

Gulf of Alaska SAFE report

Report of the
Gulf of Alaska Groundfish
Plan Team meeting
Nov 14th-18th, 2016

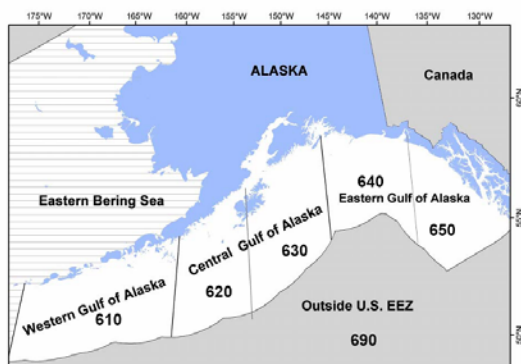
GOA Plan Team Members

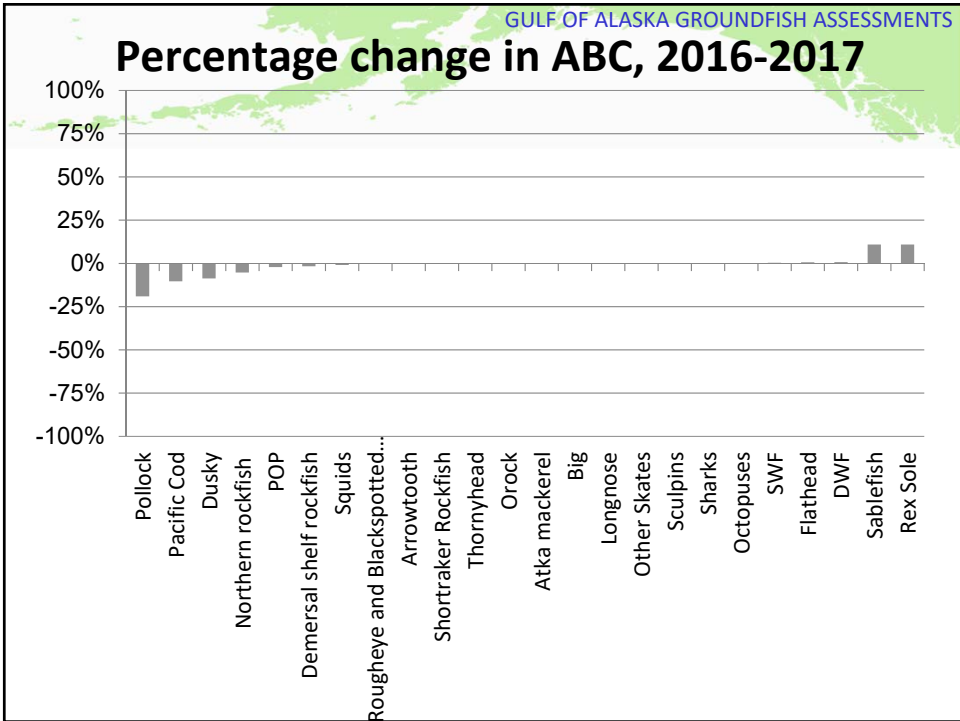
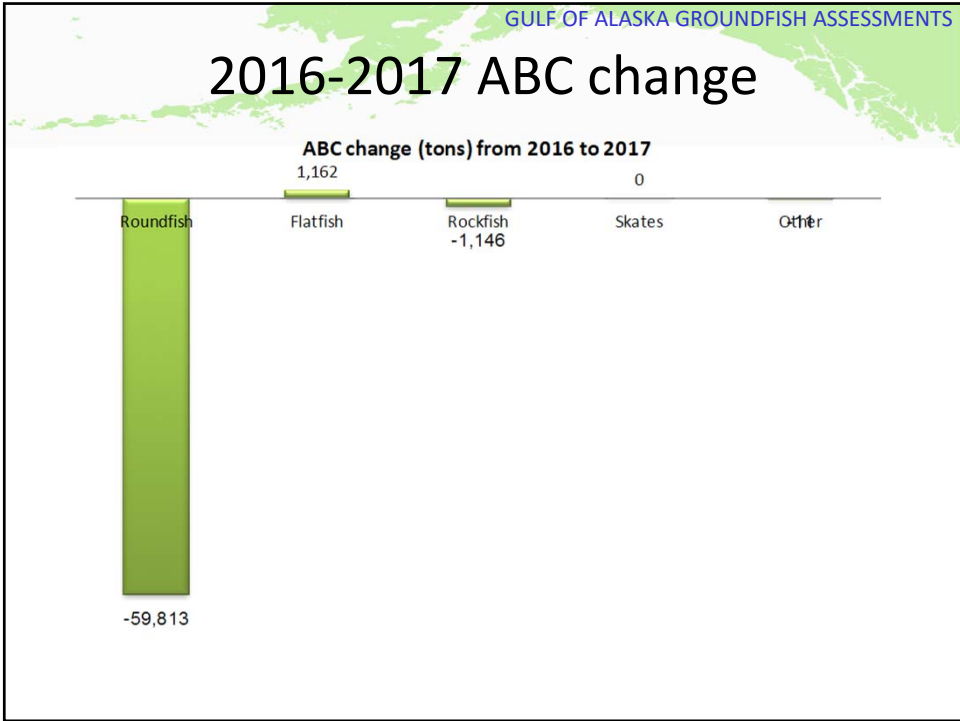
James Ianelli (chair)	AFSC/REFM
James Armstrong	NPFMC
Ben Williams	ADFG
Mark Stichert	ADFG
Jan Rumble	ADFG
Mike Dalton	AFSC/REFM
Chris Lunsford	AFSC/ABL
Jon Heifetz	AFSC/ABL
Sandra Lowe	AFSC/REFM
Paul Spencer	AFSC/REFM
Craig Faunce	AFSC/FMA
Obren Davis	AKRO
Patrick Lynch	NMFS HQ

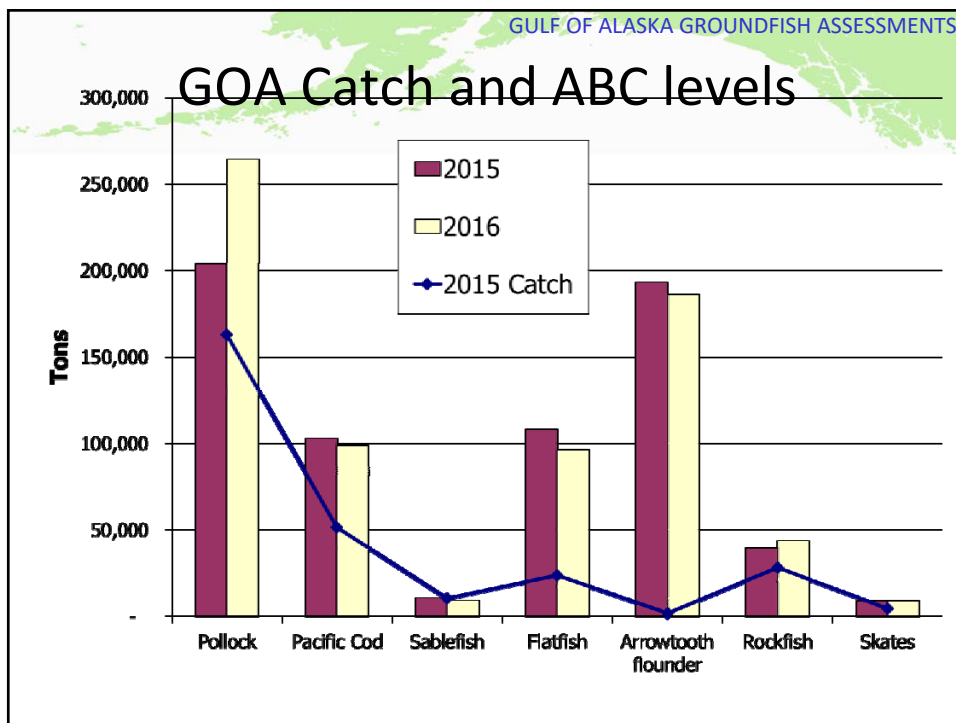
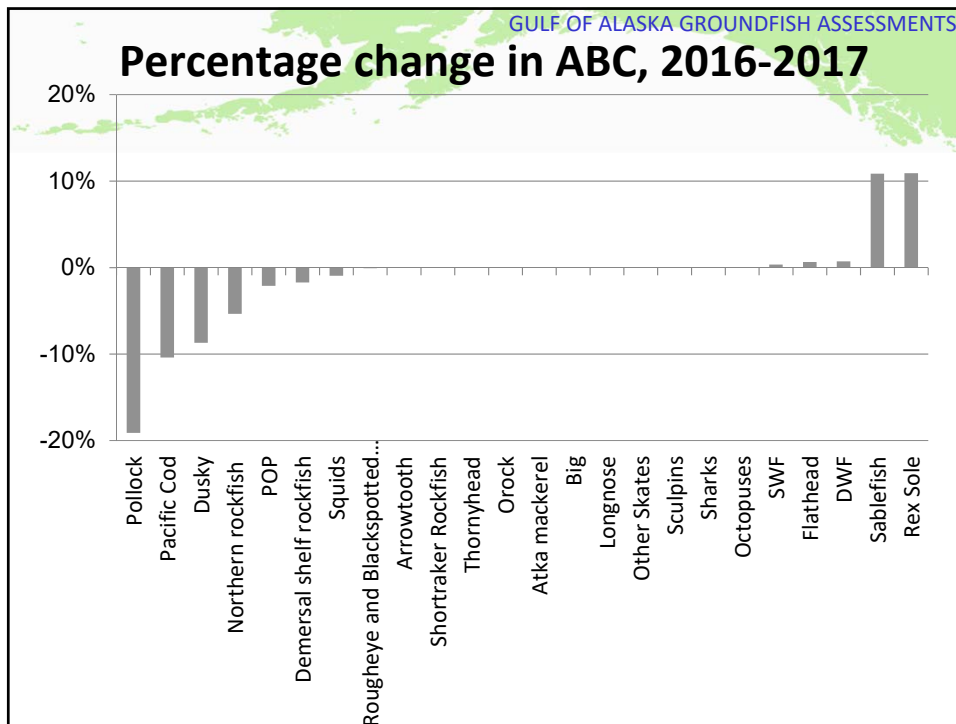
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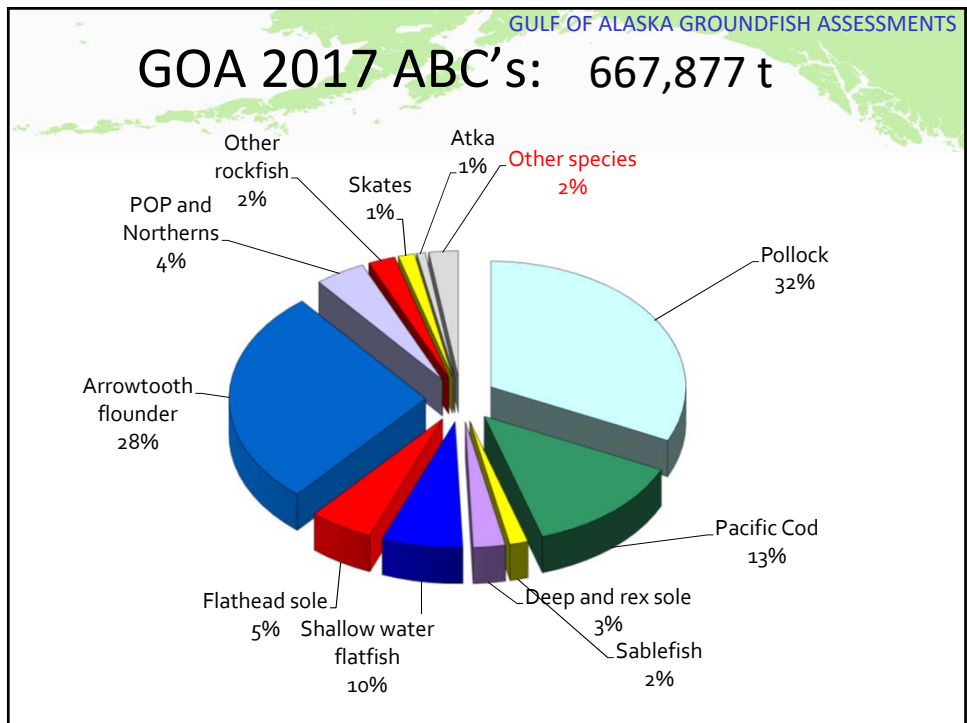
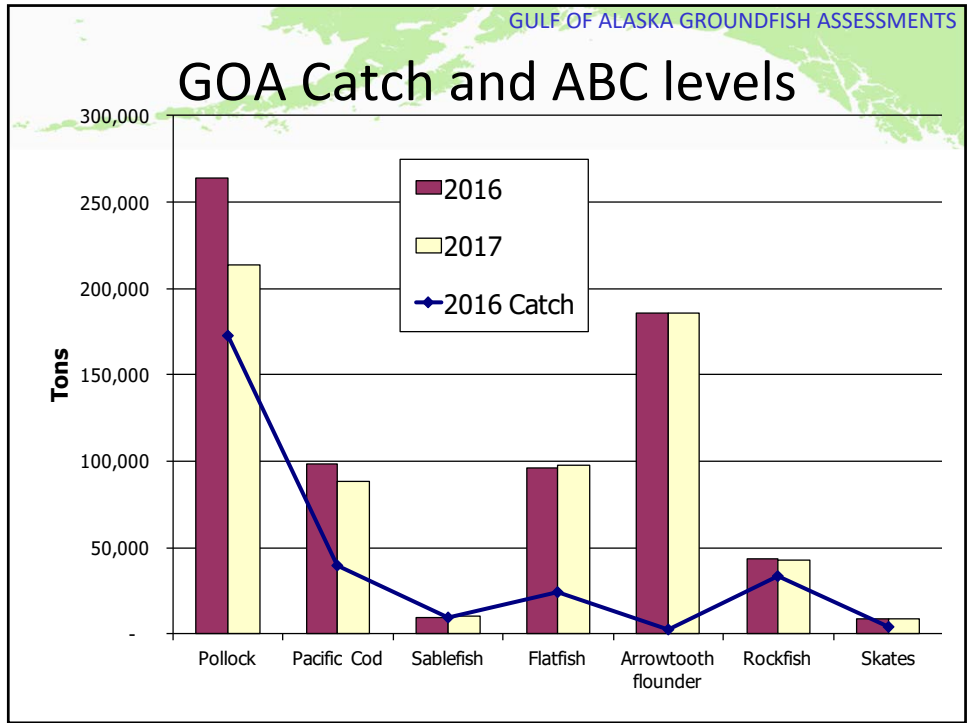
Overview

