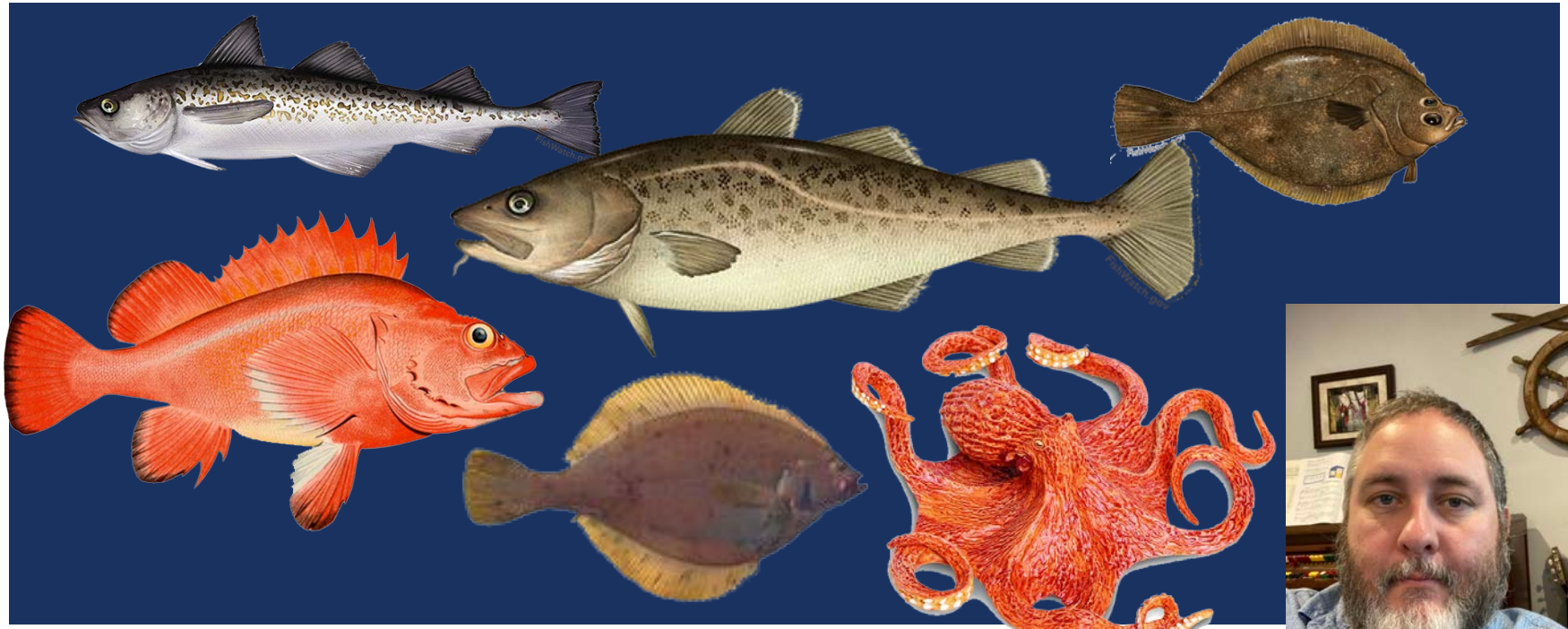
REPORT OF THE SEPTEMBER 2020 BSAI GROUNDFISH PLAN TEAM MEETING

STEVE BARBEAUX

OCTOBER 5, 2020



MEETING OVERVIEW

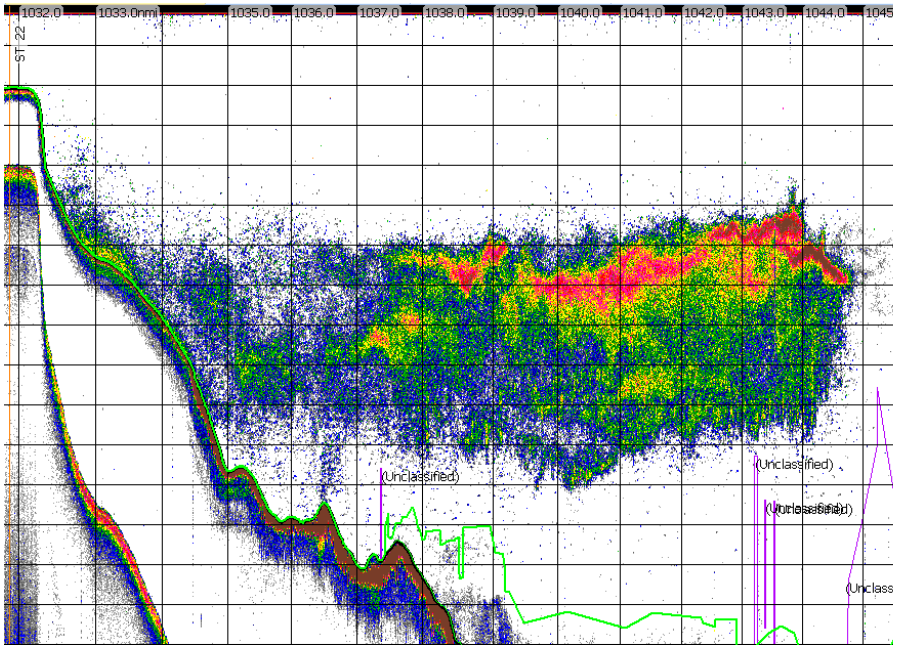
- Dates: September 9-10
- Place: Cyberspace
- Leaders: Grant Thompson, Steve Barbeaux (co-chairs); Steve MacLean (coordinator)
- Participation: 12 Team members present, plus numerous AFSC and AKRO staff and members of the public
- Documents and presentation files available on the Team agenda site

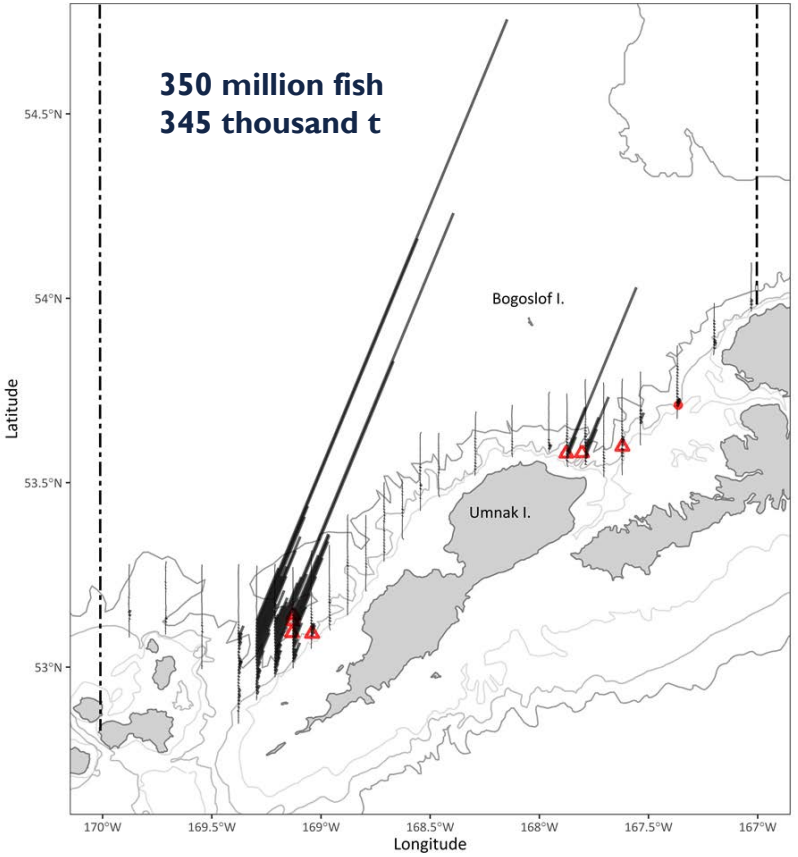
AGENDA (ACTION ITEMS IN RED)

- Administrative
- EBS and Bogoslof Pollock
- BSAI Blackspotted/Rougheye Rockfish
- BSAI Northern Rock Sole
- BSAI Yellowfin Sole
- EBS Pacific Cod
- NBS Pacific Cod Tagging
- Octopus Stock Structure
- 2021 and 2022 Harvest Specification Recommendations

