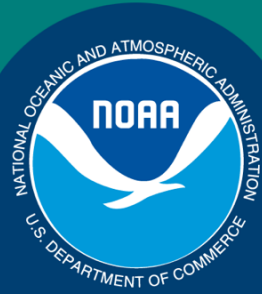


Science, Service, Stewardship

Agenda Item H.1.b
Supplemental NWFS C Presentation 1
March 2018



Groundfish Science Report

Michelle McClure

Northwest Fisheries Science Center

March 11, 2018

NOAA

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SERVICE**





Overview

- Hake Assessment
- Planned At-Sea Studies
- Western Groundfish Conference
- Recent Publications

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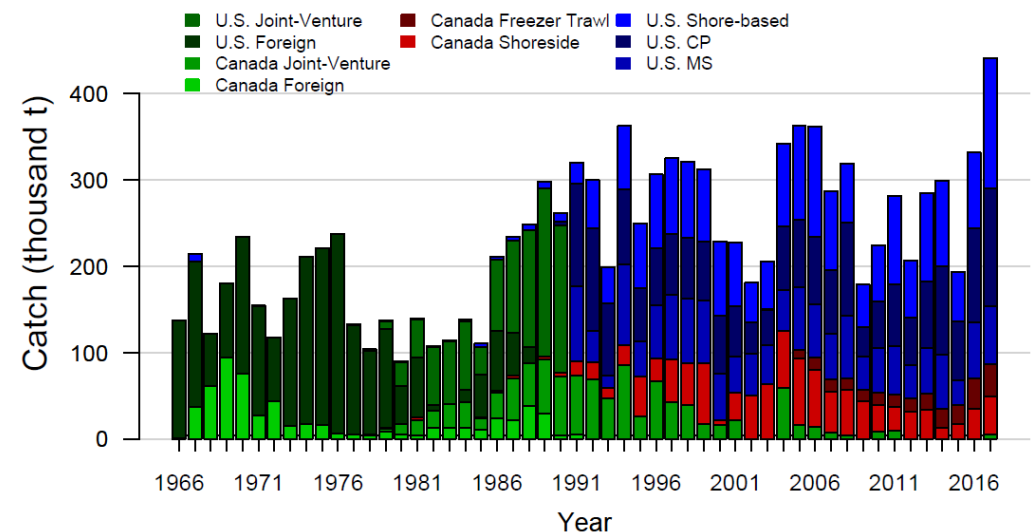


2018 Hake Stock Assessment

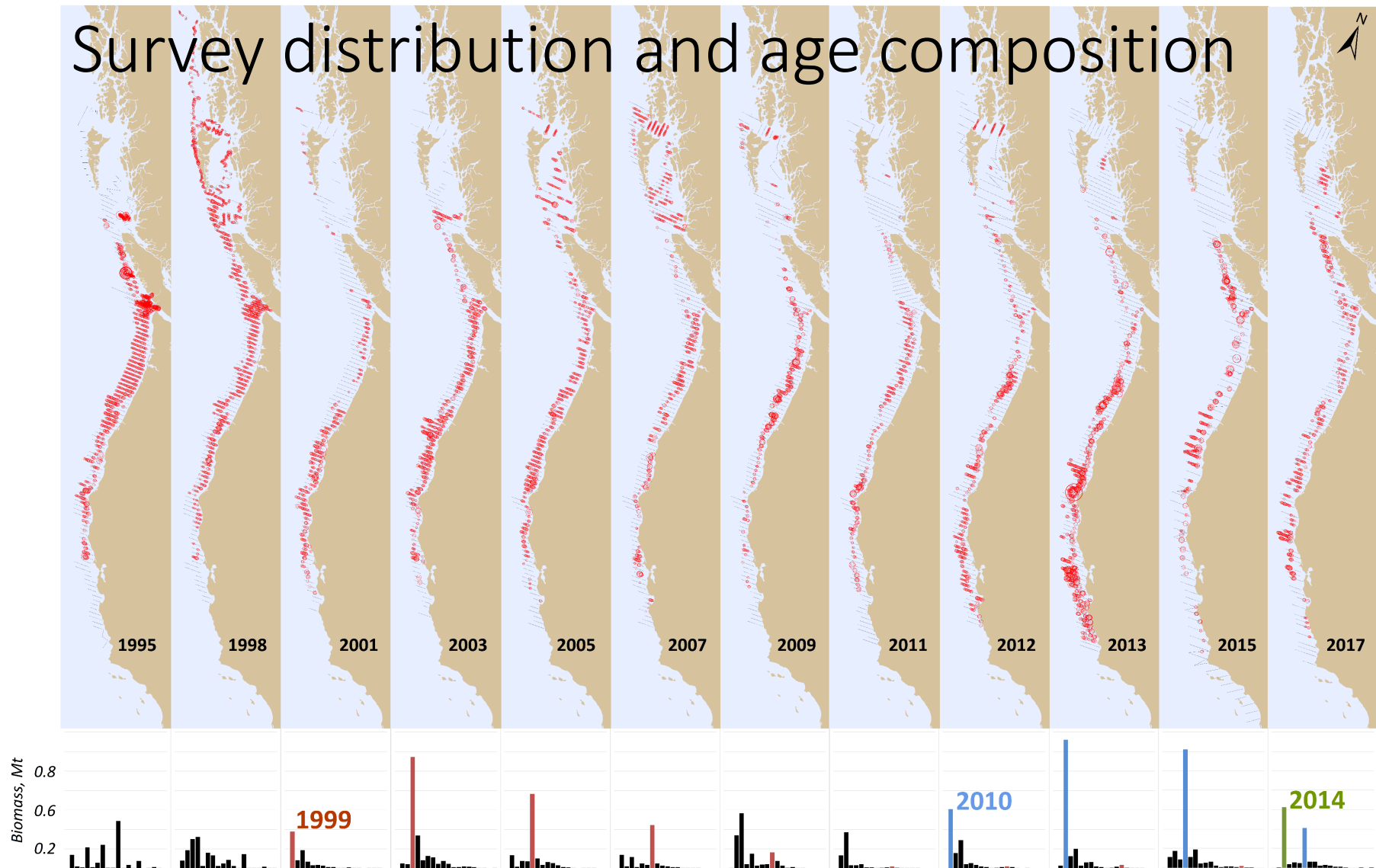
Stock Assessment for Pacific Hake (Whiting)



