2019 GOA skate complex

Olav A. Ormseth
Alaska Fisheries Science Center
NPFMC Groundfish Plan Team meeting, November 2019

overview

1) summary of results & changes
2) features of the populations
3) status: survey results for skates
4) skate catch information
5) harvest recommendations

major results & changes

1) The SAFE now includes abundance data from 4 additional surveys.

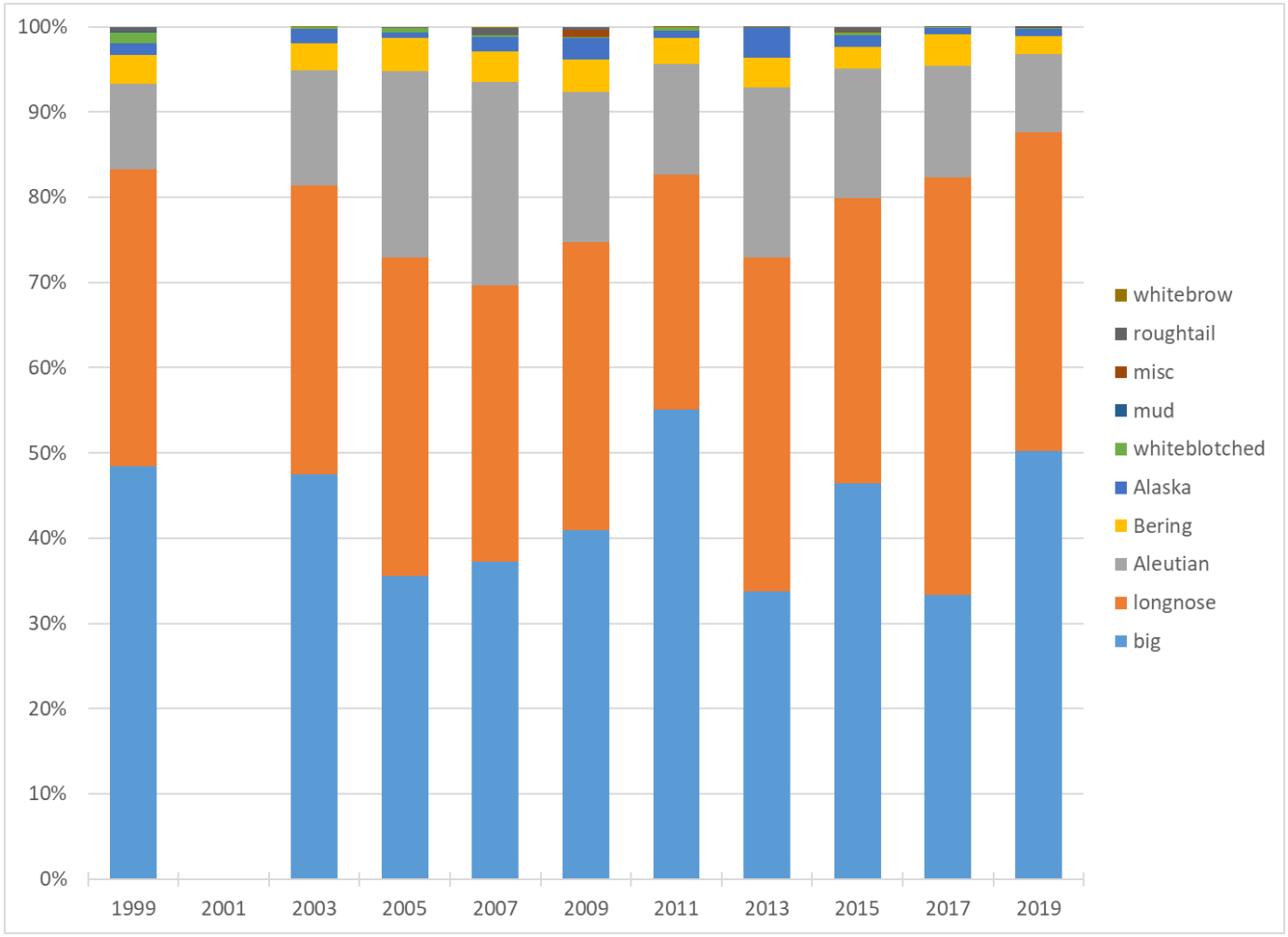
2) Gulfwide, big skate biomass increased relative to 2017, as did OFL. ABC in the CGOA actually declined and the increased ABC occurred in the WGOA and EGOA.

3) Gulfwide, longnose skate biomass decreased relative to 2017, as did OFL. The area ABCs fell in the CGOA and EGOA while increasing slightly in the WGOA.

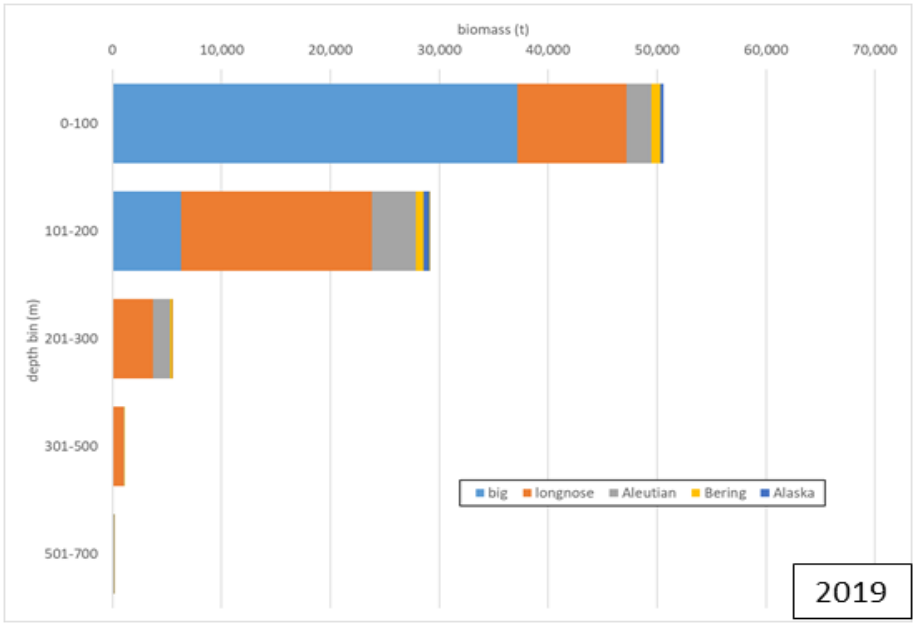
4) Biomass of other skates continues to decline from a peak in 2013. This resulted in reduced OFL and ABC.

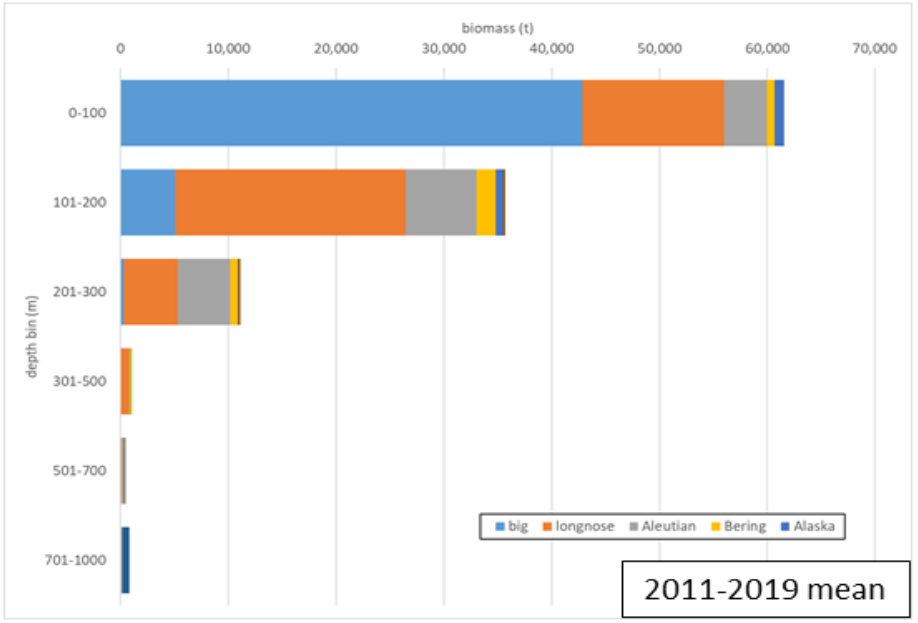
5) The additional surveys support the conclusion of a substantial decline in *Bathyraja* skate biomass since 2009 and that the current level of abundance is similar to the level in the 1990s.