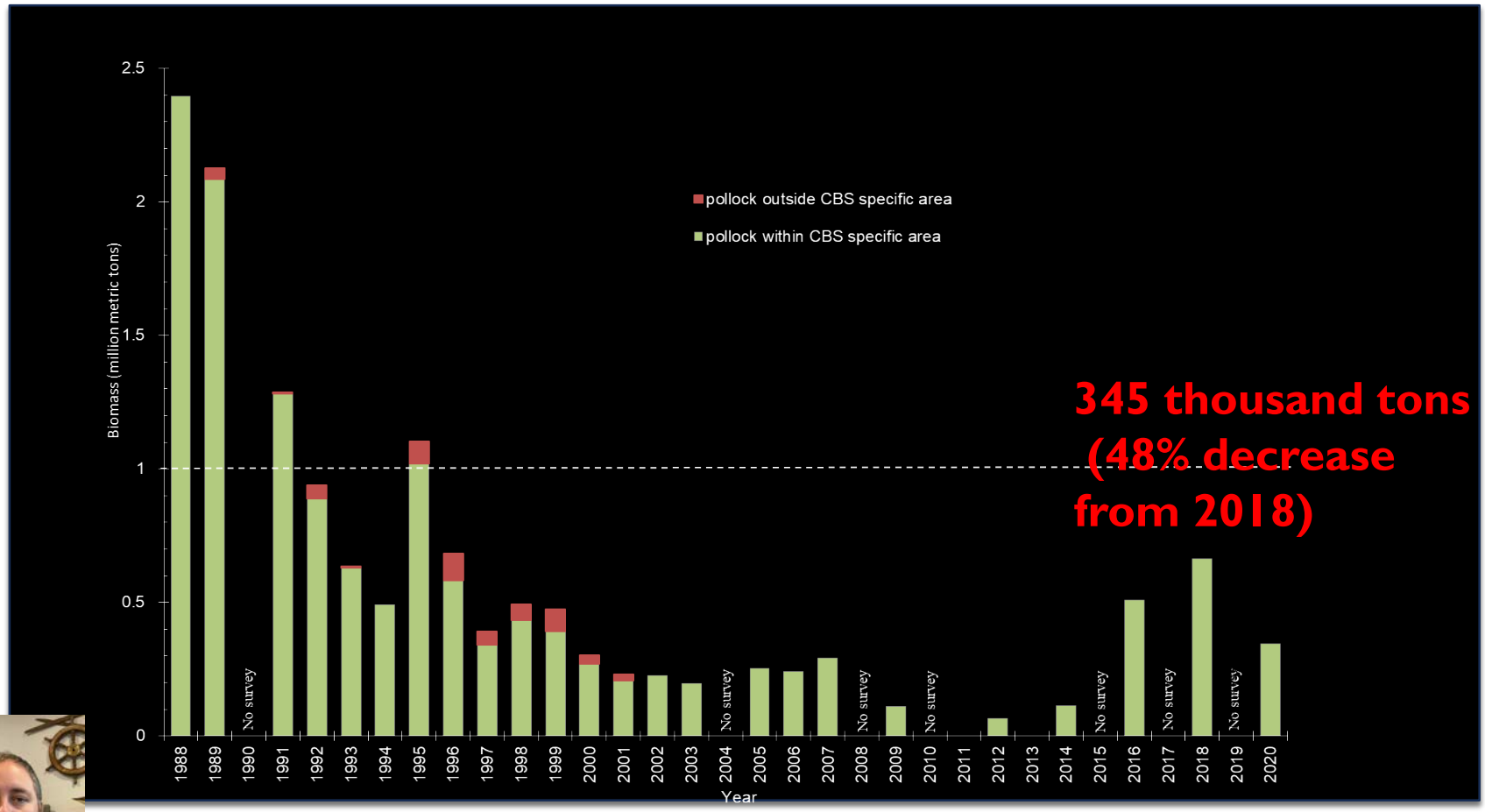
EBS AND BOGOSLOF POLLOCK (PART 1)

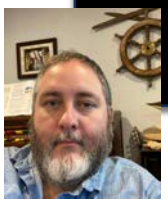
- Denise McKelvey presented the 2020 Bogosolf Island winter acoustic trawl survey





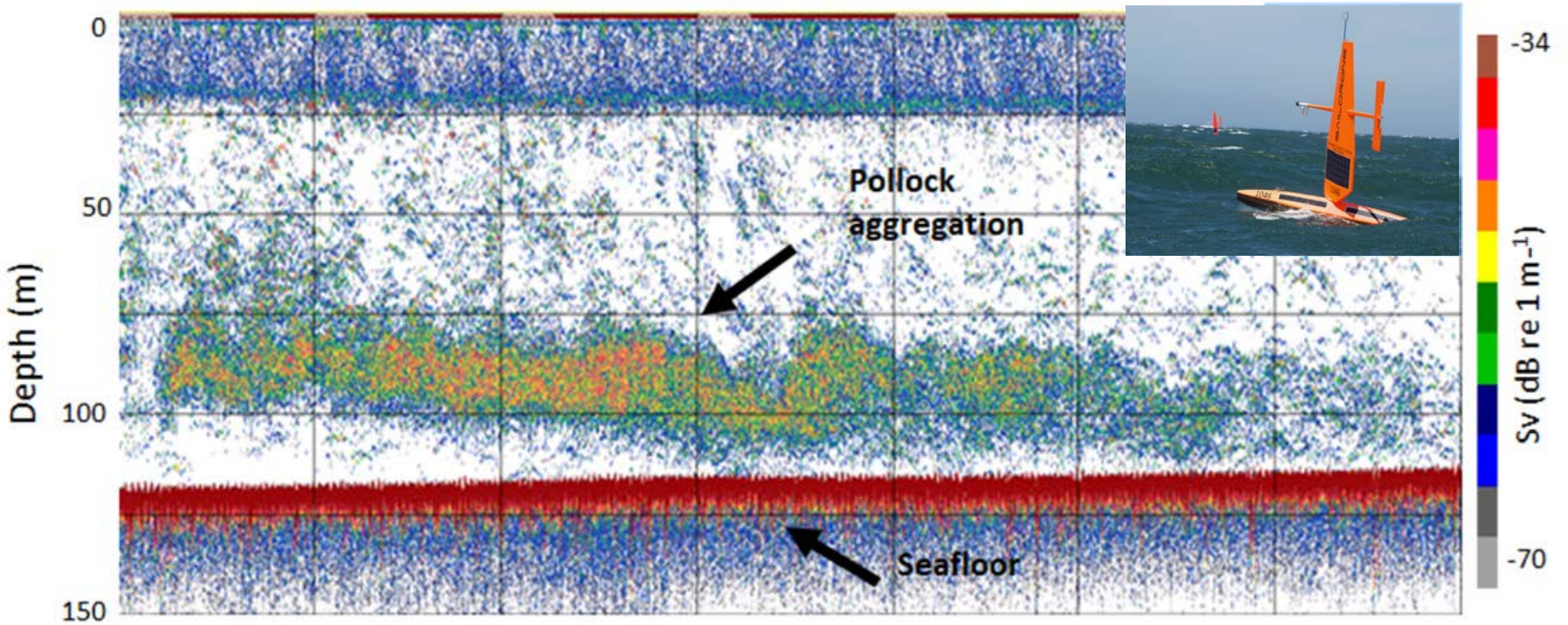
BOGOSLOF POLLOCK





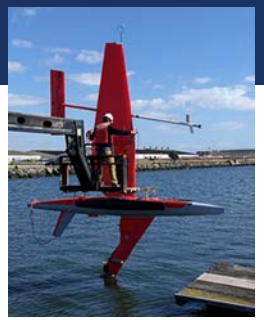
EBS AND BOGOSLOF POLLOCK (PART 2)

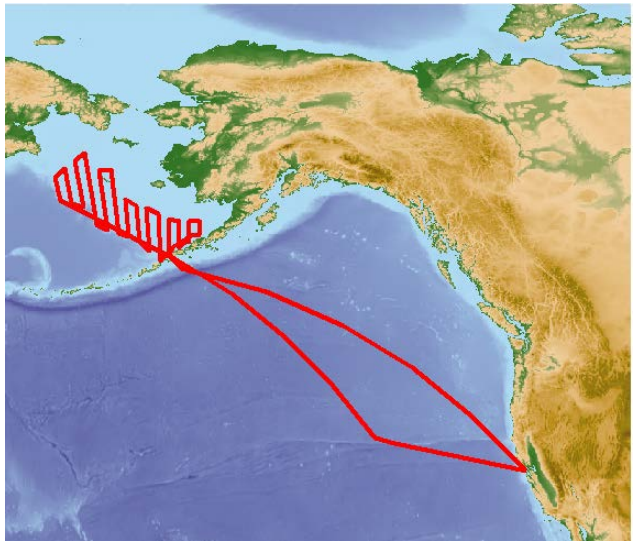
- Alex De Robertis and Jim Ianelli described the 2020 saildrone survey and plans for this year's assessment



wind is 16 knots, vehicle speed 2 knots

SAILDRONE SURVEY





Approach

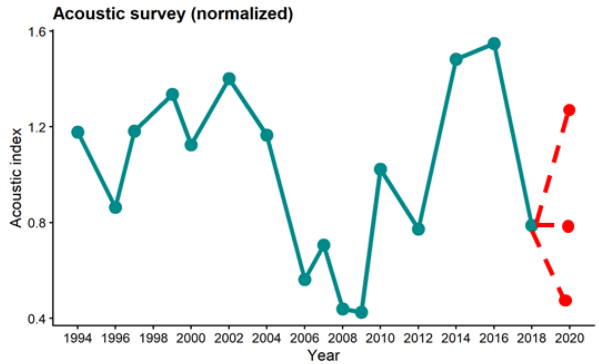
- Sail to/from Alaska
- 3 saildrones
- 40 nmi spacing
  - vs. 20 nmi for standard acoustic survey
- Survey July 4 – August 20
- Data recovery in mid-October

Limitations

- No size/age composition
- Lower sampling density
- No data until vehicles are recovered

Future Plans

- Recover data, add a 2020 to acoustic time series
- Quantify uncertainty in new index
- Incorporate index in assessment model

