

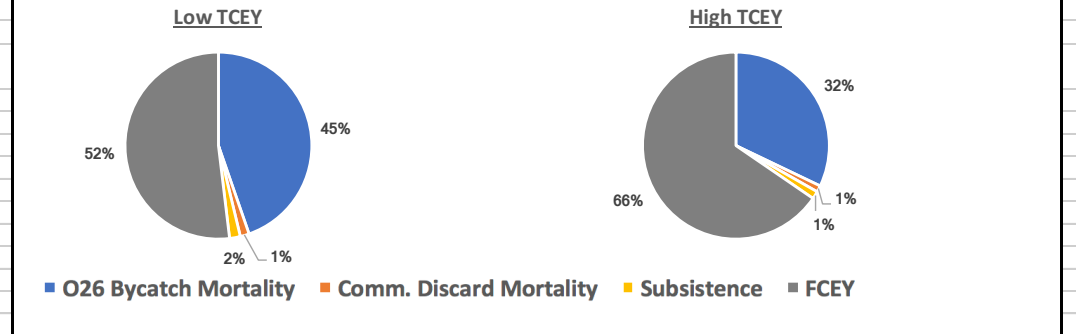
## Directed Fishery ABM Scenario

- Area 4 Setline Survey as the Primary Index, EBS Trawl Survey as the Secondary Index
- Starting Point – 1,958 mt (2017 PSC Use)
- Ceiling – 3,515 mt
- Floor – 1,000 mt
- Primary Index, Secondary Index, and Starting Point all reflect 2017 values
- Area 4CDE Directed Fishery share of removals is restored to historical share

Inputs:		Scenario - Change in Abundance from 2017:	
Starting Point	1,958	Setline Survey	0%
Ceiling	3,515	Trawl Survey	0%
Floor	1,000		
Primary Index - Area 4 Setline Survey		Bycatch Area & Size Composition:	
Standardized Year	2017	% of BSAI Bycatch Mortality in 4CDE	82.1%
Primary Index Reference	7,250	% of 4CDE Bycatch that is O26	65.0%
Primary Index Rate Change	1.0		
Secondary Index - EBS Trawl Survey, Standardized to 2017			
Secondary Index Reference	126,684		
Low Threshold	1.00		
High Threshold	1.00		
Low Multiplier on Slope	0.35	Multiplier values closer to zero slow the rate of change	
High Multiplier on Slope	0.35		

Scenario Results:						Average Use (2016-2018)	Average % Use of Limit
Sector	Starting PSC Limit (mt)	ABM PSC Limit (mt)	Change in PSC Limit	Use - % of Limit	PSC Mortality (mt)		
A80	972	972	0.00%	95%	923	1,290	74%
TLAS	415	415	0.00%	95%	394	498	67%
Longline	395	395	0.00%	40%	158	161	23%
CDQ	175	175	0.00%	90%	158	157	50%
<b>Total</b>	<b>1,958</b>	<b>1,958</b>	<b>0.00%</b>	<b>83%</b>	<b>1,634</b>	<b>2,106</b>	<b>60%</b>
Area 4CDE, M lbs. net weight		Starting Low TCEY	Low TCEY	% Change	Starting High TCEY	High TCEY	% Change
TCEY		3.22	3.22	0%	4.49	4.49	0%
O26 Bycatch Mortality		1.44	1.44	0%	1.44	1.44	0%
U26 Bycatch Mortality		0.78	0.78	0%	0.78	0.78	0%
Comm. Discard Mortality		0.05	0.05	0%	0.05	0.05	0%
Subsistence		0.06	0.06	0%	0.06	0.06	0%
FCEY		1.67	1.67	0%	2.94	2.94	0%