GOA skate species composition

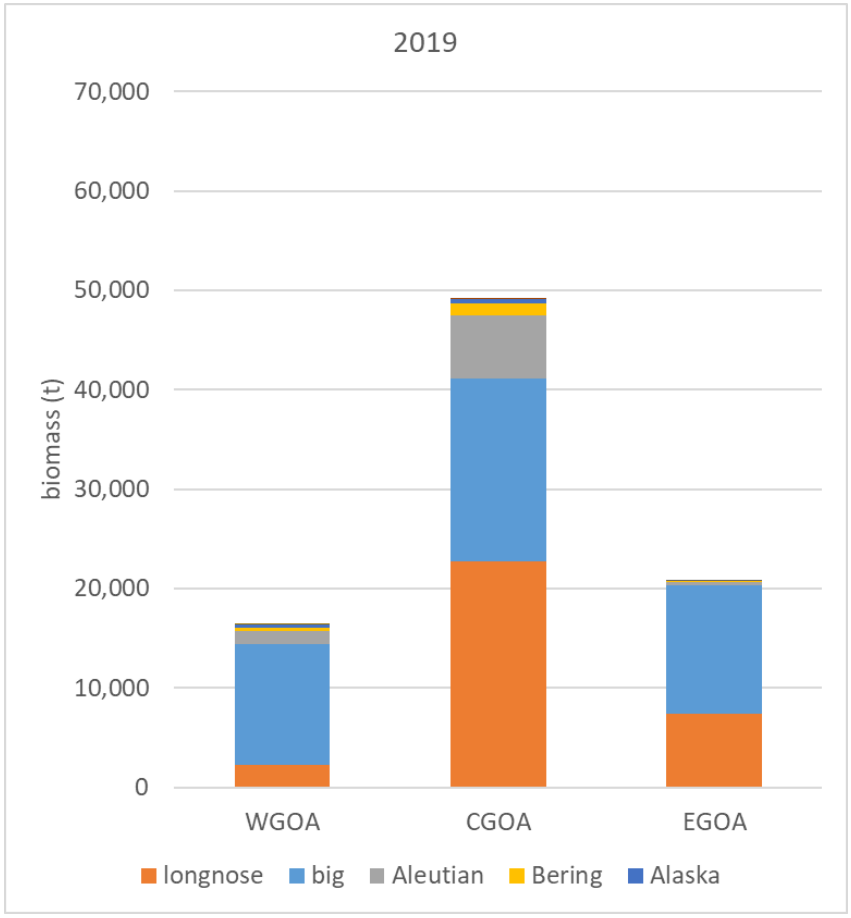


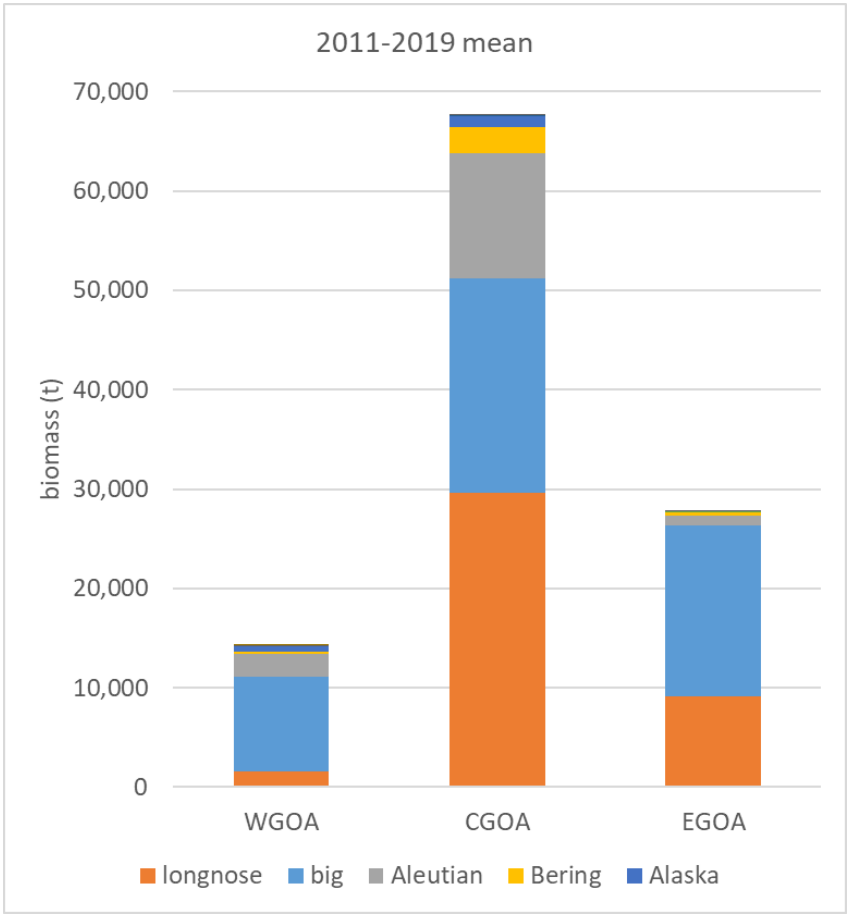
skate distribution by depth



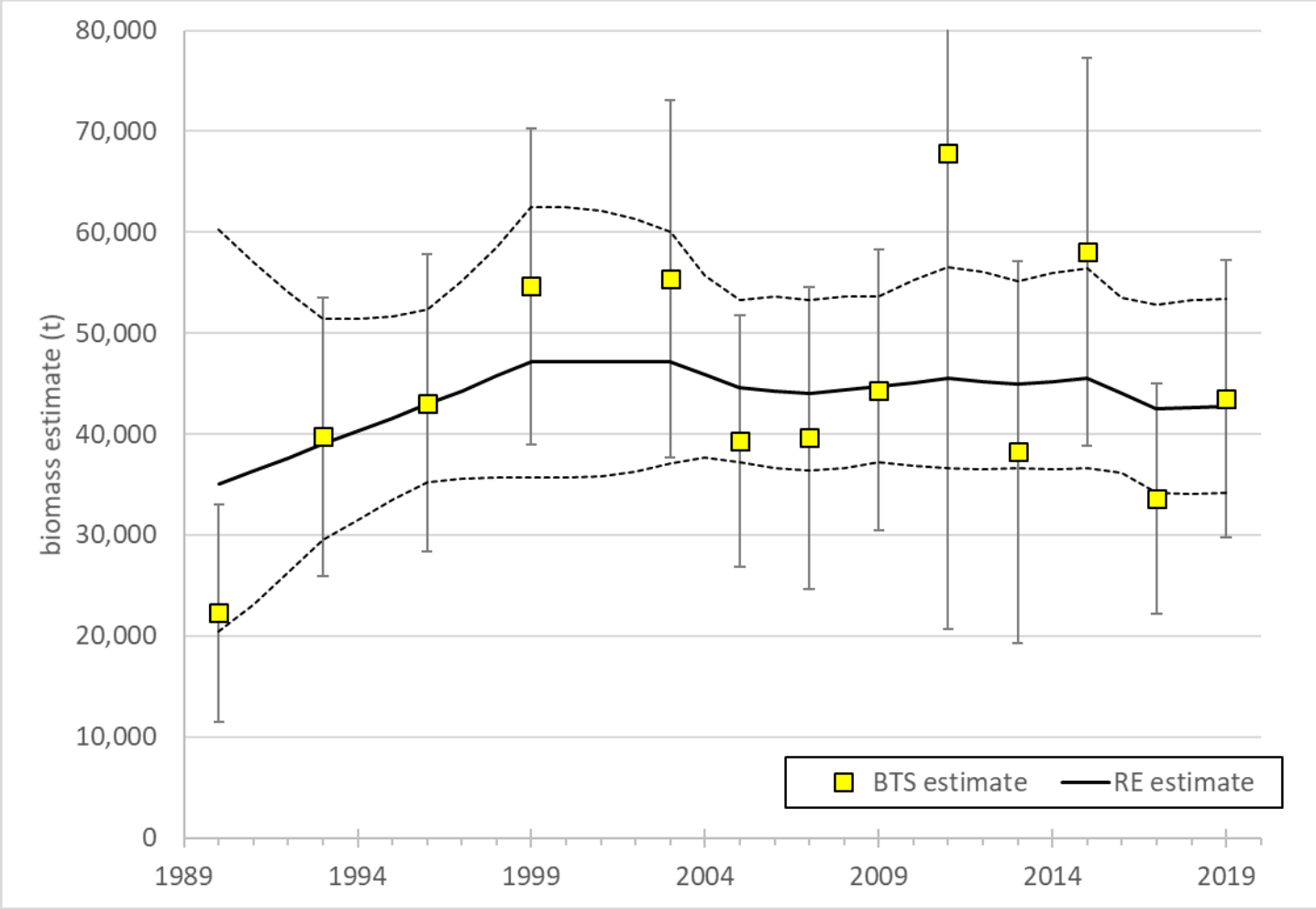


species composition/biomass by area

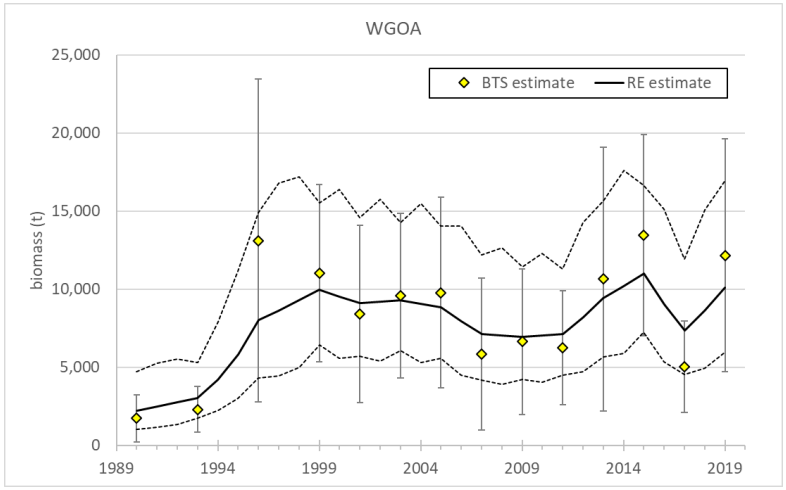


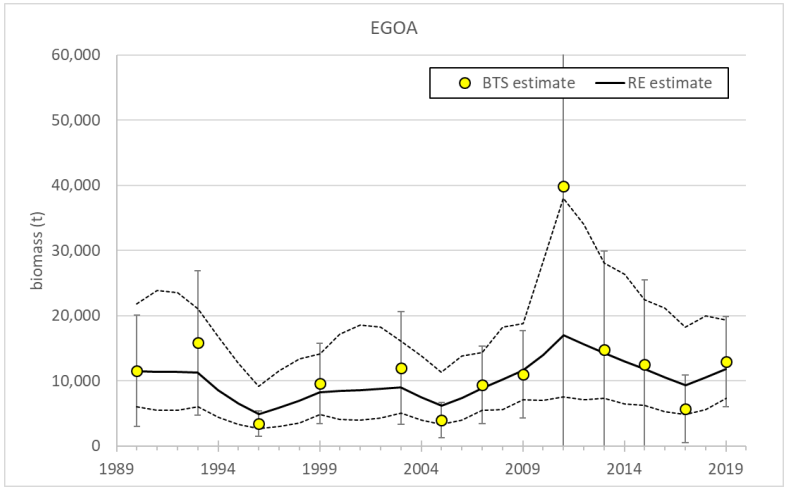


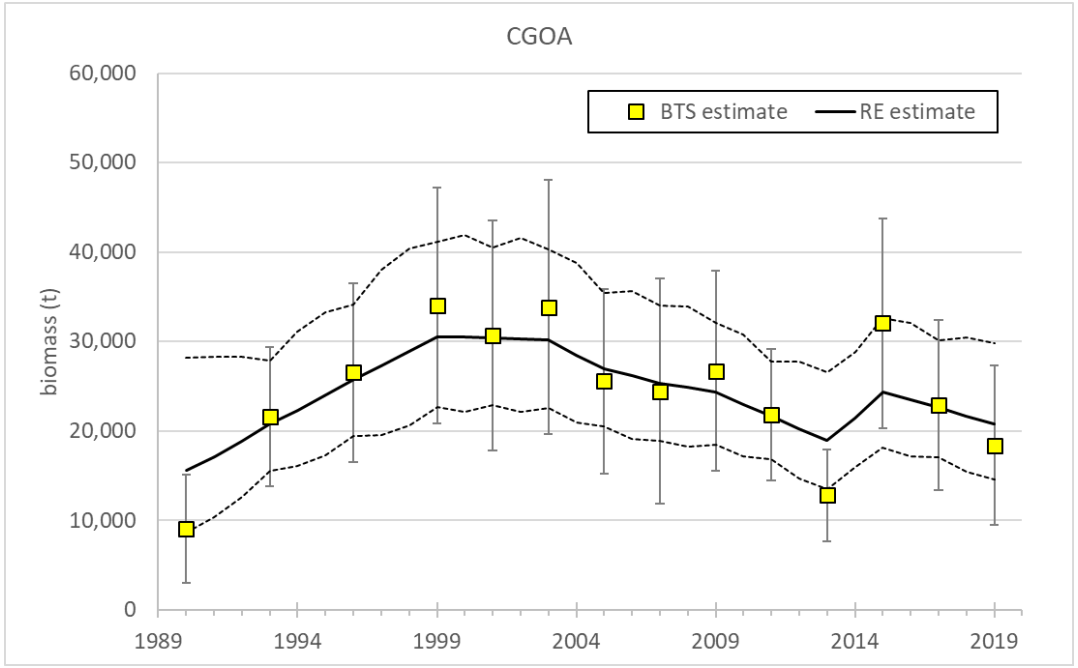
AFSC BTS biomass – big skate



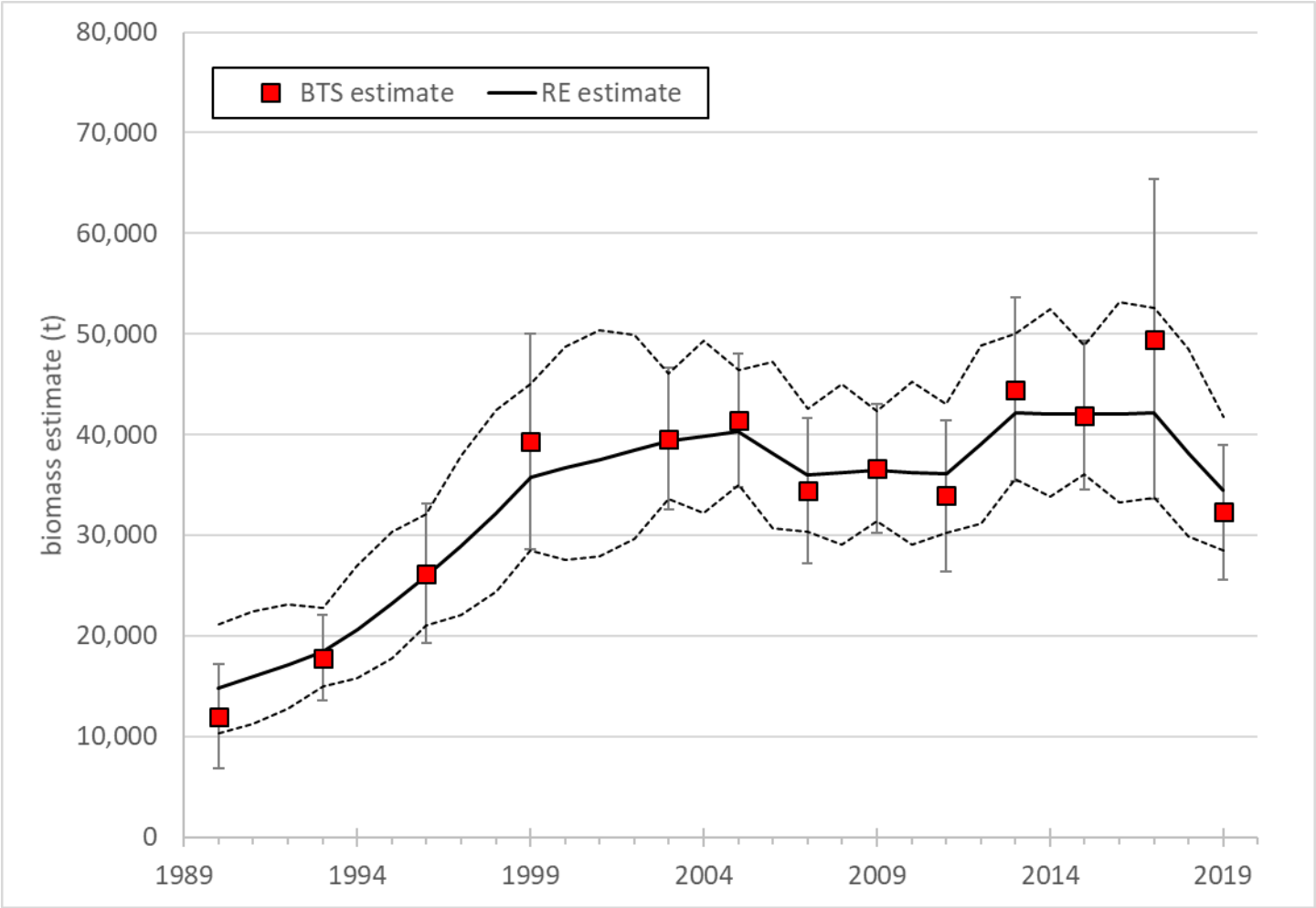
big skate biomass by area



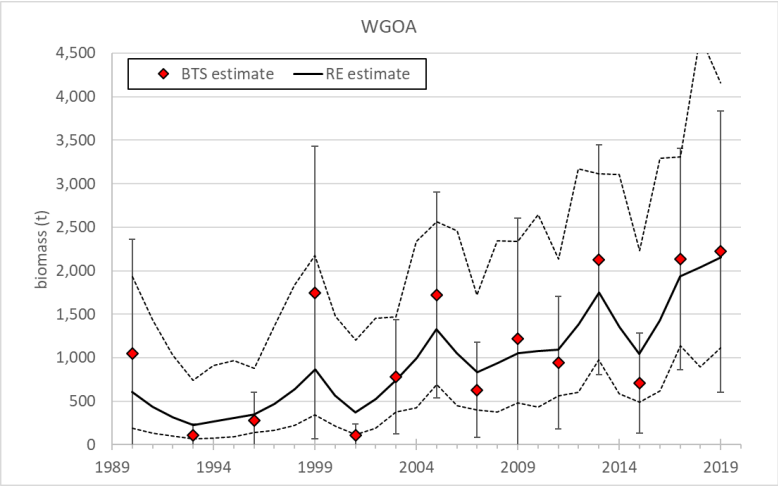