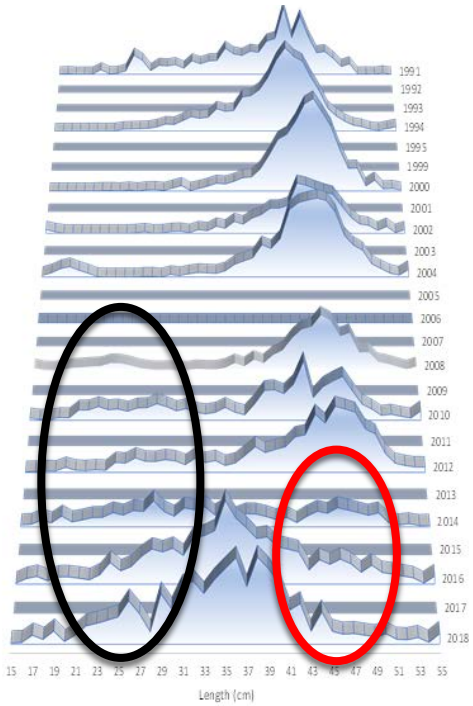


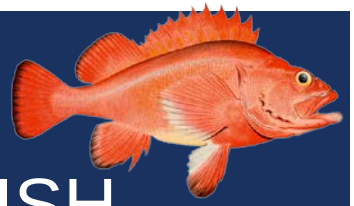
EBS AND BOGOSLOF POLLOCK: TEAM ACTION

- The Team thanked the authors and researchers involved with this project on the effort, speed, and ingenuity needed to collect 2020 biomass index for 2020 pollock assessment
- The November assessment will include the saildrone index of abundance (if possible) and updated catch data
- The Team supports the plan to evaluate model results that include saildrone-based acoustic data in the 2020 EBS pollock assessment
- The SSC went with a different model in 2019 than the Team
  - Both will be presented again this year
- VAST estimates with and without cold pool covariate will be included
- In terms of fishing reports, there is evidence that the B season is poor and there are anecdotal reports of lots of small fish while overall fishing conditions are quite poor (qualitative)

BLACKSPOTTED/ROUGHEYE ROCKFISH

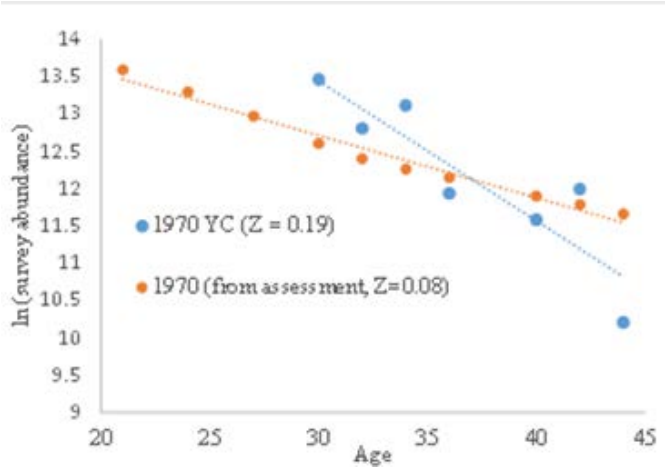
- Paul Spencer discussed issues with previous modeling efforts, responded to Team suggestions, and evaluated several new models
- Issues:
  - In recent years there has been a dramatic decline in **older** fish and a concurrent increase in **younger** fish in both the fishery and survey, but the model does not have a mechanism to explain this, and the composition data appear to be in conflict with the abundance data
  - Estimates of recruitment from large year classes have proven to be unstable, and have typically been revised downward over time
  - Choice of model has major implications for management

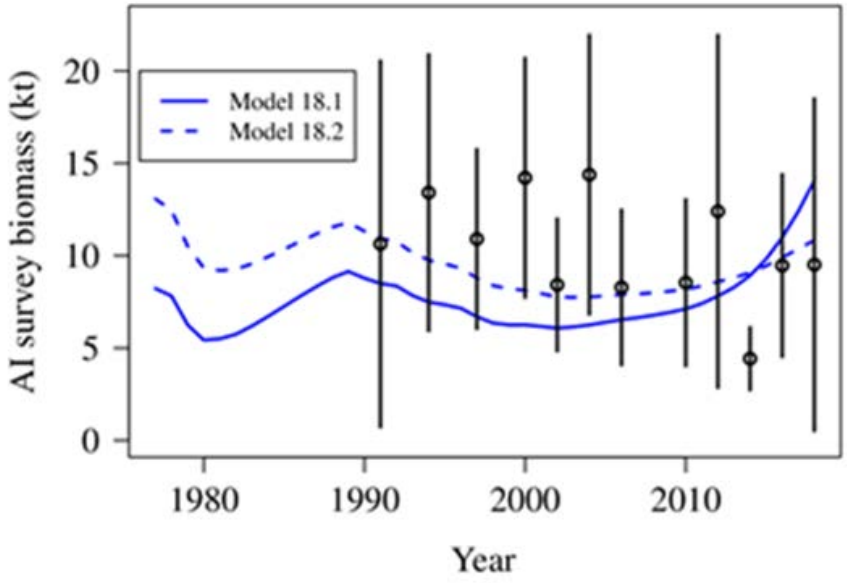


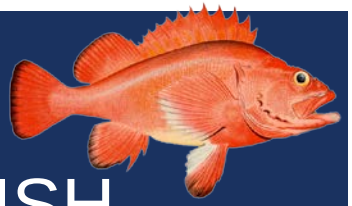


BLACKSPOTTED/ROUGHEYE ROCKFISH

- There is a mismatch between model mortality and age composition observed in the fishery and survey.
- Previous models do not fit the survey index well
  - Decreasing trend in the AI survey biomass trend, yet the 2018 population model shows a strong increase in total biomass



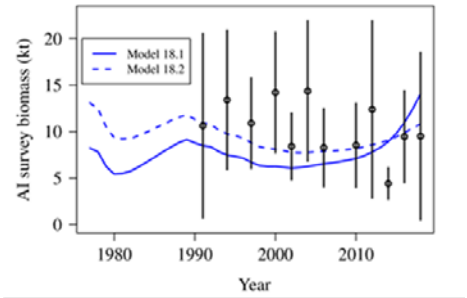




BLACKSPOTTED/ROUGHEYE ROCKFISH

Proposed model changes for November

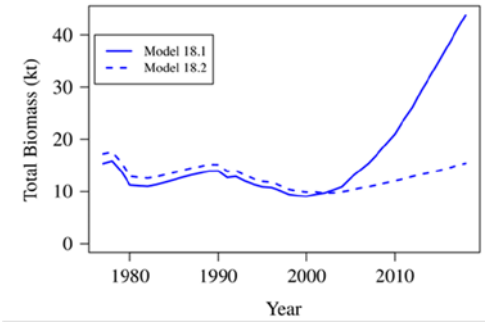
- The CV of ageing error was increased through a likelihood-based method using data from BSAI samples
- Both the mean and the variance of the natural mortality prior were increased, representing a range of methods and recent estimates from the literature
- Tested dome-shaped selectivity but did not improve model.
- Francis weighting for composition data
  - Tends to give more weight to survey index rather than age composition



Model	*Recruitment*	*SSB*
18.1	0.59	0.77
18.2	0.22	0.47
ae_m_McIan	0.22	0.59
ae_m_Francis	0.17	0.44
ae_m_drop14	-0.16	0.36

BLACKSPOTTED/ROUGHEYE ROCKFISH

- The Team agrees with the author's recommendation to pursue the following three elements for the November 2020 assessment:
  1. Updating either the natural mortality point estimate or prior distribution using recent literature,
  2. Updating the ageing error matrix with likelihood-based estimates, and
  3. Using the Francis method for weighting composition data
- The Team also recommends exploring the updated maturity data for blackspotted and rougheye rockfish



BSAI NORTHERN ROCK SOLE

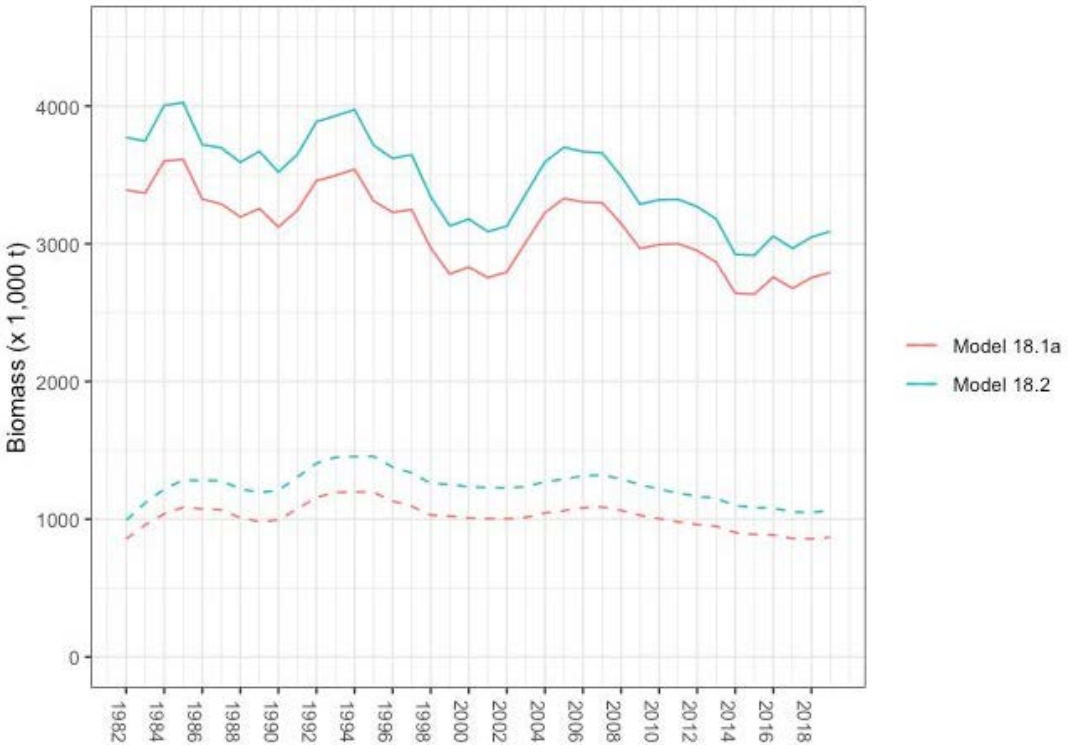
- Jim Ianelli presented a brief update on northern rock sole which highlighted an error in the data file in last year's assessment and the plan to move back to a single model approach (rather than an ensemble) this coming November
  - In preparing for this year's assessment, a data file error was found in which the spawning month was not read in correctly
  - The corrected values for projected total biomass and female spawning biomass were approximately 10% greater than documented last year
- The Team recommends using the corrected ABC and OFL values for BSAI northern rock sole in the 2021-2022 harvest specifications