Year	Setline Index	Standardized Setline	Trawl Index	Standardized Trawl	Slope Modifier	ABM PSC Limit	Without Secondary
1998	18,502	2.552	161,256	1.27	0.10	3,515	3,515
1999	16,201	2.235	129,116	1.02	0.01	3,515	3,515
2000	16,203	2.235	118,677	0.94	-0.02	3,515	3,515
2001	13,780	1.901	141,219	1.11	0.04	3,515	3,515
2002	12,104	1.670	101,706	0.80	-0.07	3,134	3,269
2003	10,866	1.499	132,151	1.04	0.02	2,964	2,935
2004	9,987	1.378	130,075	1.03	0.01	2,716	2,697
2005	9,550	1.317	132,518	1.05	0.02	2,611	2,579
2006	9,802	1.352	155,964	1.23	0.08	2,806	2,647
2007	9,673	1.334	143,903	1.14	0.05	2,706	2,612
2008	10,264	1.416	140,247	1.11	0.04	2,845	2,772
2009	9,834	1.356	168,102	1.33	0.11	2,880	2,656
2010	9,146	1.262	195,535	1.54	0.19	2,843	2,470
2011	8,669	1.196	186,666	1.47	0.17	2,666	2,341
2012	8,403	1.159	189,000	1.49	0.17	2,606	2,269
2013	7,989	1.102	183,989	1.45	0.16	2,468	2,158
2014	7,995	1.103	171,427	1.35	0.12	2,401	2,159
2015	8,130	1.121	172,237	1.36	0.13	2,442	2,196
2016	7,826	1.079	153,704	1.21	0.07	2,260	2,114
2017	7,250	1.000	126,684	1.00	0.00	1,958	1,958
2018	7,141	0.985	NA	NA	NA	NA	1,929
Mean	10,444	1.440	151,709	1.20	0.07	2,956	2,820
<b>Scenario</b>	<b>7,250</b>	<b>1.000</b>	<b>126,684</b>	<b>1.00</b>	<b>0.00</b>	<b>1,958</b>	<b>1,958</b>



In the Scenario Results box above, you can see the effect of a change in abundance from 2017 on the PSC Limit and on the directed fishery harvest in Area 4CDE. It reflects the % change in abundance of either or both surveys and estimated % of PSC Use by sector, which can be changed above. Low TCEY and High TCEY values represent either end of the 95% confidence range of where TCEY may land, given the Setline Index value.

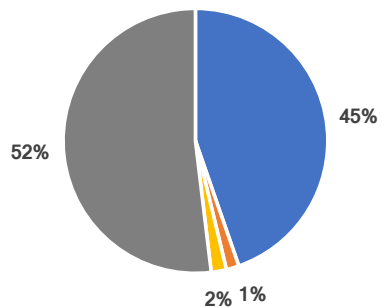
# Directed Fishery ABM Scenario – DEFAULT

<b>Inputs:</b>		<b>Scenario - Change in Abundance from 2017:</b>	
Starting Point	<b>1,958</b>	Setline Survey	<b>0%</b>
Ceiling	<b>3,515</b>	Trawl Survey	<b>0%</b>
Floor	<b>1,000</b>		
<b>Primary Index - Area 4 Setline Survey</b>		<b>Bycatch Area &amp; Size Composition:</b>	
Standardized Year	<b>2017</b>	% of BSAI Bycatch Mortality in 4CDE	82.1%
Primary Index Reference	7,250	% of 4CDE Bycatch that is O26	65.0%
Primary Index Rate Change	<b>1.0</b>		
<b>Secondary Index - EBS Trawl Survey, Standardized to 2017</b>			
Secondary Index Reference	126,684		
Low Threshold	<b>1.00</b>		
High Threshold	<b>1.00</b>		
Low Multiplier on Slope	<b>0.35</b>	Multiplier values closer to zero slow the rate of change	
High Multiplier on Slope	<b>0.35</b>		