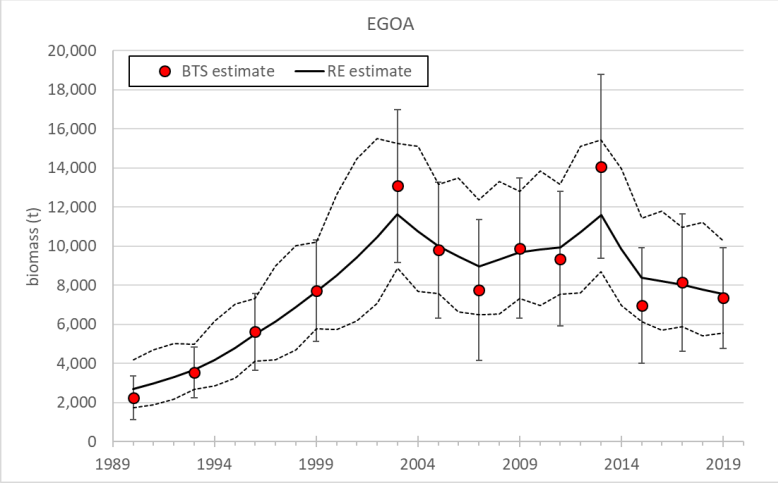


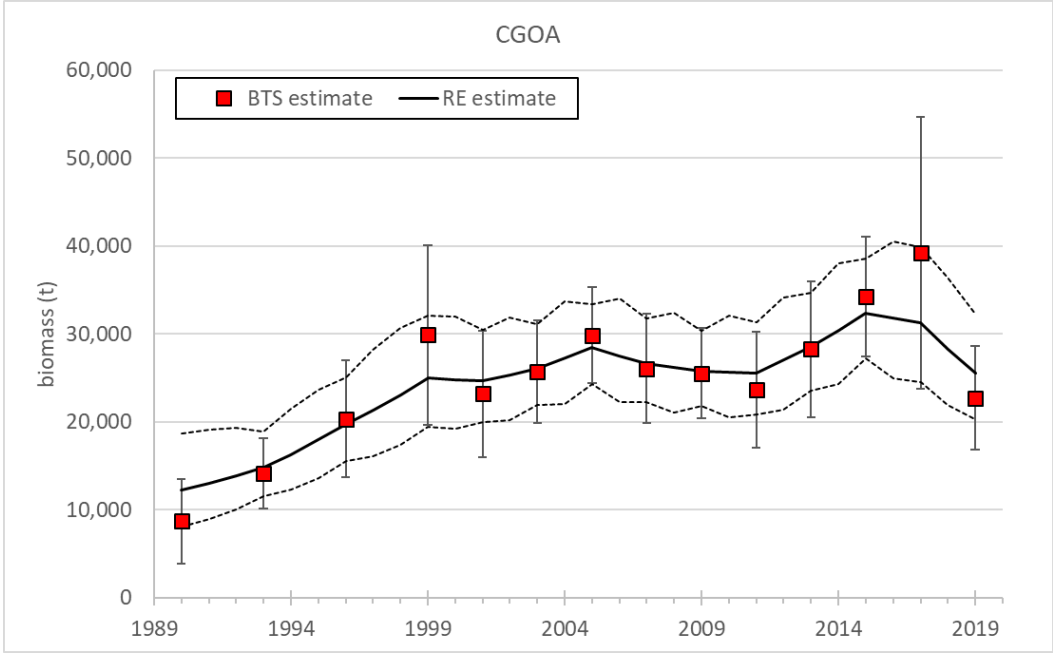
AFSC BTS biomass – longnose skate



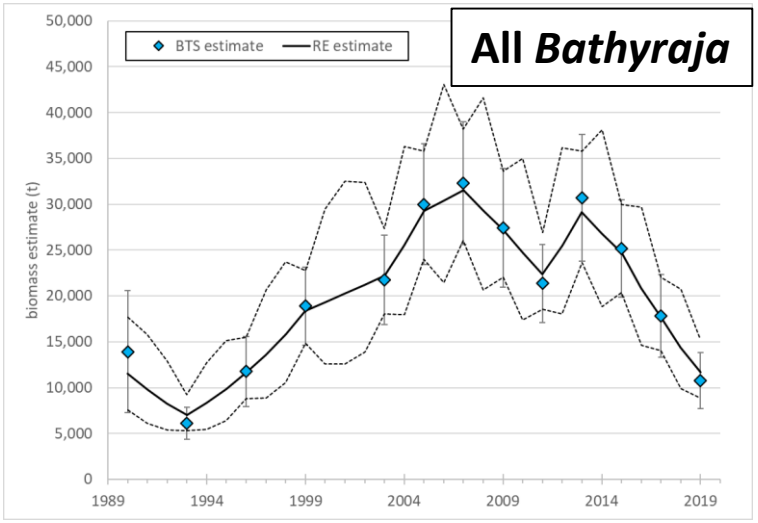
longnose skate biomass by area

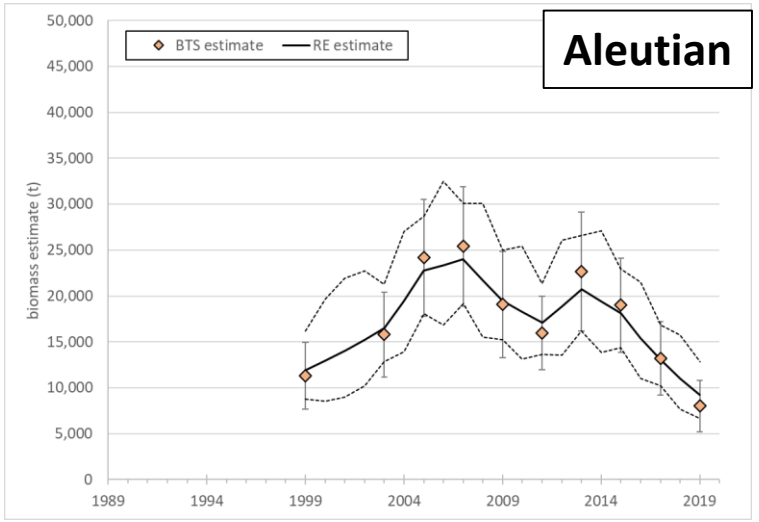


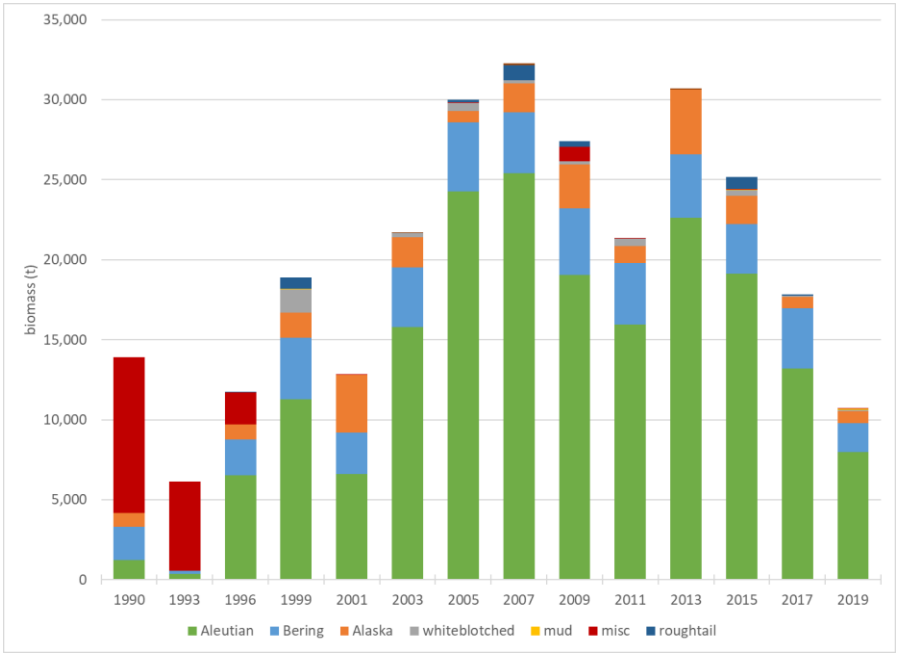




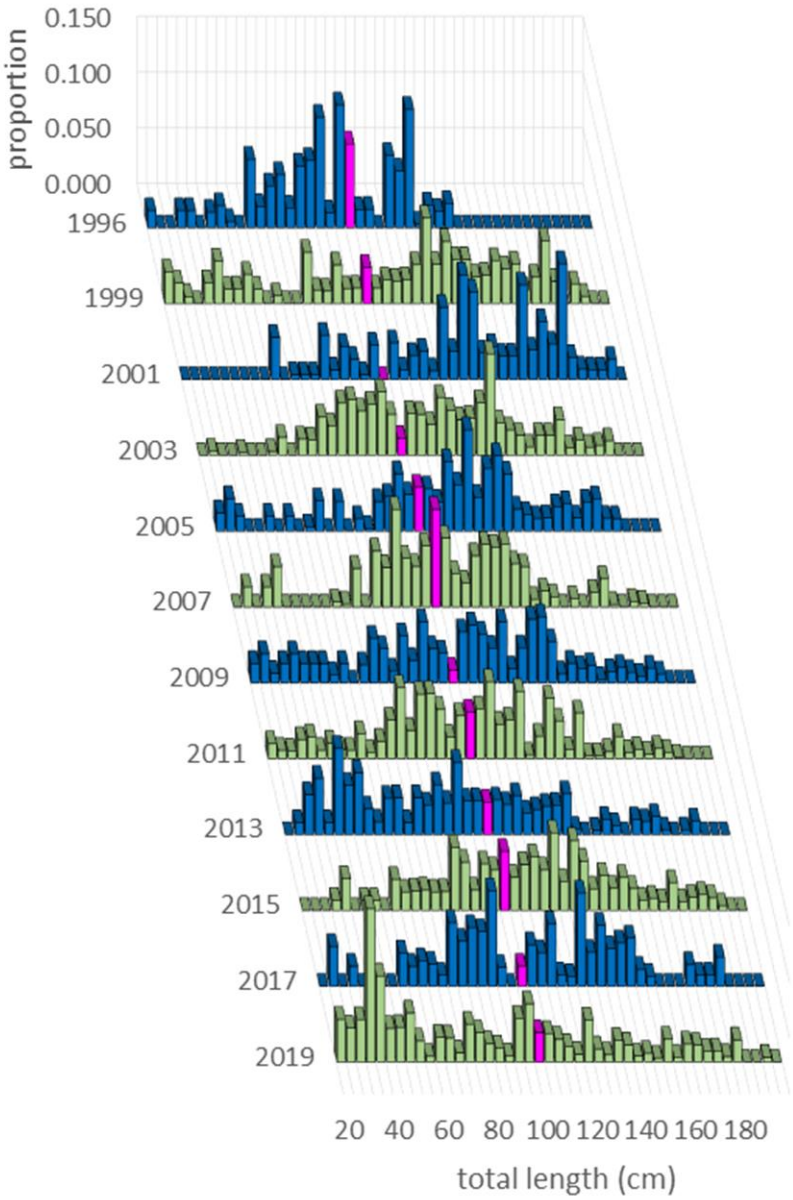
AFSC BTS biomass – other skates



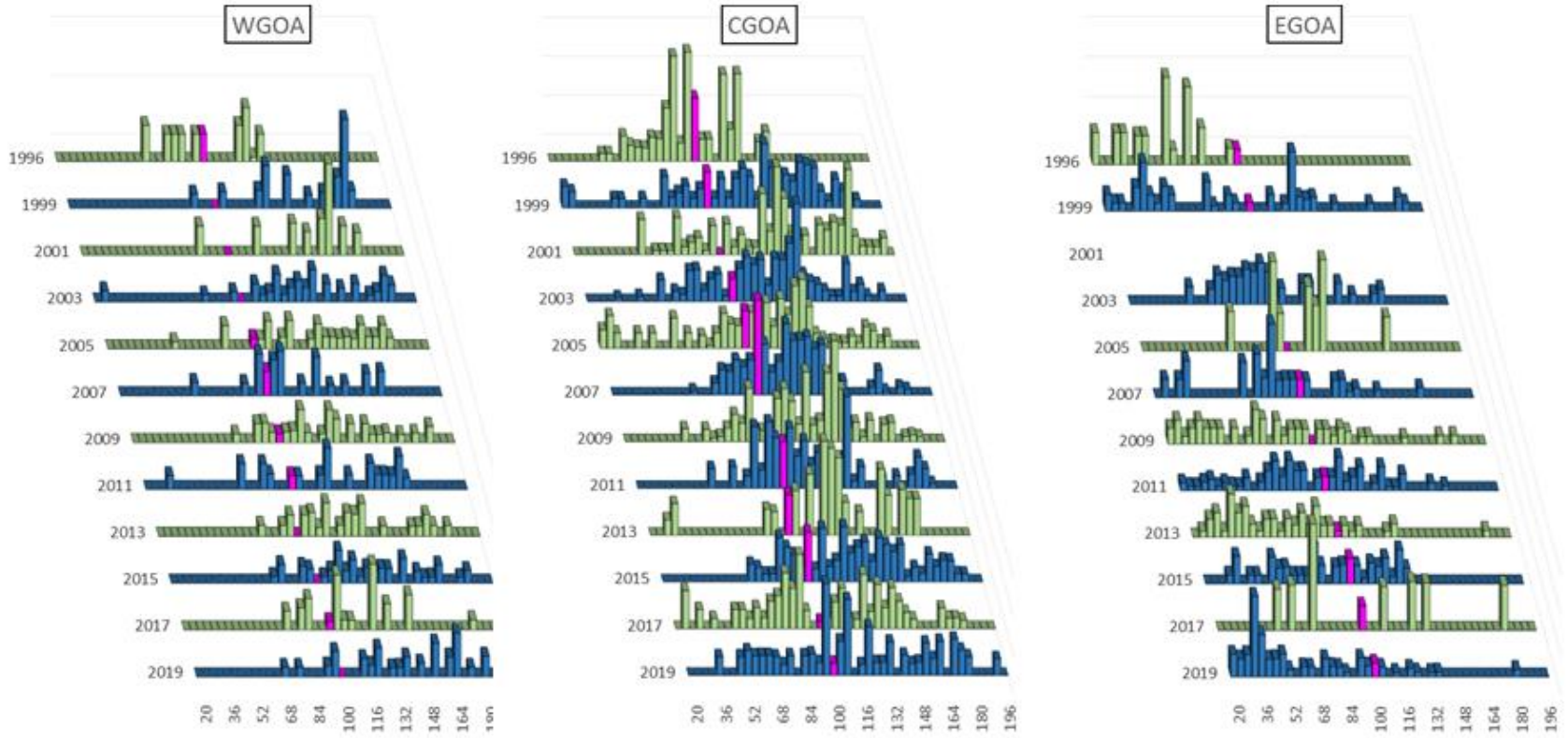




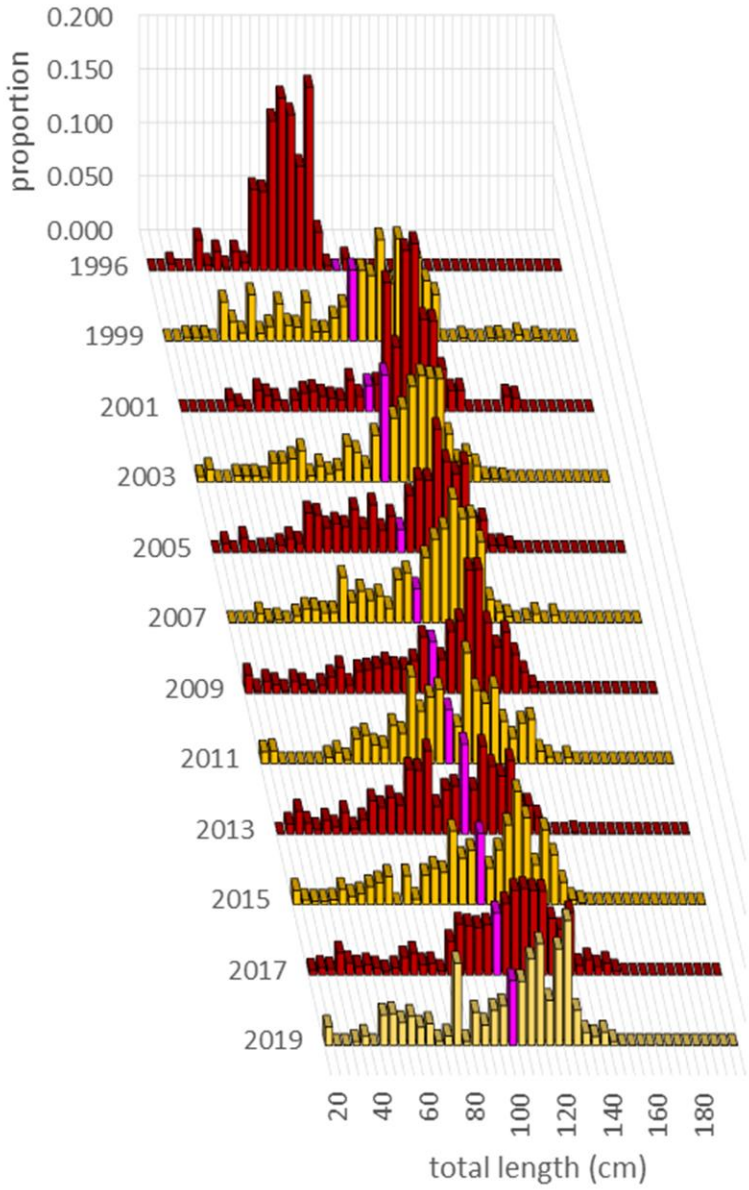
big skate size composition GOA-wide



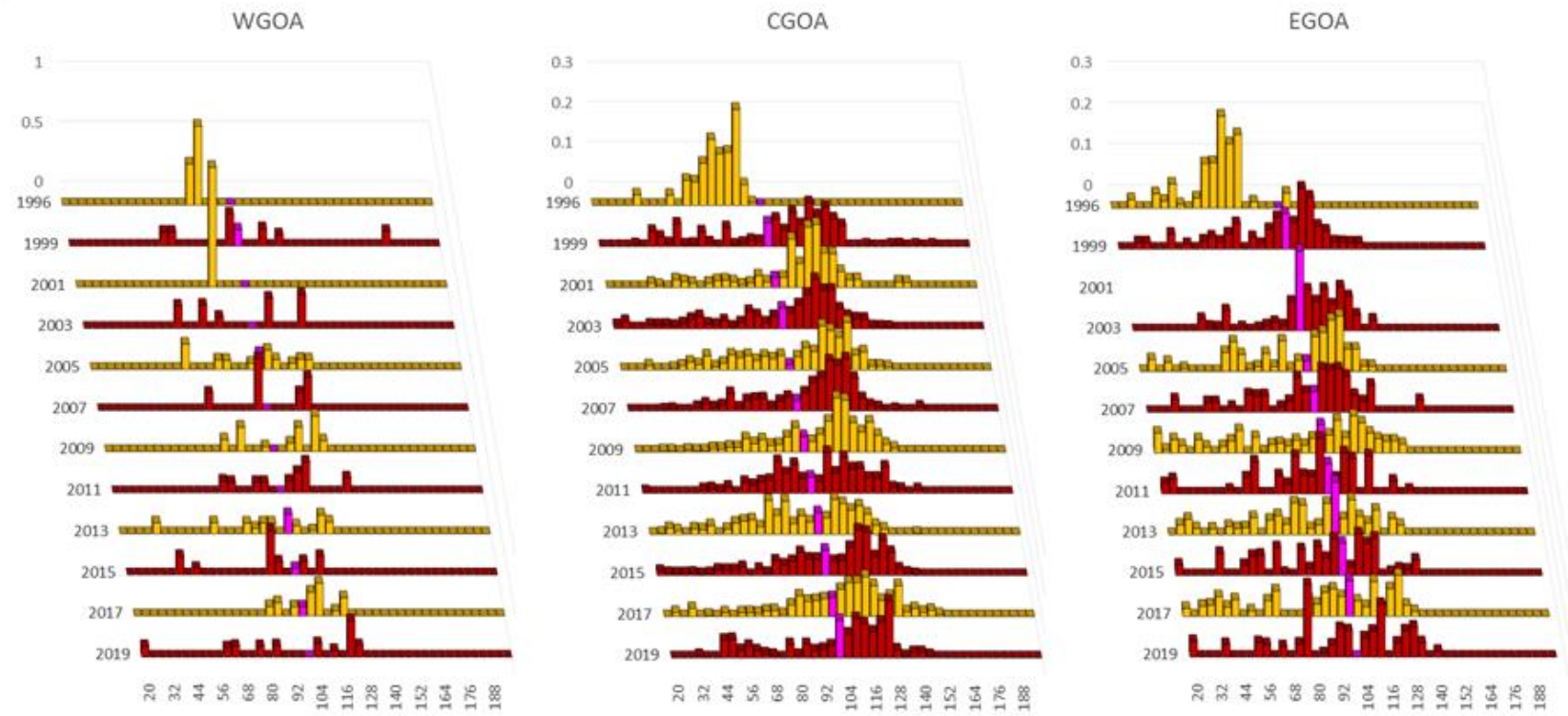