BSAI YELLOWFIN SOLE

- Ingrid Spies presented an alternative model (18.2) last November, but it had not been reviewed previously and, given that there were no conservation or other concerns indicating that an immediate switch to Model 18.2 was necessary, the Team recommended staying with the base model (18.1a) last year
- Ingrid reviewed the results of last year's model comparison:
  - The objective function for M18.2 was lower than for M18.1a
  - Mohn's ρ for M18.2 was smaller (in absolute value) than for M18.1a
  - M18.2 estimated higher biomass, OFL, and ABC than M18.1a

BSAI YELLOWFIN SOLE

- Estimated total biomass (solid lines), spawning biomass (dotted lines)



BSAI YELLOWFIN SOLE

- The Team requested that both models be included for consideration in November
- The Team recommends that, if the authors have time this year, or else in the future, they should consider estimating male M freely but with female M adjusted so that the average across sexes is equal to 0.12 (e.g., $M\_female = (0.12 - (1 - P\_female) \times M\_male)/P\_female$, where P_female is the proportion of the population that is female)

EBS PACIFIC COD

- Grant Thompson gave the EBS Pacific cod presentation
- Grant described an application of cross-conditional decision analysis (CCDA) for model ensemble
- Grant also presented an alternative model requested by an industry representative with catchability at 0.47
- The Team included a section in the minutes in response to several public comments noting that the industry is suffering economically

EBS PACIFIC COD

- The primary ensemble was based on a factorial design
- Four topics from Team/SSC comments were interpreted as factors:

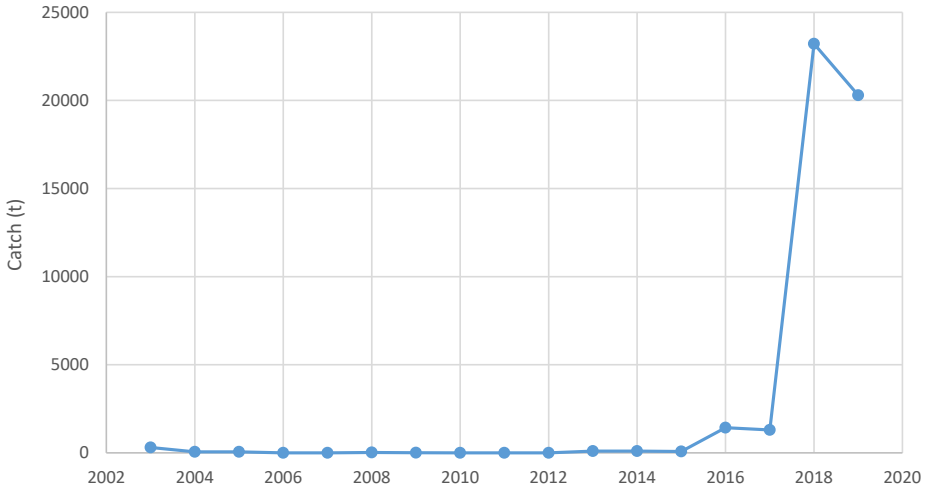
Topic	Comment(s)	Binary factor: Does the model...
M19.12 over-parameterization	SSC9	...allow time-varying survey catchability (Q)?
Spatial structure	BPT2	...treat the EBS and NBS as separate areas?
Hypotheses #2 and #3	BPT2, BPT5, SSC7	...use area-specific surveys?
Movement	BPT5, SSC11	...incorporate explicit inter-area movement?

- Model 19.12 is the base model
- Models in blue were models selected by the BSAI Plan Team to move forward in the ensemble for November (dark blue was excluded by SSC)

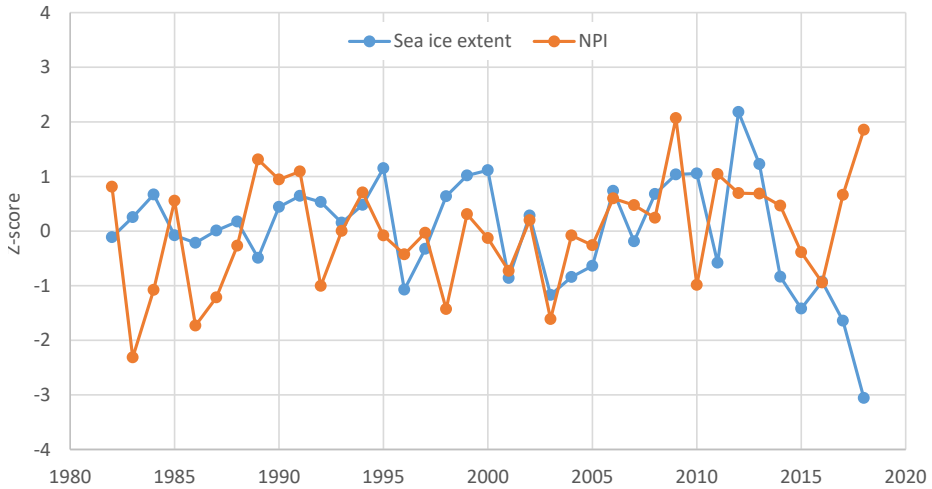
Time varying Q?	No				Yes			
Separate area?	No		Yes		No		Yes	
Separate surveys?	No	Yes	Yes		No	Yes	Yes	
Movement?	No		No	Yes	No		No	Yes
Models	**19.12a**	19.12b	20.1	19.12c	**19.12**	19.12d	20.2	20.3
No prior on Q		**20.4**	20.5	**19.12e**		**19.15**	20.6	20.7

EBS PACIFIC COD (NEW DATA)

NBS catch time series
(Catch-In-Areas not available before 2003)

