch constrains Alaska bottom trawl fisheries
- Bycatch reduction efforts are strongly motivated if limits are tracked for each vessel
- Conventional halibut bycatch accounting is either imprecise at vessel level or laborious
- Effective and efficient accounting of halibut bycatch for each vessel could be achieved by electronic monitoring of all halibut as they are released.

Applications
Bering Sea deck-sorting
- Catcher-processor trawler crews sort and release halibut from catches before putting below deck
- Requires on-deck monitoring to be added to usual, later sampling as catch enters processing area.

Gulf of Alaska fleet
- Smaller decks and catch handling limit number of halibut sampled
- Sampling only done on some trips

Basic Design
- Full enclosure for light control
- Hinged entrance and exit doors
- Light from strobed LED strips
- Image triggered by exit sensors
- 2.8 megapixel machine-vision camera
- Oblique view (camera at head end)
- Computer control, storage, processing

Processing
- Calibration
- Segmentation
- Separate fish from background
- Many methods and options in place
- Measure fish length
- 3 point – nose, tail, narrowest point
- More accurate than center tracking

Deployments
- Prototype on Bering trawler (2014)
- Trawl survey – 146 species (2015 –16)
- Bering Sea deck-sort tests (2015 – 17)
- 4 deployments – up to 2 months
- Gulf of Alaska trawlers (2016 –17)
- 8 vessels, 14 trips
- Progressive improvements, based on issues identified at-sea
  - More robust in all condition
  - Familiarity and feedback from fleet

Future
- Continue to develop and improve
  - New accuracy tests – deck-sort data
  - Integrate field and management use
  - Open source design and software
  - Measurement of problem images by fitting ‘normal’ halibut shape

Conclusion
Camera chute can provide an effective and efficient option to monitor halibut bycatch – development is proceeding

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