big skate size composition by area



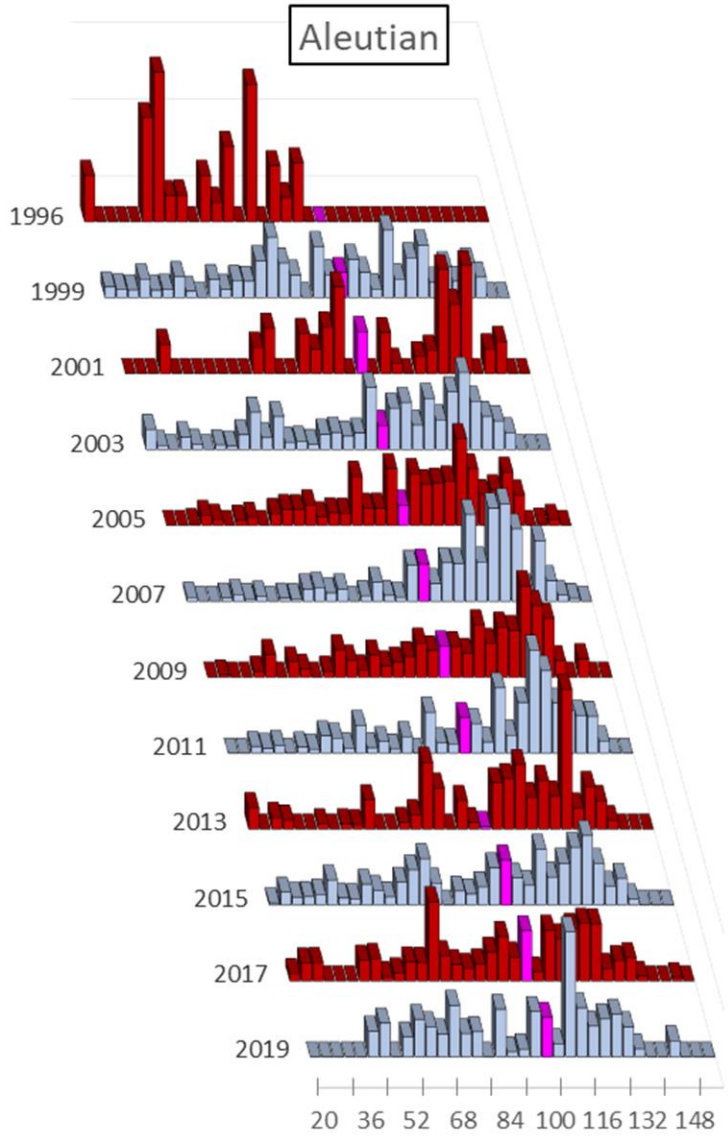
longnose skate size composition GOA-wide



longnose skate size composition by area



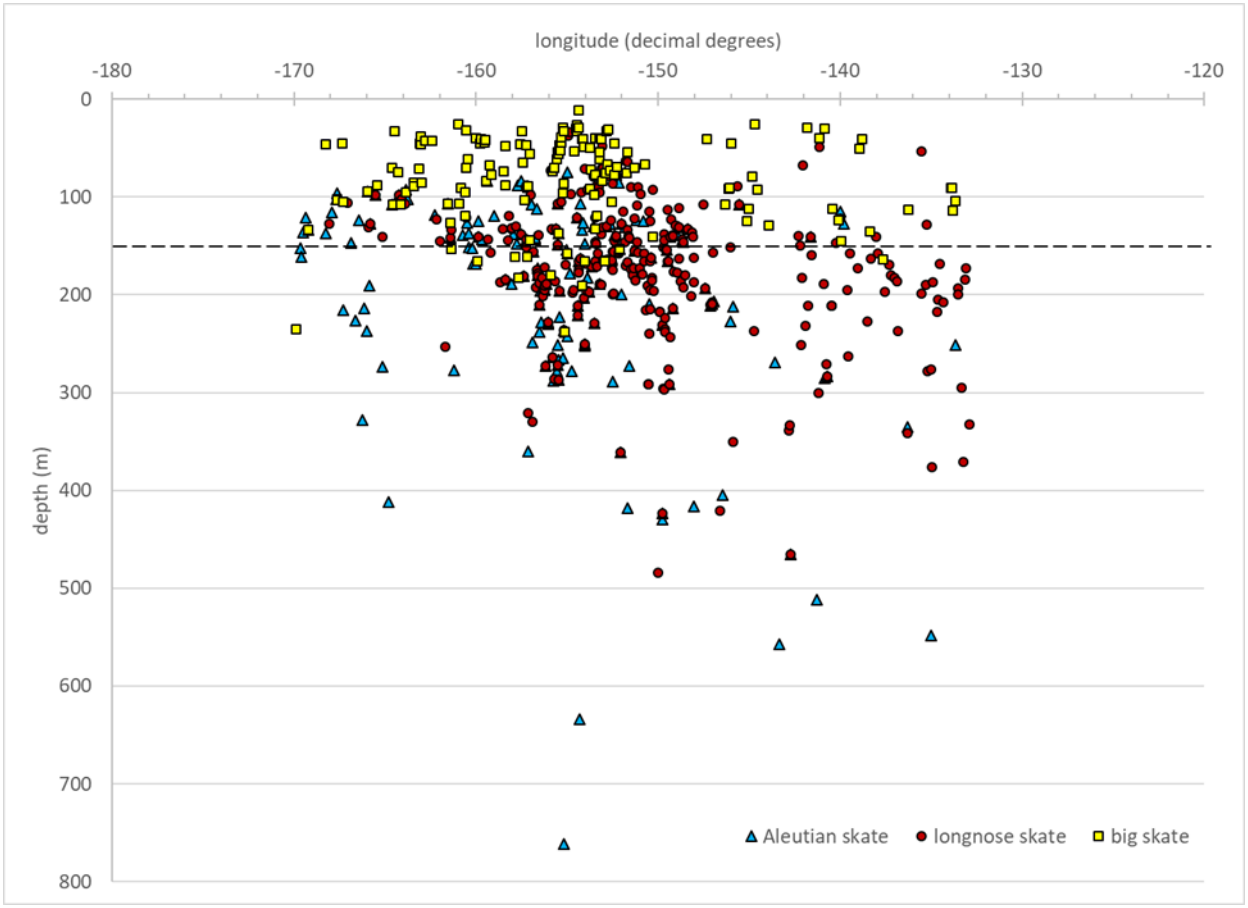
Aleutian skate length comp



additional survey data

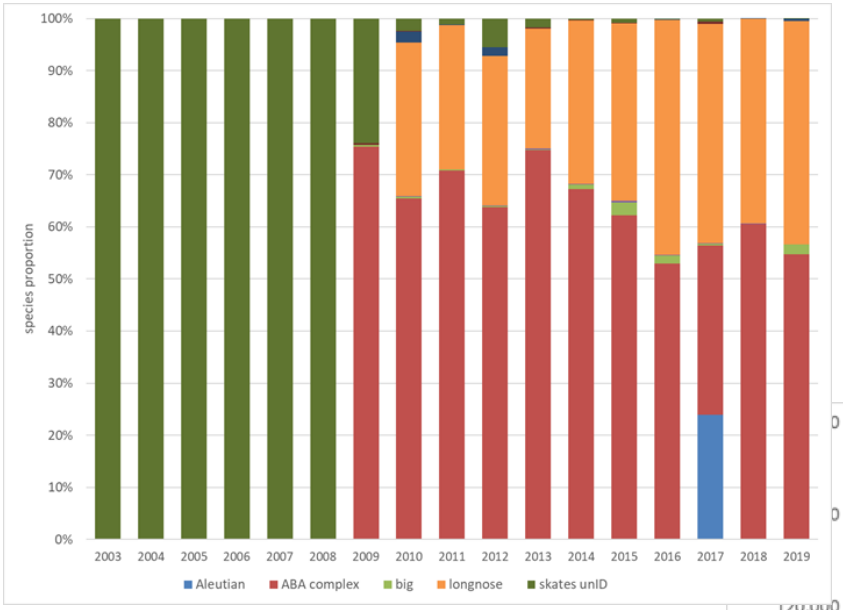
- AFSC longline survey (RPN)
- IPHC longline survey (RPN)
- ADF&G “Kodiak+” bottom trawl survey (CPUE)
- ADF&G “PWS+” bottom trawl survey (CPUE, FO, biomass)
- PWS survey the only one that doesn’t overlap AFSC BTS