Biennial “off”
year for GOA
12 stocks in Tier
3
(mostly above
 $B_{40\%}$)
2 in Tier 4
7 in Tier 5, and
5 in Tier 6
Note some
hybrid groups







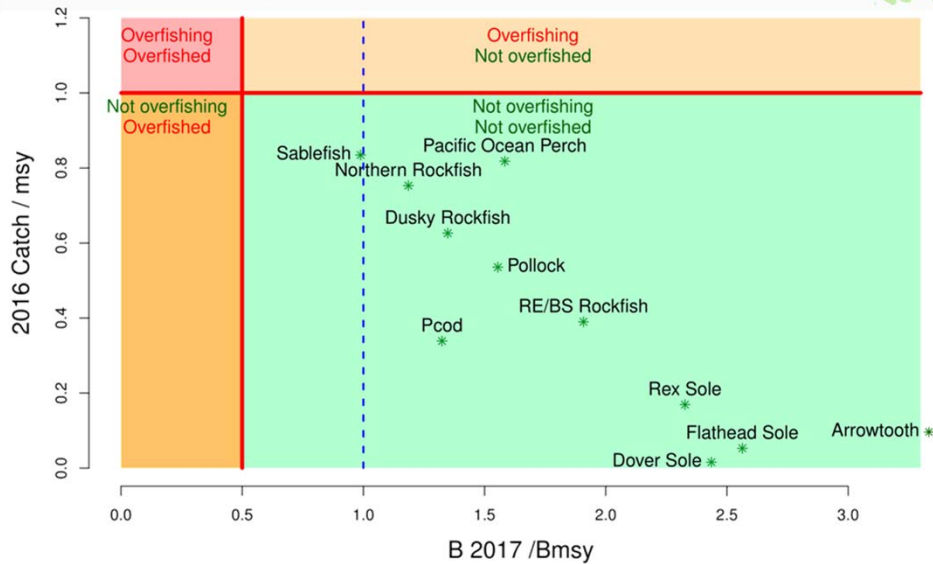


ABC / TAC

Team recommendations where
 $ABC < \text{maximum permissible}$:

Species	Tier	Max F_{ABC}	Max ABC	F_{ABC}	ABC
Sablefish	3b	0.081	10,408 t	0.078	10,074 t
DSR	4, 6	0.026	289 t	0.02	227 t

Stock status summary **this** year



GOA Groundfish Species overview

Off-year so mainly pollock, Pacific cod, and sablefish

1. 2017 ABC/Catch and recommended changes
2. Highlights
 - ♦ New data
 - ♦ Analytic approach (changes)
3. Stock status and trend



ABC

Species	2016 Catch	ABC		Change
		2016	2017	
Pollock	172,927	264,230	213,689	down 50,541(19%)
Pacific Cod	39,544	98,600	88,342	down 10,258(10%)
Sablefish	9,281	9,087	10,073	up 986(11%)
Flatfish	24,425	96,103	97,360	up 1,257(1%)
Arrowtooth flounder	2,283	186,188	186,093	down 95(0%)
Rockfish	33,653	43,706	42,560	down 1,146(3%)
Atka mackerel	993	4,700	4,700	same(0%)
Skates	4,258	8,939	8,939	same(0%)
Other Species	3,698	16,131	16,120	down 11(0%)
Total	291,062	727,684	667,876	down 59,808(8%)

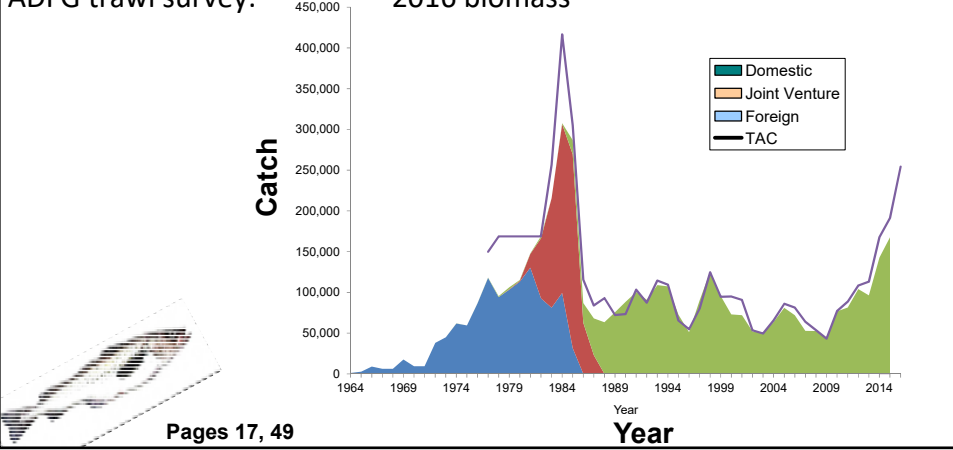
1. GOA pollock

Fishery: 2015, 2016 total catch and 2015 catch at age

Shelikof EIT survey: 2016 winter biomass and age comp

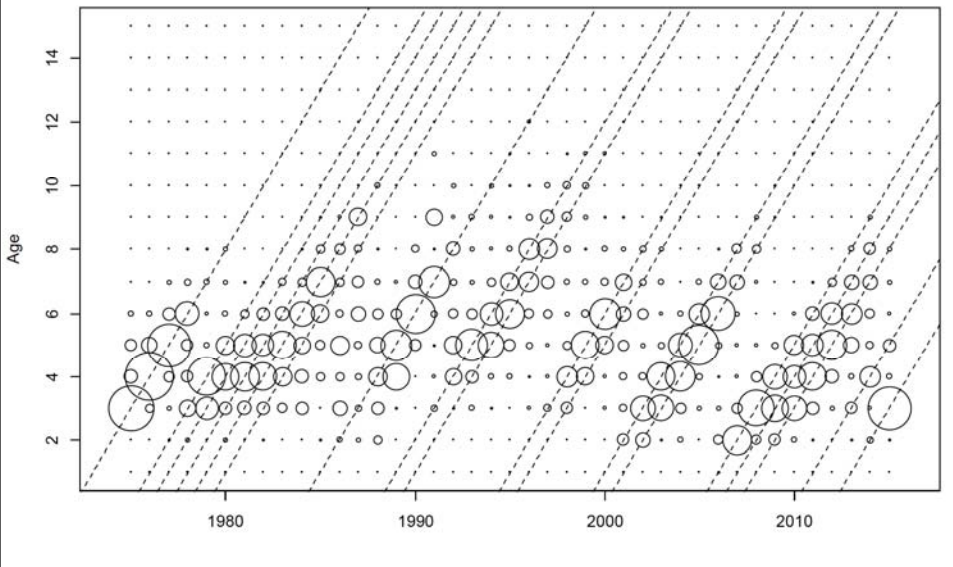
NMFS Summer trawl : 2015 biomass & length comps

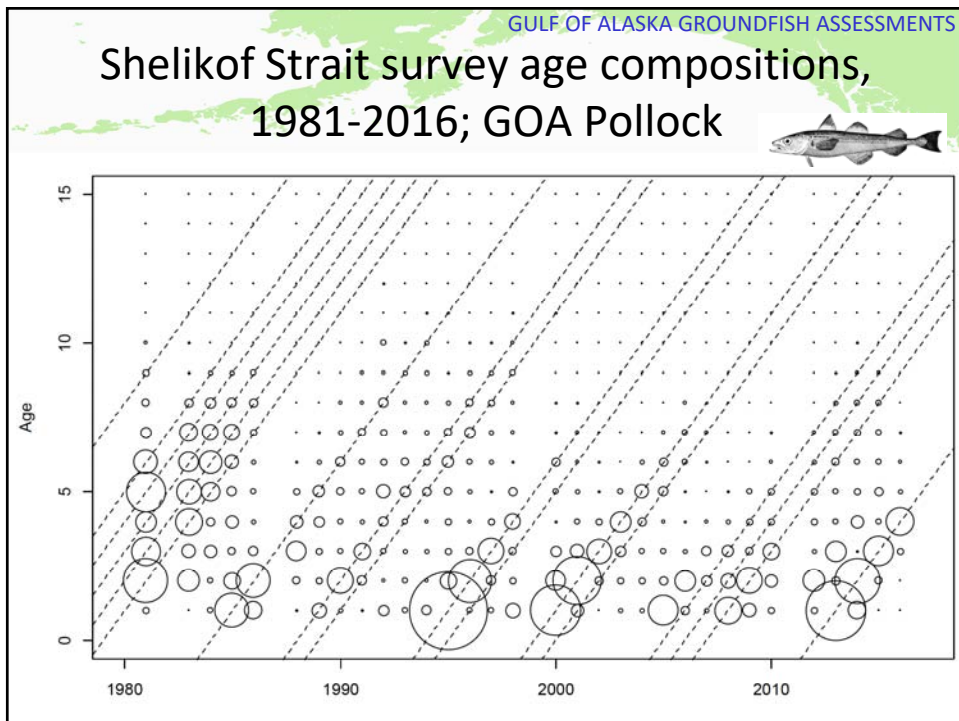
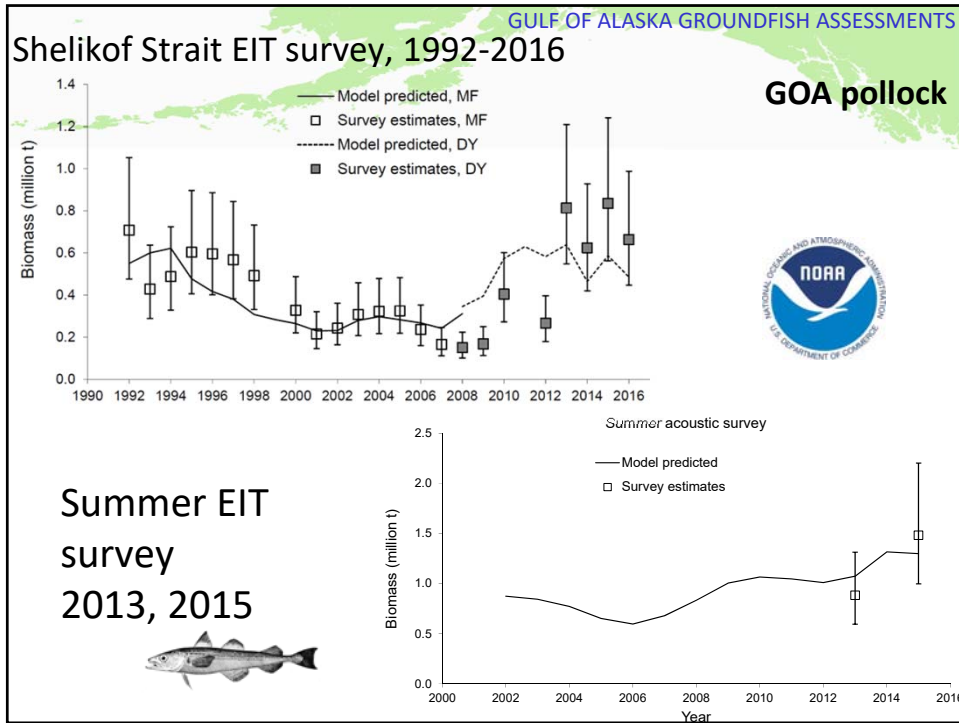
ADFG trawl survey: 2016 biomass

