

*Science, Service, Stewardship*



# Groundfish Science Report

Michelle McClure and John Stein  
Northwest Fisheries Science Center

September 16, 2015



**NOAA  
FISHERIES  
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## Overview

- Groundfish Mortality Report
- Halibut Report
- Observer Safety Initiative
- Limited Entry Cost Earnings Survey
- Survey and collections update
- Science Update



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# Estimated Discard and Catch of Groundfish Species in the 2015 US West Coast Fisheries

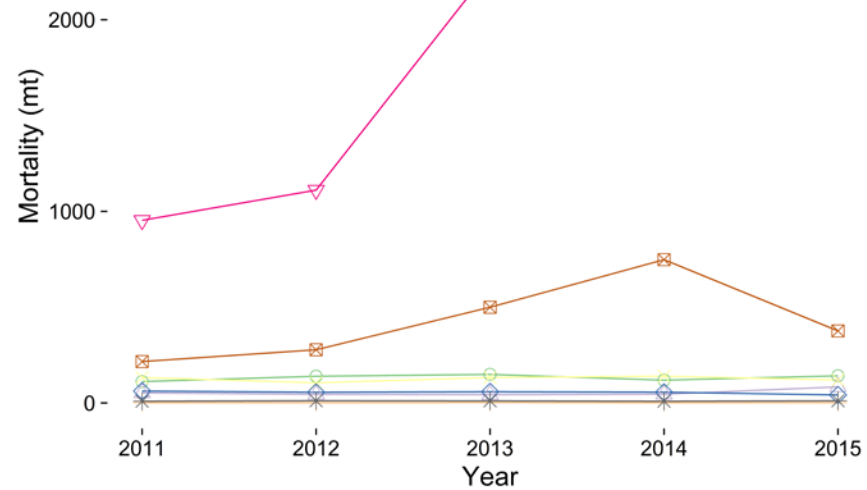
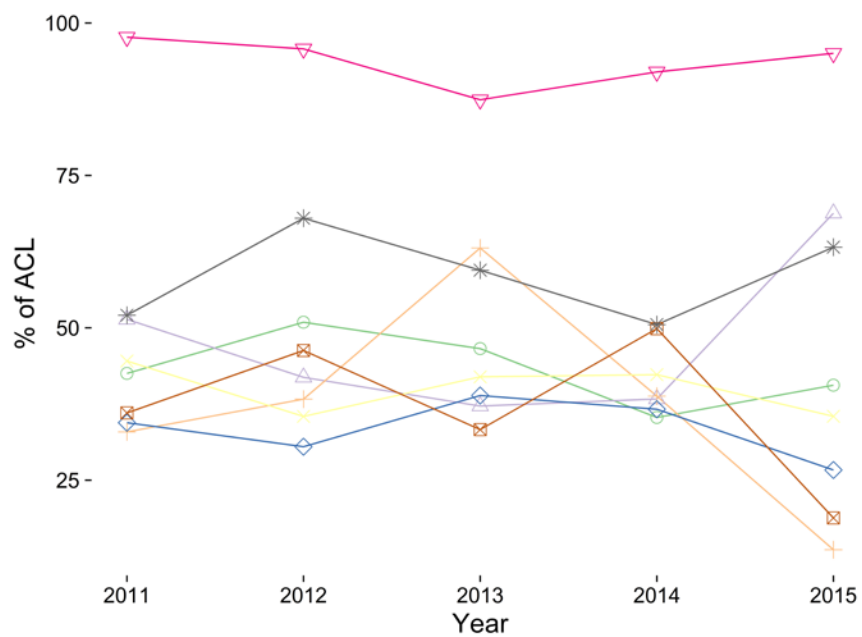
- Kayleigh A. Somers, Yong-Woo Lee, Jason Jannot,
- Neil Riley, Vanessa Tuttle, Jon McVeigh
- September 2016



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# 2015 Mortality Estimates

- No species exceeded ACL, ABC, or OFL harvest goals
- Estimated fishing mortality of 4 species was >90% of ACL:
  - black rockfish, south of 46°16' N. latitude (91%)
  - minor nearshore rockfish, north of 46°10' N. latitude (93%)
  - petrale sole (95%)
  - sablefish, north of 36° N. latitude (98%)
- 30 FMP-listed groundfish species or complexes (71%) had fishing mortality estimates <50% of 2015 ACL



