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Assessment of northern and southern rock sole stocks in the Gulf of Alaska

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Projections

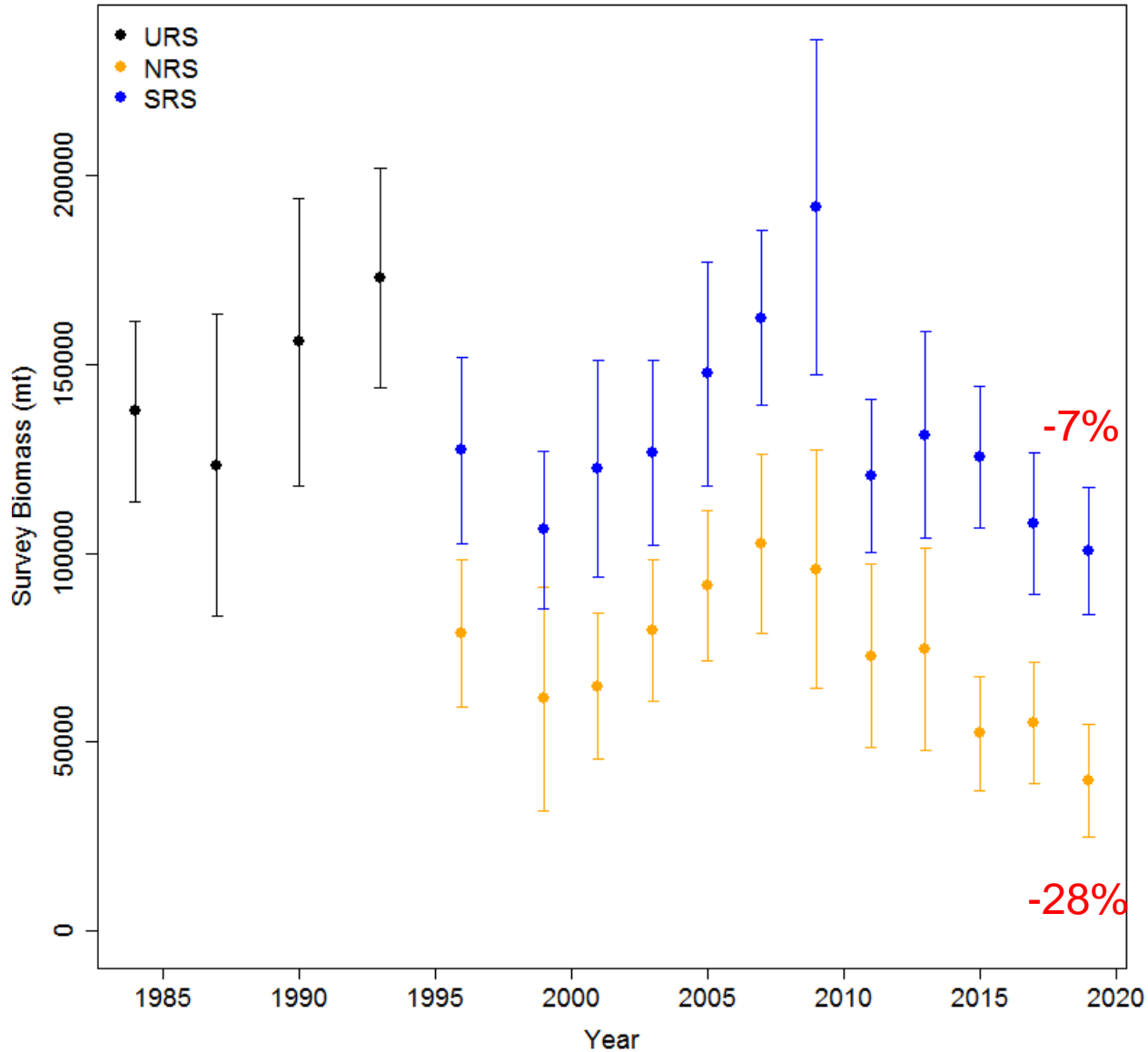
- Tier 3 projection model
- Updated 2018 catch estimates (half of total)
 - Previous estimate: 963 t
 - Final from AKRO Catch Accounting System: 1,048 t
- 2019 catch estimate
 - Expanded the October 17th total catch by 1.192
 - 880 t