- Coastwide catch in 2017 was highest ever: 440,944 t, out of a TAC (adjusted for carryovers) of 597,500 t.
- Attainment in the U.S. was 80.2% of its quota; in Canada it was 55.6%.
- Assessment conducted by Joint Technical Committee (reps from U.S. and Canada)
- Base stock assessment has same general structure as last year with minor updates

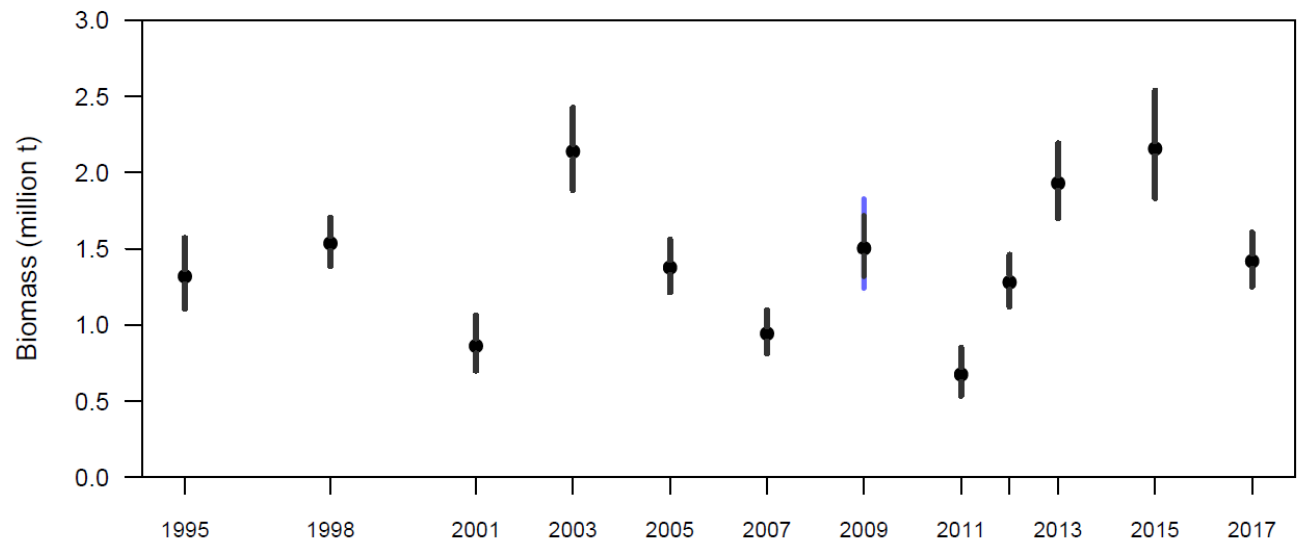


Survey distribution and age composition

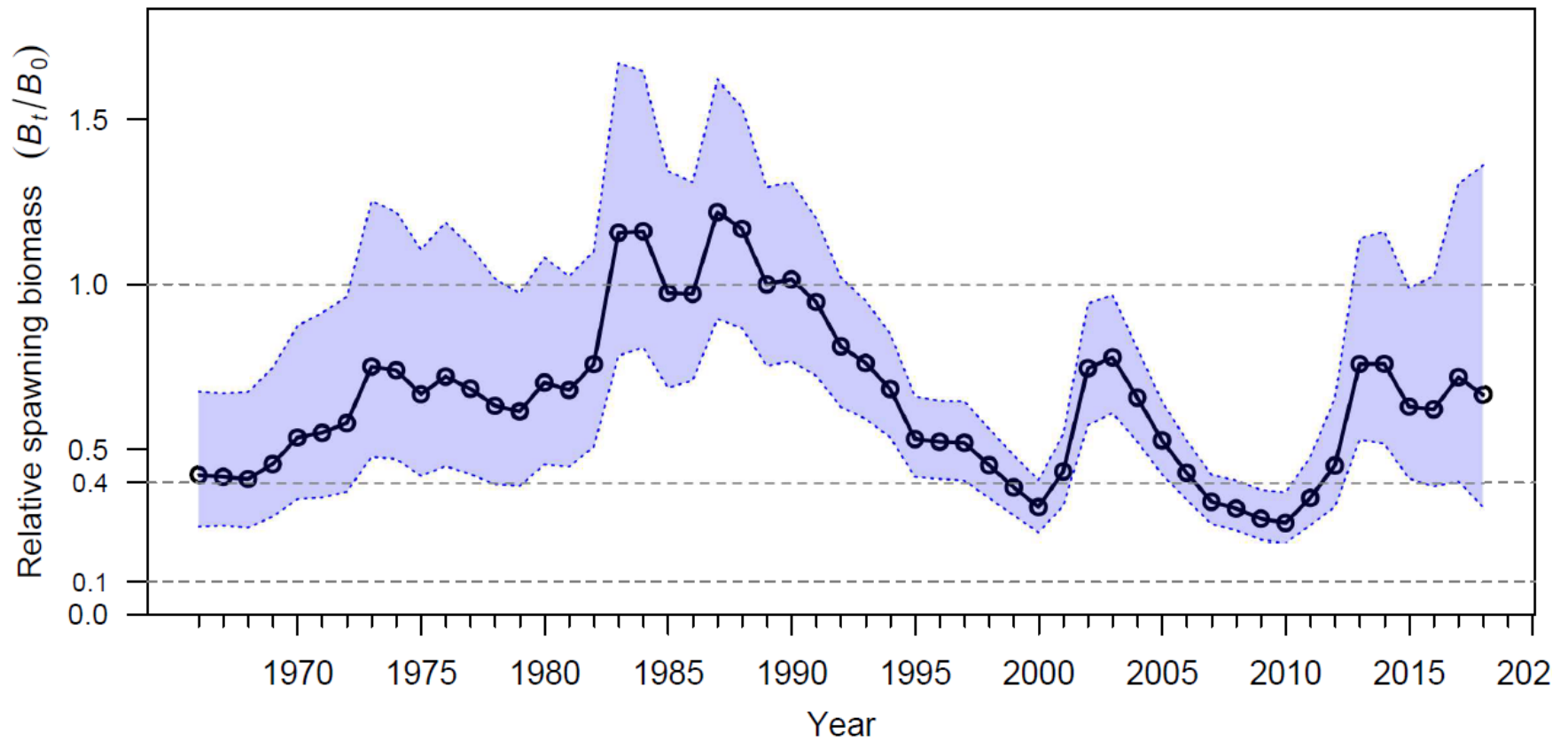


Acoustic survey Biomass Estimate

- Survey estimate of 1.418 Mt lower than expected given high 2015 estimate and addition of 2014 cohort to ages 2+ stock