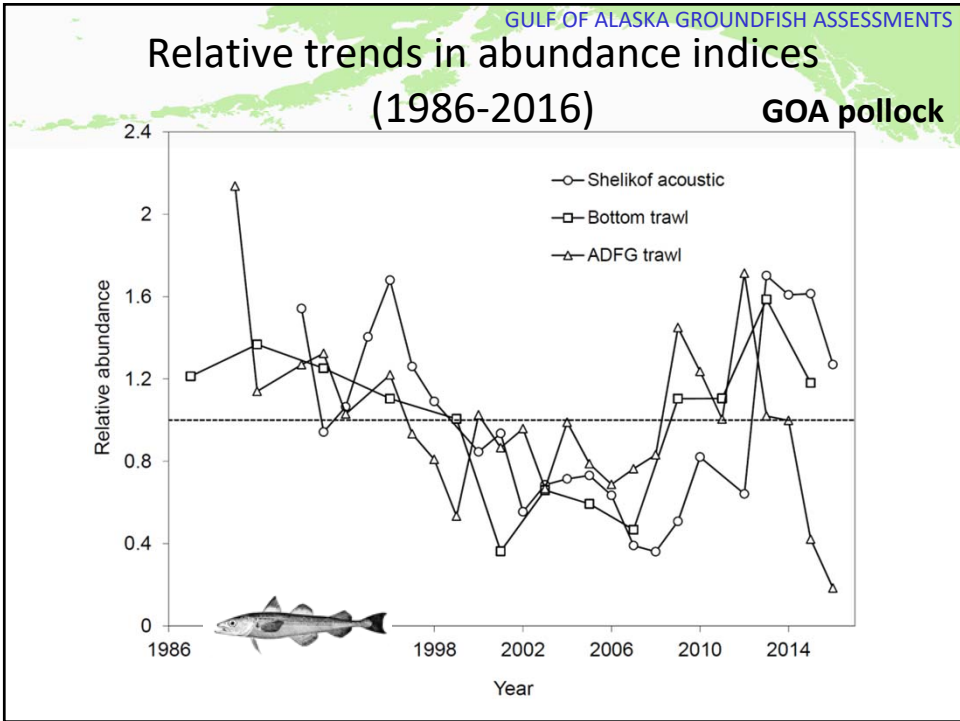
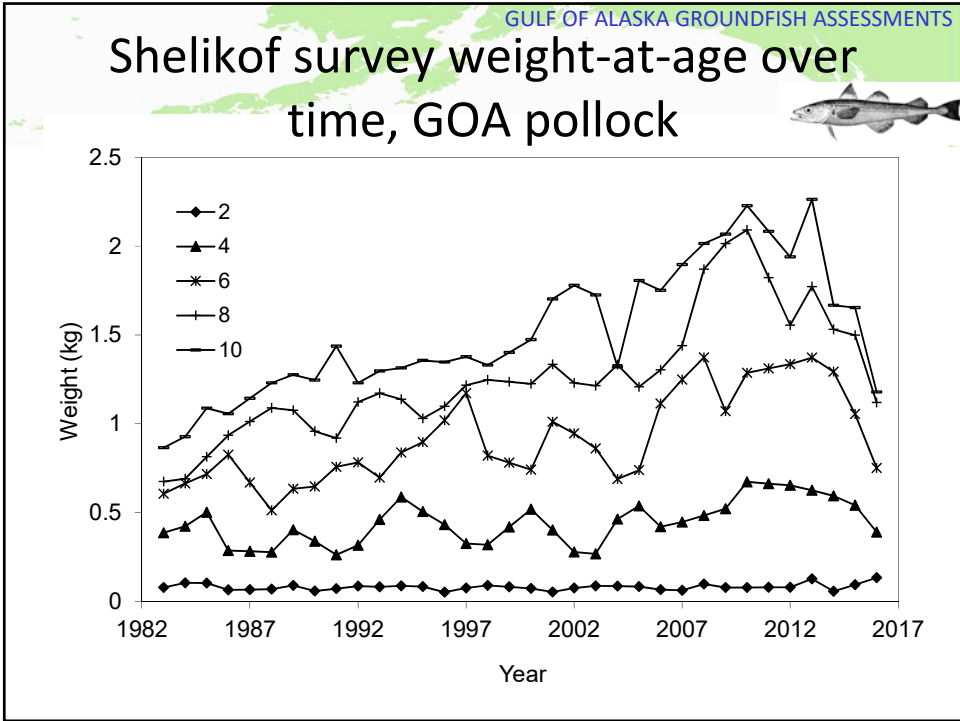


Fishery catch at age, 1976-2015

GOA pollock







GOA pollock model changes:

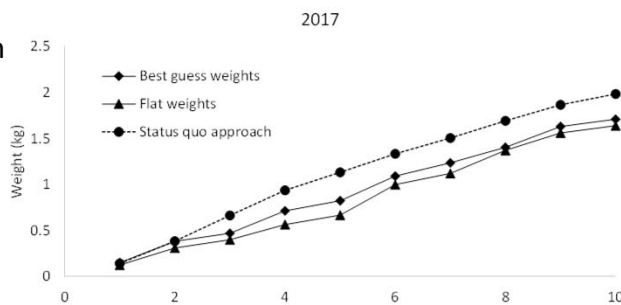
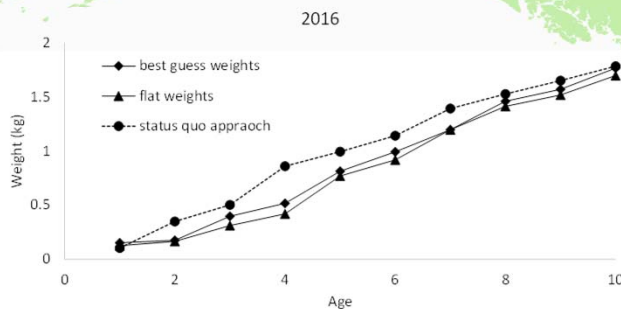
- Model 15.1a Last year's base model
- Model 16.1 Random effects model fishery weight at age, 2016 & 2017
- Model 16.2 As 16.1 plus new indices for the delta-GLM ADFG index
- Model 16.3 As 16.2 with acoustic survey net selectivity adjustment
- Model 16.4 As 16.2 plus a spatial GLMM index for the NMFS bottom trawl survey

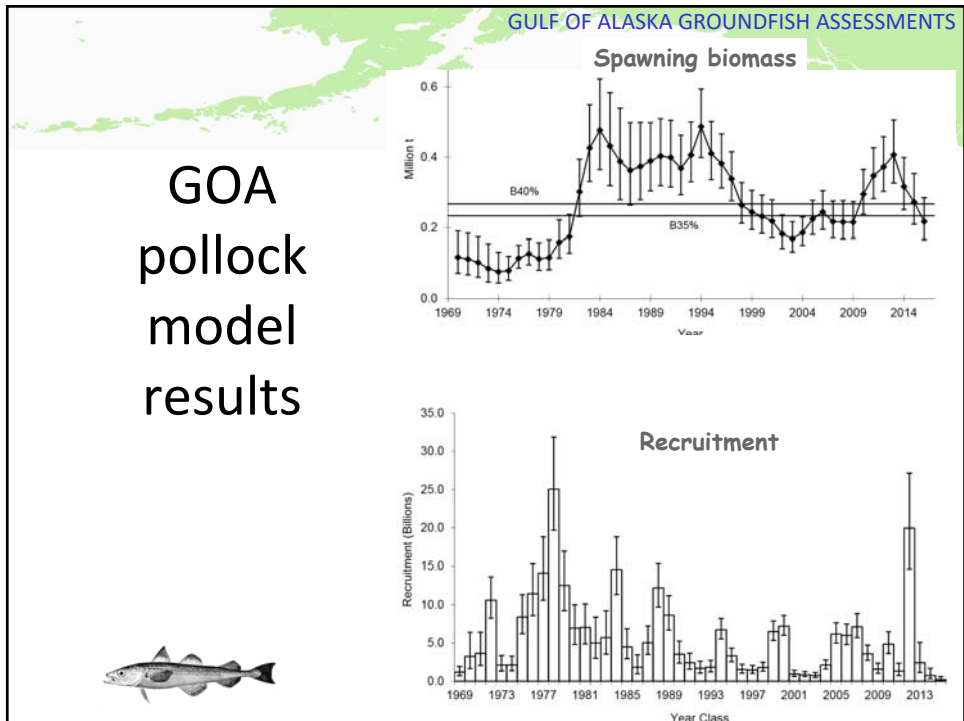
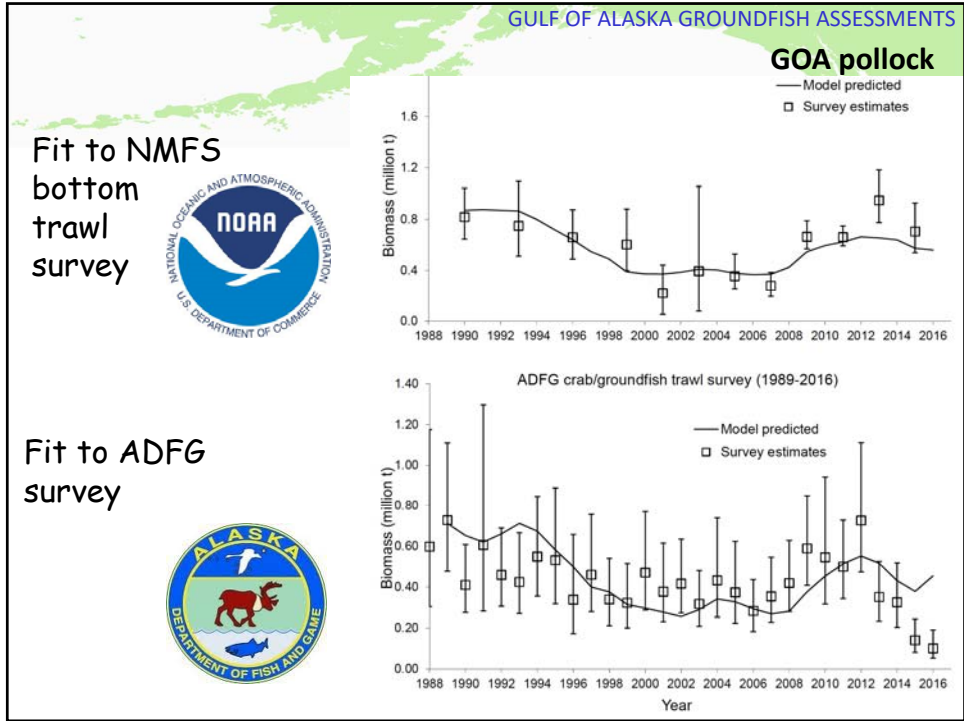