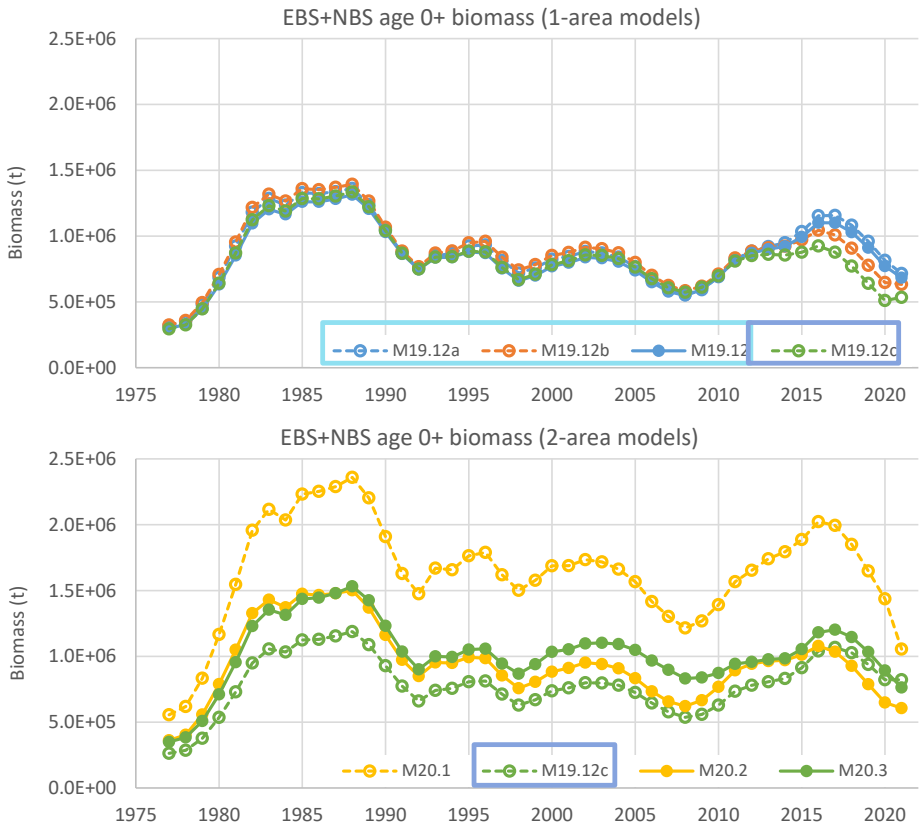


Sea ice extent and NPI, expressed as z-scores



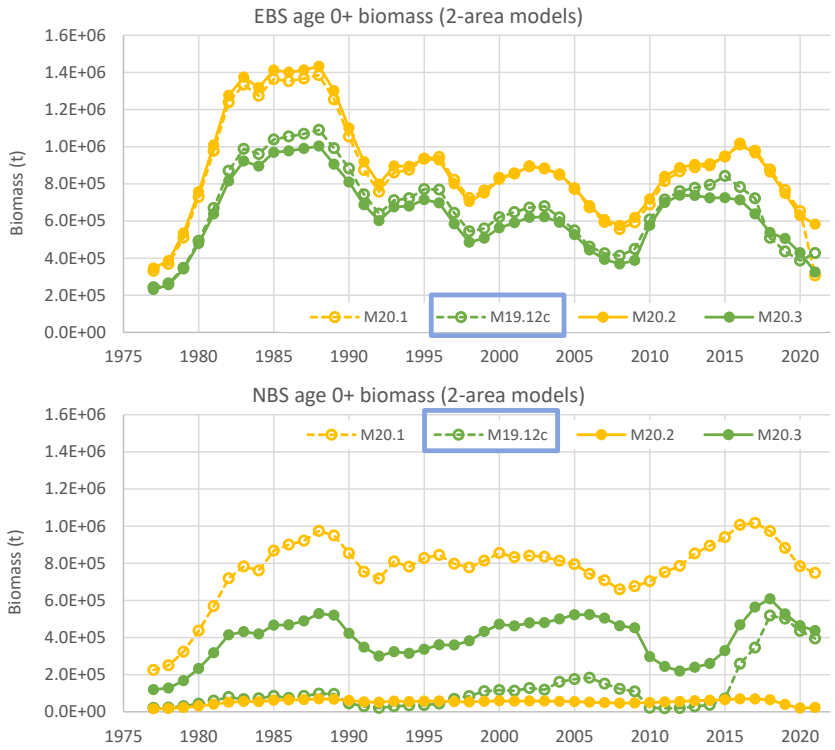
EBS PACIFIC COD

Age 0+ biomass time series, combined areas



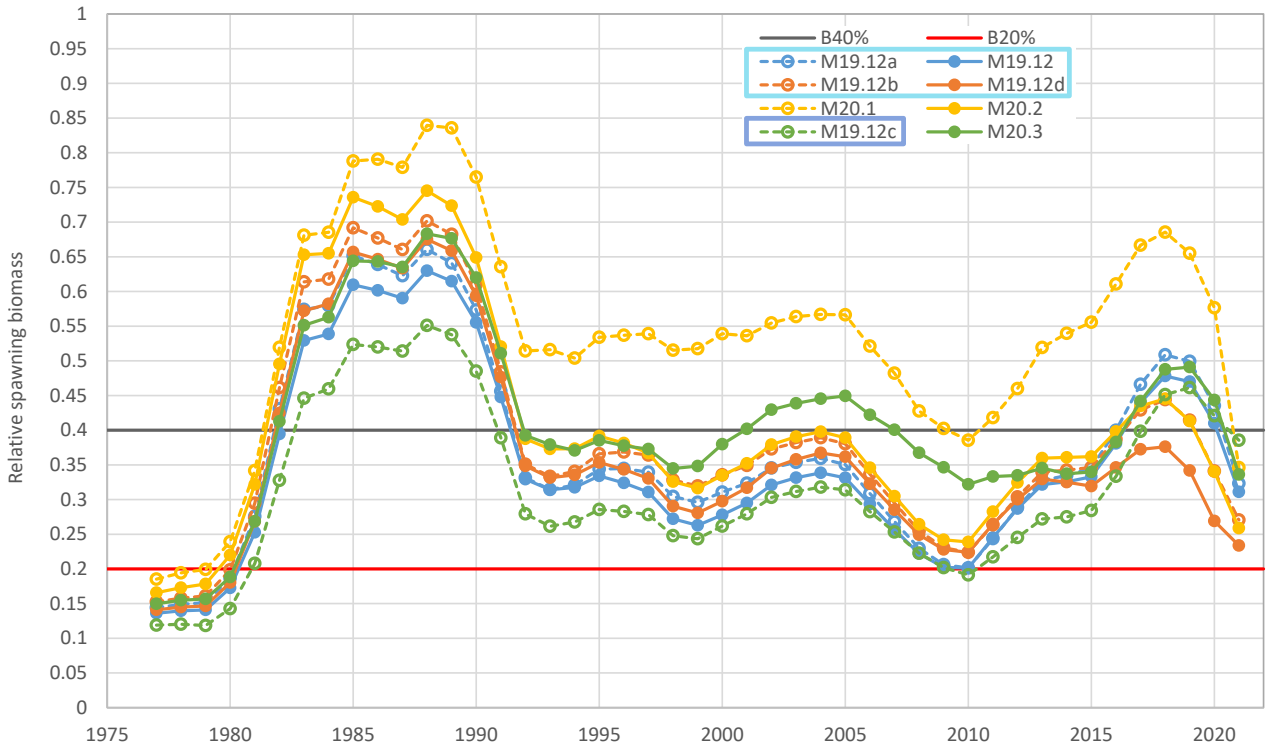
EBS PACIFIC COD

Age 0+ biomass time series, separate areas (2-area models only)