skate depth & AFSC longline survey



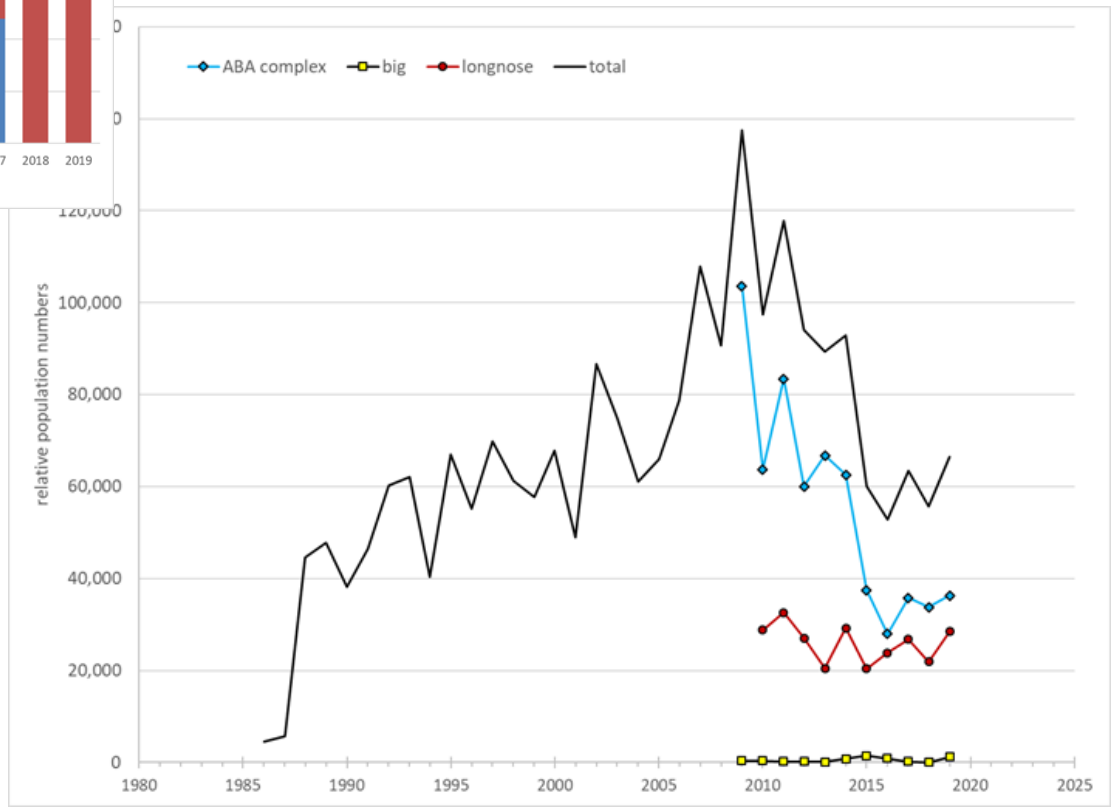
- dashed line = 150 m; no sampling in waters shallower than 150 m

AFSC longline survey (AKFIN)

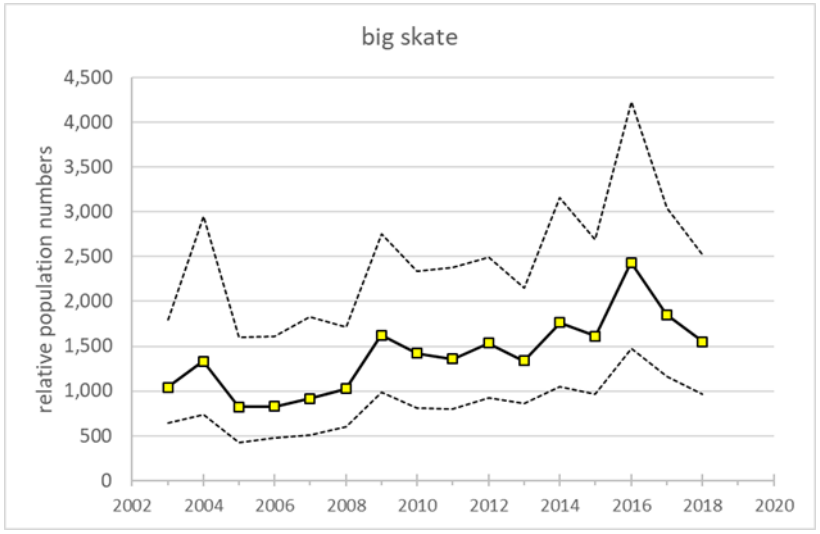


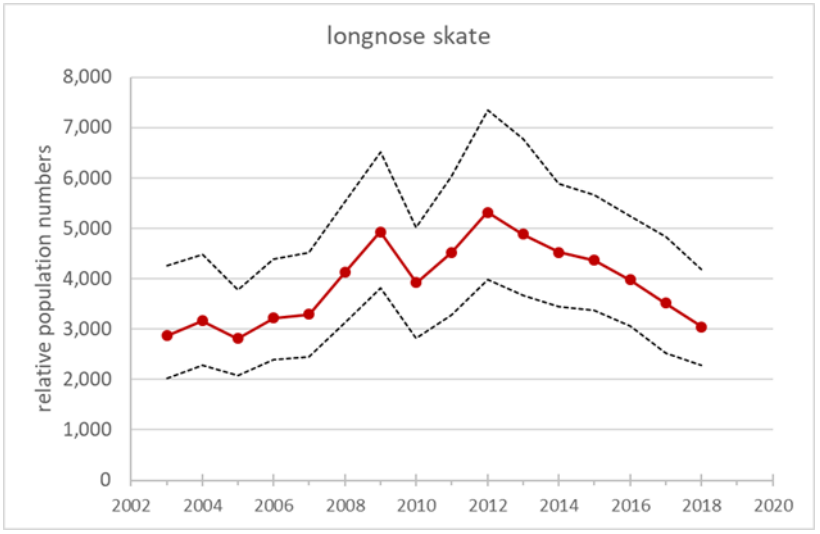
species composition

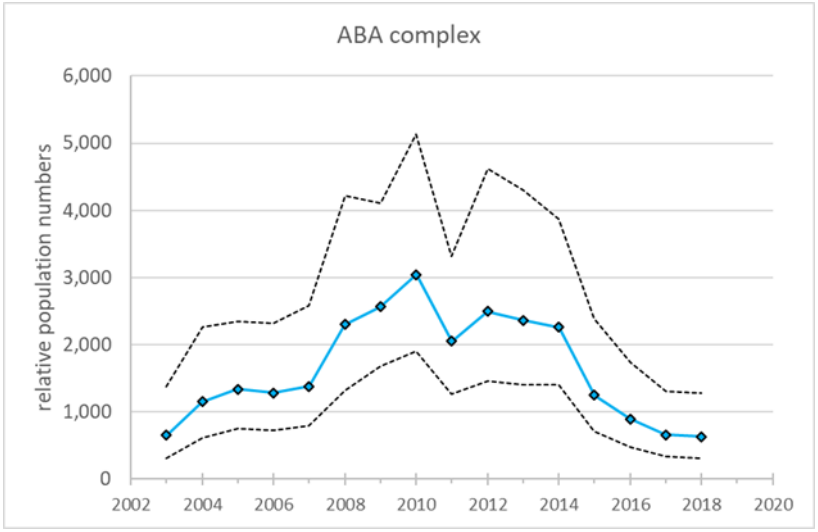
abundance trends



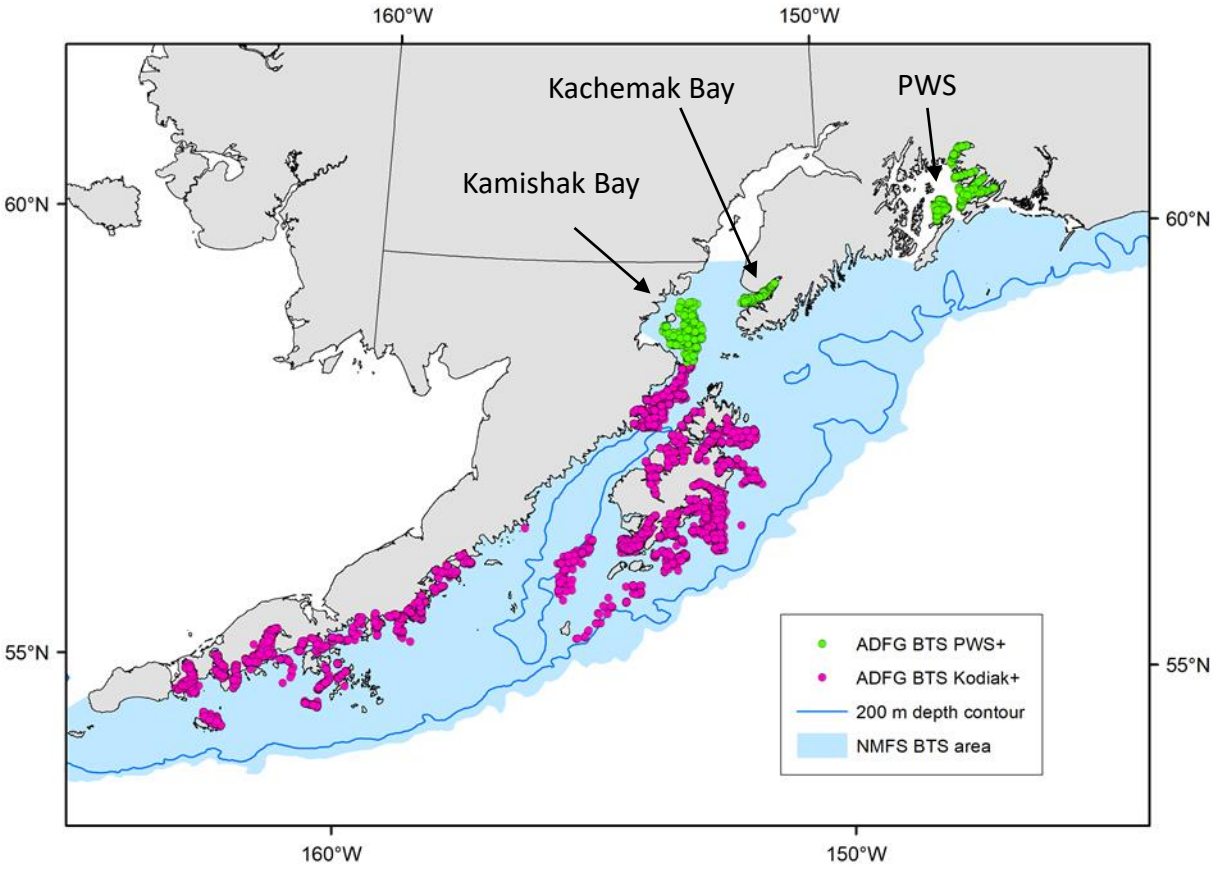
IPHC longline survey (Tribuzio)