RE model for fishery weight at age

- Important differences

~Insensitive to CVs of wt-age observation errors





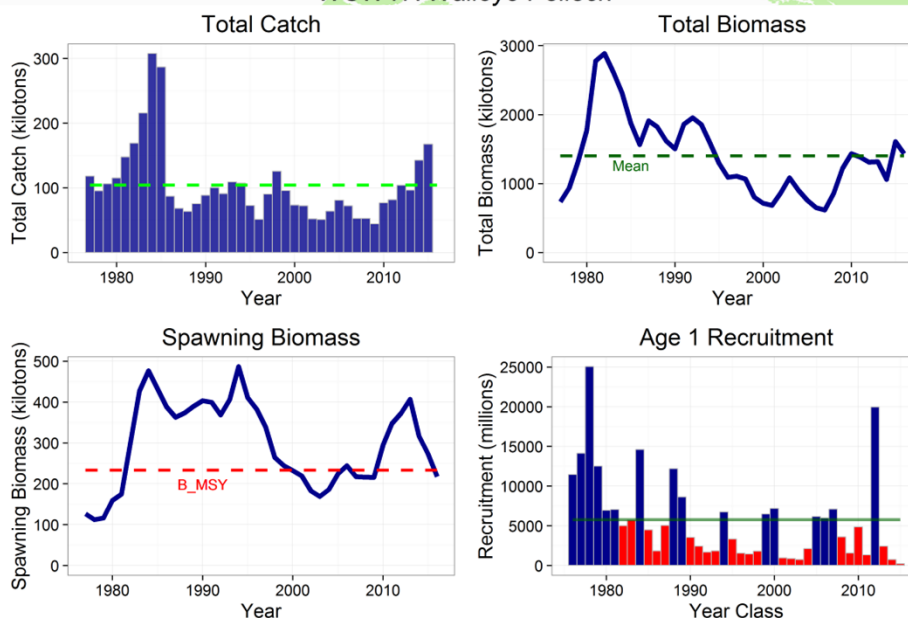
GOA Pollock Team discussions

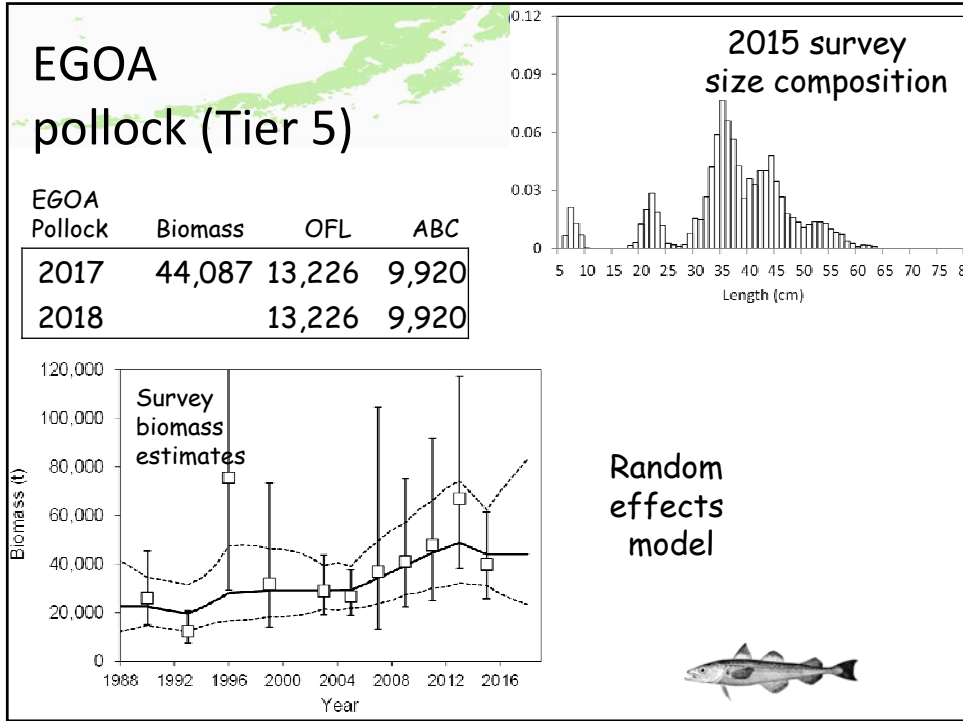
Recommendations

- Continue economic performance summary
- Develop ADF&G survey delta-GLM model further
- Evaluate prediction error of the weight-at-age model
- Coordinate evaluation of annual change in ADF&G survey biomass estimates relative to the NMFS bottom trawl survey for both Pacific cod and walleye pollock.




WCWYK Walleye Pollock



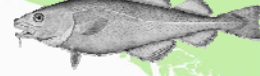


2. GOA Pacific cod

GULF OF ALASKA GROUND FISH ASSESSMENTS



Species	2016 Catch	ABC		Change
		2016	2017	
Pollock	172,927	264,230	213,689	down 50,541(19%)
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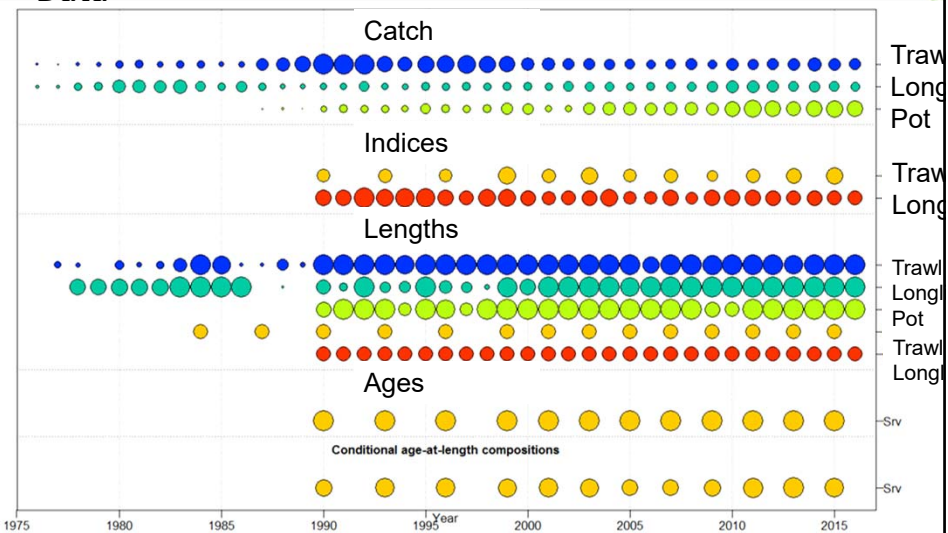
Approach for 2016

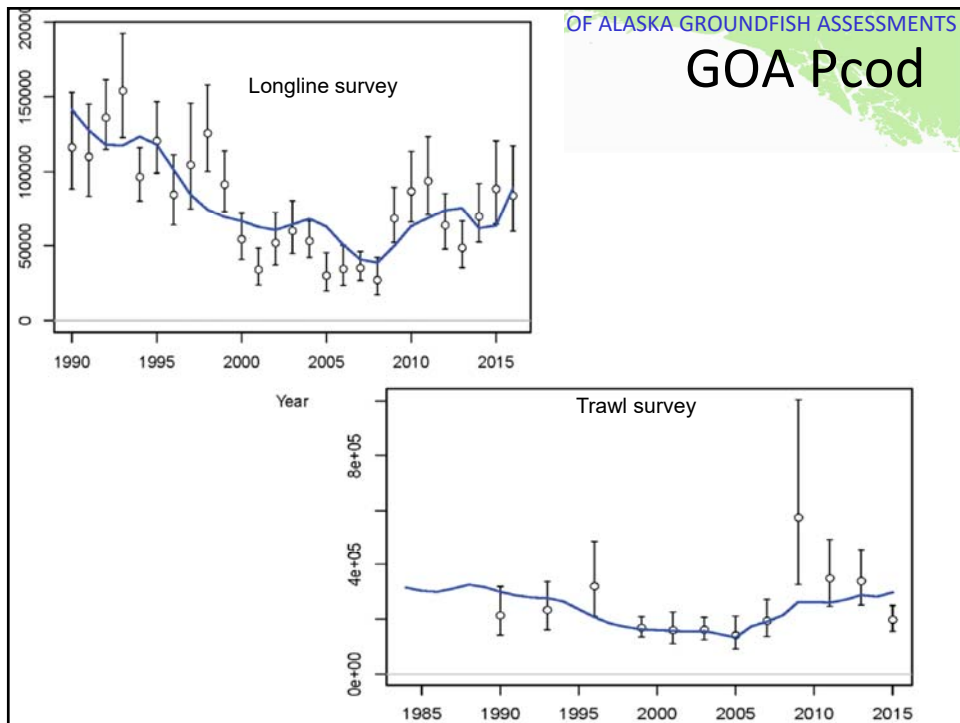
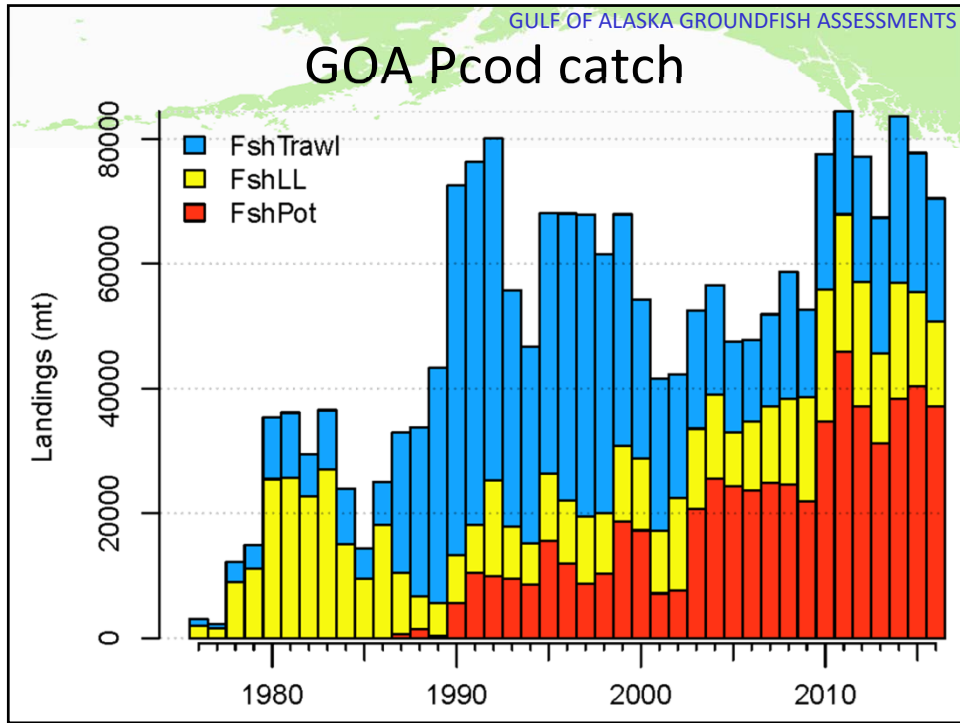
- Simplify initial model
 - Better understand inherent assumptions
 - Ascertain reasonable bounds on estimates
 - Inclusion of longline survey
 - Natural mortality estimated in the model



GOA Pcod

Data



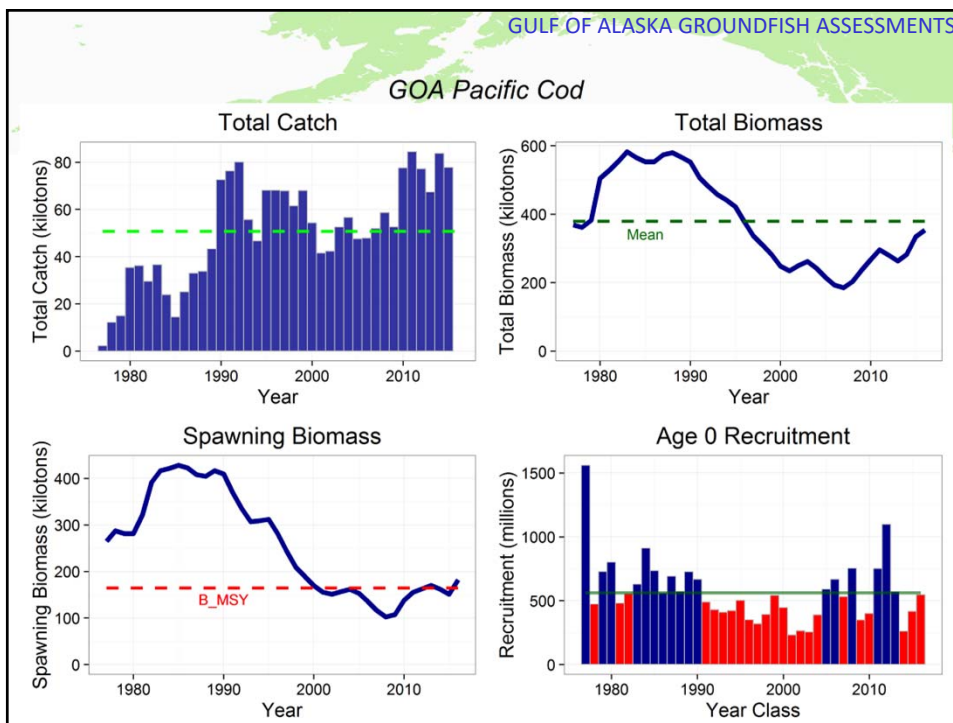




GOA Pacific cod

Summary

- ◆ New model an improvement
- ◆ Natural mortality higher than previous assessments
- ◆ Growth relationship re-evaluated
- ◆ More productive but lower biomass than previous
 - Higher FABC