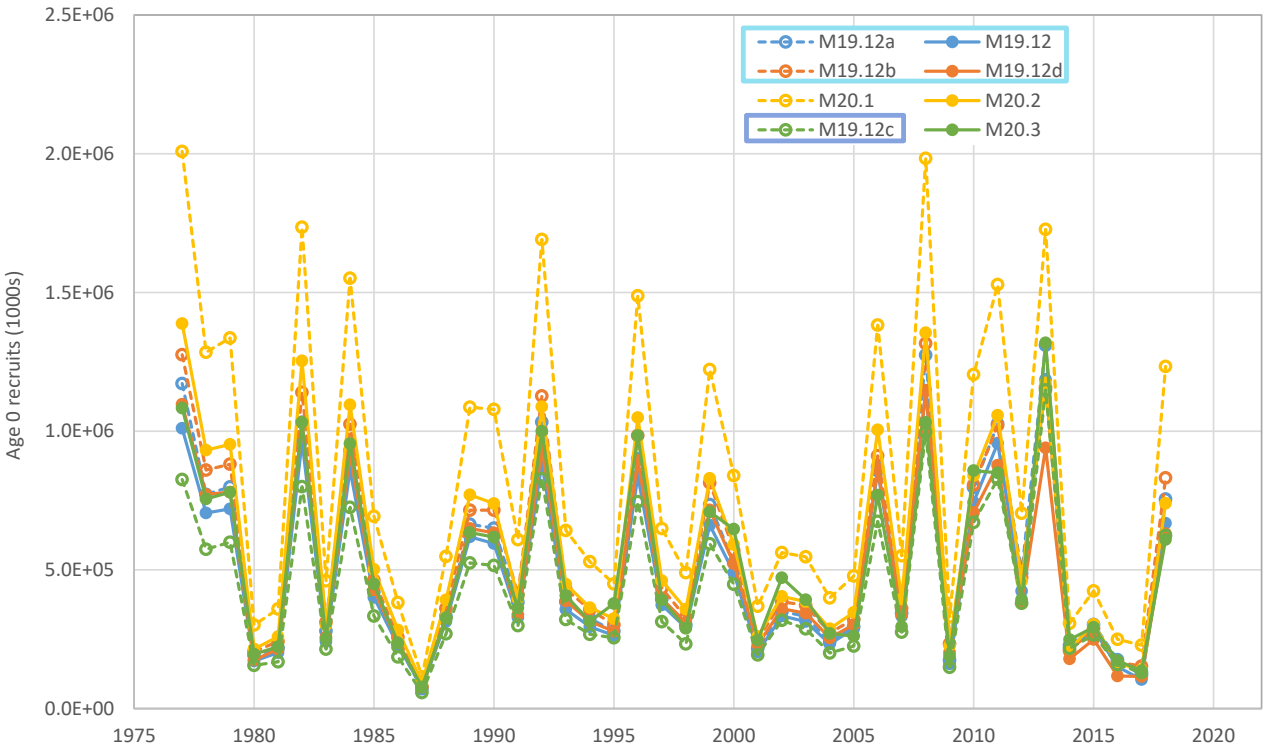
EBS PACIFIC COD

Relative spawning biomass time series, combined areas



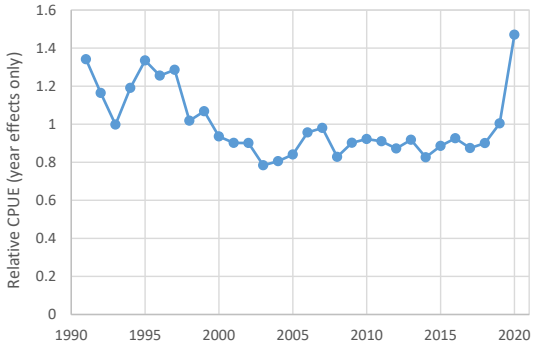
EBS PACIFIC COD

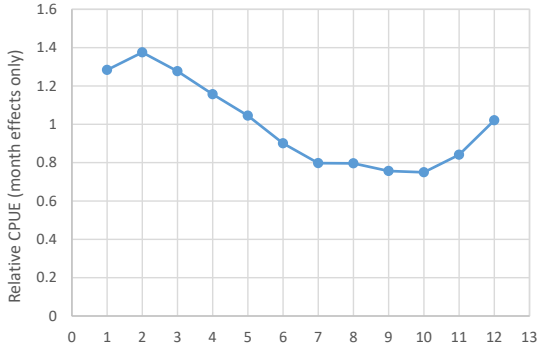
Age 0 recruitment, combined areas

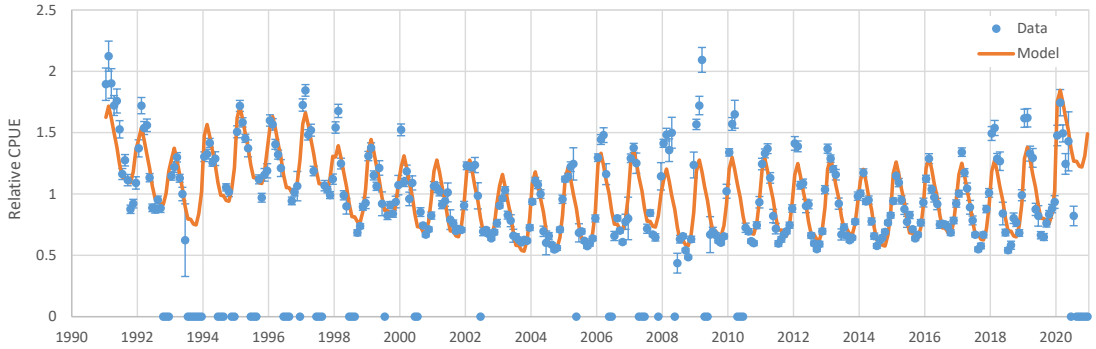


EBS PACIFIC COD

Longline fishery CPUE
(provided for context only; not used in models)







EBS PACIFIC COD

Cross-conditional decision analysis

- CCDA is a systematic method for answering a question that regularly plagues attempts to choose a single model from a set of alternatives, namely, *"But what if we're wrong?"*
- CCDA answers this question by considering not only the performance of a given model within the ensemble when the structure of that model is the "true" one, but also the performance of that model when any of the *other* models in the ensemble is the "true" one, repeating this process for each model in the ensemble
- Plan Team decided that the method was far too time consuming to be used for this November, but asked that CCDA continue to be developed and considered in the 2021 CIE review.

EBS PACIFIC COD

Post-script

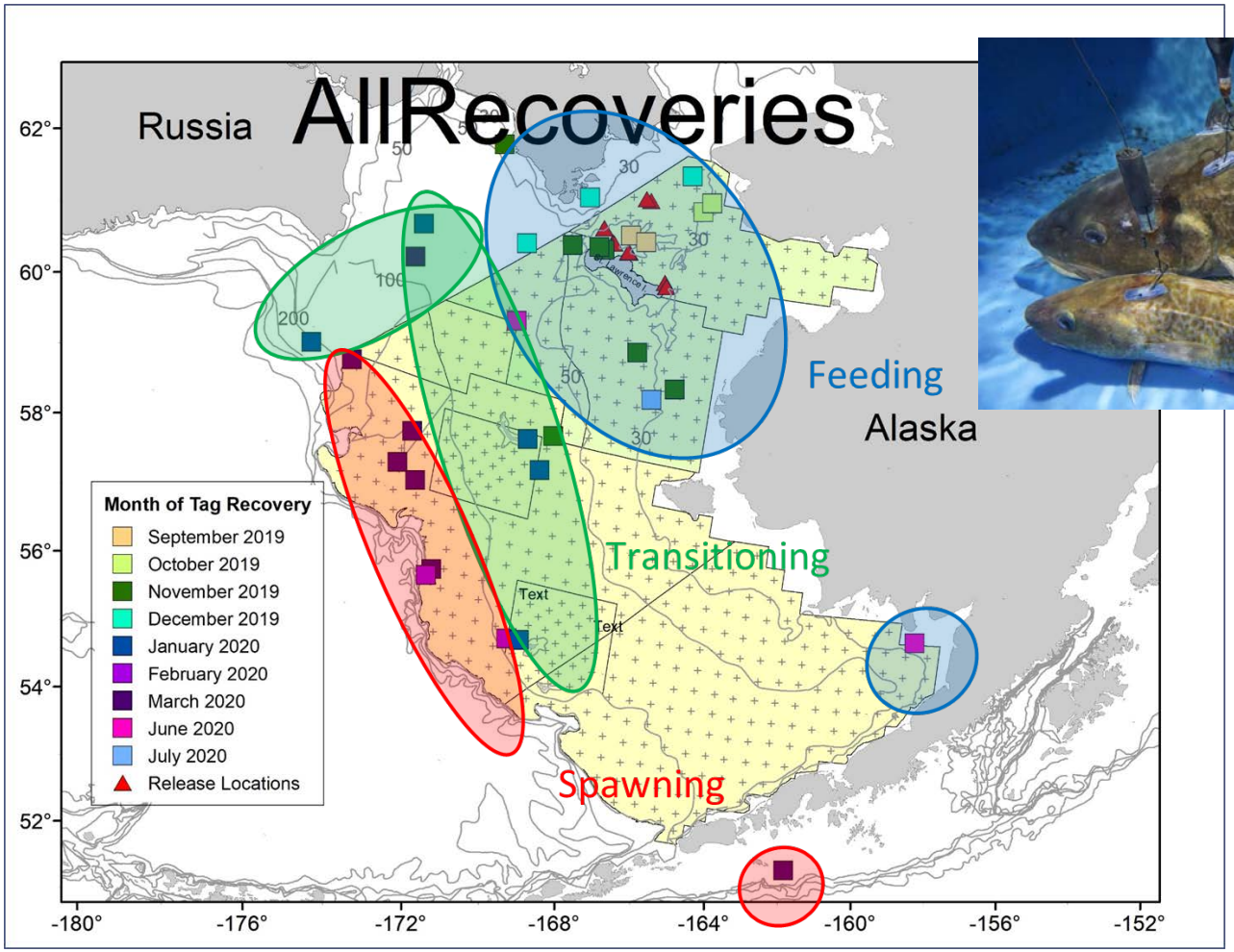
- At the request of an industry representative, an alternative version of the current base model for EBS Pacific cod (M19.12) was run
  - In the base model, the base value of catchability (Q) for the trawl survey is estimated freely at 1.034
  - In the alternative version, the base value of catchability was fixed at 0.465, which is the value that sets the average of the product of Q and survey selectivity for fish in the 60-81 cm size range equal to 0.47, corresponding to the proportion of the population within that size range estimated by Nichol et al. (2007) to be present within the depth range sampled by the survey gear
- As expected, fixing Q in the manner described has a substantial impact on projections for 2021:
  - Estimate of 2021 rel. spawn. biom. increases (0.30 → 0.60)
  - Estimate of $F_{40\%}$ increases (0.415 → 0.522)
  - Estimate of 2021 maxABC increases (113,071 t → 371,530 t)
- Document describes the history of the Nichol et al. (2007) estimate as used in the assessments, and reasons for its discontinuation

EBS PACIFIC COD

Team recommendations

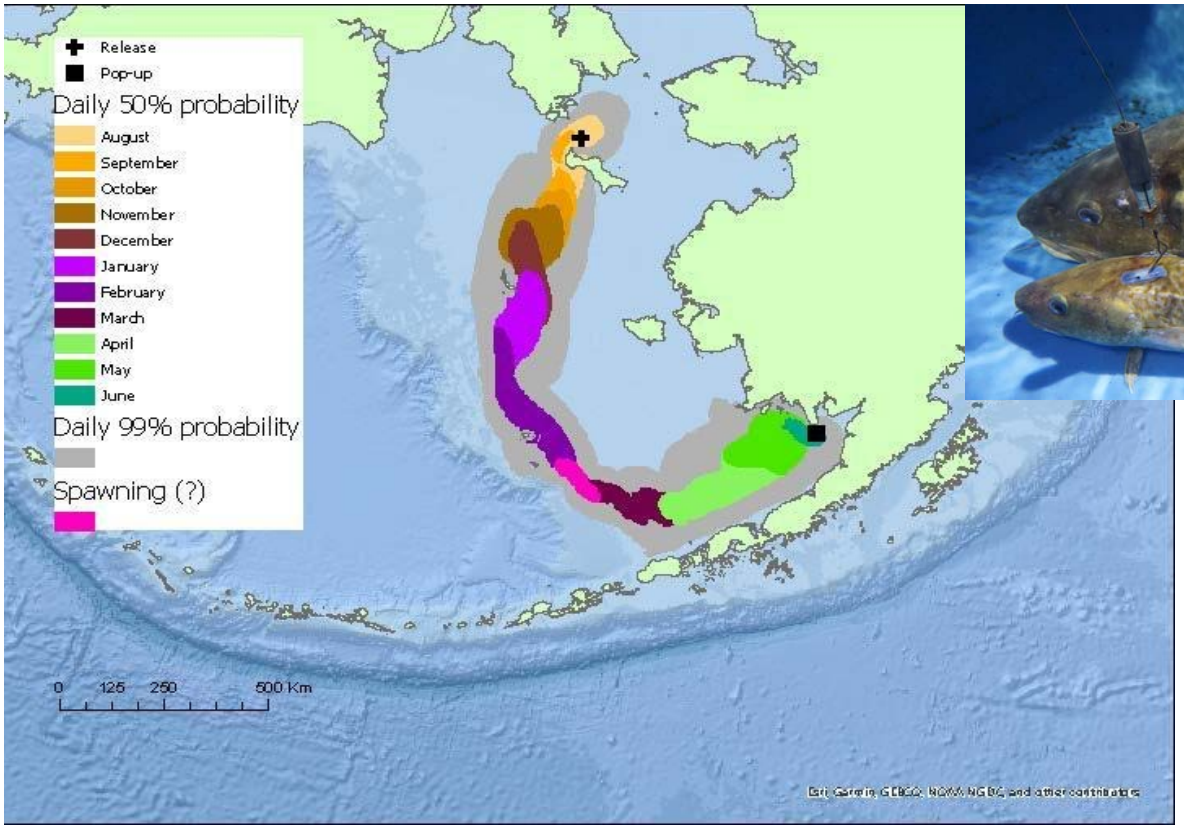
- The Team recommends that the ESR and/or ESP provide an index of movement (e.g., using the standard EBS survey stations, evaluate the proportion of Pacific cod biomass over time in the northernmost survey stations that are located between 59°N and 60°N in years 1982-2019) to validate the movement indices in this model
  - This would be needed in November if these models move forward, or if not, should be included in the 2021 Pacific cod ESP
- The Team recommends the author run the model ensemble averaging approach using models 19.12a., 20.4, 19.12e, 19.12, 19.15, and using last year's ensemble averaging methodology (without the exponential weighting as per the SSC recommendations from 2019)
- The Team welcomes any clarification from the Council regarding industry comments on considering economic factors in ABC recommendations