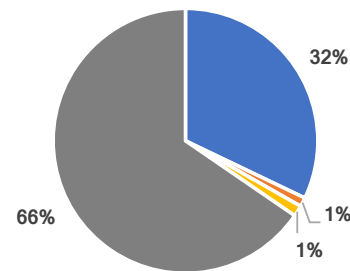
<b>Scenario Results:</b>						Average Use (2016-2018)	Average % Use of Limit
Sector	Starting PSC Limit (mt)	ABM PSC Limit (mt)	Change in PSC Limit	Use - % of Limit	PSC Mortality (mt)		
A80	972	<b>972</b>	0.00%	<b>95%</b>	<b>923</b>	1,290	74%
TLAS	415	<b>415</b>	0.00%	<b>95%</b>	<b>394</b>	498	67%
Longline	395	<b>395</b>	0.00%	<b>40%</b>	<b>158</b>	161	23%
CDQ	175	<b>175</b>	0.00%	<b>90%</b>	<b>158</b>	157	50%
<b>Total</b>	<b>1,958</b>	<b>1,958</b>	<b>0.00%</b>	<b>83%</b>	<b>1,634</b>	<b>2,106</b>	<b>60%</b>

Area 4CDE, M lbs. net weight	Starting Low TCEY	Low TCEY	% Change	Starting High TCEY	High TCEY	% Change
TCEY	3.22	<b>3.22</b>	0%	4.49	<b>4.49</b>	0%
O26 Bycatch Mortality	1.44	<b>1.44</b>	0%	1.44	<b>1.44</b>	0%
U26 Bycatch Mortality	0.78	<b>0.78</b>	0%	0.78	<b>0.78</b>	0%
Comm. Discard Mortality	0.05	<b>0.05</b>	0%	0.05	<b>0.05</b>	0%
Subsistence	0.06	<b>0.06</b>	0%	0.06	<b>0.06</b>	0%
FCEY	1.67	<b>1.67</b>	0%	2.94	<b>2.94</b>	0%

**Low TCEY**



**High TCEY**



■ O26 Bycatch Mortality 
 ■ Comm. Discard Mortality 
 ■ Subsistence 
 ■ FCEY

## Directed Fishery ABM Scenario – Increased Starting Point of 2,354 MT

Inputs:		Scenario - Change in Abundance from 2017:	
Starting Point	<b>2,354</b>	Setline Survey	<b>0%</b>
Ceiling	<b>3,515</b>	Trawl Survey	<b>0%</b>
Floor	<b>1,000</b>		
<u>Primary Index - Area 4 Setline Survey</u>		<u>Bycatch Area &amp; Size Composition:</u>	
Standardized Year	<b>2017</b>	% of BSAI Bycatch Mortality in 4CDE	82.1%
Primary Index Reference	7,250	% of 4CDE Bycatch that is O26	65.0%
Primary Index Rate Change	<b>1.0</b>		
<u>Secondary Index - EBS Trawl Survey, Standardized to 2017</u>			
Secondary Index Reference	126,684		
Low Threshold	<b>1.00</b>		
High Threshold	<b>1.00</b>		
Low Multiplier on Slope	<b>0.35</b>	Multiplier values closer to zero slow the rate of change	
High Multiplier on Slope	<b>0.35</b>		

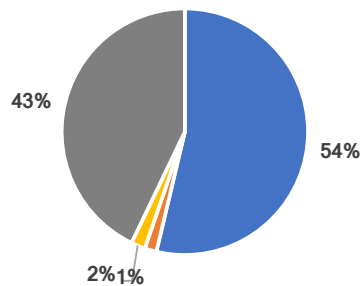
An increased starting point allows for higher PSC Mortality and decreases the proportional share of removals for the directed fishery

Scenario Results:						Average Use (2016-2018)	Average % Use of Limit
Sector	Starting PSC Limit (mt)	ABM PSC Limit (mt)	Change in PSC Limit	Use - % of Limit	PSC Mortality (mt)		
A80	1,169	<b>1,169</b>	0.00%	<b>95%</b>	<b>1,110</b>	1,290	74%
TLAS	499	<b>499</b>	0.00%	<b>95%</b>	<b>474</b>	498	67%
Longline	475	<b>475</b>	0.00%	<b>40%</b>	<b>190</b>	161	23%
CDQ	211	<b>211</b>	0.00%	<b>90%</b>	<b>190</b>	157	50%
<b>Total</b>	<b>2,354</b>	<b>2,354</b>	0.00%	83%	<b>1,964</b>	2,106	60%