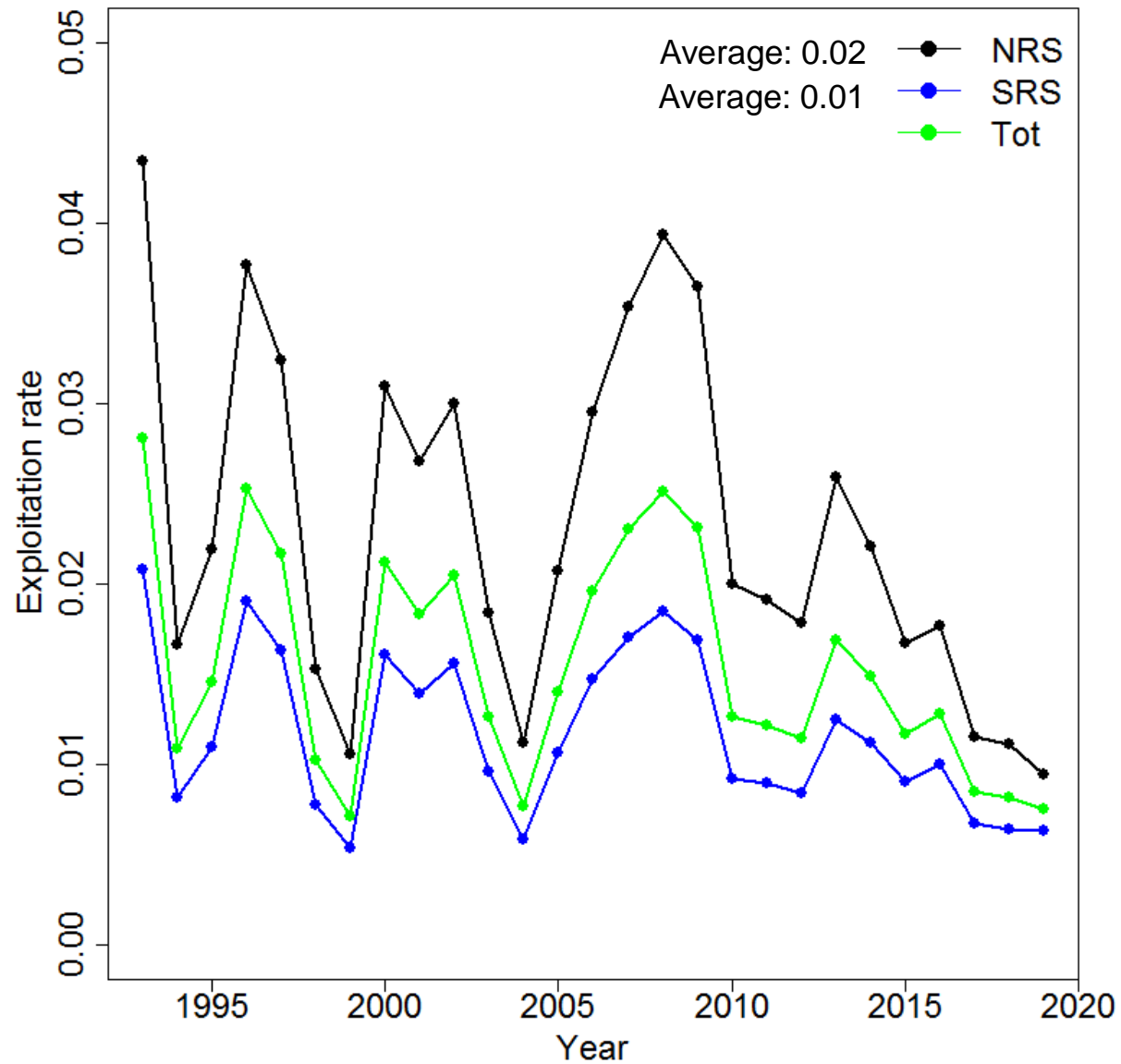
Quantity	As estimated or specified last year for:		As estimated or recommended this year for:	
	2019	2020	2020	2021
<i>M</i> (female, male)	0.2, 0.253*	0.2, 0.253*	0.2, 0.253*	0.2, 0.253*
Tier	3a	3a	3a	3a
Projected total (age 0+) biomass (t)	93,791	94,110	94,619	95,275
Projected Female spawning biomass (t)	47,104	45,967	47,701	46,643
$B_{100\%}$	51,387	51,387	51,387	51,387
$B_{40\%}$	20,555	20,555	20,555	20,555
$B_{35\%}$	17,985	17,985	17,985	17,985
F_{OFL}	0.462	0.462	0.462	0.462
$maxF_{ABC}$	0.382	0.382	0.382	0.382
F_{ABC}	0.382	0.382	0.382	0.382
OFL (t)	20,582	20,836	20,962	21,246
maxABC (t)	17,331	17,548	17,655	17,897
ABC (t)	17,331	17,548	17,655	17,897
	As determined last year for:		As determined this year for:	
Status	2017	2018	2018	2019
Overfishing	No	n/a	No	n/a
Overfished	n/a	No	n/a	No
Approaching overfished	n/a	No	n/a	No