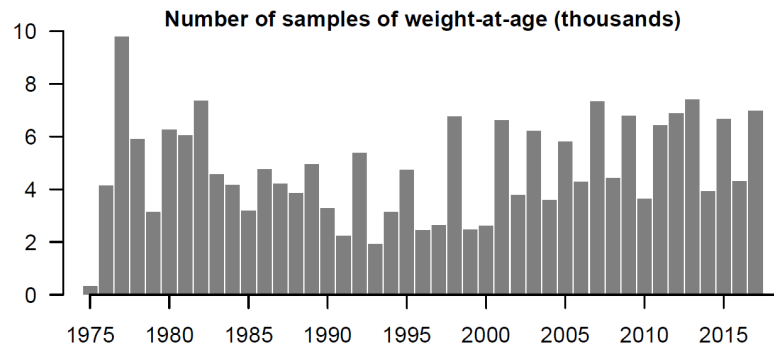


Estimated relative spawning biomass

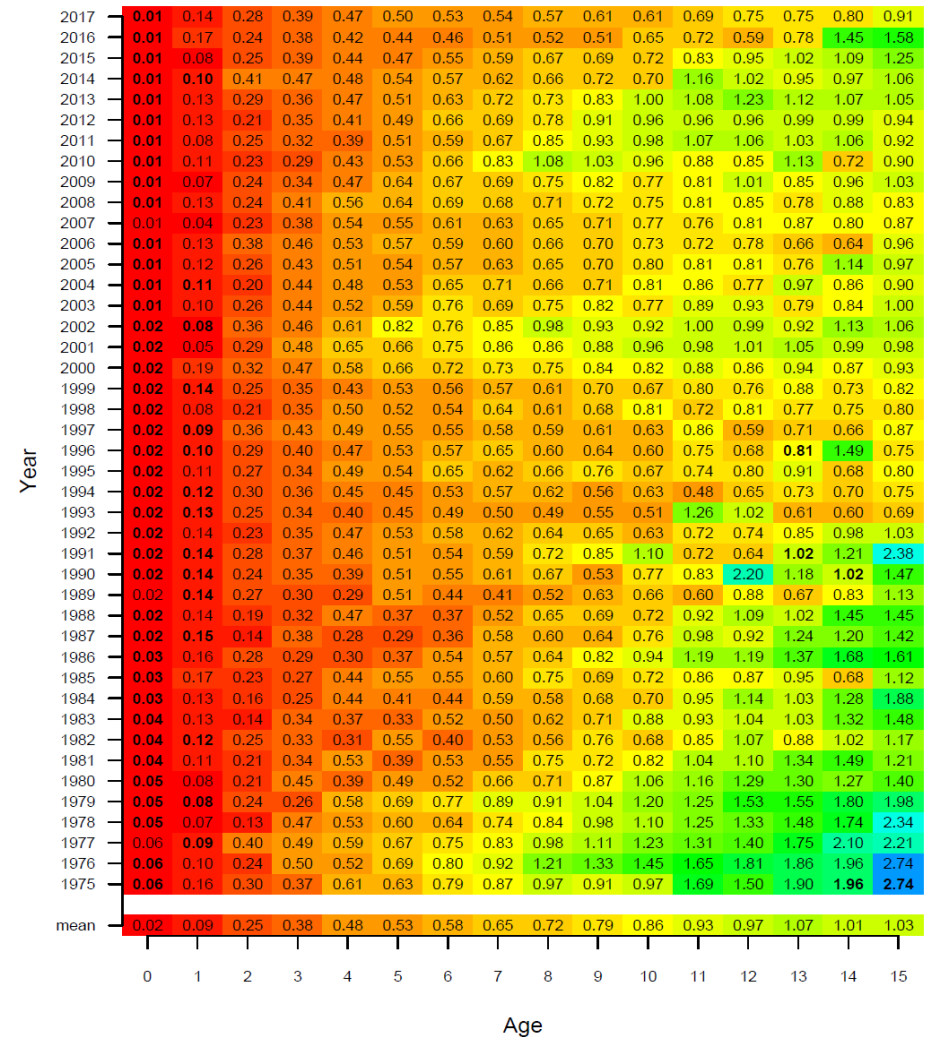


Weight at age and unfished equilibrium

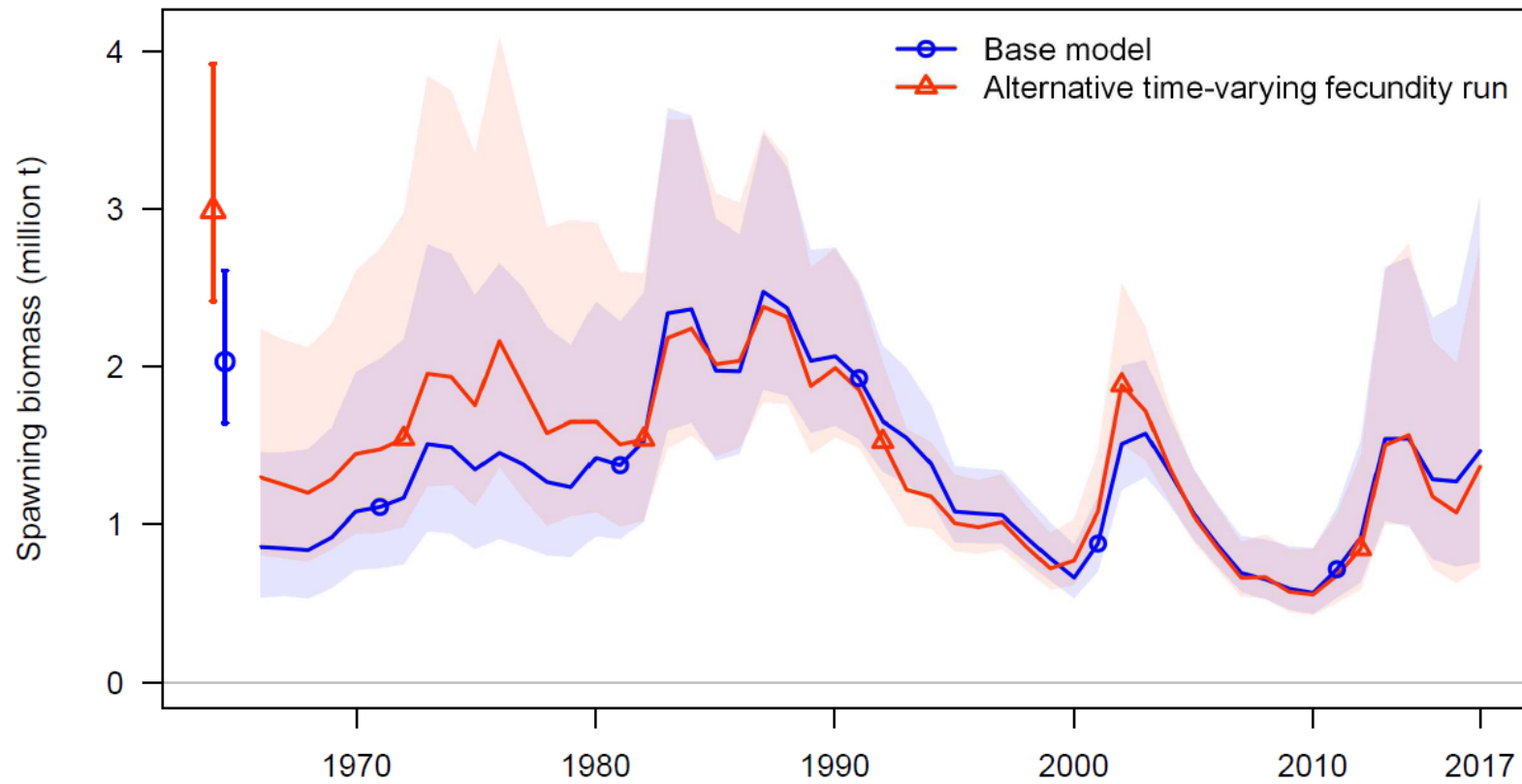
- New maturity-at-age estimates replace older length-based calculations