3. Sablefish



Species	2016 Catch	ABC		Change
		2016	2017	
Pollock	172,927	264,230	213,689	down 50,541(19%)
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2016 sablefish assessment overview



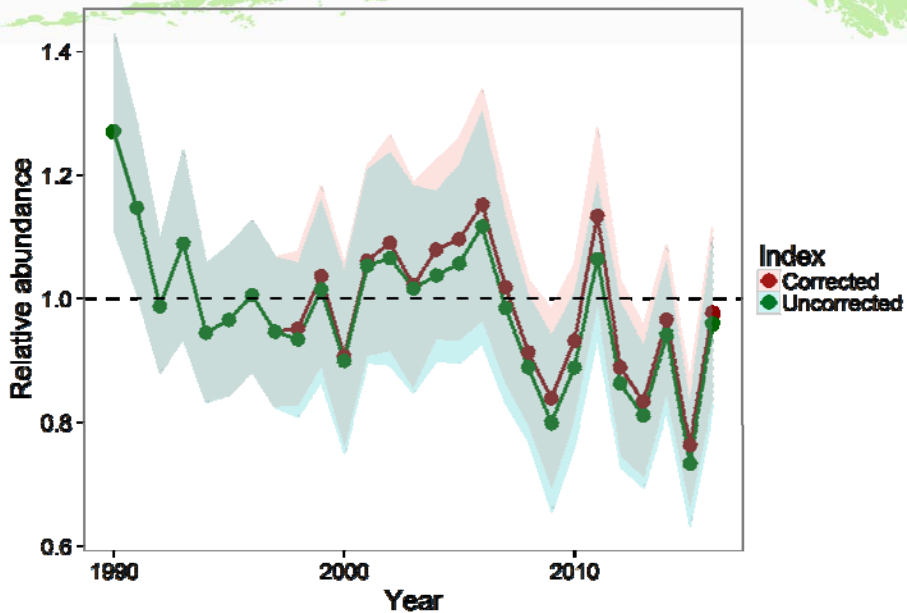
Overview

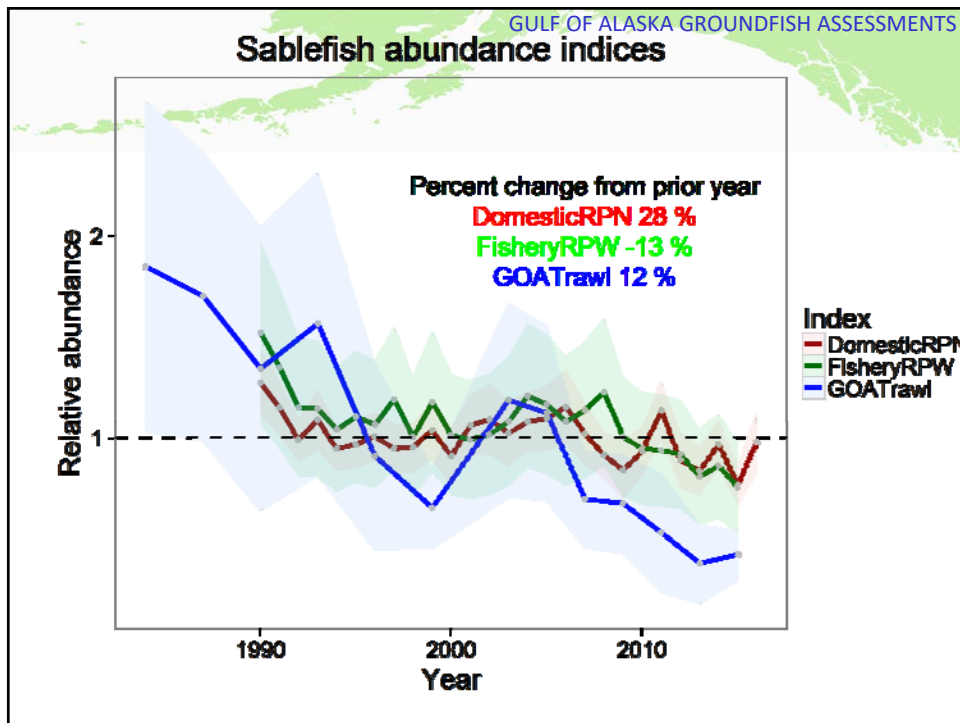
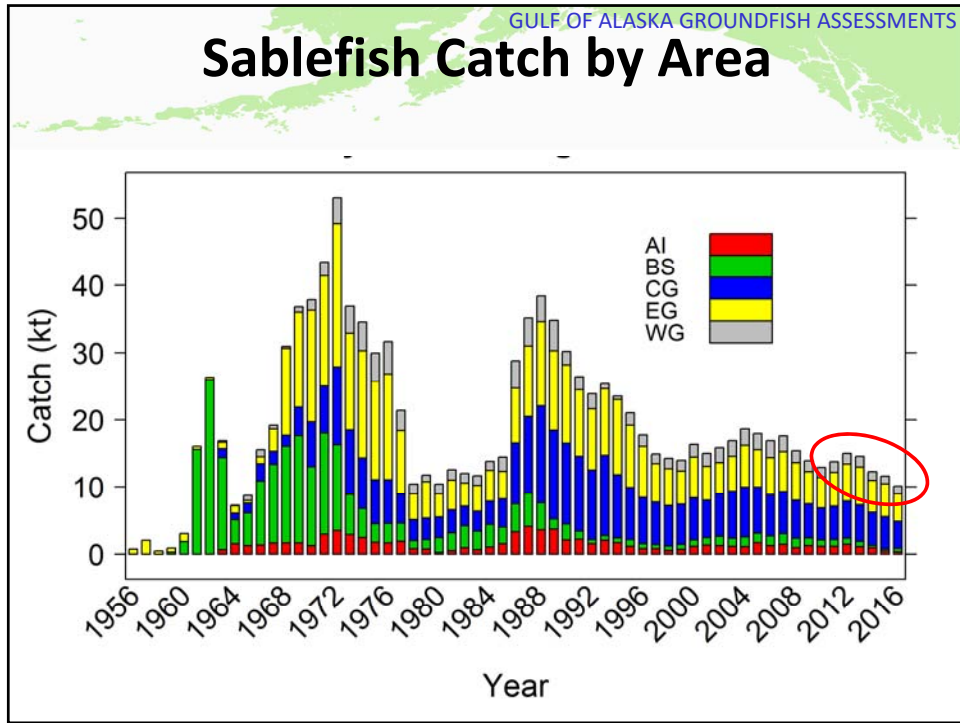
- CIE Review
- New data
- New models
- Model evaluations
- Projections
- Apportionment
- Future

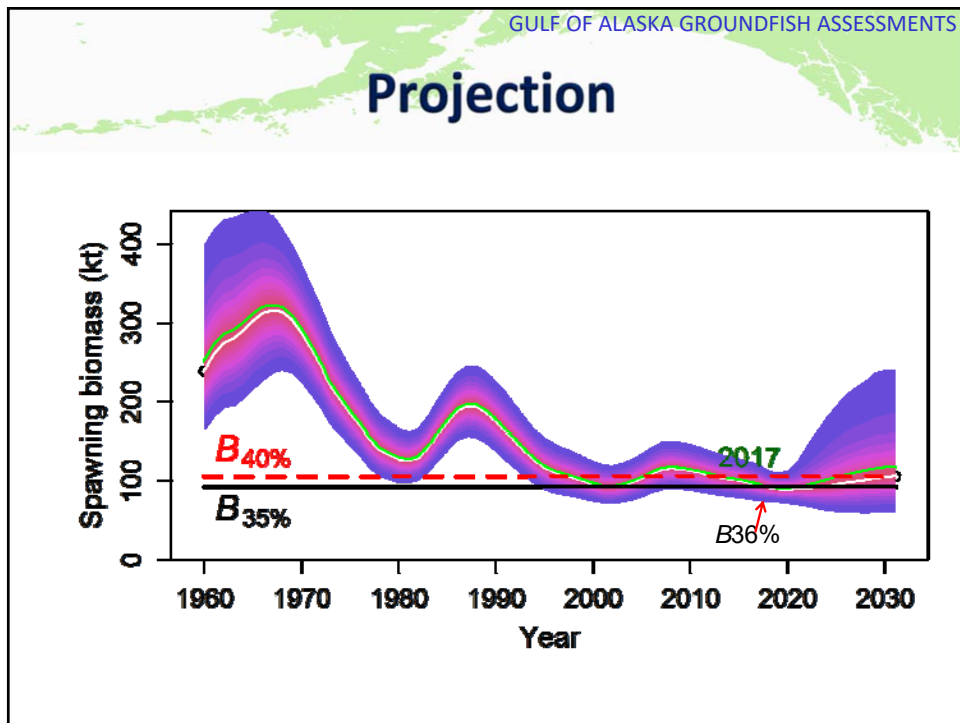
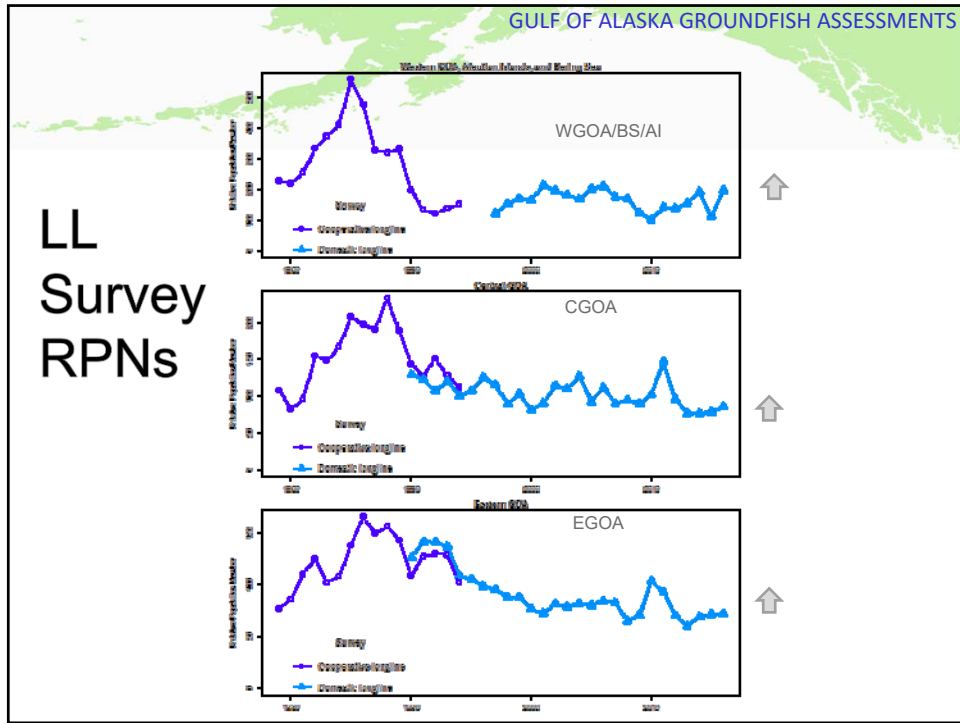
Model scenarios

Model	Description
10.3	This is the reference model used from 2010-2015
10.3a	As 10.3 with revised LL survey area sizes
10.3b	As 10.3a with analytical annual LL survey variances
16.1	As 10.3b with LL survey abundance with sperm whale depredation
16.2	As 10.3b with catch mortality from both sperm and killer whales
16.3	As 16.1 with catch mortality from both sperm and killer whales
16.4	As 16.3 SDNR-reweighted
16.5	Model 16.4 with natural mortality estimates with a prior CV of 10%

Effect of sperm whale corrections on the longline survey







ABC summary

AFSC Longline survey up from low in 2015
 Fishery CPUE at time series low in 2015
 36% of unfished spawning biomass