- Species
- BOCACCIO ROCKFISH (SOUTH OF 40°10' N. LAT.)
  - △ Canary rockfish
  - + COWCOD ROCKFISH (SOUTH OF 40°10' N. LAT.)
  - x DARKBLOTCHED ROCKFISH
  - ◇ PACIFIC OCEAN PERCH (NORTH OF 40°10' N. LAT.)
  - ▽ Petrale sole
  - ⊕ Widow rockfish
  - \* YELLOWEYE ROCKFISH



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# Pacific Halibut Bycatch in US West Coast Fisheries (2002-2015)

- Jason Jannot, Kayleigh A. Somers,
- Neil Riley, Vanessa Tuttle, Jon McVeigh
- September 2016

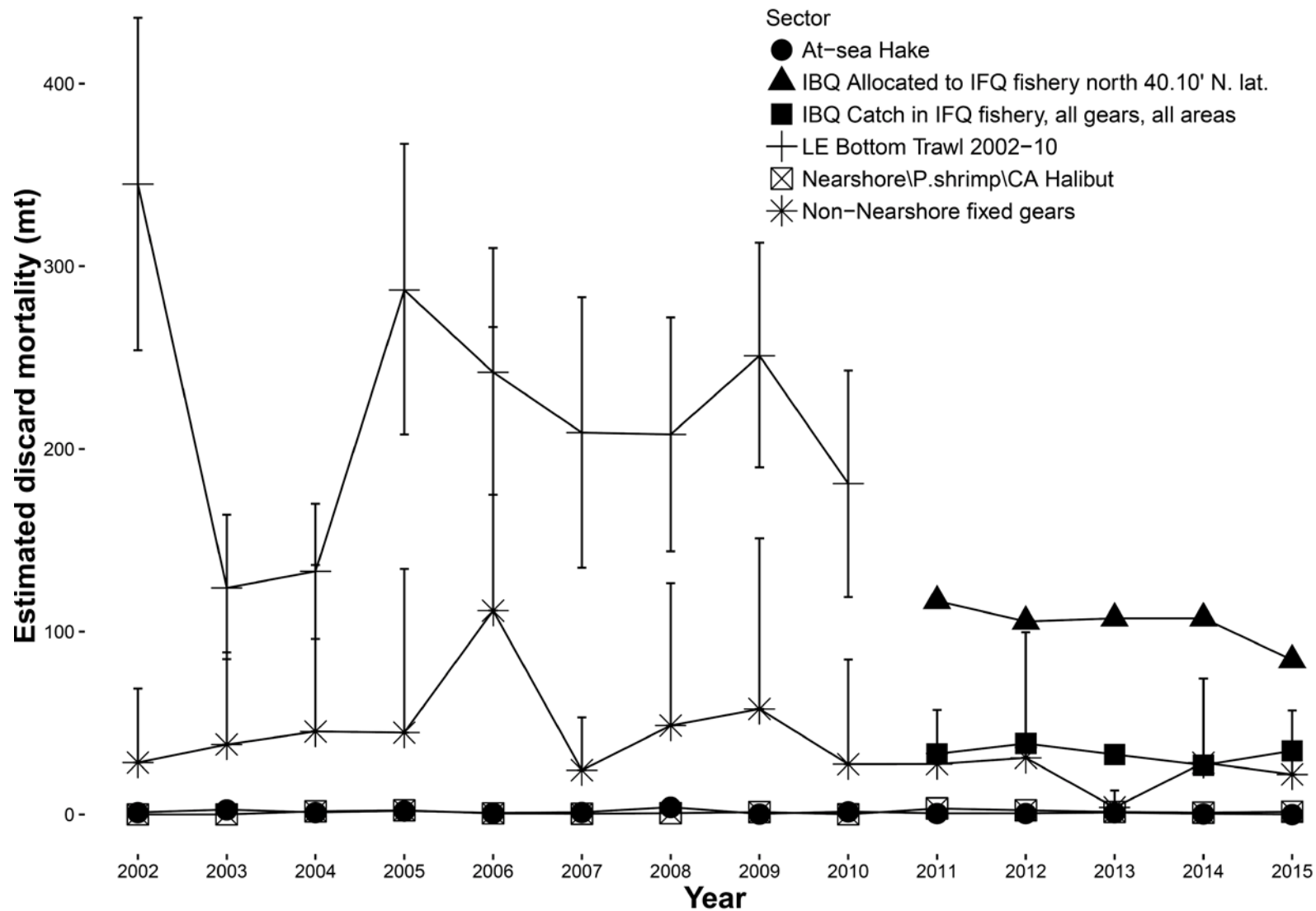


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# 2015 Pacific Halibut Mortality Estimates