- Questions raised about how best to calculate spawning biomass in unfished equilibrium (B_0)



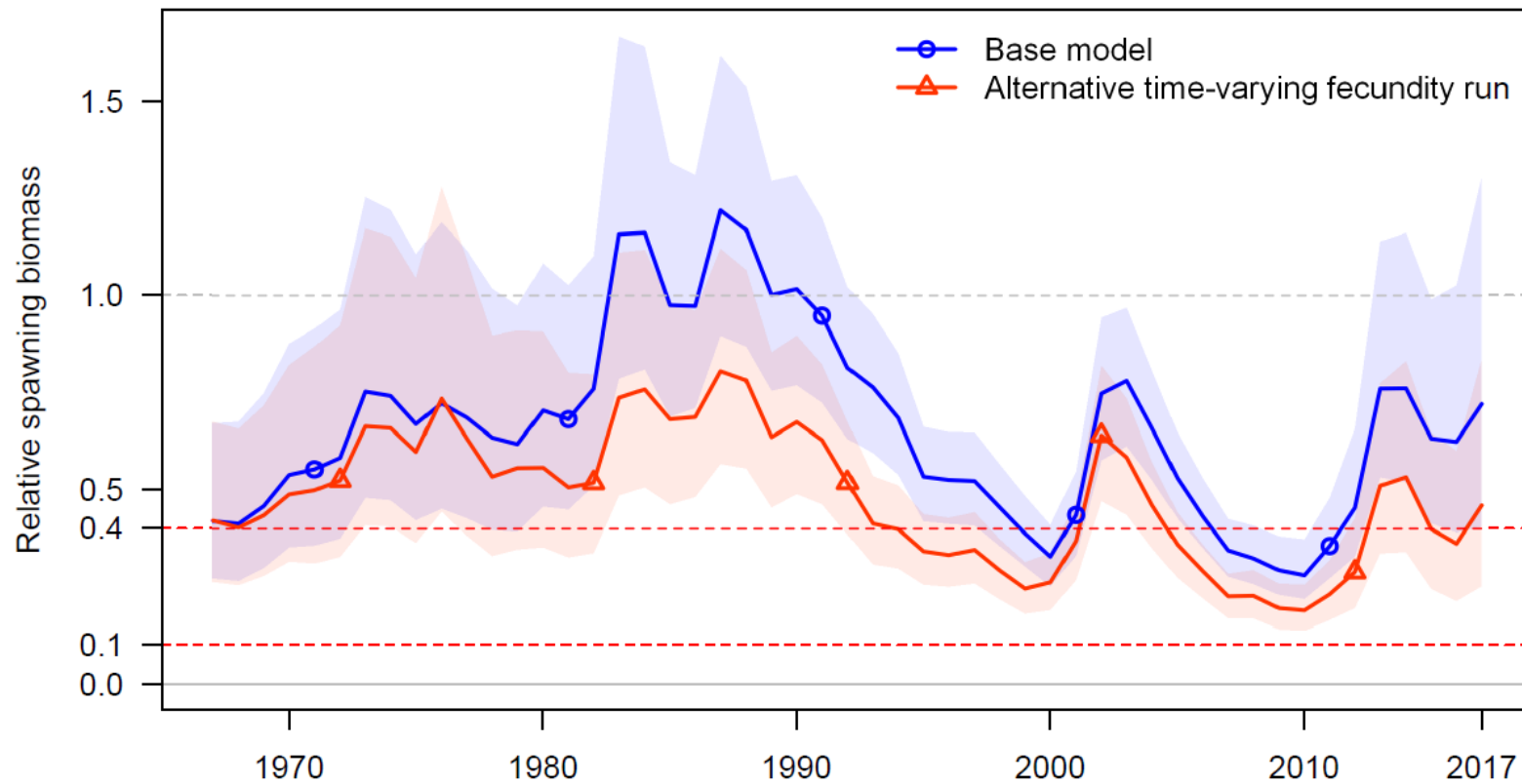
Mean weight at age with interpolation & extrapolation (all data)