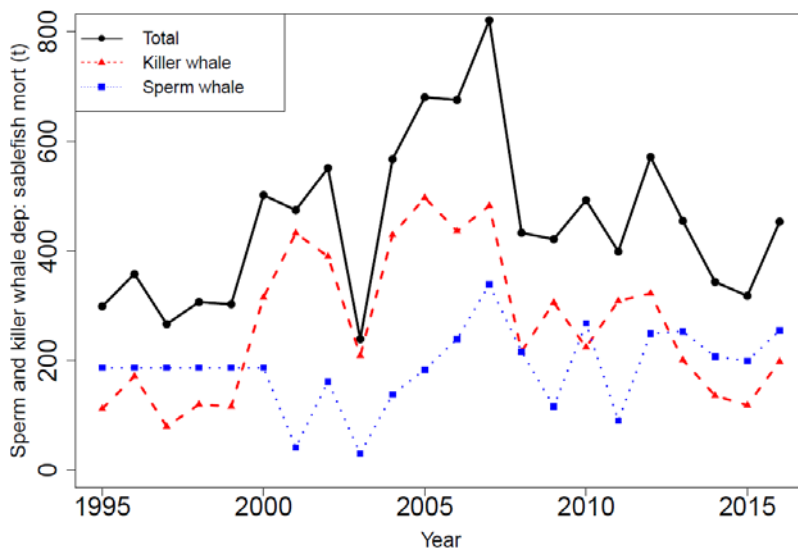
ABC 2017 (Max): 13,509 t

- 14.5 % **increase** from 2016

ABC reduced due to whale depredation

Near-term projection **stable**

All area whale depredation in fishery



NEW!!! 2017 ABC Corrected For Depredation

Area	AI	BS	WG	CG	WY*	EY*	Total
2017 ABC	1,783	1,318	1,457	4,608	1,550	2,793	13,509
3-yr average	-48	-44	-108	-94	-82	-50	-426
2017 ABC_{wc}	1,735	1,275	1,349	4,514	1,468	2,743	13,083

Note that SSC also account for whale depredation for OFL

Apportionment

CIE:

- ♦ Recommended seeking input on objectives
- ♦ Static apportionment fine

SSC, Plan Team agreed with Author's proposal to keep fixed

Recommended

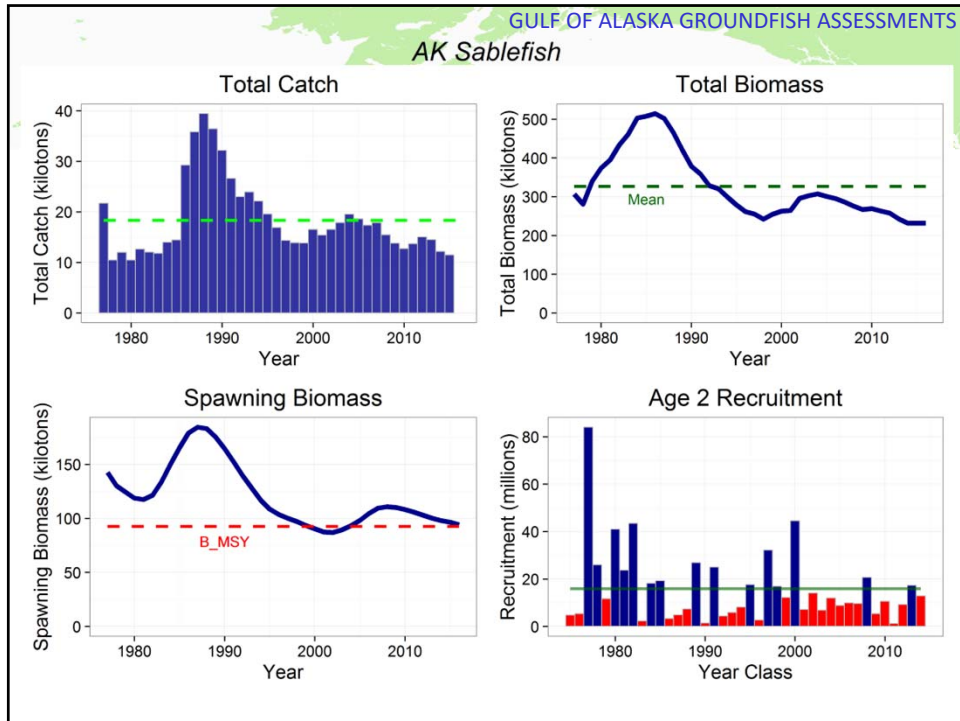
- Use model ABC, continuing with the fixed apportionment from 2015 fishery

Area	2016 ABC	Standard apportionment for 2017 ABC	Recommended fixed apportionment for 2017 ABC*	Difference from 2016
Total	11,795	13,509	13,509	14.5%
Bering Sea	1,151	1,856	1,318	14.5%
Aleutians	1,557	2,263	1,783	14.5%
Gulf of Alaska (subtotal)	9,087	9,390	10,408	14.5%
Western	1,272	1,437	1,457	14.5%
Central	4,023	3,676	4,608	14.5%
W. Yakutat**	1,353	1,617	1,550	14.5%
E. Yak. / Southeast**	2,438	2,660	2,793	14.5%

AK Sablefish


Teams' discussions

- ♦ Model selection and the whale depredation adjustment.
 - 3-yr average of area-specific depredation for killer and sperm whales appropriate (behavior of fishers may change)
- ♦ Stock assessments for whale populations desirable
- ♦ Concern about how changes in observer coverage will affect whale depredation estimates



GULF OF ALASKA GROUNDFISH ASSESSMENTS

Flatfish ABC Summary



Species	2016 Catch	ABC		Change
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Flatfish ABC's

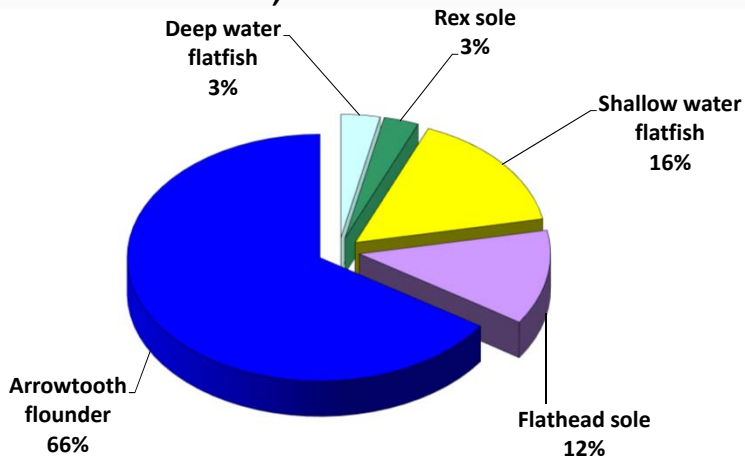
Species	2016 ABC	2017 ABC	Change
Shallow water flatfish	44,364	44,514	up 150(0%)
Rex sole	7,493	8,311	up 818(11%)
Deep water flatfish	9,226	9,292	up 66(1%)
Flathead sole	35,020	35,243	up 223(1%)
Arrowtooth flounder	186,188	186,093	down 95(0%)
Subtotal	282,291	283,453	up 1,162(0%)
Subtotal (without ATF)	96,103	97,360	up 1,257(1%)

Deep-water ABC from Dover assessment Tier 3 + others Tier 6

Shallow water flats: N and S rock sole Tier 3, others Tier 5

Flatfish 2017 ABC's

283,450 t combined



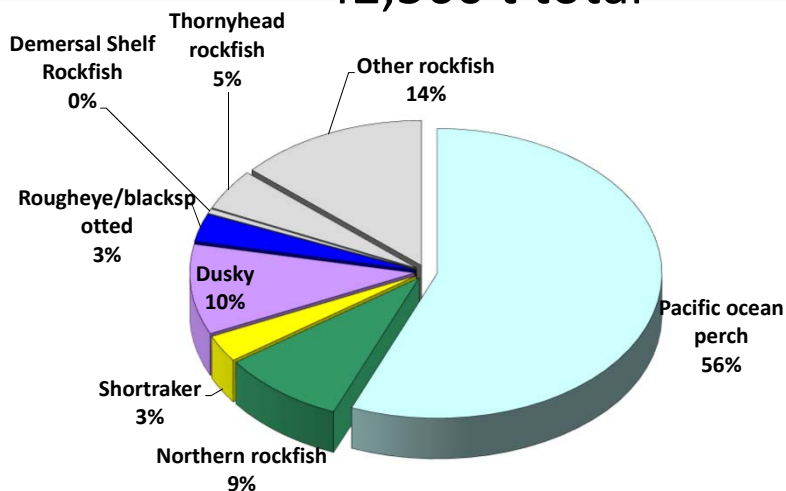
General comments on flatfish assessments

- Lightly exploited
- Analytical developments:
 - ◆ N & S and “undifferentiated” rock sole models
 - ◆ Continued developments in the Dover and flathead sole models from 2015
 - Stock Synthesis modeling platform (SS3) application
 - Models accepted from 2014
 - ◆ Rex sole assessment conversion completed to SS3

