

## **6. Assessment of the Rex Sole Stock in the Gulf of Alaska**

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**[NOTE: The GOA groundfish Plan Team evaluated catches and noted that they were minor differences so continued to use the projections from 2019 for the 2021 and 2022 specifications (as shown below). An updated partial assessment will be conducted in 2021, and a full assessment in 2023.]**

### **Summary of Results**

Based on the projection model results which were updated in 2019, the recommended ABC for 2021 and 2022 in the Western-Central GOA is 11,925 t, and the OFL is 14,512 t. The recommended ABC for 2021 and 2022 in the Eastern GOA is 3,491 t, and the OFL is 4,267 t. The principal reference values are shown in the following three tables. The first table shows quantities for the entire GOA, the second table shows quantities for the Western-Central GOA, and the third table shows quantities for the Eastern GOA. The Western-Central and Eastern GOA are based on a Tier 3a approach, and the entire GOA table is simply the sum of the two areas.

<b>Quantity</b>	As estimated or <i>specified last year for:</i>		As estimated or <i>recommended this year for:</i>	
	2020	2021	2021	2022
<i>M</i> (natural mortality rate)	0.17	0.17	0.17	0.17
Tier	3a	3a	3a	3a
Projected total (3+) biomass (t)	100,198	101,244	101,244	101,244
Female spawning biomass (t)	43,855	44,500	44,500	44,500
<i>B</i> <sub>100%</sub>	See area-specific tables below		See area-specific tables below	
<i>B</i> <sub>40%</sub>				
<i>B</i> <sub>35%</sub>				
<i>F</i> <sub>OFL</sub>				
<i>maxF</i> <sub>ABC</sub>				
<i>F</i> <sub>ABC</sub>				
OFL (t)	18,127	18,779	18,779	18,779
maxABC (t)	14,878	15,416	15,416	15,416
ABC (t)	14,878	15,416	15,416	15,416
<b>Status</b>	As determined <i>last</i> year for:		As determined <i>this</i> year for:	
	2018	2019	2019	2020
Overfishing	no	n/a	no	n/a
Overfished	n/a	no	n/a	no
Approaching overfished	n/a	no	n/a	no

<b>Quantity: (Western-Central GOA)</b>	As estimated or <i>specified last year for:</i>		As estimated or <i>recommended this year for:</i>	
	2020	2021	2021	2022
<i>M</i> (natural mortality rate)	0.17	0.17	0.17	0.17
Tier	3a	3a	3a	3a
Projected total (3+) biomass (t)	78,755	79,666	79,666	79,666
Female spawning biomass (t)	34,948	35,506	35,506	35,506
<i>B</i> <sub>100%</sub>	48,138	48,138	48,138	48,138
<i>B</i> <sub>40%</sub>	19,255	19,255	19,255	19,255
<i>B</i> <sub>35%</sub>	16,848	16,848	16,848	16,848
<i>F</i> <sub>OFL</sub>	0.29	0.29	0.29	0.29
<i>maxF</i> <sub>ABC</sub>	0.23	0.23	0.23	0.23
<i>F</i> <sub>ABC</sub>	0.23	0.23	0.23	0.23
OFL (t)	13,974	14,512	14,512	14,512
maxABC (t)	11,480	11,925	11,925	11,925
ABC (t)	11,480	11,925	11,925	11,925
<b>Status</b>	As determined <i>last year for:</i>		As determined <i>this year for:</i>	
	2018	2019	2019	2020
Overfishing	no	n/a	no	n/a
Overfished	n/a	no	n/a	no
Approaching overfished	n/a	no	n/a	no

\* Projections are based on the final catch of 2017-2018 from the Western and Central GOA of 1,483 t and 1,749 t and estimated catches of 1,574 t and 2,103 t that were used in place of maximum permissible ABC for 2019 and 2020-2021, respectively. The 2019 projected catch was calculated as the current catch of GOA rex sole in the Western and Central GOA as of October 19, 2019 added to the average October 19 – December 31 GOA rex sole catches over the 5 previous years. The 2020-2021 projected catch was calculated as the average catch over the previous five years.

Quantity: (Eastern GOA)	As estimated or <i>specified last year for:</i>		As estimated or <i>recommended this year for:</i>	
	2020	2021	2021	2022
<i>M</i> (natural mortality rate)	0.17	0.17	0.17	0.17
Tier	3a	3a	3a	3a
Projected total (3+) biomass (t)	21,443	21,578	21,578	21,578
Female spawning biomass (t)	8,907	8,994	8,994	8,994
<i>B</i> <sub>100%</sub>	9,597	9,597	9,597	9,597
<i>B</i> <sub>40%</sub>	3,839	3,839	3,839	3,839
<i>B</i> <sub>35%</sub>	3,359	3,359	3,359	3,359
<i>F</i> <sub>OFL</sub>	0.31	0.31	0.31	0.31
<i>maxF</i> <sub>ABC</sub>	0.25	0.25	0.25	0.25
<i>F</i> <sub>ABC</sub>	0.25	0.25	0.25	0.25
OFL (t)	4,153	4,267	4,267	4,267
maxABC (t)	3,398	3,491	3,491	3,491
ABC (t)	3,398	3,491	3,491	3,491
Status	As determined <i>last year for:</i>		As determined <i>this year for:</i>	
	2018	2019	2019	2020
Overfishing	no	n/a	no	n/a
Overfished	n/a	no	n/a	no
Approaching overfished	n/a	no	n/a	no

\* Projections are based on the final catch of 2017-2018 from the Eastern GOA and estimated catches of 2.3 t and 1.5 t that were used in place of maximum permissible ABC for 2019 and 2020-2021, respectively. The 2019 projected catch was calculated as the current catch of GOA rex sole in the Eastern GOA as of October 19, 2019. The 2020-2021 projected catch was calculated as the average catch over the previous five years. In many years catches from the Eastern GOA are small and confidential.

## Area Apportionment

The table below shows apportionment of the 2021 and 2022 ABCs among areas. The ABCs calculated for the Western-Central area (based on model estimates) are apportioned based on random effects model predictions of the proportion of Western-Central survey biomass in the Western and Central areas, respectively, in 2021-2022. Likewise, the ABC calculated for the Eastern area (based on model estimates) are apportioned based on random effects model predictions of the proportion Eastern survey biomass in the West Yakutat and Southeast areas, respectively.

<b>Quantity</b>	<b>Western</b>	<b>Central</b>	<b>Total Western- Central</b>	<b>West Yakutat</b>	<b>Southeast</b>	<b>Total Eastern</b>
Area						
Apportionment	25.27%	74.73%	100.00%	34.55%	65.45%	100.00%
2021 ABC (t)	3,013	8,912	11,925	1,206	2,285	3,491
2022 ABC (t)	3,013	8,912	11,925	1,206	2,285	3,491