Spawning biomass comparison



Relative spawning biomass comparison



Decision table comparison

Base model

Within model quantile		5%	25%	50%	75%	95%	
Management Action		Beginning of year relative spawning biomass					
Year	Catch (t)						
a:	2018	0	38%	54%	67%	83%	119%
	2019	0	40%	58%	72%	93%	152%
	2020	0	42%	60%	76%	101%	172%
b:	2018	180,000	38%	54%	67%	83%	119%
	2019	180,000	36%	53%	68%	89%	148%
	2020	180,000	33%	52%	68%	93%	165%
c:	2018	350,000	38%	54%	67%	83%	119%
	2019	350,000	32%	49%	64%	86%	145%
	2020	350,000	26%	44%	61%	86%	158%
d:	2018	440,000	38%	54%	67%	83%	119%
	2019	440,000	30%	48%	62%	84%	143%
	2020	440,000	21%	40%	57%	83%	155%
e:	2018	597,500	38%	54%	67%	83%	119%
	2019	597,500	26%	44%	59%	80%	140%
	2020	597,500	14%	33%	50%	76%	148%

Alternative

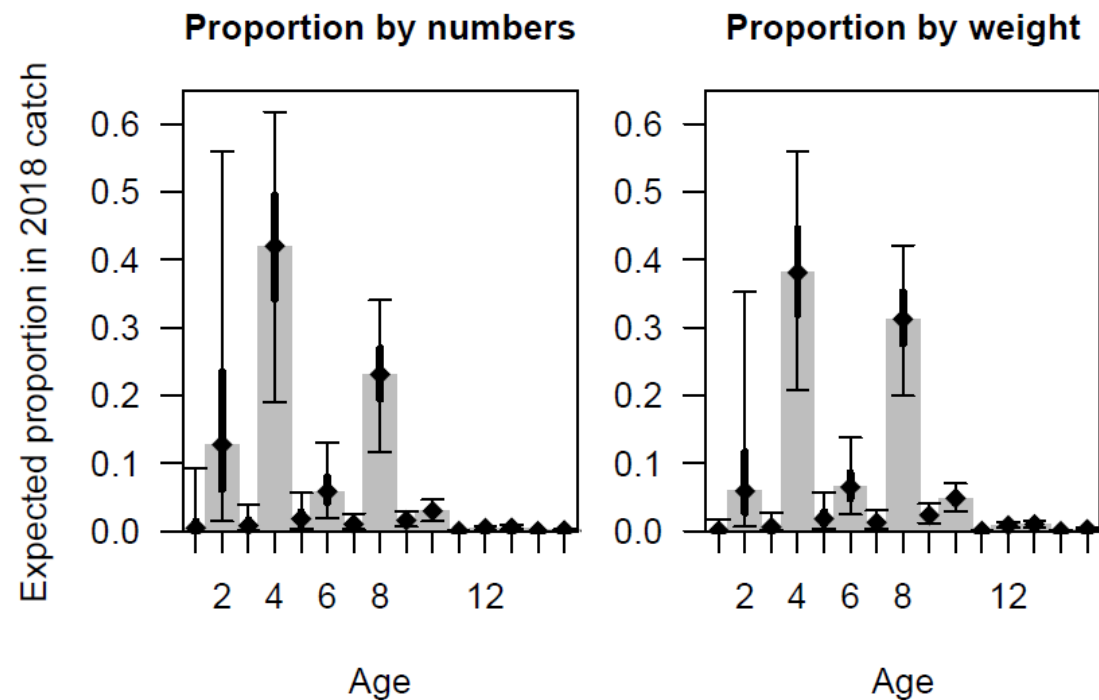
Within model quantile		5%	25%	50%	75%	95%	
Management Action		Beginning of year relative spawning biomass					
Year	Catch (t)						
a:	2018	0	22%	32%	41%	51%	72%
	2019	0	23%	35%	45%	60%	94%
	2020	0	24%	35%	46%	62%	106%
b:	2018	180,000	22%	32%	41%	51%	72%
	2019	180,000	21%	33%	43%	58%	91%
	2020	180,000	19%	31%	42%	58%	102%
c:	2018	350,000	22%	32%	41%	51%	72%
	2019	350,000	19%	30%	41%	55%	89%
	2020	350,000	15%	26%	37%	54%	98%
d:	2018	440,000	22%	32%	41%	51%	72%
	2019	440,000	18%	29%	39%	54%	87%
	2020	440,000	12%	24%	35%	51%	96%
e:	2018	597,500	22%	32%	41%	51%	72%
	2019	597,500	15%	27%	37%	52%	85%
	2020	597,500	8%	20%	31%	48%	92%