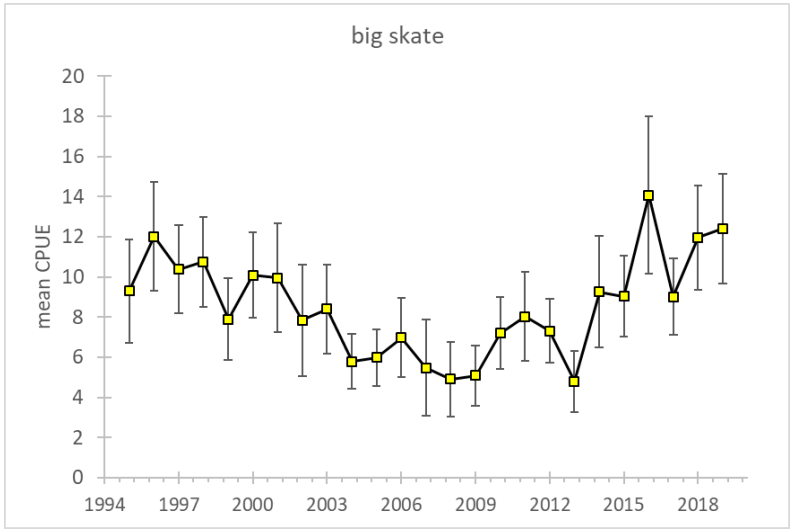


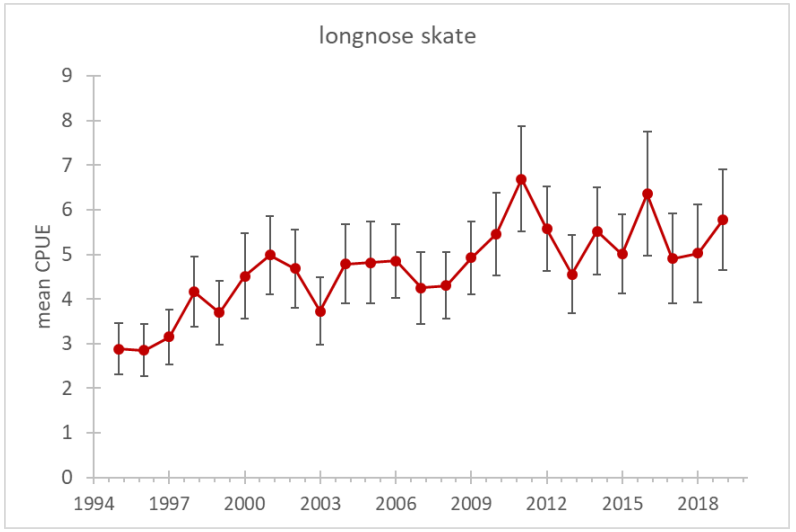
ADF&G trawl survey locations

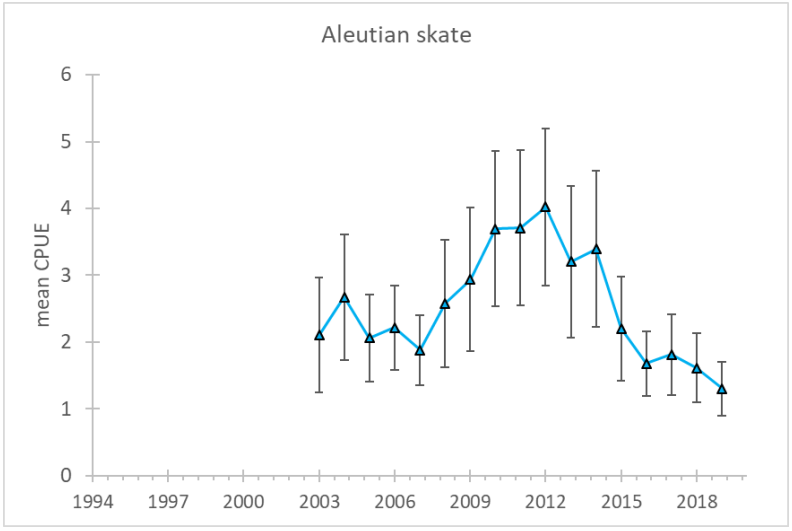


- shows only PWS “core” stations
- PWS only ADFG area outside of AFSC area

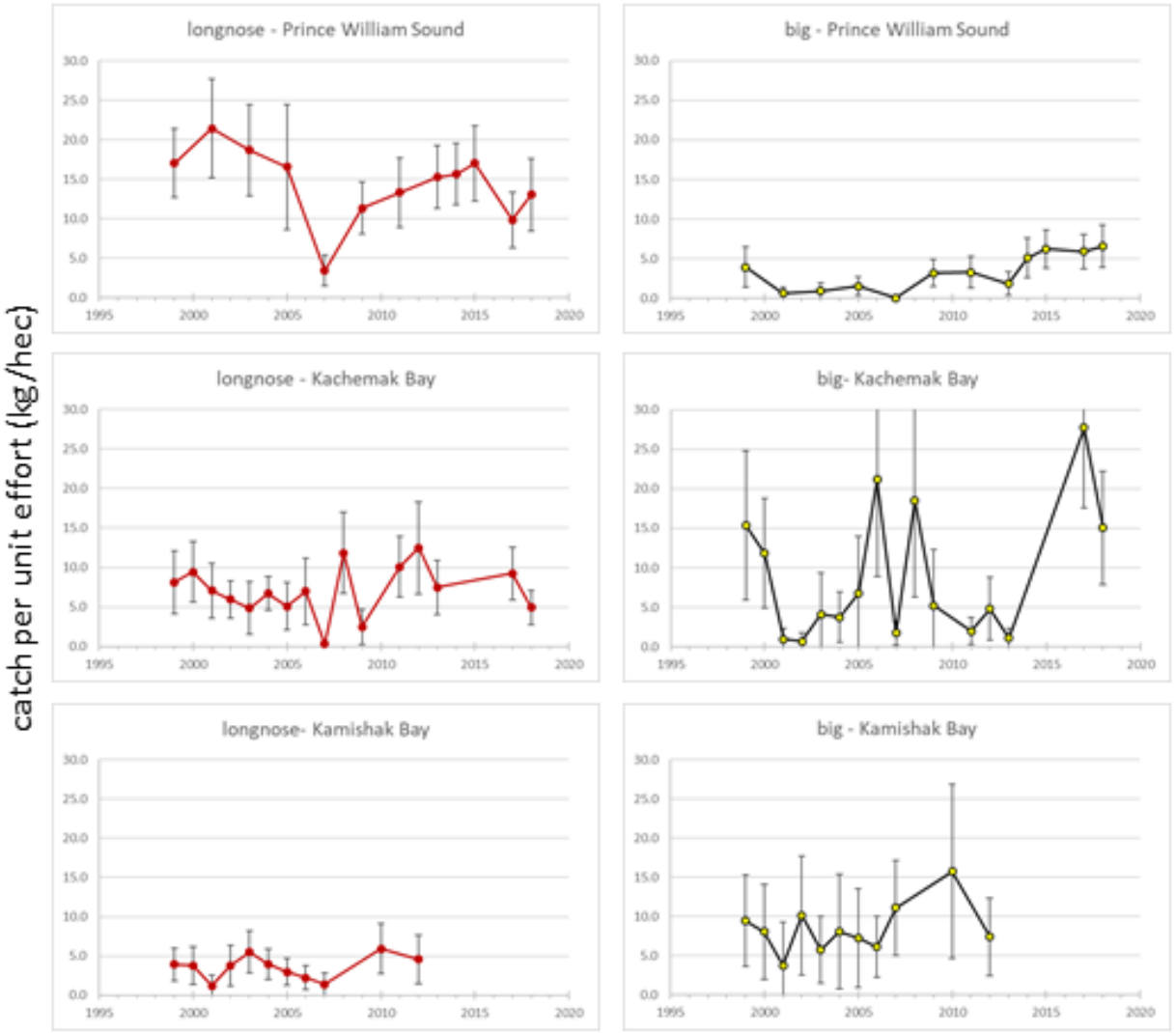
ADF&G trawl survey – Kodiak+ (Spalinger)



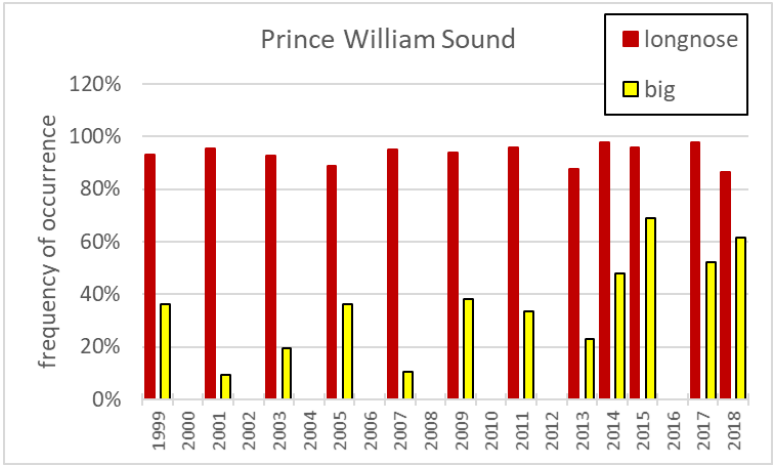


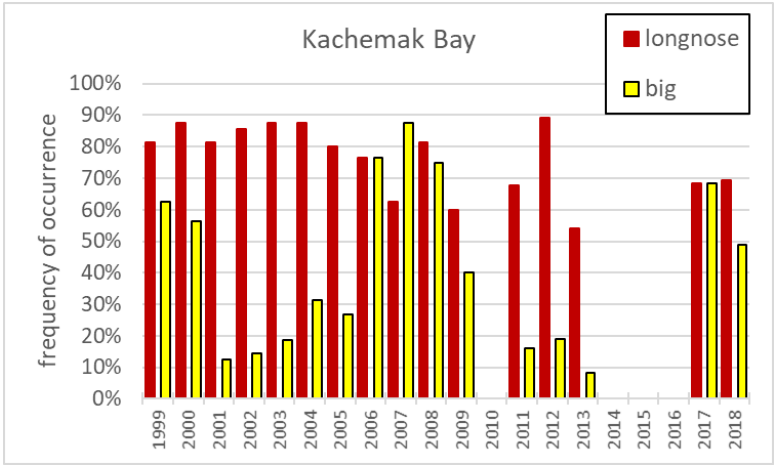


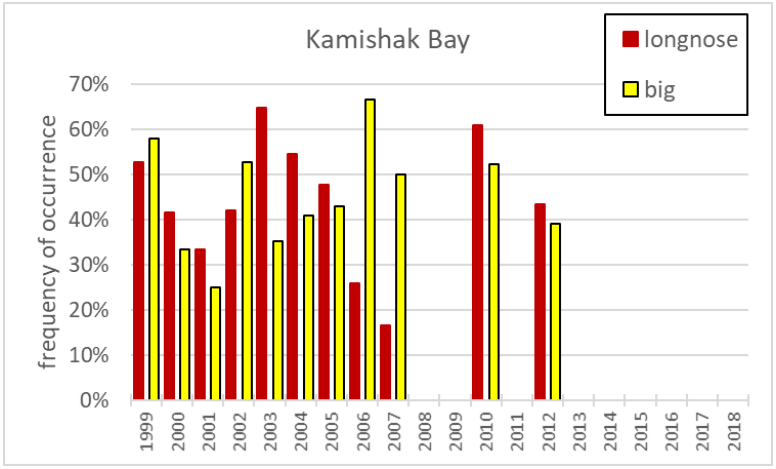
ADF&G trawl survey – PWS+ (Byerly)



ADF&G trawl survey – PWS+



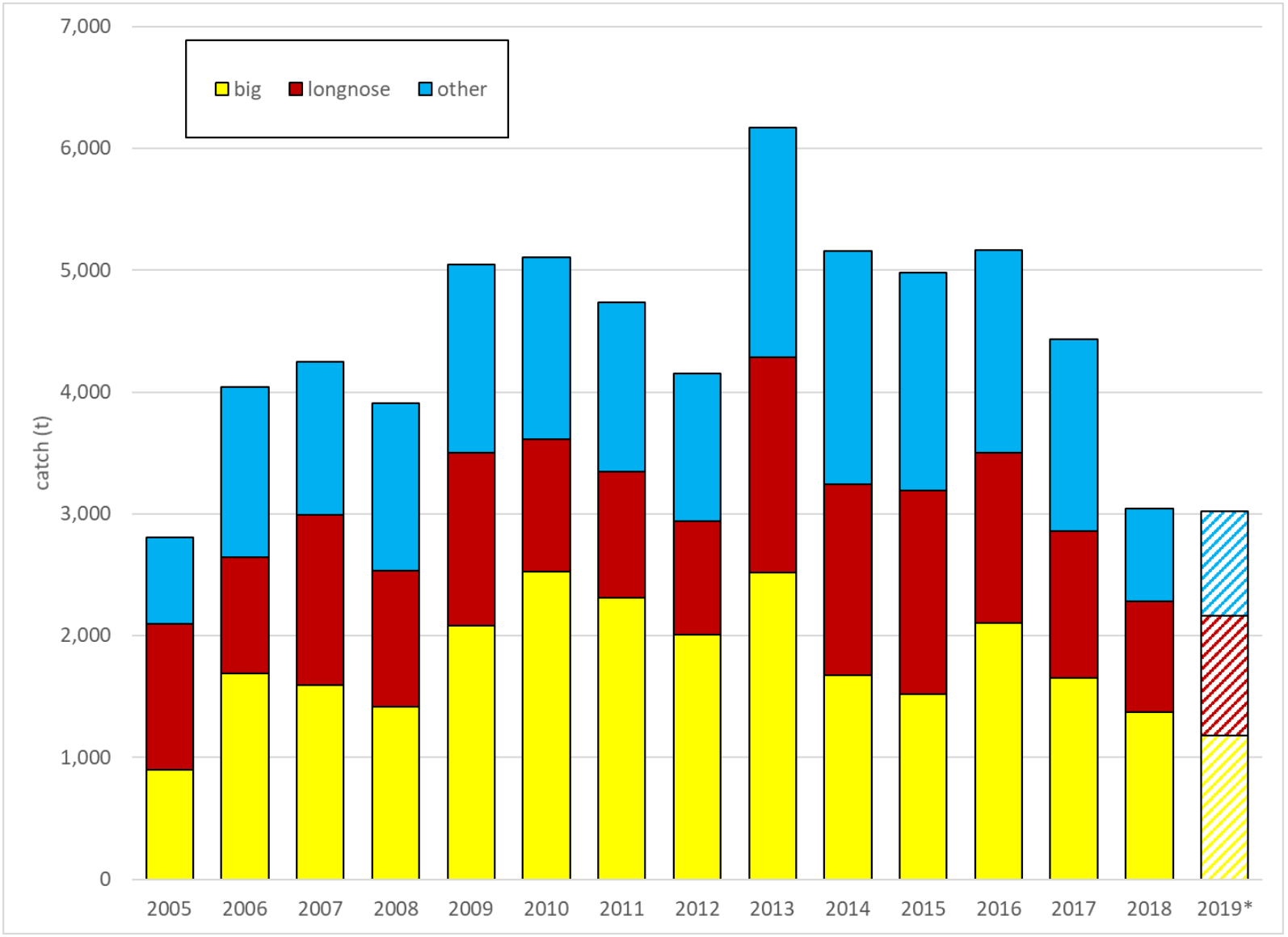




PWS biomass estimates and catch

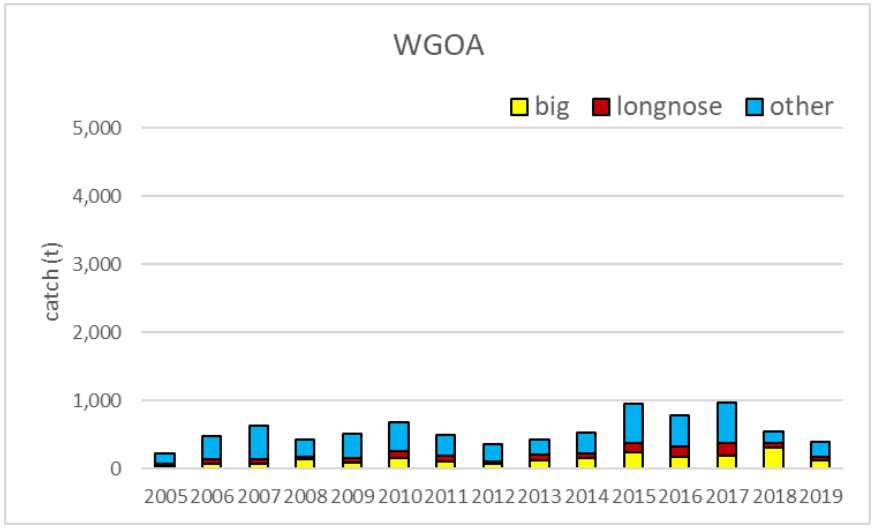
	PWS biomass		Area 649 catch		PWS expl. rate	
	longnose	big	longnose	big	longnose	big
1999	1,459	336				
2000						
2001	1,833	56				
2002						
2003	1,600	77				
2004						
2005	1,417	131	0.7	0.0	0.00	0.00
2006			10.7	7.2		
2007	294	5	8.1	0.3	0.03	0.05
2008			4.3	0.7		
2009	971	274	60	28	0.06	0.10
2010			50	25		
2011	1,140	282	42	40	0.04	0.14
2012			25	19		
2013	1,306	160	95	40	0.07	0.25
2014	1,341	436	58	76	0.04	0.17
2015	1,456	532	115	30	0.08	0.06
2016			71	48		
2017	846	506	55	60	0.07	0.12
2018	1,117	562	26	24	0.02	0.04
2019			30	25		