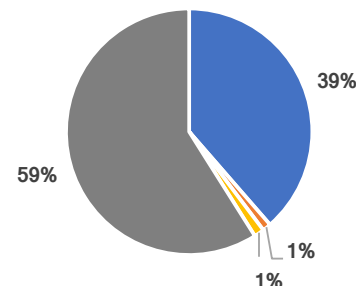
  

Area 4CDE, M lbs. net weight	Starting Low TCEY	Low TCEY	% Change	Starting High TCEY	High TCEY	% Change
TCEY	3.22	<b>3.22</b>	0%	4.49	<b>4.49</b>	0%
O26 Bycatch Mortality	1.73	<b>1.73</b>	0%	1.73	<b>1.73</b>	0%
U26 Bycatch Mortality	0.93	<b>0.93</b>	0%	0.93	<b>0.93</b>	0%
Comm. Discard Mortality	0.05	<b>0.05</b>	0%	0.05	<b>0.05</b>	0%
Subsistence	0.06	<b>0.06</b>	0%	0.06	<b>0.06</b>	0%
FCEY	1.38	<b>1.38</b>	0%	2.65	<b>2.65</b>	0%

**Low TCEY**



**High TCEY**



■ O26 Bycatch Mortality ■ Comm. Discard Mortality ■ Subsistence ■ FCEY

## Directed Fishery ABM Scenario – Increased Floor of 1,777 MT is hit at a 10% decline in abundance

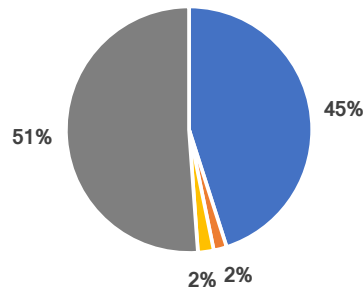
Inputs:		Scenario - Change in Abundance from 2017:	
Starting Point	1,958	Setline Survey	-10%
Ceiling	3,515	Trawl Survey	0%
Floor	1,777		
Primary Index - Area 4 Setline Survey		Bycatch Area & Size Composition:	
Standardized Year	2017	% of BSAI Bycatch Mortality in 4CDE	82.1%
Primary Index Reference	7,250	% of 4CDE Bycatch that is O26	65.0%
Primary Index Rate Change	1.0		
Secondary Index - EBS Trawl Survey, Standardized to 2017			
Secondary Index Reference	126,684		
Low Threshold	1.00		
High Threshold	1.00		
Low Multiplier on Slope	0.35	Multiplier values closer to zero slow the rate of change	
High Multiplier on Slope	0.35		

A Floor of 1,777 mt is hit with just a 10% reduction in abundance identified by the primary index

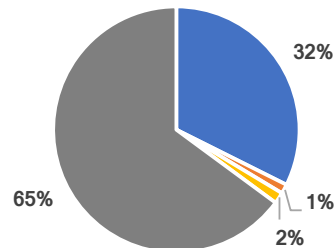
Scenario Results:						Average Use (2016-2018)	Average % Use of Limit
Sector	Starting PSC Limit (mt)	ABM PSC Limit (mt)	Change in PSC Limit	Use - % of Limit	PSC Mortality (mt)		
A80	972	882	-9.24%	95%	838	1,290	74%
TLAS	415	377	-9.24%	95%	358	498	67%
Longline	395	359	-9.24%	40%	144	161	23%
CDQ	175	159	-9.24%	90%	143	157	50%
<b>Total</b>	<b>1,958</b>	<b>1,777</b>	<b>-9.24%</b>	<b>83%</b>	<b>1,483</b>	<b>2,106</b>	<b>60%</b>

Area 4CDE, M lbs. net weight	Starting Low TCEY	Low TCEY	% Change	Starting High TCEY	High TCEY	% Change
TCEY	3.22	2.90	-10%	4.49	4.04	-10%
O26 Bycatch Mortality	1.44	1.31	-9%	1.44	1.31	-9%
U26 Bycatch Mortality	0.78	0.70	-9%	0.78	0.70	-9%
Comm. Discard Mortality	0.05	0.05	0%	0.05	0.05	0%
Subsistence	0.06	0.06	0%	0.06	0.06	0%
FCEY	1.67	1.48	-11%	2.94	2.62	-11%