Risk table for base model

Catch in 2018	Probability $B_{2019} < B_{2018}$	Probability $B_{2019} < B_{40\%}$	Probability $B_{2019} < B_{25\%}$	Probability $B_{2019} < B_{10\%}$	Probability 2018 relative fishing intensity >100%	Probability 2019 default harvest policy catch <2018 catch
a: 0	37%	5%	0%	0%	0%	0%
b: 180,000	55%	9%	1%	0%	0%	1%
c: 350,000	64%	13%	2%	0%	9%	10%
d: 440,000	68%	15%	2%	0%	19%	21%
e: 597,500	73%	20%	4%	0%	44%	46%
f: 639,000	75%	21%	5%	0%	50%	52%
g: 725,984	77%	24%	7%	0%	61%	62%
h: 626,954	74%	20%	5%	0%	49%	50%

Expected proportions in 2018 fishery

- Forecasts depend on simplifying assumptions about selectivity
- 2010 and 2014 cohorts expected to have make up majority of catch in 2018
- Age-2 fish from above average but highly uncertainty 2016 cohort may be significant as well



Summary of Pacific Hake stock assessment

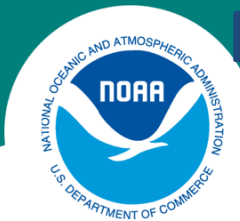
- Uncertainty is large, but stock is likely above $B_{40\%}$.
- Forecasts strongly influenced by size of large but uncertain 2014 cohort and very uncertain 2016 cohort.
- Aging 2010 cohort declining due to fishing and natural mortality leads to estimated decline in spawning biomass for catch of 350,000 t or greater.
- Higher risk of falling below $B_{40\%}$ within 2 years than estimated from last year's assessment.



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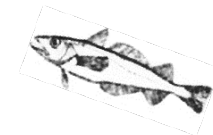
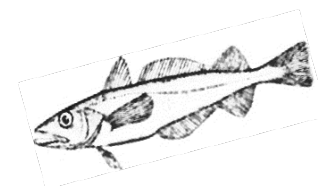
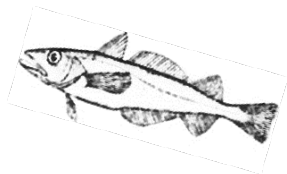
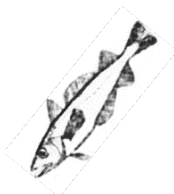


At-Sea Investigations



Planned Hake-Relevant Research – Summer 2018

- 2018 Research Cruise:
 - Methodology improvements
 - Comparative cod-ends
 - Inter-vessel calibrations
 - Euphausiid distribution, abundance, habitat
- Saildrone proof-of-concept study
 - Joint with PMEL, SWC
 - Accompanying CPS survey





Do You Want Experience at Sea Collecting Data for Fisheries Management?

ARE YOU TIRED OF RUN-OF-THE-MILL VOLUNTEER OPPORTUNITIES?

NOAA'S Northwest Fisheries Science Center is looking for a few hardy souls to volunteer for a leg of our 2018 West Coast Groundfish Bottom Trawl Survey. Sail with us aboard a real commercial fishing vessel working with commercial fishermen and NOAA Fisheries scientists as we collect data integral to the sustainable management of groundfish species of the Northeast Pacific Ocean.



DO YOU QUALIFY?

- Have you been out to sea previously or do you know how vulnerable you are to seasickness?
- Can you carry 35 lbs. while walking on a moving surface?
- Can you stand for up to 15 hours on a steel deck in harsh weather conditions?
- Can you ascend and descend steel ladders and stairs?
- Can you hear a general alarm (hearing aids permitted)?
- Will you survive if you are unable to Tweet, Snapchat, post photos to Instagram, blog, or share "What is on your mind?" on whatever your preferred social media platform is for up to 10 days?
- Are you willing to cut into the heads of fish or surgically extract vertebrae, stomachs or gonads for the betterment of fisheries management?
- **Must be available to attend training May 1-3, 2018.**

WHAT DO VOLUNTEERS DO?

- Help sort fish and invertebrates by species.
- Collect biological data from fish.
- Other duties to fulfill the mission.



WHAT DO YOU GET IN RETURN?

- Invaluable experience with fisheries data collection.
- The chance to meet and work with real commercial fishermen.
- All-you-can-eat meals, including ice cream and candy!
- Travel to exotic ports-of-call (see list below).

HOW TO VOLUNTEER?

- Pick your first and second choice leg, and contact Keith.Bosley@noaa.gov or 541-867-0506.
- See <https://tinyurl.com/hwpsc-surveys> for more information.