Quantity	As estimated or <i>specified last year for:</i>		As estimated or <i>recommended this year for:</i>	
	2019	2020	2020	2021
<i>M</i> (female, male)	0.2, 0.262*	0.2, 0.262*	0.2, 0.262*	0.2, 0.262*
Tier	3a	3a	3a	3a
Projected total (age 0+) biomass (t)	140,338	141,681	142,193	145,405
Projected Female spawning biomass (t)	71,433	69,295	71,643	71,340
$B_{100\%}$	93,518	93,518	93,518	93,518
$B_{40\%}$	37,407	37,407	37,407	37,407
$B_{35\%}$	32,731	32,731	32,731	32,731
F_{OFL}	0.326	0.326	0.326	0.326
$maxF_{ABC}$	0.271	0.271	0.271	0.271
F_{ABC}	0.271	0.271	0.271	0.271
OFL (t)	25,779	26,383	26,491	27,326
maxABC (t)	21,794	22,298	22,390	23,094
ABC (t)	21,794	22,298	22,390	23,094
	As determined <i>last year for:</i>		As determined <i>this year for:</i>	
Status	2017	2018	2018	2019
Overfishing	No	n/a	No	n/a
Overfished	n/a	No	n/a	No
Approaching overfished	n/a	No	n/a	No