GOA Rockfish

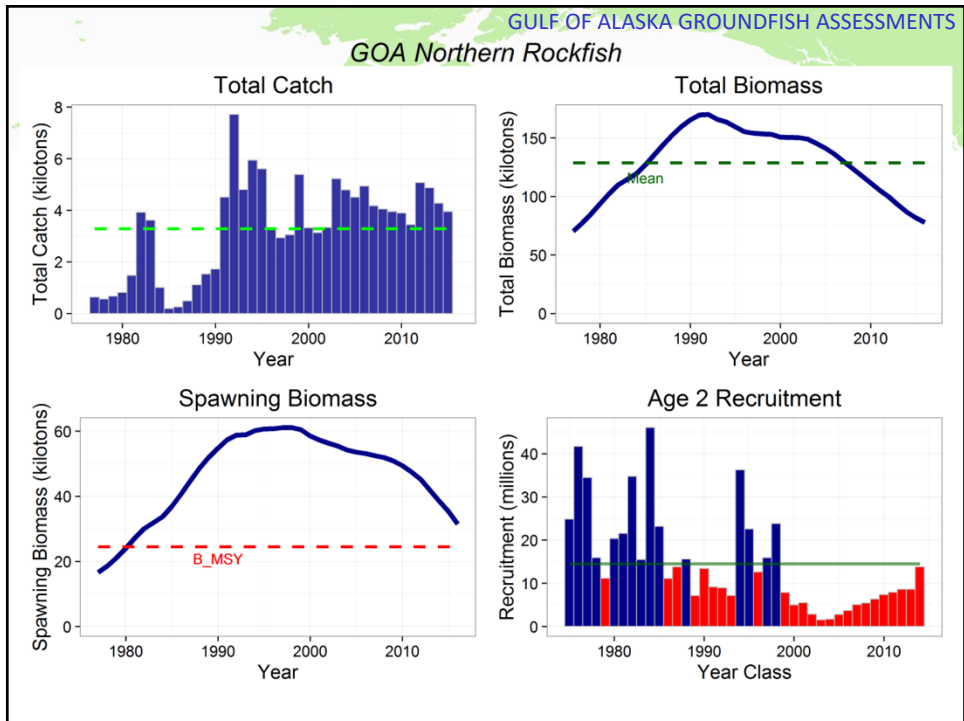
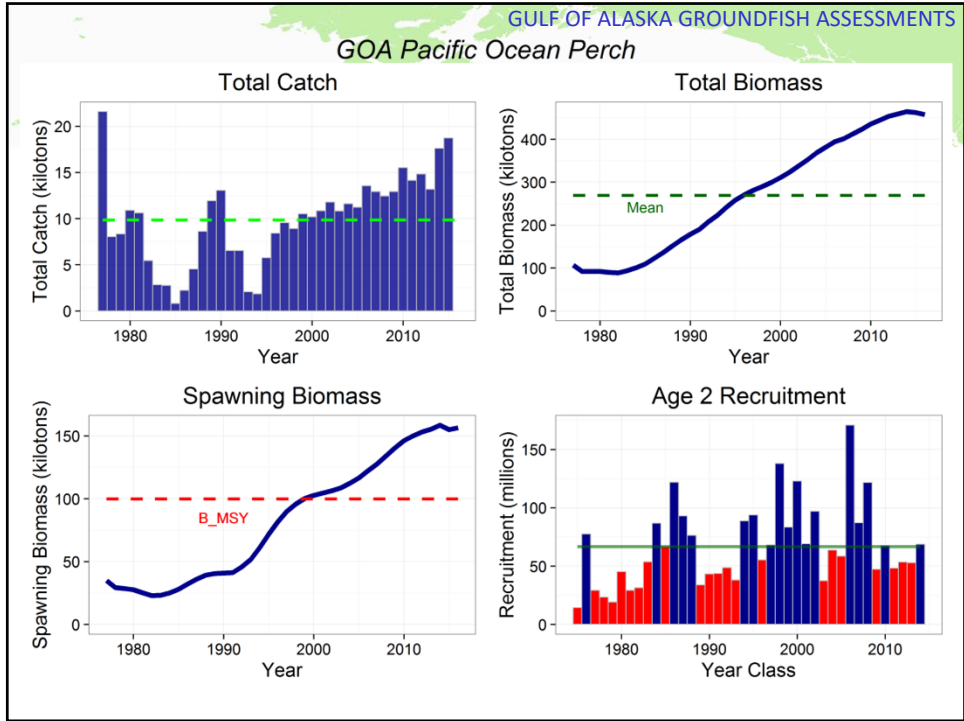
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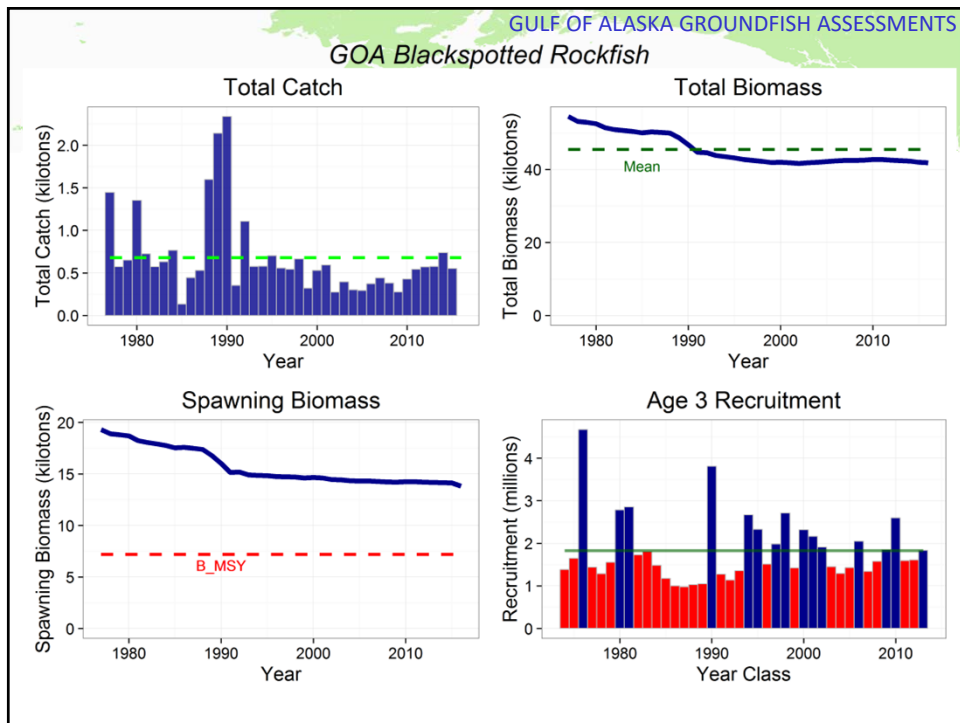
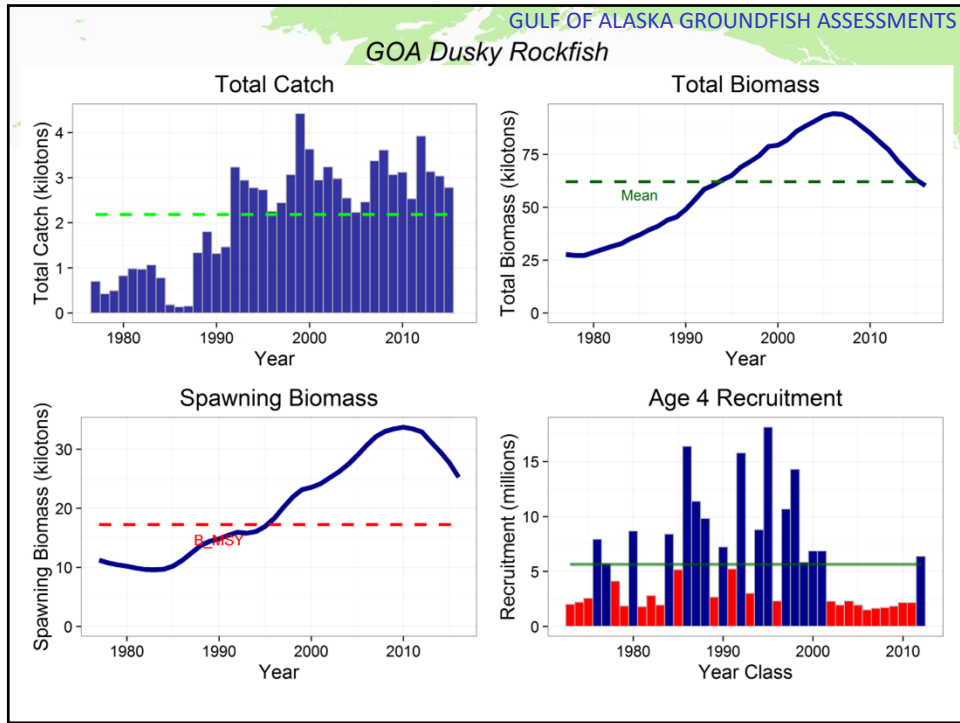
Rockfish 2017 ABC's 42,560 t total



Rockfish ABC Summary

Species	2016	2017	Change
POP	24,437	23,918	down 519 (2%)
northern rockfish	4,004	3,790	down 214 (5%)
Shortraker Rockfish	1,286	1,286	same (0%)
Dusky	4,686	4,278	down 408 (9%)
Rougheye and Blackspotted Rockfish	1,328	1,327	same (0%)
Demersal shelf rockfish	231	227	same (0%)
Thornyhead	1,961	1,961	same (0%)
Other rock	5,773	5,773	same (0%)
Sub Total	43,706	42,560	down 1,146 (3%)



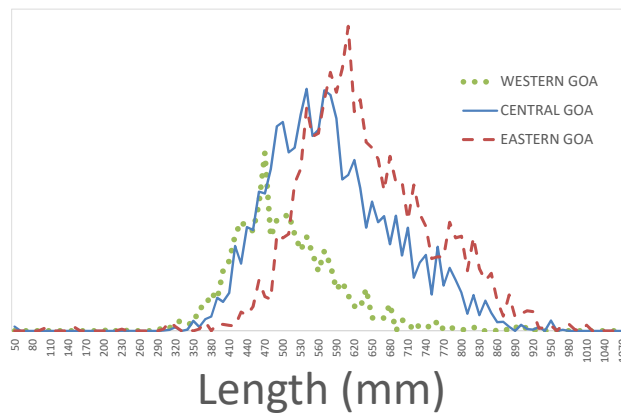


GOA Rockfish issues

Stock structure template

- ◆ Shortraker rockfish

Shortraker Rockfish: Barriers and Phenotypic Characters



Size Composition

Mean pop. length:
53.9 – 62.5 cm

Slightly larger fish in the EGOA

GOA shortraker rockfish

Stock structure result from Team discussions

- ♦ *The Team concluded that there is little concern - although harvest of this species in the WGOA and CGOA have exceeded quotas, in-season spatial management has been effective at preventing excessive over-harvest.*

GOA shortraker rockfish

▪ The GOA Plan Team recommends

- ♦ Examining the shortraker exploitation rates (F) over time from each area and gear type.
- ♦ Examining fishery and survey length distributions, especially for longline gear by region
- ♦ Revisiting the trawl survey and longline survey (within depth strata) for the purposes of improving the area apportionment and understanding of spatial structure.

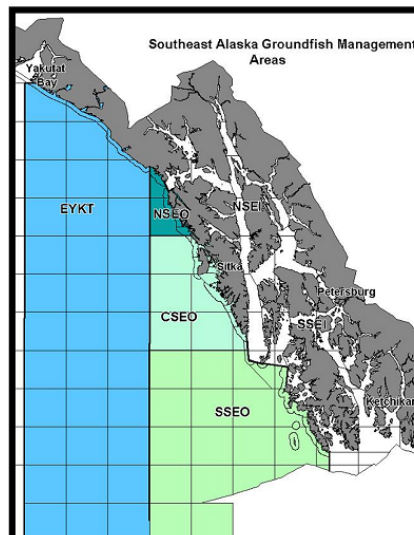
GOA Blackspotted/Rougheye Rockfish

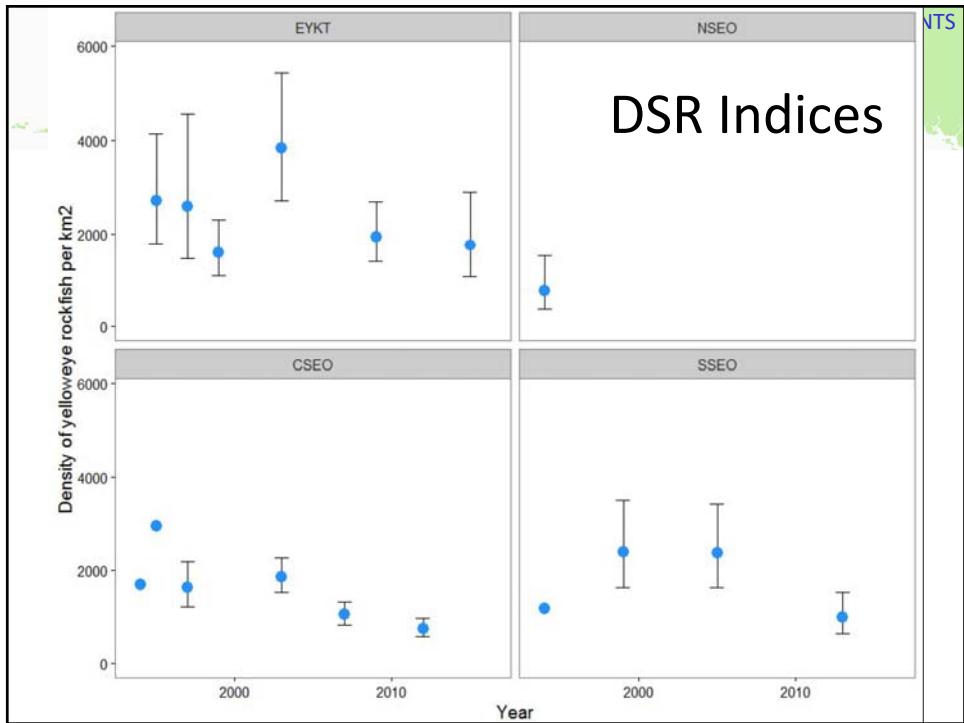
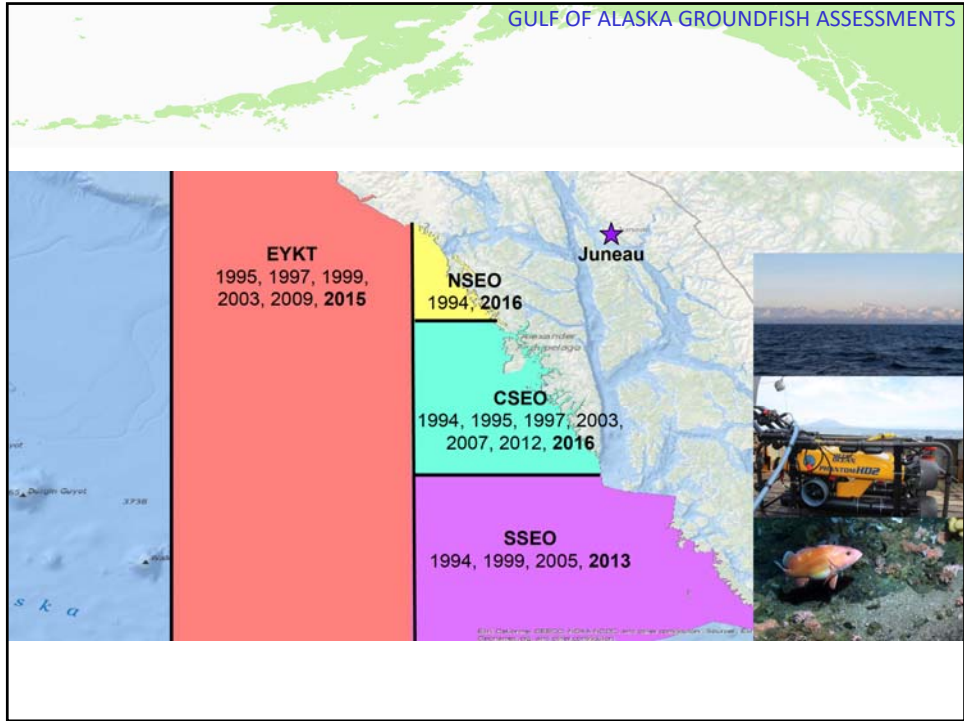
The GOA Plan Team recommends