Tentative SUMMER Schedule	2018 Ports-of-call	Tentative FALL Schedule
Leg 1: May 19 - 28	Newport to Astoria/Newport	Leg 1: August 18 - 27
Leg 2: June 1 - 10	Newport/Astoria to Charleston/Brookings/Eureka	Leg 2: August 31 - September 9
Leg 3: June 14 - 23	Charleston/Brookings/Eureka to San Francisco	Leg 3: September 13 - 22
Leg 4: June 27 - July 5	San Francisco to Santa Barbara/Ventura	Leg 4: September 26 - October 4
Leg 5: July 9 -16	Santa Barbara/Ventura to Long Beach	Leg 5: October 8 - 15

Survey Fishes:

An Illustrated List of the Fishes Captured during the Northwest Fisheries Science Center's Fishery Resource Analysis and Monitoring Division's West Coast Surveys

<https://doi.org/10.7289/V5/TM-NWFSC-138>

September 2017



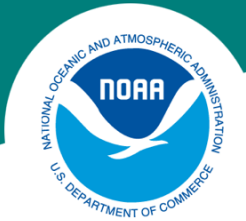
U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Northwest Fisheries Science Center

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Western Groundfish Conference

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**20th Biennial Western
Groundfish Conference was
held in Seaside, California
February 13-16th**

**Program, abstracts and participant
list available at
<http://www.westernngc.org/>**



NOAA FISHERIES SERVICE



- Included nearly 200 participants, over 80 presented papers and over 50 posters related to Northeast Pacific groundfish biology, ecology, habitat, assessment and management
- Opening session was collaboration with Technical Subcommittee of the Canada-U.S. Groundfish Committee (TSC) on the “Ups and downs of descending device policy and science”
- Participation and sponsorship by a wide range of West Coast agencies, industry associations and non-governmental organizations
- Next WGC to be held in Alaska in 2020



Thank you sponsors!



Science Updates: Recent Publications



Illuminating the Headrope of a Selective Flatfish Trawl: Effect on Catches of Groundfishes, Including Pacific Halibut

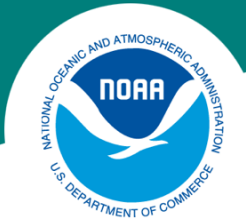
Mark J.M. Lomeli¹, W. Waldo Wakefield², Bent Herrmann³

¹Pacific States Marine Fisheries Commission, Newport, Oregon

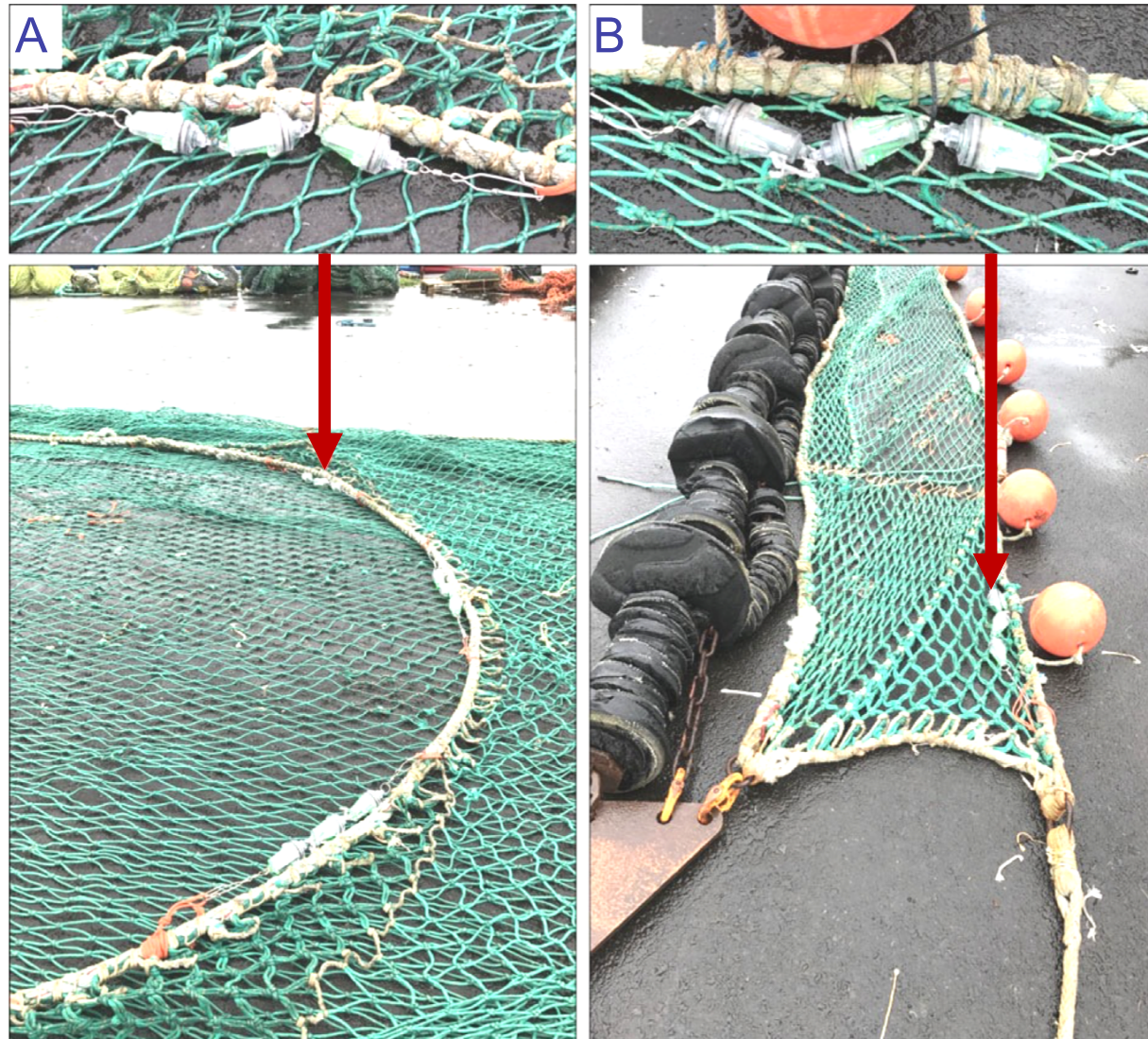
²Northwest Fisheries Science Center, Fishery Resource Analysis and Monitoring Division, Newport, Oregon 97365, USA