Survey biomass estimates



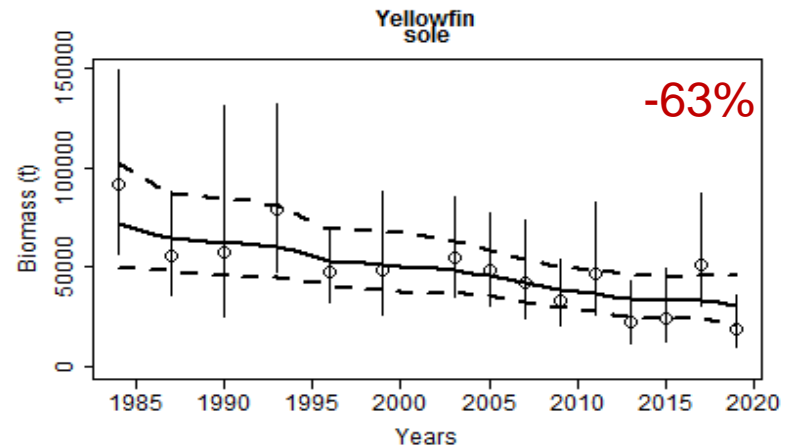
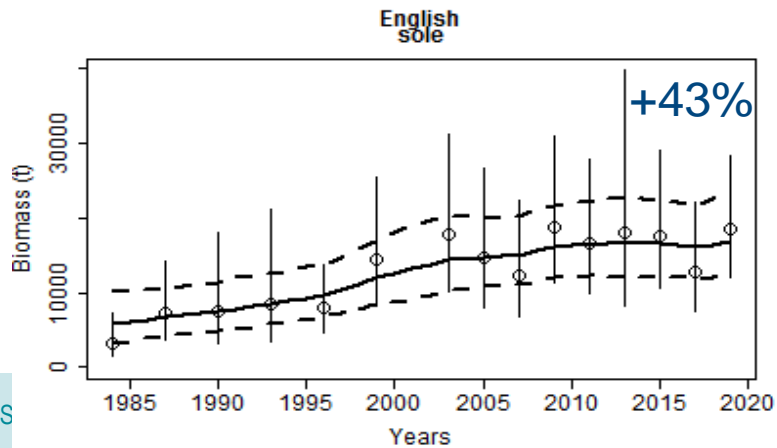
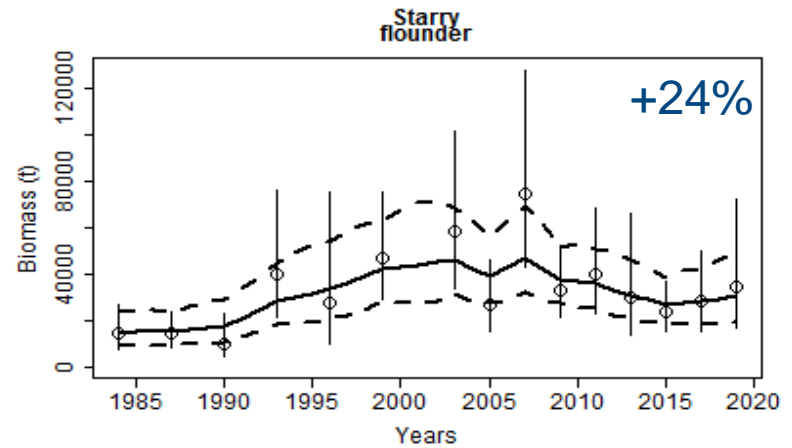
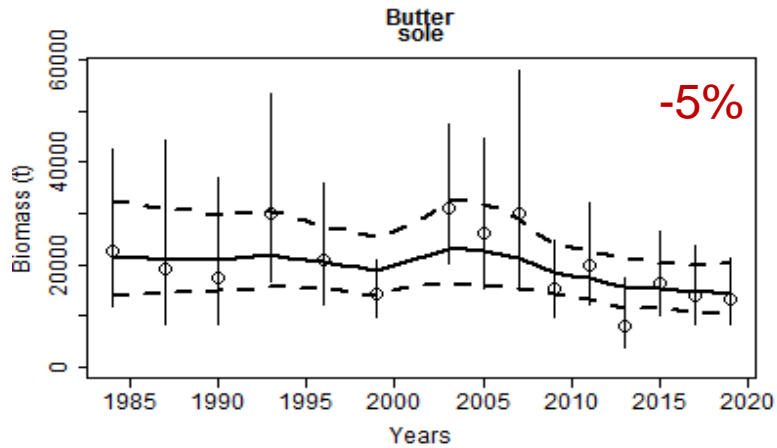
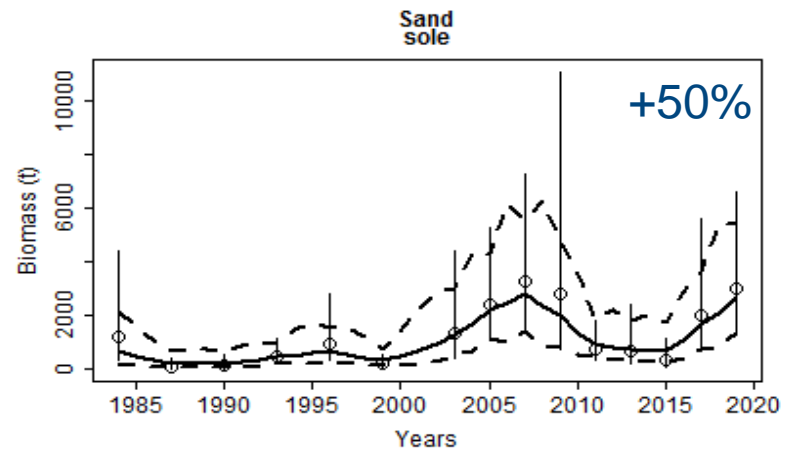
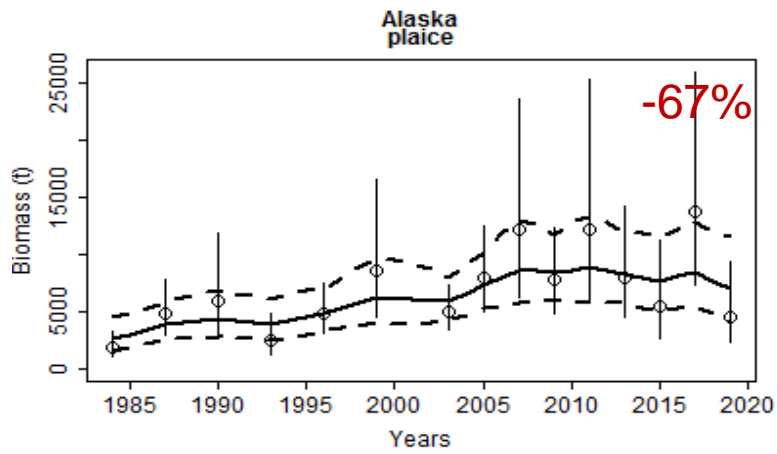
Catch-biomass ratios