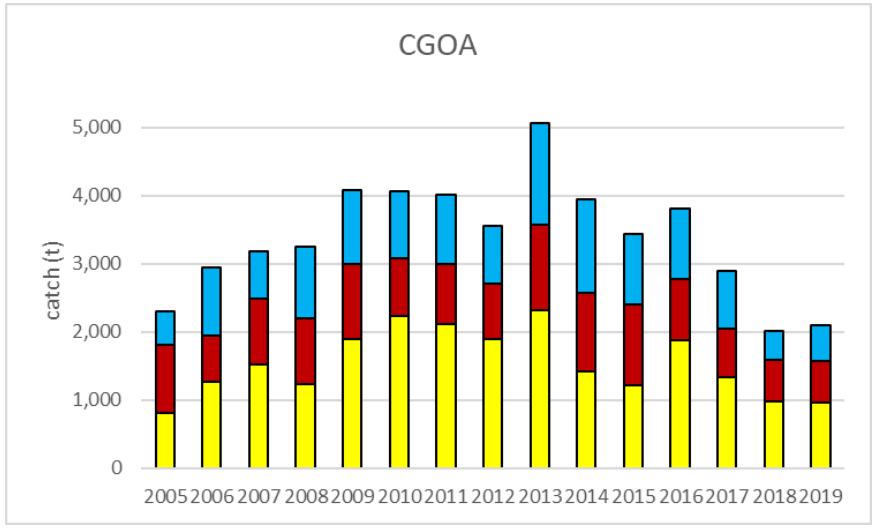
skate catch: gulfwide

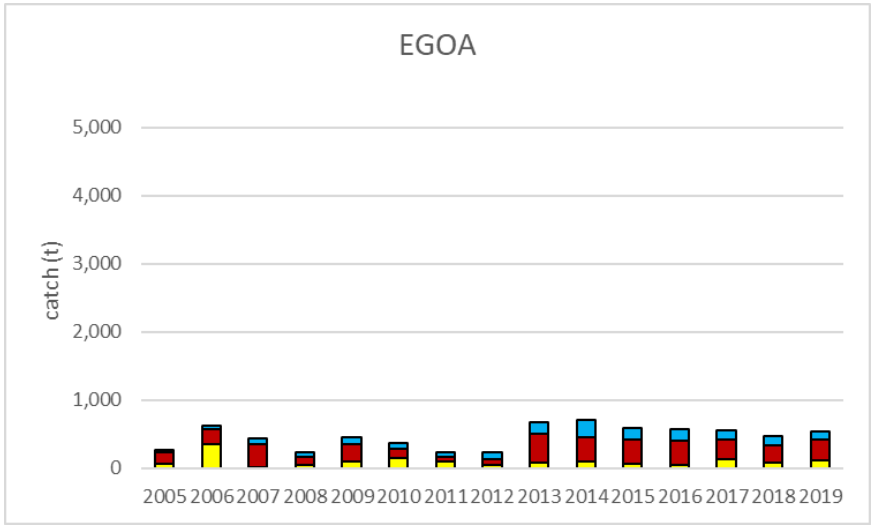


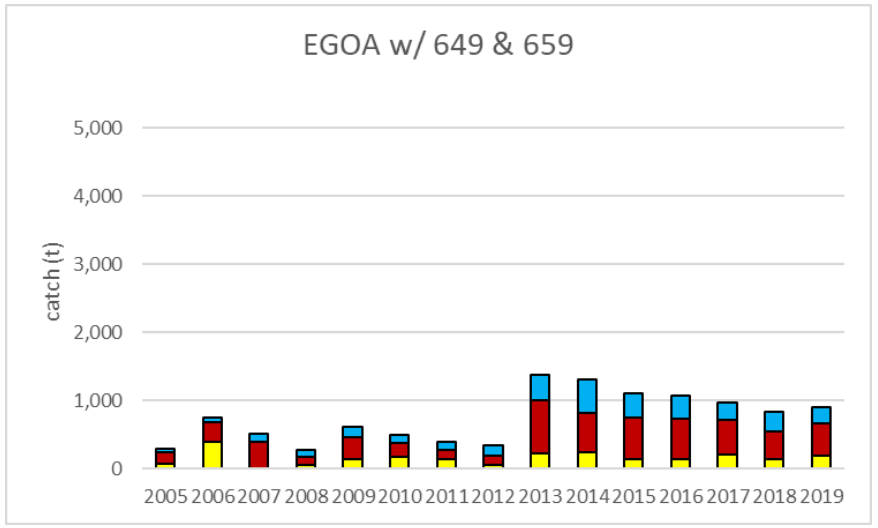
649 & 659 not included

skate catch by area

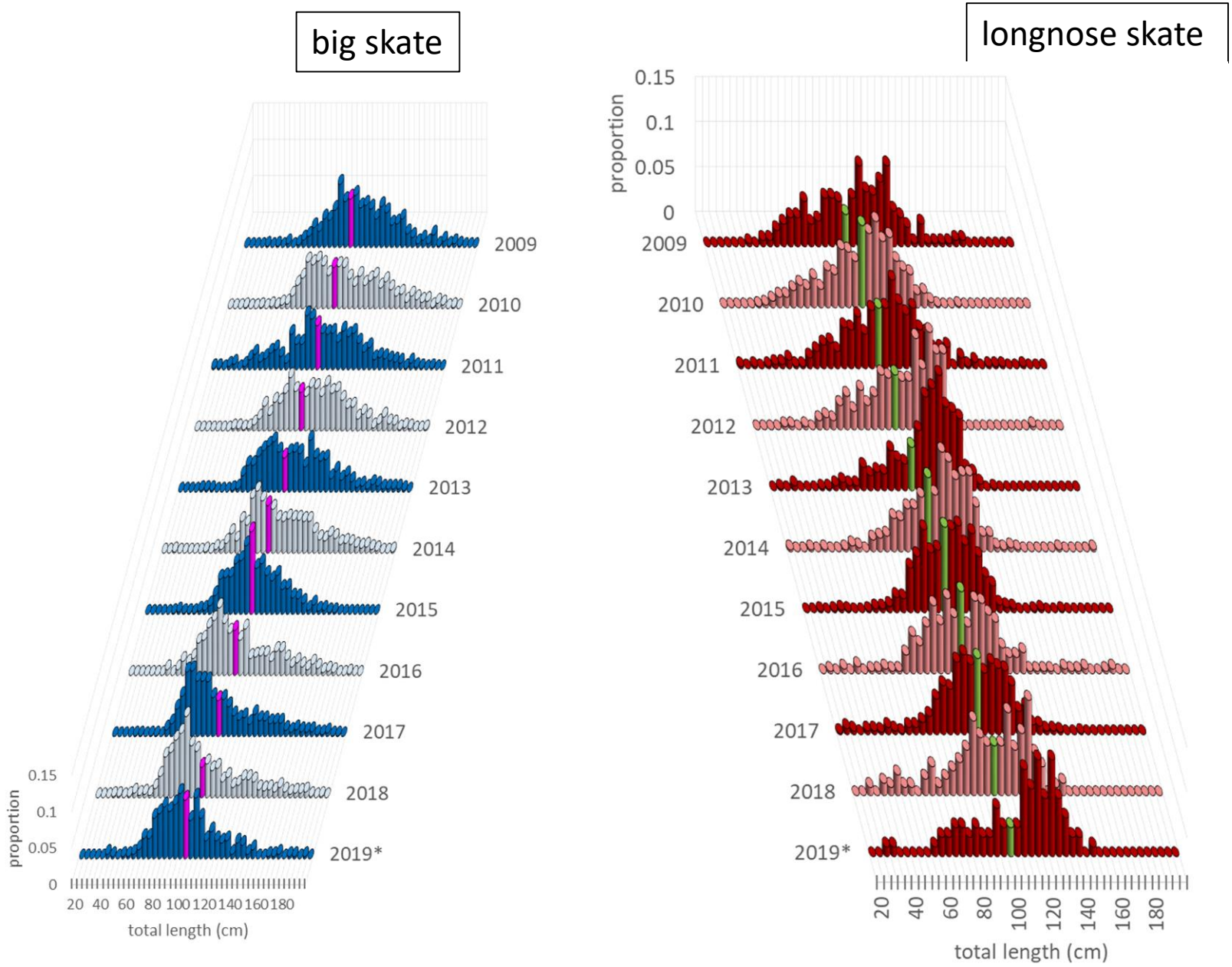




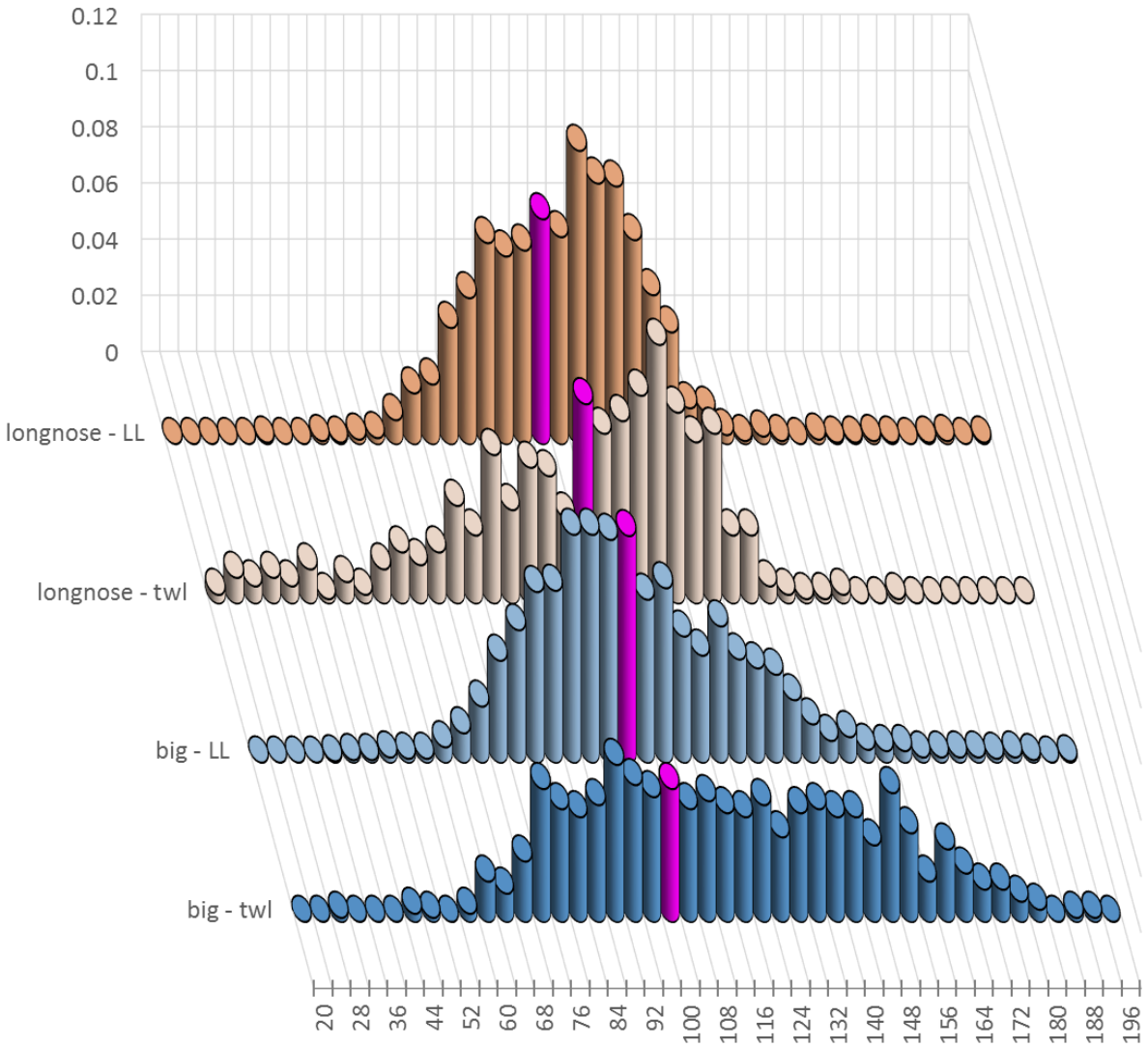




catch size composition (all gears)