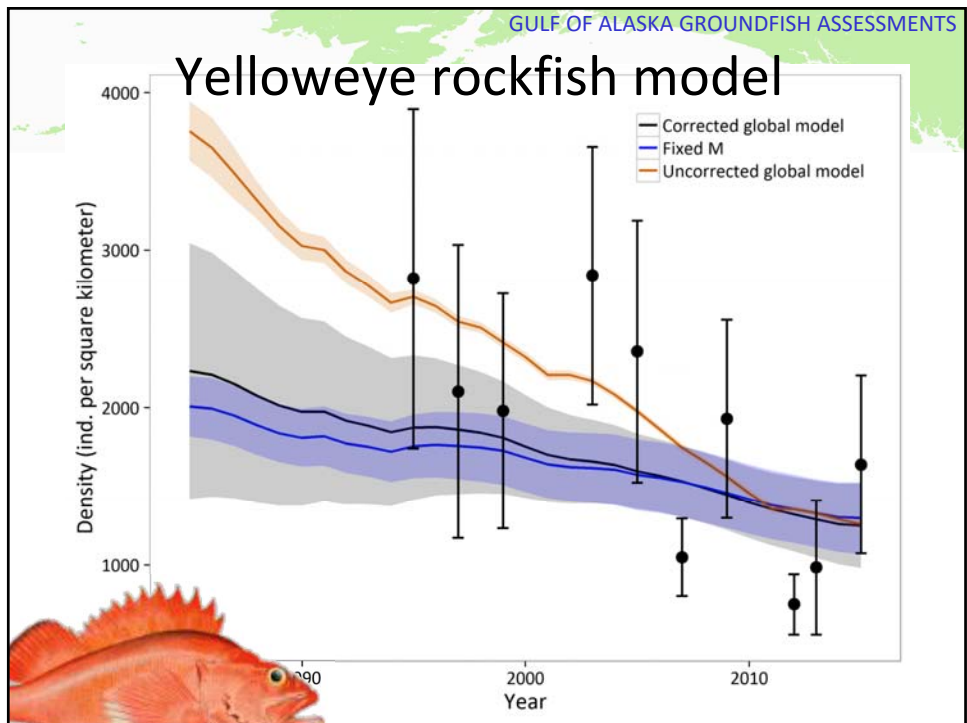
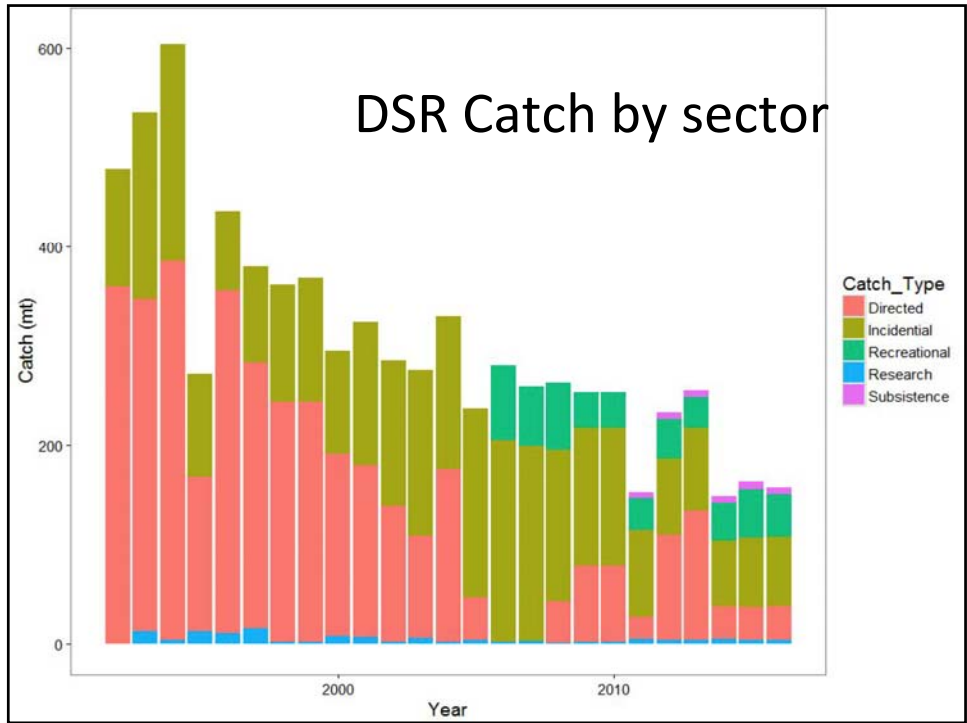
- ♦ Evaluating a Tier 5 approach by species with “worst-case” scenarios that consider total catch comprised of one species
- ♦ The Team recommends the authors work with the observer program program to request a one year sampling program to collect tissue for genetic analysis during otolith collection in the fishery (for species ID purposes)

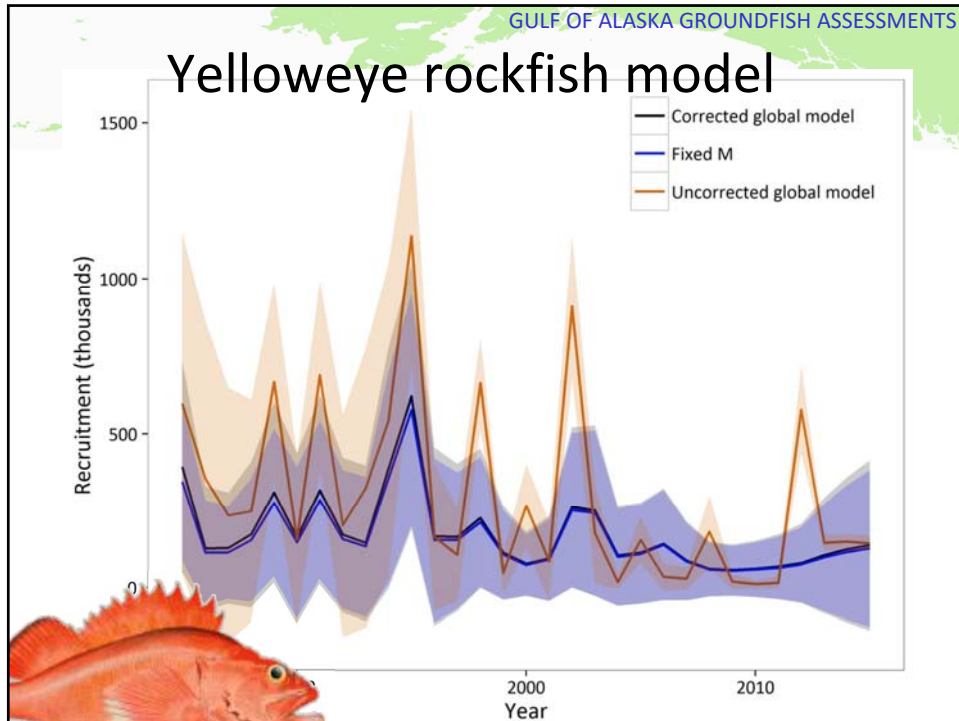


14. Demersal shelf rockfish









GULF OF ALASKA GROUND FISH ASSESSMENTS

Demersal shelf rockfish age-structured model

The Team was encouraged by developments and **recommended:**

...the authors bring forward updated configurations for the corrected global (status quo) and fixed M models for September, 2017

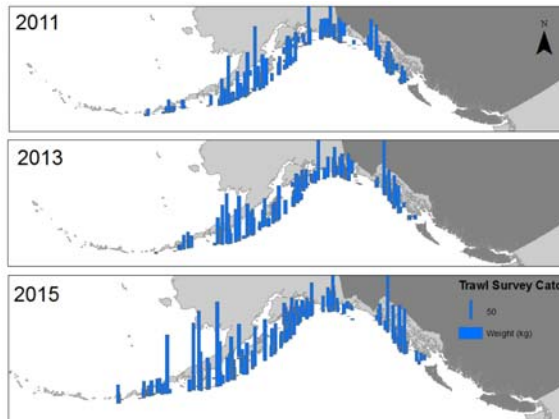
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Demersal shelf rockfish	231	227	same (0%)
Thornyhead	1,961	1,961	same (0%)
Other rock	5,773	5,773	same (0%)
Sub Total	43,706	42,560	down 1,146 (3%)

15. Shortspine thornyheads



Tier 5



15. Shortspine thornyheads



Fish tagged in EGOA show the most movement to other areas

- ◆ ~75% stayed in AI and EGOA areas
- ◆ 100% stayed in EBS
- ◆ ~9% of the recoveries occurred in relatively small area in BC
 - May be a function of fishing effort.

Distance traveled ranged from 0.3 - 990 nmi

- ◆ Average distance ~47 nmi
- ◆ Similar between males and females



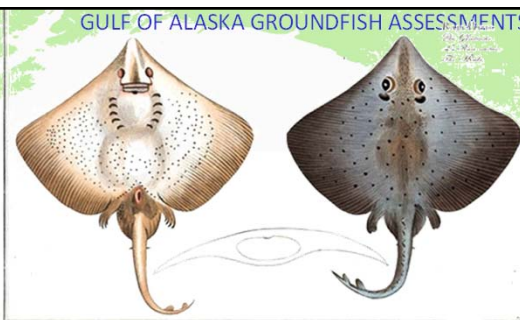
ABCs for remaining GOA species

Species	2016 Catch	ABC		Change
		2016	2017	
Pollock	172,927	264,230	213,689	down 50,541(19%)
Pacific Cod	39,544	98,600	88,342	down 10,258(10%)
Sablefish	9,281	9,087	10,073	up 986(11%)
Flatfish	24,425	96,103	97,360	up 1,257(1%)
Arrowtooth flounder	2,283	186,188	186,093	down 95(0%)
Rockfish	33,653	43,706	42,560	down 1,146(3%)
Atka mackerel	993	4,700	4,700	same(0%)
Skates	4,258	8,939	8,939	same(0%)
Other Species	3,698	16,131	16,120	down 11(0%)
Total	291,062	727,684	667,876	down 59,808(8%)

Other species...

Species	2015 Catch	2016	2017	Change
Atka mackerel	993	4,700	4,700	same(0%)
Big skate	1,380	3,814	3,814	same(0%)
Longnose skate	1,310	3,206	3,206	same(0%)
Other skates	1,568	1,919	1,919	same(0%)
Sculpins	1,293	5,591	5,591	same(0%)
Sharks	1,841	4,514	4,514	same(0%)
Squid	241	1,148	1,137	same(0%)
Octopus	323	4,878	4,878	same(0%)

18. GOA skates



Species	2016 Catch	2016	2017	Change
Big skate	1,380	3,814	3,814	same(0%)
Longnose skate	1,310	3,206	3,206	same(0%)
Other skate	1,568	1,919	1,919	same(0%)
All skates	4,258	8,939	8,939	same(0%)

19. GOA sculpin

- Yellow Irish lord (YIL), plain, great, and bigmouth sculpin



19. GOA sculpin

- Team recommends further examination into potential causes for the apparent bigmouth sculpin decline by evaluating the utility of including pre-1990 survey estimates as well as investigating inclusion of IPHC survey data.



20. Sharks

- The Team recommends the author continue with efforts to **estimate catch by numbers** including expanding the time series back to 2003 and pursue investigations into the average weight estimates used for larger sharks as well as instances where no weights are available for observed sharks.

21. Squid

- Catch series changed slightly

Species	2015 Catch	2016	2017	Change
Atka mackerel	993	4,700	4,700	same(0%)
Big skate	1,380	3,814	3,814	same(0%)
Longnose skate	1,310	3,206	3,206	same(0%)
Other skates	1,568	1,919	1,919	same(0%)
Sculpins	1,293	5,591	5,591	same(0%)
Sharks	1,841	4,514	4,514	same(0%)
Squid	241	1,148	1,137	same(0%)
Octopus	323	4,878	4,878	same(0%)

Forage fish summary

Capelin distribution centered in CGOA

- ♦ Distinct from other forage species

Herring abundant throughout GOA

- ♦ Primarily inshore distribution
- ♦ Have complex spawning and early life history

Next steps:

- ♦ Capelin synthesis
- ♦ Improved data from acoustic survey?
- ♦ Herring synthesis?