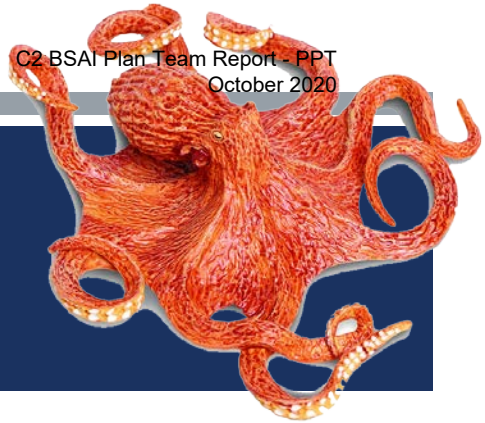
PACIFIC COD TAGGING



PACIFIC COD TAGGING

Individual Travel Path
Preliminary Geolocation Model (depth and light only)



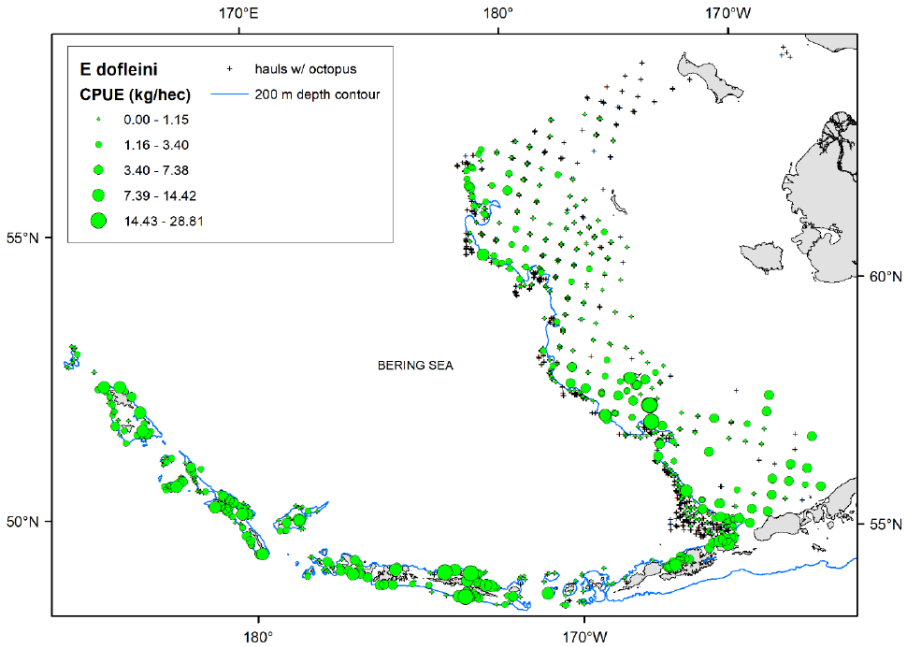


OCTOPUS STOCK STRUCTURE

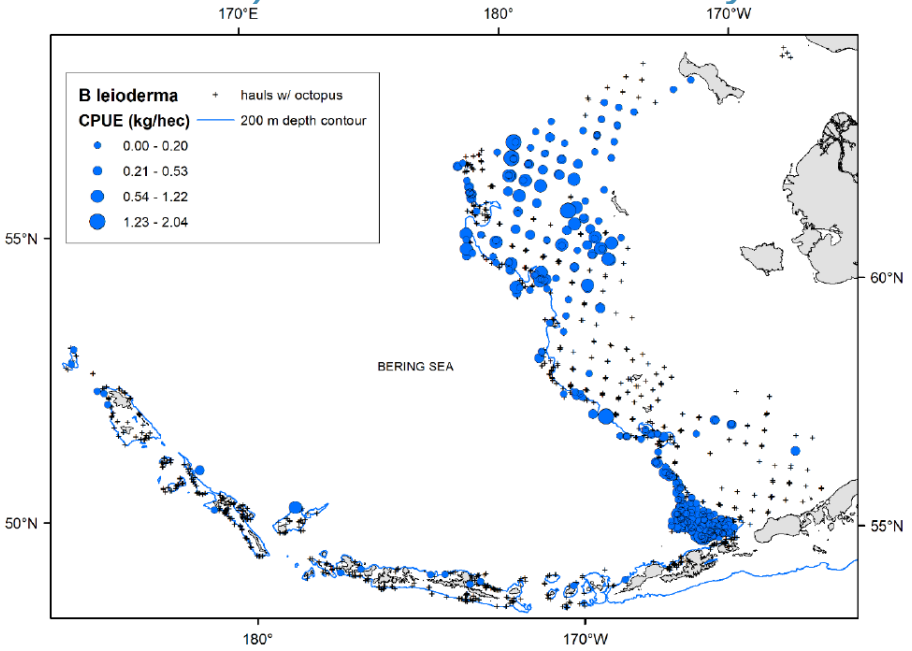
- Olav Ormseth presented the stock structure template for octopus
- The octopus complex is a data-limited, Tier 6 stock comprised of several individual species, none of which are targeted in a directed fishery
- For these reasons, the author noted that applying the stock structure template to this stock complex is problematic
- Octopus catch – both as bycatch in the fishery and in the survey – is a rare event, which can influence biomass estimates
- Biomass estimates are likely underestimates due to the untrawlable habitat octopus typically inhabit
- There are also limited species ID data available, as they have been collected only since 2010 in the survey, and not at all in the fishery

OCTOPUS STOCK STRUCTURE

Giant Pacific octopus (*Enteroctopus dofleini*) in bottom trawl surveys



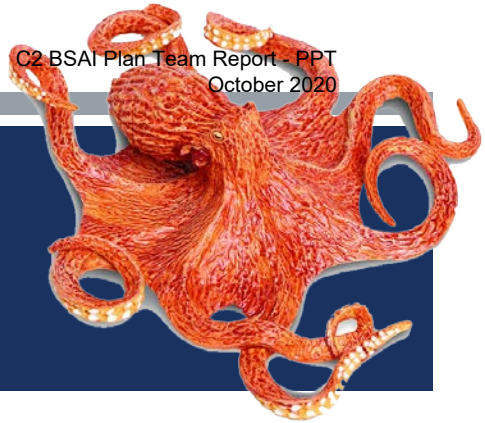
Smoothskin octopus (*Benthoctopus leioderma*) in bottom trawl surveys



OCTOPUS STOCK STRUCTURE

Exploitation rates (based on highly uncertain survey biomass estimates)

	Biomass (t)		Catch (t)		exploitation rate	
year	EBS	AI	EBS	AI	EBS	AI
2004	6,914	4,095	548	20	0.079	0.005
2010	1,441	3,075	133	49	0.092	0.016
2012	3,986	2,779	127	10	0.032	0.004
2016	9,776	3,833	585	11	0.060	0.003



OCTOPUS STOCK STRUCTURE

- Relatively few movement/tagging data are available, but movement of *E. dofleini* appears to be relatively limited once larvae settle out
  - Adult octopus are stationary 94% of the time in Prince William Sound and maintain small home ranges
  - Adult *E. dofleini* do not move over large distances (movement is measured in meters), which might contribute to geographic isolation and a high degree of population structuring
- However, there is no evidence of isolation by distance across the range from the few studies of genetic differentiation in Alaska and other regions
  - This may be due to dispersal of the planktonic larval life stage
- With respect to stock structure issues, the Team agreed with the author that the octopus complex be given a rating of "little or no concern"

Note: A Team member noted that we sometimes interpret lack of information as "little or no concern," which is different from a clear demonstration that no problems exist.