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Assessment of the shallow-water flatfish stock complex in the Gulf of Alaska



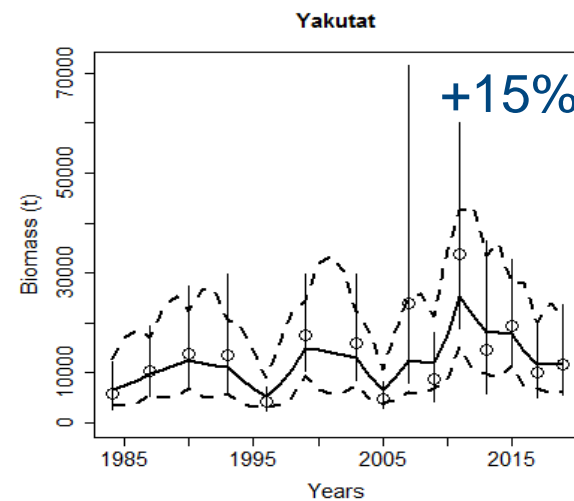
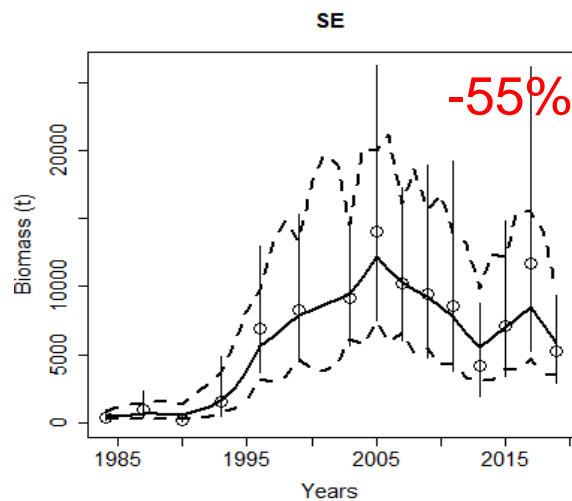
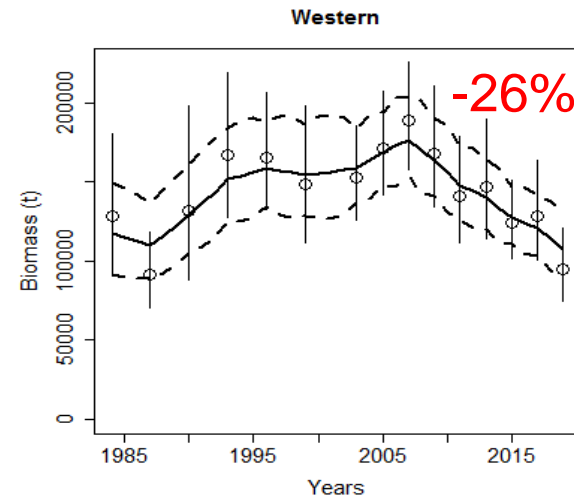
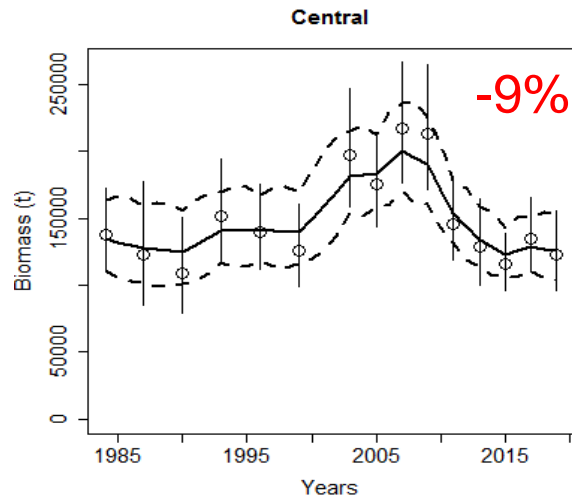
						<i>As specified last year for:</i>				<i>As recommended this year for:</i>			
						2019		2020		2020		2021	
Species	Tier	FABC	FOFL	2019	2020	ABC	OFL	ABC	OFL	ABC	OFL	ABC	OFL
				Biomass ¹	Biomass ¹								
Northern rock sole	3a	0.382	0.462	94,619	95,275	17,331	20,582	17,548	20,836	17,655	20,962	17,897	21,246
Southern rock sole	3a	0.271	0.326	142,193	145,405	21,794	25,779	22,298	26,383	22,390	26,491	23,094	27,326
Yellowfin sole	5	0.15	0.2	31259	31259	5,293	7,057	5,293	7,057	4,689	6,252	4,689	6,252
Butter sole	5	0.15	0.2	14304	14304	2,455	3,274	2,455	3,274	2,146	2,861	2,146	2,861
Starry flounder	5	0.15	0.2	30605	30605	4,421	5,895	4,421	5,895	4,591	6,121	4,591	6,121
English sole	5	0.15	0.2	16943	16943	2,432	3,242	2,432	3,242	2,541	3,389	2,541	3,389
Sand sole	5	0.15	0.2	2673	2673	227	302	227	302	401	535	401	535
Alaska plaice	5	0.15	0.2	6997	6997	1,634	2,178	1,634	2,178	1,050	1,399	1,050	1,399
Total				339,593	343,461	55,587	68,309	56,308	69,167	55,463	68,010	56,409	69,129