**Low TCEY**



**High TCEY**



■ O26 Bycatch Mortality ■ Comm. Discard Mortality ■ Subsistence ■ FCEY

## Directed Fishery ABM Scenario – Increased Floor of 1,777 MT at a 20% decline in abundance

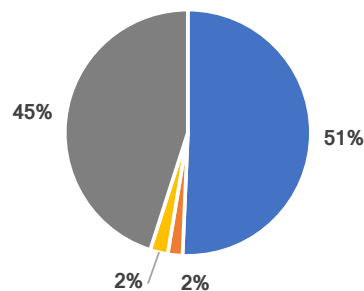
<b>Inputs:</b>		<b>Scenario - Change in Abundance from 2017:</b>	
Starting Point	<b>1,958</b>	Setline Survey	<b>-20%</b>
Ceiling	<b>3,515</b>	Trawl Survey	<b>0%</b>
Floor	<b>1,777</b>		
<b>Primary Index - Area 4 Setline Survey</b>		<b>Bycatch Area &amp; Size Composition:</b>	
Standardized Year	<b>2017</b>	% of BSAI Bycatch Mortality in 4CDE	82.1%
Primary Index Reference	7,250	% of 4CDE Bycatch that is O26	65.0%
Primary Index Rate Change	<b>1.0</b>		
<b>Secondary Index - EBS Trawl Survey, Standardized to 2017</b>			
Secondary Index Reference	126,684		
Low Threshold	<b>1.00</b>		
High Threshold	<b>1.00</b>		
Low Multiplier on Slope	<b>0.35</b>	Multiplier values closer to zero slow the rate of change	
High Multiplier on Slope	<b>0.35</b>		

Further declines in abundance beyond 10% result in the directed fishery bearing the burden of conservation

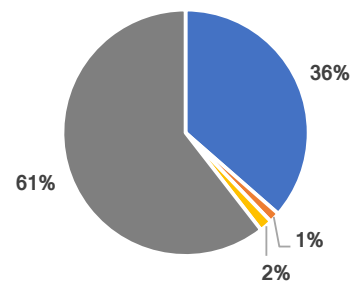
FCEY is reduced from 52% to 45%

<b>Scenario Results:</b>						Average Use (2016-2018)	Average % Use of Limit
Sector	Starting PSC Limit (mt)	ABM PSC Limit (mt)	Change in PSC Limit	Use - % of Limit	PSC Mortality (mt)		
A80	972	<b>882</b>	-9.24%	<b>95%</b>	<b>838</b>	1,290	74%
TLAS	415	<b>377</b>	-9.24%	<b>95%</b>	<b>358</b>	498	67%
Longline	395	<b>359</b>	-9.24%	<b>40%</b>	<b>144</b>	161	23%
CDQ	175	<b>159</b>	-9.24%	<b>90%</b>	<b>143</b>	157	50%
<b>Total</b>	<b>1,958</b>	<b>1,777</b>	<b>-9.24%</b>	<b>83%</b>	<b>1,483</b>	<b>2,106</b>	<b>60%</b>
Area 4CDE, M lbs. net weight	Starting Low TCEY	Low TCEY	% Change	Starting High TCEY	High TCEY	% Change	
TCEY	3.22	<b>2.58</b>	-20%	4.49	<b>3.59</b>	-20%	
O26 Bycatch Mortality	1.44	<b>1.31</b>	-9%	1.44	<b>1.31</b>	-9%	
U26 Bycatch Mortality	0.78	<b>0.70</b>	-9%	0.78	<b>0.70</b>	-9%	
Comm. Discard Mortality	0.05	<b>0.05</b>	0%	0.05	<b>0.05</b>	0%	
Subsistence	0.06	<b>0.06</b>	0%	0.06	<b>0.06</b>	0%	
FCEY	1.67	<b>1.16</b>	-31%	2.94	<b>2.17</b>	-26%	