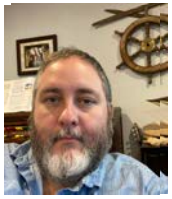
2021 AND 2022 HARVEST SPECIFICATIONS

- The Team approved the proposed harvest specifications for 2021 and 2022 by recommending the 2021 BSAI final harvest specifications for OFLs and ABCs as published in the Federal Register in March 2020, with the exception of BSAI northern rock sole
- The Team recommends the revised 2021 OFL and ABC for the proposed 2021 and 2022 from the model correction discussed under the northern rock sole agenda item above

2021 AND 2022 HARVEST SPECIFICATIONS

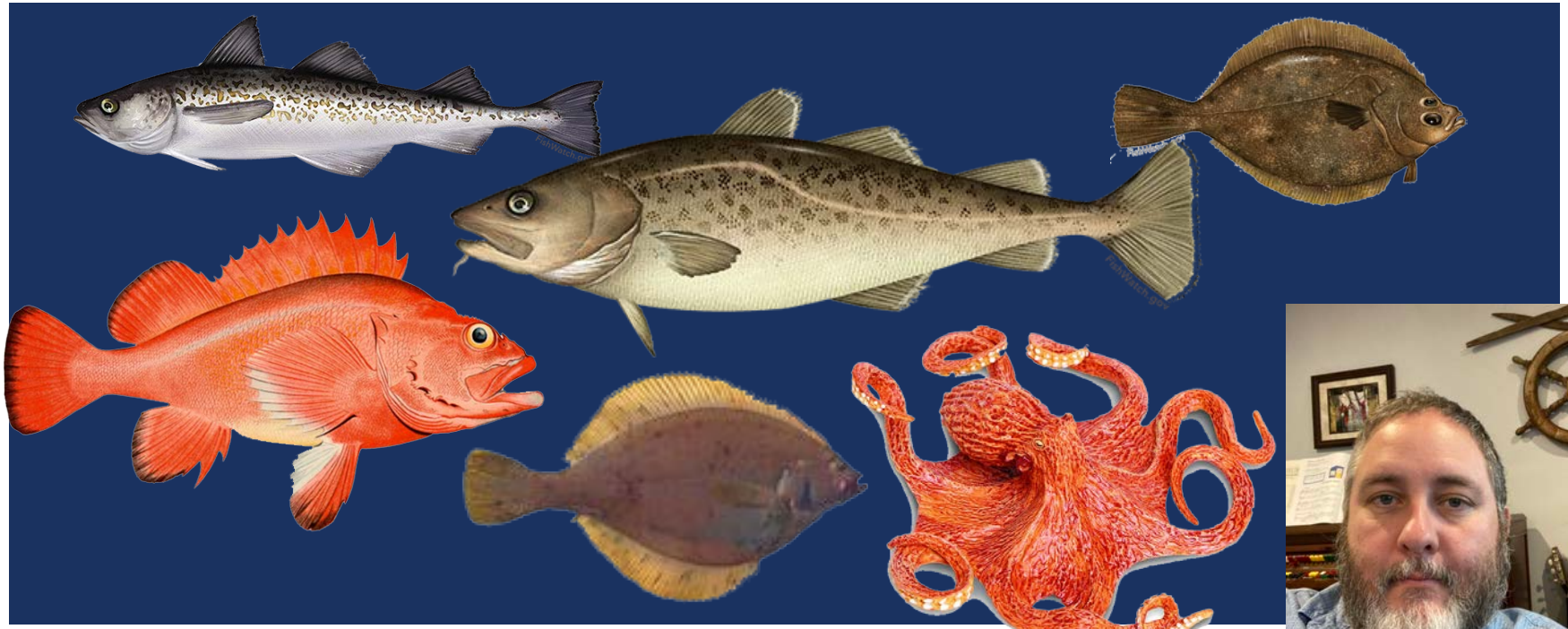
Species	Area	2019 OFL	2019 ABC	2019 TAC	Catch as of 12/31/2019	2020 OFL	2020 ABC	2020 TAC	Catch as of 8/29/2020	Proposed 2021 and 2022 OFL	Proposed 2021 and 2022 ABC	Proposed 2021 and 2022 TAC
Pollock	EBS	3,914,000	2,163,000	1,397,000	1,409,219	4,085,000	2,043,000	1,425,000	1,097,046	3,385,000	1,767,000	
	AI	64,240	52,887	19,000	1,663	66,973	55,120	19,000	2,786	70,970	58,384	
	Bogoslof	183,080	137,310	75	8	183,080	137,310	75	37	183,080	137,310	
Pacific cod	BS	216,000	181,000	166,475	164,098	191,386	155,873	141,799	107,705	125,734	102,975	
	AI	27,400	20,600	14,214	12,941	27,400	20,600	13,796	3,436	27,400	20,600	
Sablefish	BSAI	n/a	n/a	n/a	n/a	50,481	n/a	n/a	n/a	64,765	n/a	
	BS	3,221	1,489	1,489	3,191	n/a	2,174	1,861	2,382	n/a	2,865	
	AI	4,350	2,008	2,008	661	n/a	2,952	2,039	1,015	n/a	3,891	
Yellowfin sole	BSAI	290,000	263,200	154,000	128,061	287,307	260,918	150,700	93,718	287,943	261,497	
Greenland turbot	BSAI	11,362	9,658	5,294	2,850	11,319	9,625	5,300	2,199	10,006	8,510	
	BS	n/a	8,431	5,125	2,678	n/a	8,403	5,125	1,530	n/a	7,429	
	AI	n/a	1,227	169	171	n/a	1,222	175	669	n/a	1,081	
Arrowtooth flounder	BSAI	82,939	70,673	8,000	10,063	84,057	71,618	10,000	8,122	86,647	73,804	
Kamchatka flounder	BSAI	10,965	9,260	5,000	4,488	11,495	9,708	6,800	7,093	11,472	9,688	
Northern rock sole	BSAI	122,000	118,900	47,100	25,799	157,300	153,300	47,100	21,480	251,800	245,500	
Flathead sole	BSAI	80,918	66,625	14,500	15,912	82,810	68,134	19,500	6,526	86,432	71,079	
Alaska plaice	BSAI	39,880	33,600	18,000	16,164	37,600	31,600	17,000	17,552	36,500	30,700	
Other flatfish	BSAI	21,824	16,368	6,500	3,784	21,824	16,368	4,000	3,767	21,824	16,368	
Pacific Ocean perch	BSAI	61,067	50,594	44,069	43,614	58,956	48,846	42,875	28,507	56,589	46,885	
	BS	n/a	14,675	14,675	14,518	n/a	14,168	14,168	3,690	n/a	13,600	
	EAI	n/a	11,459	11,009	10,945	n/a	11,063	10,613	7,929	n/a	10,619	
	CAI	n/a	8,435	8,385	8,263	n/a	8,144	8,094	6,993	n/a	7,817	
	WAI	n/a	16,025	10,000	9,888	n/a	15,471	10,000	9,895	n/a	14,849	
Northern rockfish	BSAI	15,507	12,664	6,500	9,063	19,751	16,243	10,000	7,643	19,070	15,683	
Blackspotted/Rougheye Rockfish	BSAI	676	555	279	393	861	708	349	412	1,090	899	
	EBS/EAI	n/a	351	75	89	n/a	444	85	115	n/a	560	
	CAI/WAI	n/a	204	204	304	n/a	264	264	297	n/a	339	
Shortraker rockfish	BSAI	722	541	358	383	722	541	375	166	722	541	
Other rockfish	BSAI	1,793	1,344	663	1,269	1,793	1,344	1,088	816	1,793	1,344	
	BS	n/a	956	275	699	n/a	956	700	236	n/a	956	
	AI	n/a	388	388	569	n/a	388	388	580	n/a	388	
Atka mackerel	BSAI	79,200	68,500	57,951	57,206	81,200	70,100	59,305	47,355	74,800	64,400	
	EAI/BS	n/a	23,970	23,970	23,654	n/a	24,535	24,535	13,845	n/a	22,540	
	CAI	n/a	14,390	14,390	14,110	n/a	14,721	14,721	13,531	n/a	13,524	
	WAI	n/a	30,140	19,591	19,441	n/a	30,844	20,049	19,979	n/a	28,336	
Skates	BSAI	51,152	42,714	26,000	20,205	49,792	41,543	16,313	13,639	48,289	40,248	
Sculpins	BSAI	53,201	39,995	5,000	5,606	67,817	50,863	5,300	3,837	n/a	n/a	
Sharks	BSAI	689	517	125	146	689	517	150	156	689	517	
Octopuses	BSAI	4,769	3,576	400	268	4,769	3,576	275	643	4,769	3,576	
Total	BSAI	5,340,955	3,367,578	2,000,000	1,937,052	5,584,382	3,272,581	2,000,000	1,478,038	4,857,384	2,984,264	

Sources: 2019 OFLs, ABCs, and TACs and 2020 OFLs and ABCs are from harvest specifications adopted by the Council in December 2018 and December 2019, respectively; 2019 catches



REPORT OF THE SEPTEMBER 2020 BSAI GROUNDFISH PLAN TEAM MEETING

QUESTIONS?



BSAI SPECS – AP ACTION

- Review Plan Team and SSC Proposed:
  - ABC & OFL
  - PSC limits
  - Halibut DMRs
- Provide AP Proposed:
  - TAC

BSAI SPECS – COUNCIL ACTION

- Review Plan Team and SSC Proposed:
  - ABC & OFL
  - PSC limits
  - Halibut DMRs
- Review AP Proposed:
  - TAC
  - PSC limits
  - Halibut DMRs
- Identify Proposed:
  - ABC, OFL, TAC
  - PSC limits
  - Halibut DMRs