Quantity	As estimated or <i>specified last year for:</i>		As estimated or <i>recommended this year for:</i>	
	2019	2020	2020	2021
M (natural mortality rate)	0.2	0.2	0.2	0.2
Tier	3a and 5	3a and 5	3a and 5	3a and 5
Biomass (t)	343,755	345,304	339,593	343,461
F_{OFL}	*	*	*	*
$maxF_{ABC}$	*	*	*	*
F_{ABC}	*	*	*	*
OFL (t)	68,309	69,167	68,010	69,129
maxABC (t)	55,587	56,308	55,463	56,409
ABC (t)	55,587	56,308	55,463	56,409
Status	As determined <i>last year for:</i>		As determined <i>this year for:</i>	
	2017	2018	2018	2019
Overfishing	No	NA	No	NA

Area apportionment

Area	Central	Western	Southeast	W. Yakutat
Proportion	50%	43%	2%	5%



Summary

Stock/Assemblage	Area	2019				2020		2021	
		OFL	ABC	TAC	Catch	OFL	ABC	OFL	ABC
Shallow-water flatfish	W	--	25,620	13,250	72	--	23,849	--	24,256
	C	--	25,731	25,731	1861	--	27,732	--	28,205
	WYAK	--	2,279	2,279	<1	--	2,773	--	2,820
	SEO	--	1,957	1,957	<1	--	1,109	--	1,128
	Total		68,309	55,587	43,217	68,010	55,463	69,129	56,409