- Catch Share Program remains below IBQ allocation (42% of IBQ)
  - Bottom trawl : 33.3 mt
  - Hook & Line : 1.5 mt
  - Pot : 0.4 mt
  - Shoreside Midwater : 0.6 mt
  - At-sea hake: 0.06 mt
- LE Sablefish Endorsed : 20.1 mt
- Other sectors : 3.3 mt
- Bottom trawl + LE Sablefish Endorsed ~ 90% total Pacific Halibut mortality







# National Observer Safety Review Overarching Goals

- Identify gaps and recommend improvements that will result in improved mitigation of dangers inherent to the industry and observers
- Develop flexible self-evaluation tools that would adapt to changing safety concerns as they evolve

# Limited Entry Groundfish Fixed Gear Fleet Cost Earnings Survey

- Data collection focuses on owners of vessels with a limited entry groundfish permit with a fixed gear endorsement.
- This data is used for analysis such as estimation of fleet net revenue and regional economic impact modeling.
- The response rate was over 70%, which is the highest response rate obtained over five iterations of this survey.
- The NWFSC thanks vessel owners for their cooperation with this survey.

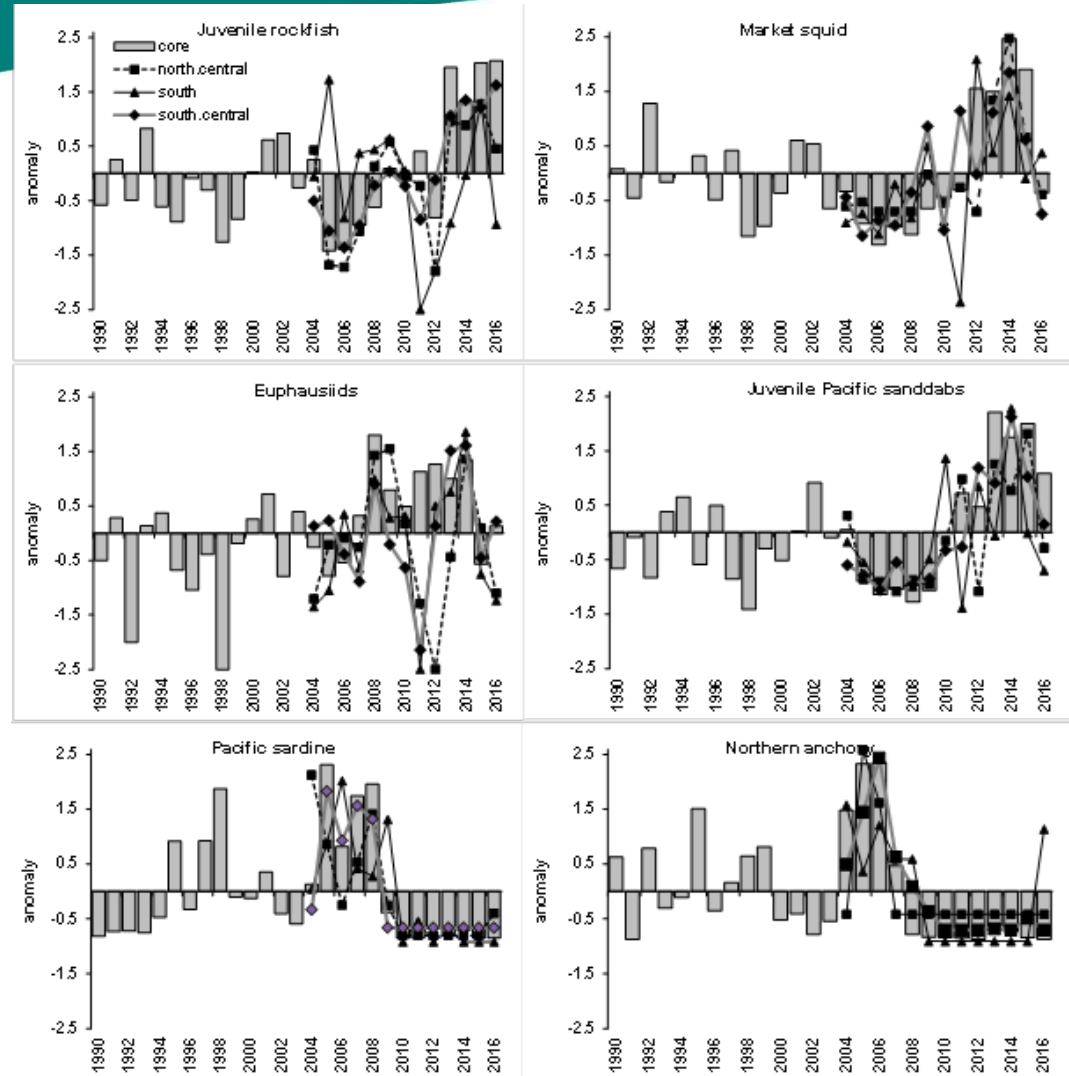


## Rockfish Recruitment and Ecosystem Assessment Survey

A joint SWFSC/NWFSC effort to conduct a coastwide midwater trawl survey for Young-of-the-Year (YOY) rockfish, Pacific hake, and other groundfish, conducted April 26 through June 26, 2016



- Despite unusual ocean conditions related to “the blob” over the last two years, the last four years (2013-2016) have seen very high catches of YOY rockfish in most areas