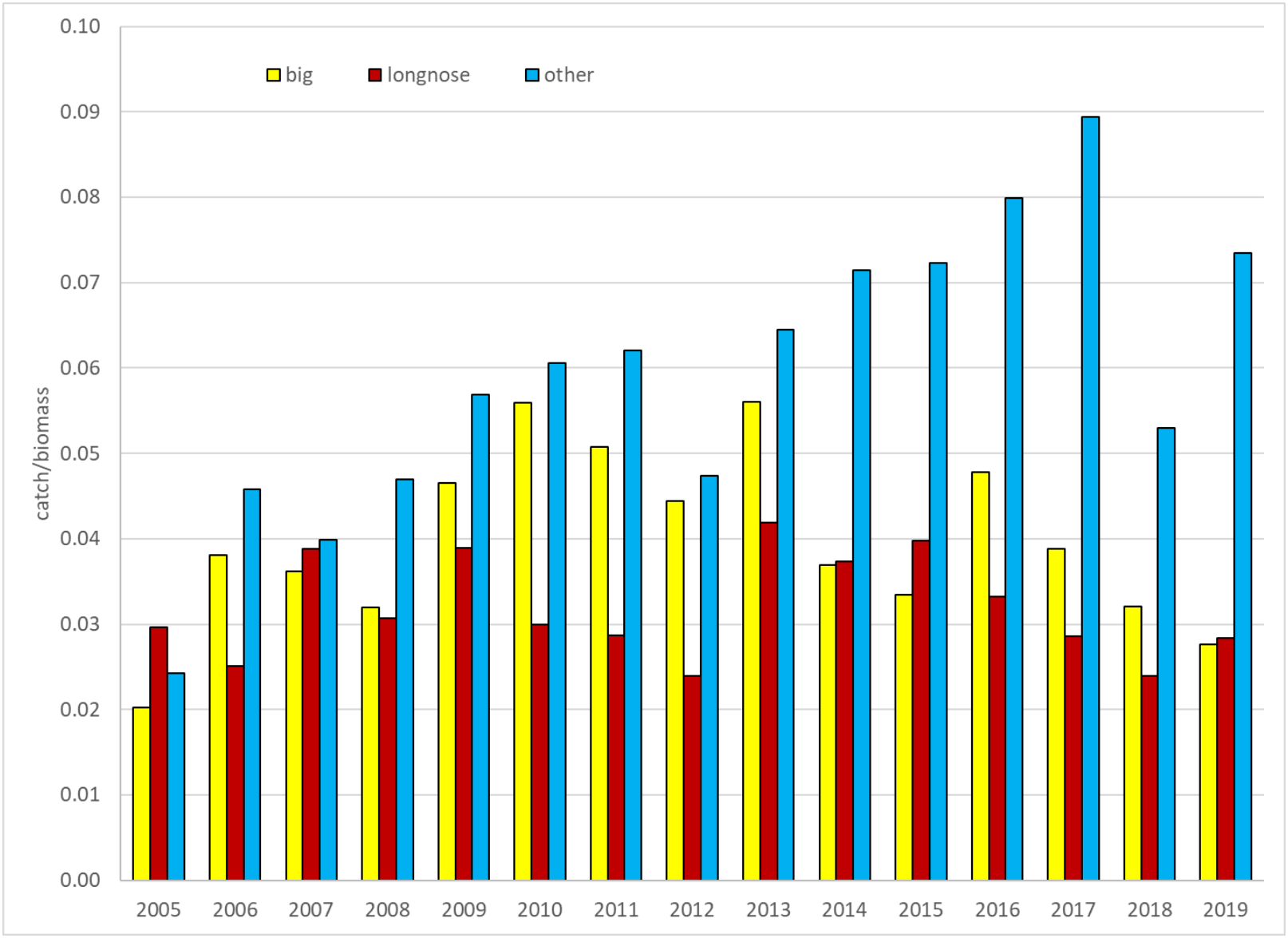
catch size composition (by gear 2013-2019)



retention rates

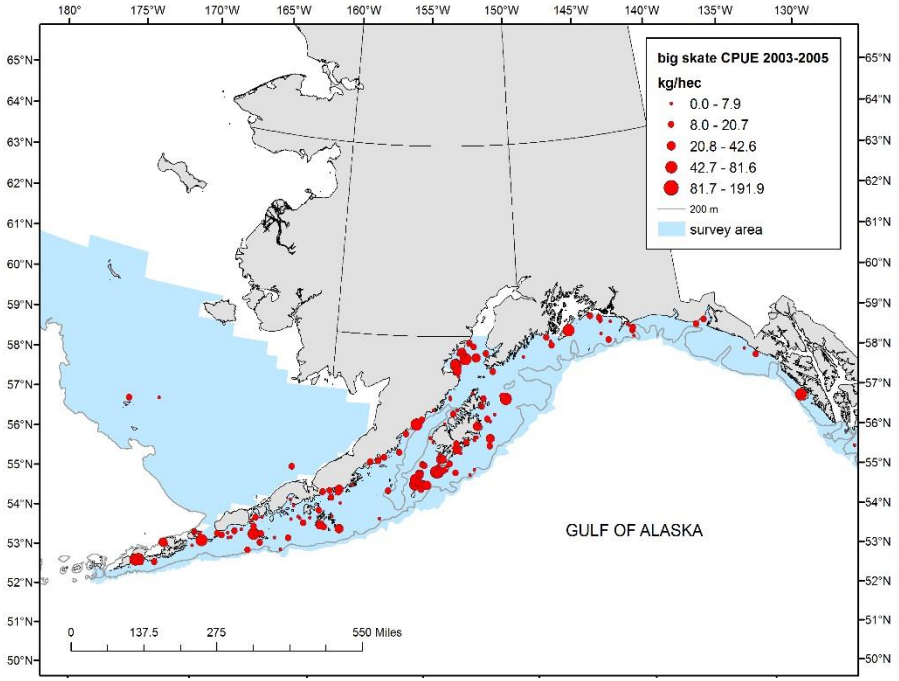
mgmt. measures to
reduce retention begin

exploitation rates

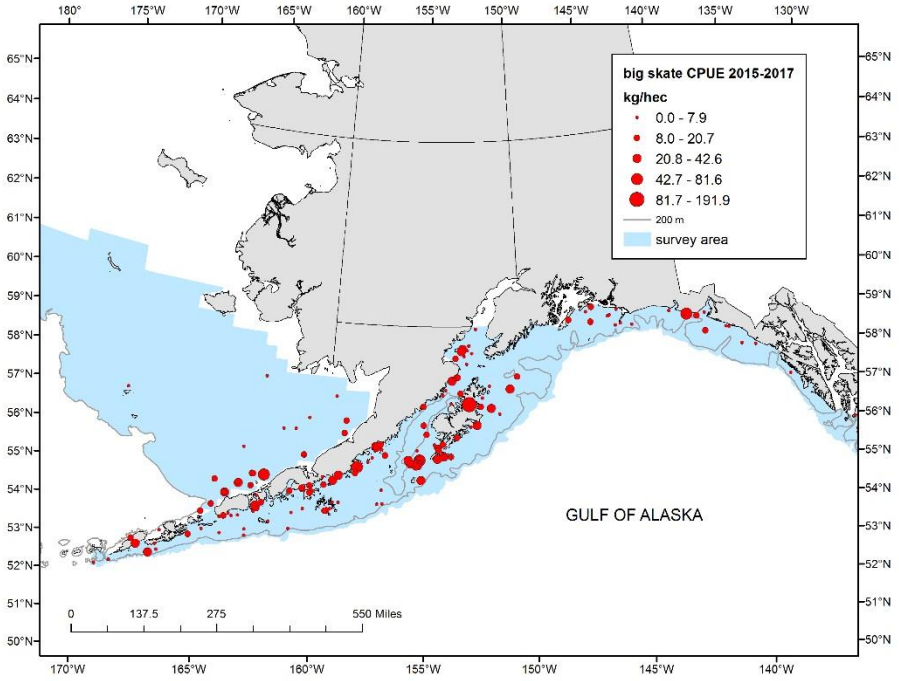


big skate survey CPUE

2003-2006

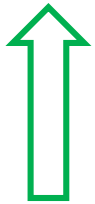


2015-2017



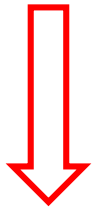
harvest recs – big skate

big skate (*Beringraja binoculata*)					
		As estimated or *specified last full assessment* for		As estimated or *recommended this* year for:	
Quantity		2018	2019	**2020**	2021
M (natural mortality)		0.1	0.1	**0.1**	0.1
Specified/recommended Tier		5	5	**5**	5
Biomass (t)	W	6,716	6,716	**10,109**	10,109
	C	23,658	23,658	**20,798**	20,798
	E	7,601	7,601	**11,861**	11,861
	GOA-wide	37,975	37,975	**42,779**	42,779
F_{OFL} (*F=M*)		0.1	0.1	**0.1**	0.1
$maxF_{ABC}$ *(F=0.75*M)*		0.075	0.075	**0.075**	0.075
F_{ABC}		0.075	0.075	**0.075**	0.075
OFL (t)	GOA-wide	3,797	3,797	**4,278**	4,278
ABC (t; equal to maximum ABC)	W	504	504	**758**	758
	C	1,774	1,774	**1,560 ***	1,560
	E	570	570	**890**	890
		As determined *last* year for:		As determined *this* year for:	
Status		2016	2017	**2018**	2019
Overfishing?		*no*	*na*	**no**	na
(for Tier 5 stocks, data are not available to determine whether the stock is in an overfished condition)					



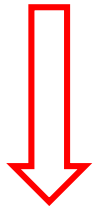
harvest recs – longnose skate

longnose skate (*Raja rhina*)					
		As estimated or *specified last full assessment* for		As estimated or *recommended this* year for:	
Quantity		2018	2019	**2020**	2021
M (natural mortality)		0.1	0.1	**0.1**	0.1
Specified/recommended Tier		5	5	**5**	5
Biomass (t)	W	1,982	1,982	**2,156**	2,156
	C	37,390	37,390	**25,583**	25,583
	E	8,260	8,260	**7,558**	7,558
	GOA-wide	47,632	47,632	**34,487**	34,487
F_{OFL} ($F=M$)		0.1	0.1	**0.1**	0.1
$maxF_{ABC}$ ($F=0.75*M$)		0.075	0.075	**0.075**	0.075
F_{ABC}		0.075	0.075	**0.075**	0.075
OFL (t)	GOA-wide	4,763	4,763	**3,449**	3,449
ABC (t; equal to maximum ABC)	W	149	149	**158** *	158
	C	2,804	2,804	**1,875**	1,875
	E	619	619	**554**	554
		As determined *last* year for:		As determined *this* year for:	
Status		2016	2017	**2018**	2019
Overfishing?		*no*	*na*	**no**	na
(for Tier 5 stocks, data are not available to determine whether the stock is in an overfished condition)					



harvest recs – other skate

other skates (*Bathyraja* species)					
		As estimated or *specified last full assessment* for		As estimated or *recommended this* year for:	
Quantity		2018	2019	**2020**	2021
M (natural mortality)		0.1	0.1	**0.1**	0.1
Specified/recommended Tier		5	5	**5**	5
Biomass (t)	GOA-wide	18,454	18,454	**11,662**	11,662
F_{OFL} (*F=M*)		0.1	0.1	**0.1**	0.1
$maxF_{ABC}$ *(F=0.75*M)*		0.075	0.075	**0.075**	0.075
F_{ABC}		0.075	0.075	**0.075**	0.075
OFL (t)	GOA-wide	1,845	1,845	**1,166**	1,166
ABC (t; equal to maximum ABC)	GOA-wide	1,384	1,384	**875**	875
		As determined *last* year for:		As determined *this* year for:	
Status		2016	2017	**2018**	2019
Overfishing?		*no*	*na*	**no**	na
(for Tier 5 stocks, data are not available to determine whether the stock is in an overfished condition)					



risk table – short version

Assessment-related considerations	*Population dynamics considerations*	*Environmental/ ecosystem considerations*	*Fishery Performance considerations*	***Overall score (highest of the individual scores)***
Level 1: Normal	Level 1: Normal	Level 1: Normal	Level 1: Normal	**Level 1: Normal**

Risk matrix table analysis and reductions to maximum ABC: All elements in the risk table were scored as 1 (Normal). **No reduction from the maximum ABC is recommended.**

risk table – long version

Evaluation for risk for GOA skates (all species) in 2019

Assessment-related considerations: Skates in the GOA are managed under Tier 5 and are thus by definition data-limited. Skate biomass is reliably estimated by the bottom trawl survey, the RE model performs well for all stocks and stock/area combinations. There are no considerations that would warrant reducing the ABC below maximum permissible. Rated Level 1, normal.

Population dynamics considerations: The biomass of big and longnose skate is relatively stable after increases in the 1990s (Figure 11). The survey and fishery size compositions suggest there have been fewer large skates in recent years but that new individuals may be recruiting to each population (Figures 16 and 17). The biomass of other skates, mainly Aleutian skate, has dropped substantially in recent years (Figures 11-13). The current biomass level is approximately the same as in 1996, so the low biomass is not unprecedented, and there appears to be some new recruitment (Figure 20). All of the skate biomass changes are accounted for in the RE model. As a result of these observations there are no undue concerns regarding dynamics. Rated Level 1, normal.

Environmental/ecosystem considerations: All marine organisms are influenced by water temperature, so the recent occurrences of marine heatwaves in the GOA have the potential to impact GOA skates. Skates may experience similar heatwave-related stresses to other large groundfishes (e.g. Pacific cod) where higher temperatures increase metabolic demands and the need to find adequate prey. This might be exacerbated by the reduced productivity associated with heatwaves in the GOA. However the data do not exist to evaluate whether and to what extent this might have occurred, and there do not appear to be ecosystem considerations that are not adequately addressed through the Tier 5 harvest recommendation process. For these reasons this consideration is rated Level 1, normal.

Fishery performance: As a nontarget stock, catches of skates in the GOA are influenced by their abundance and by the behavior of target fisheries. Recent changes in maximum retention amounts appear to have reduced targeting and retention of skates. Rated Level 1, normal.