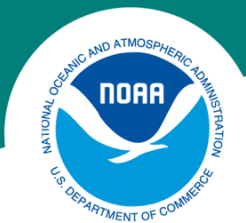
³SINTEF Fisheries and Aquaculture, Hirtshals, Denmark

Published in *Marine and Coastal Fisheries*

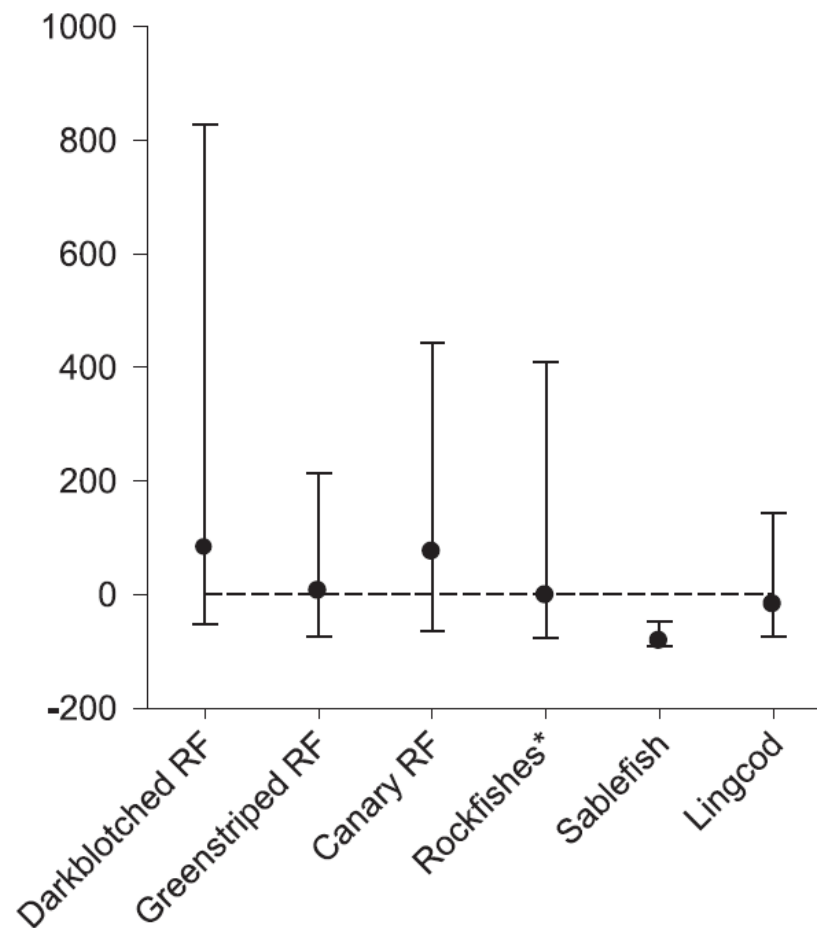
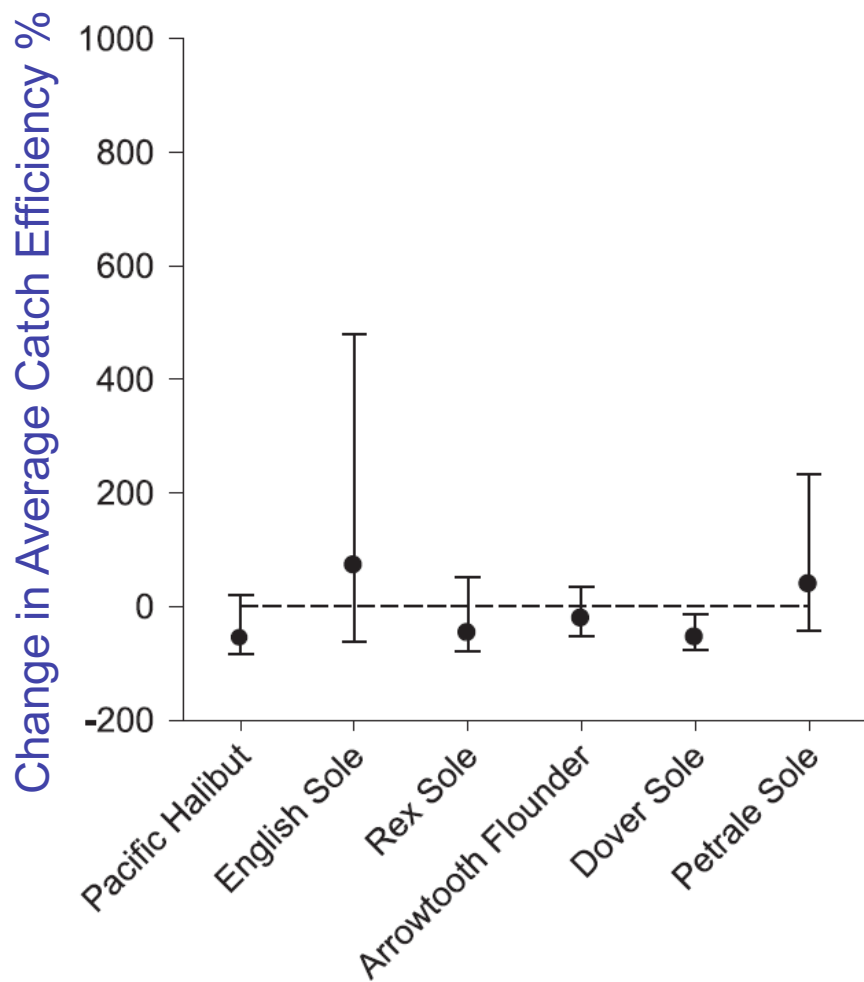


- West coast fishermen are increasingly experimenting with artificial illumination to improve gear selectivity
- This study shows that illuminating the headrope of the selective flatfish trawl can affect the catch rates of several groundfish species, including Pacific Halibut, and that the effect varies by species and size





How does adding headrope LED lights change bottom trawl catch efficiency?



Questions?