- Catches of juvenile sanddab, lingcod and other YOY groundfish have also been high
- However, catches of market squid and krill declined in recent years, and catches of coastal pelagic species have remained low in most regions
- Catches of warm-water species such as pelagic red crabs and California lizardfish remained high in California waters in 2016



Standardized anomalies of several of the most frequently encountered YOY groundfish and other pelagic species from rockfish recruitment survey in the core (Central California) region (1990-2016) and the southern and northern California survey areas<sub>12</sub> (2004-2016, excluding 2012 for the northern area).



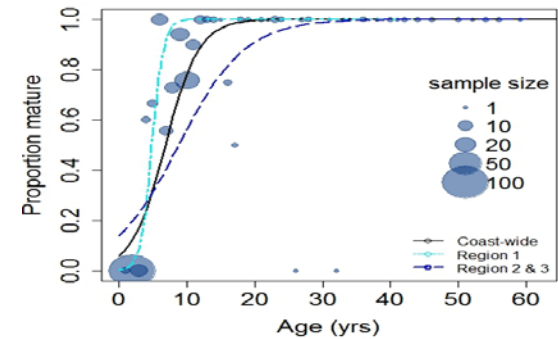
# Summary of FRAM maturity collections (2009-2015)

- Studies initiated in 2009
- 31 species and 10,000+ ovaries collected to date
- Time series established for assessments
- Relate reproductive variability to ecosystem processes
- Investigate how habitat, food availability, upwelling, etc. relate to size and age at maturity
- Examine how oceanography, climate (El Niño, “warm blob”) etc. relate to abortive maturation and skipped spawning

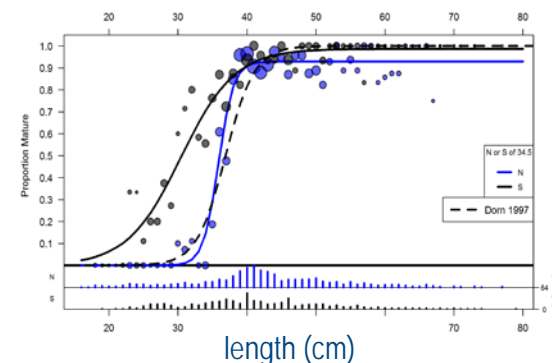
## Seven sampling platforms enhance temporal coverage

- Federal: NWFSC (Surveys+Observer Teams); SWFSC
- State: WDFW, ODWF, CDFW
- Tribal
- IPHC

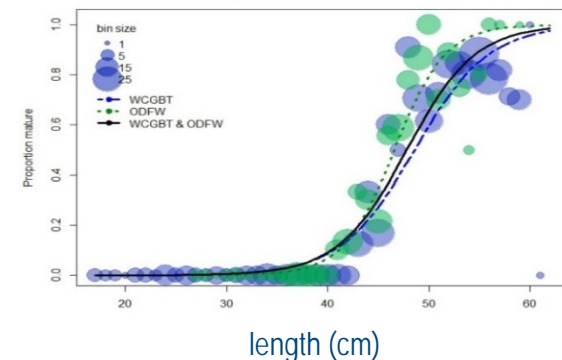
Sablefish



Pacific hake



Canary rockfish



# An empirical weight-at-age approach reduces estimation bias compared to modeling parametric growth in an integrated stock assessment