**Low TCEY**



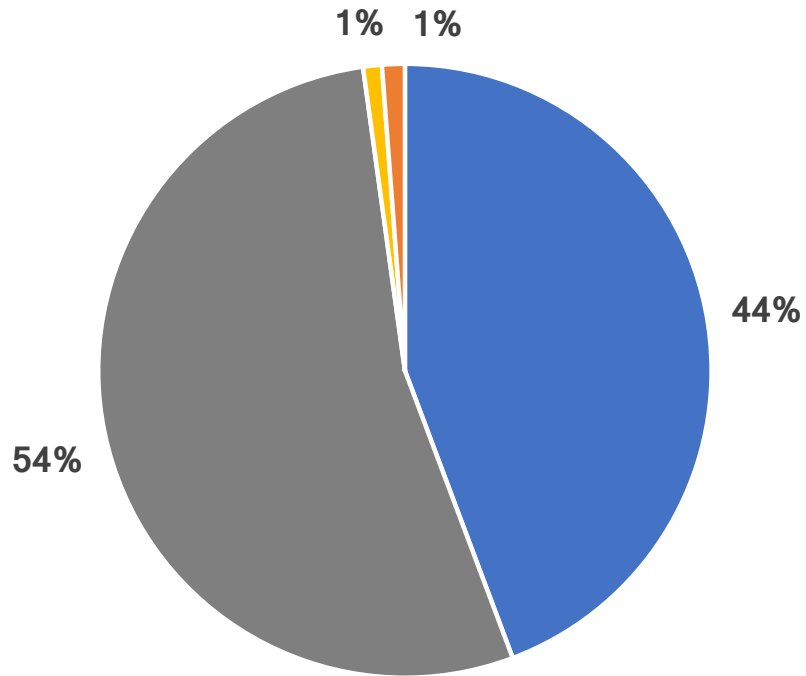
**High TCEY**



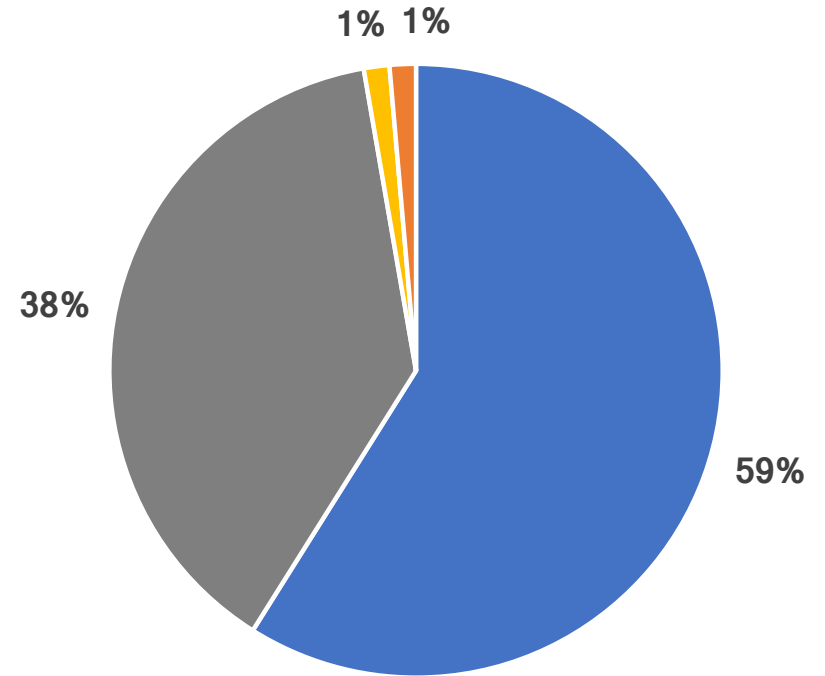
■ O26 Bycatch Mortality ■ Comm. Discard Mortality ■ Subsistence ■ FCEY

## Comparison of O26 Halibut Removals in Area 4CDE

Average, 2002-2011



Average, 2014-2018



■ O26 Bycatch    ■ Directed Fishery    ■ Subsistence    ■ Comm. Discard

- 2019 Catch Limit of 2.04M lbs is 51% of total O26 Removals, 2018 O26 Bycatch projected forward is 47% of total