Peter T. Kuriyama<sup>1</sup>, Kotaro Ono<sup>1</sup>, Felipe Hurtado-Ferro<sup>1</sup>, Allan C. Hicks<sup>2</sup>, Ian G. Taylor<sup>2</sup>, Roberto R. Licandeo<sup>3</sup>, Kelli F. Johnson<sup>1</sup>, Sean C. Anderson<sup>1,4</sup>, Cole C. Monnahan<sup>1</sup>, Merrill B. Rudd<sup>1</sup>, Christine C. Stawitz<sup>1</sup>, Juan L. Valero<sup>5</sup>

<sup>1</sup> University of Washington

<sup>2</sup> NMFS/NWFSC

<sup>3</sup> University of British Columbia

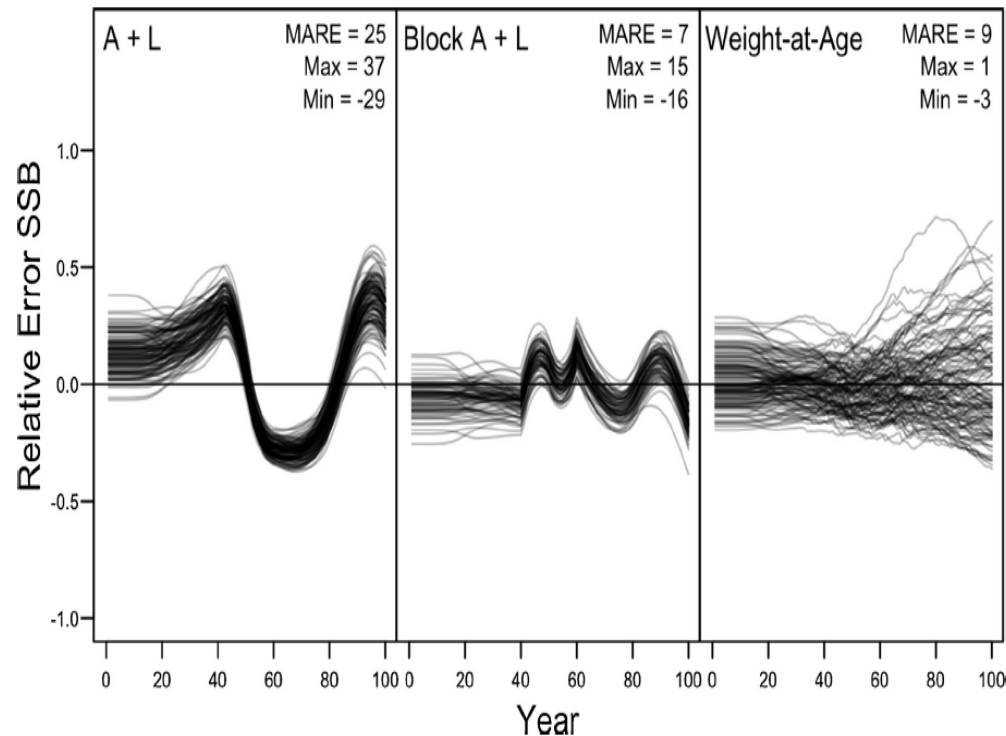
<sup>4</sup> Simon Fraser University

<sup>5</sup> CAPAM, Scripps Institution of Oceanography

Fisheries Research, 180: 119-127.



Simulation model shows that, for data –rich stocks with time-varying growth, the empirical-weight-at-age approach results in less biased estimates of biomass and relative stock status, compared to either an assumption of static growth or estimated time-varying growth using time-blocks.



# Incorporating movement in the modelling of shark and ray population dynamics: approaches and management implications

Matias Braccini<sup>1</sup>, Alexandre Aires-da-Silva<sup>2</sup>, Ian G. Taylor<sup>3</sup>

<sup>1</sup> Western Australian Fisheries and Marine Research Laboratories

<sup>2</sup> IATTC

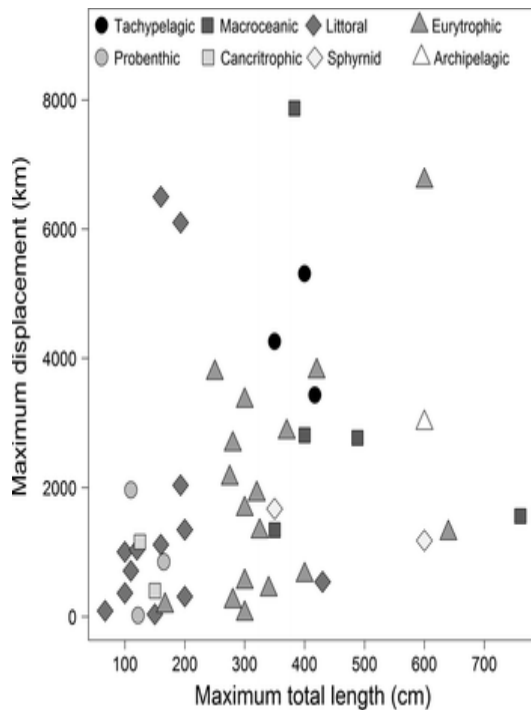
<sup>3</sup> NMFS/NWFSC

Reviews in Fish Biology and Fisheries, 26:13-24.





- For highly mobile species, the explicit incorporation of movement in the modelling of population dynamics is required for improved management. For sharks and rays, the integration of the increasingly available movement information (derived from both conventional and electronic tagging) into assessment models would advance our understanding of the dynamics of this group.
- Data from tagging programs, VMS, and other sources provide information necessary to parameterize movement models. The power and complexity of assessment models now allows the integration of these data types into spatially explicit assessment frameworks.

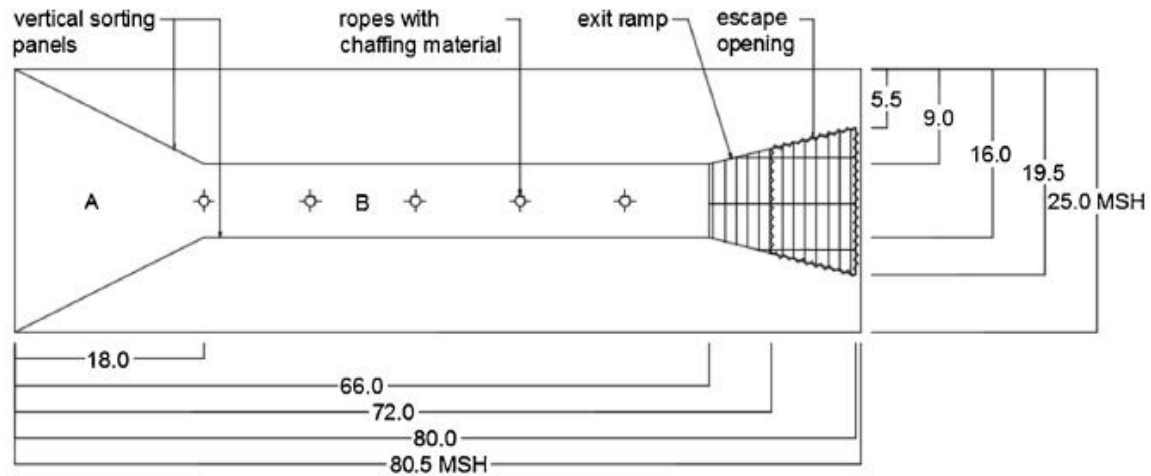


Maximum reported displacement (*straight-line* movement between release and recapture) for 46 shark species based on conventional tagging. Shark ecomorphotype follows Compagno ([1990](#))

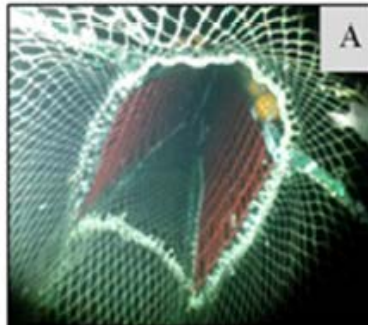
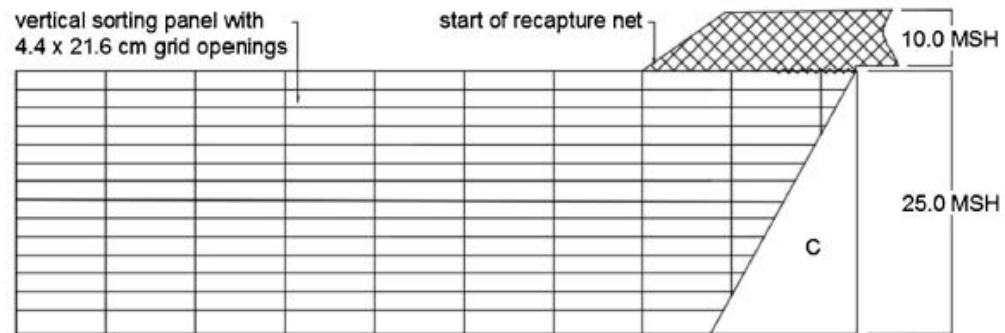
**Evaluation of a sorting grid bycatch reduction device for the selective flatfish bottom trawl in the U.S. West Coast fishery.**  
**Lomeli, M.J.M., Wakefield, W.W. 2016. Fish. Res. 183: 294-303.**



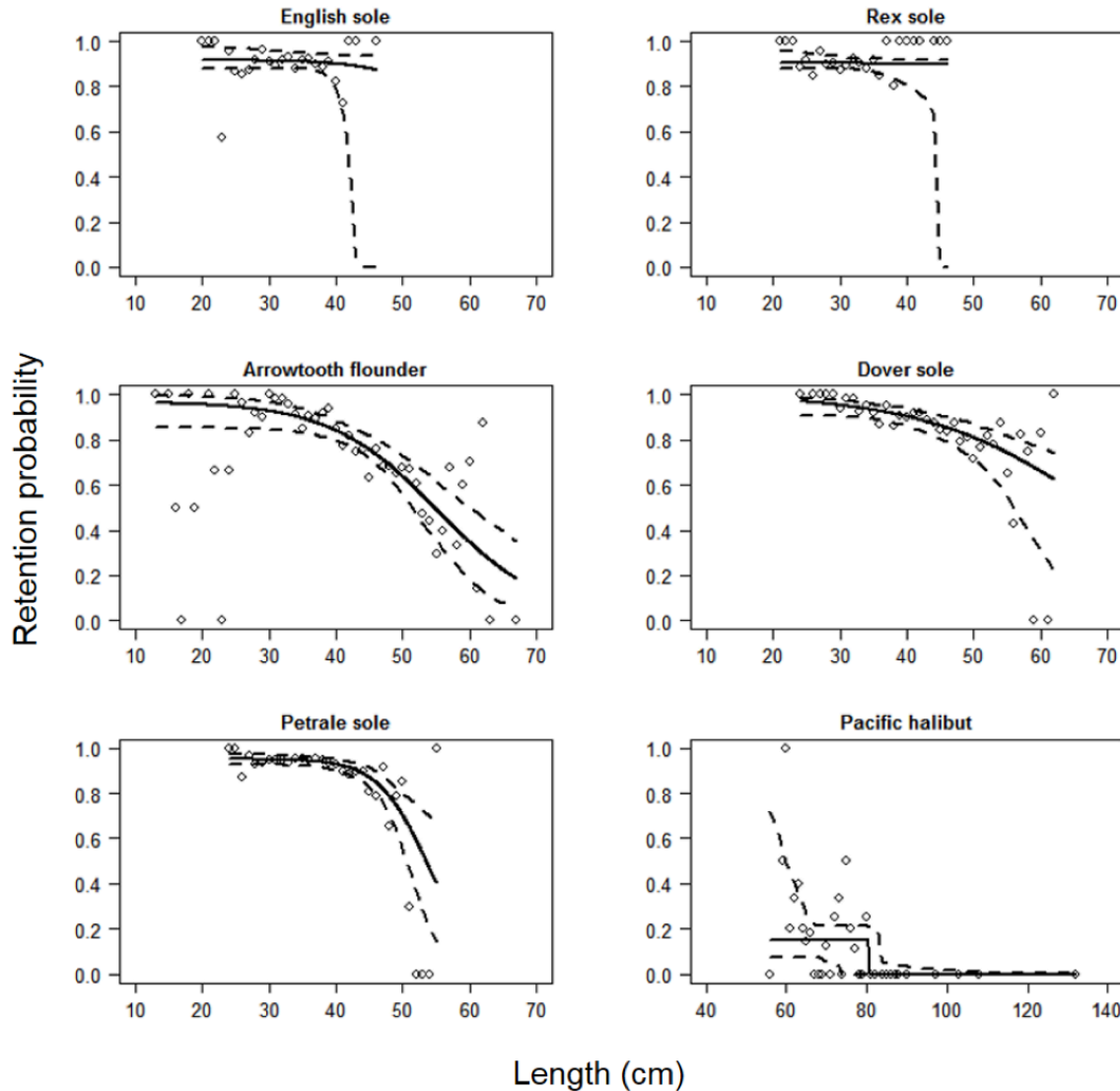
Top view



Port side view

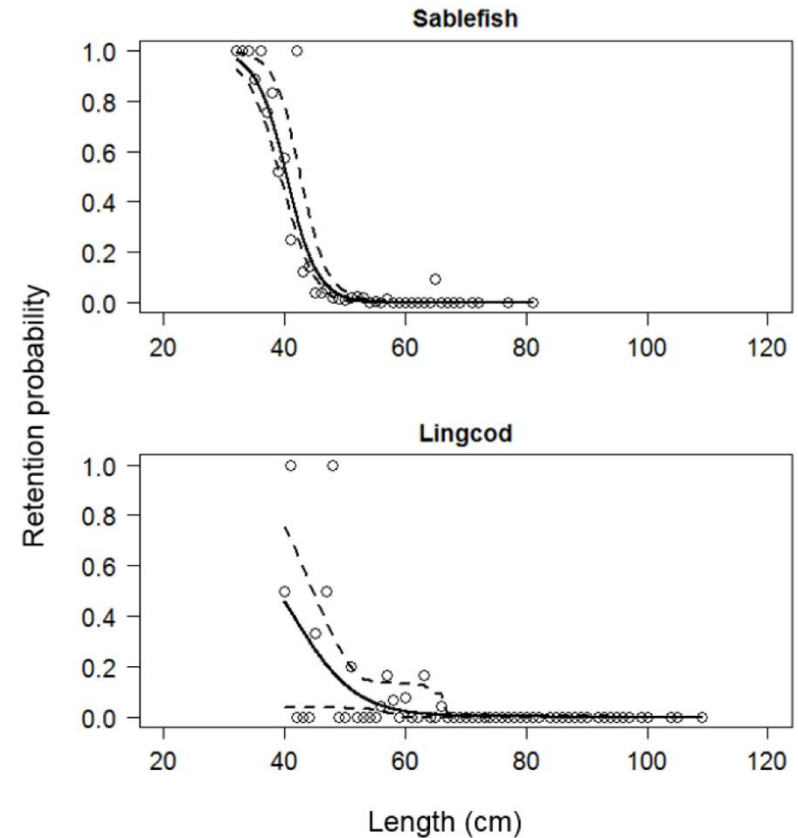
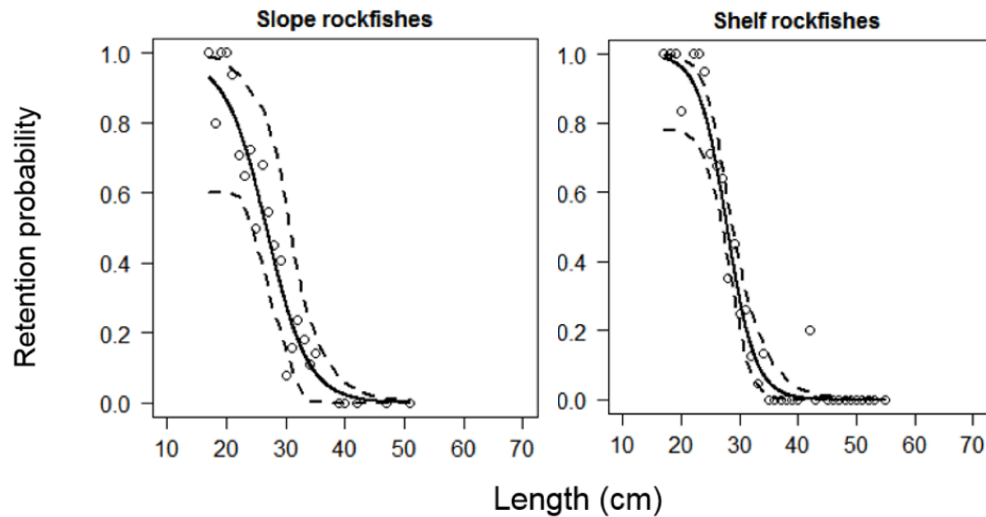


# Flatfish Selectivity



Species	% Retention (kg)
English sole	90.8
Rex sole	90.5
Arrowtooth flounder	68.1
Dover sole	86.9
Petrale sole	92.3
Pacific halibut	9.7

# Roundfish Selectivity



Species	% Retention (kg)
Shelf rockfishes	19.7
Slope rockfishes	36.0
Sablefish	3.0
Lingcod	0.3