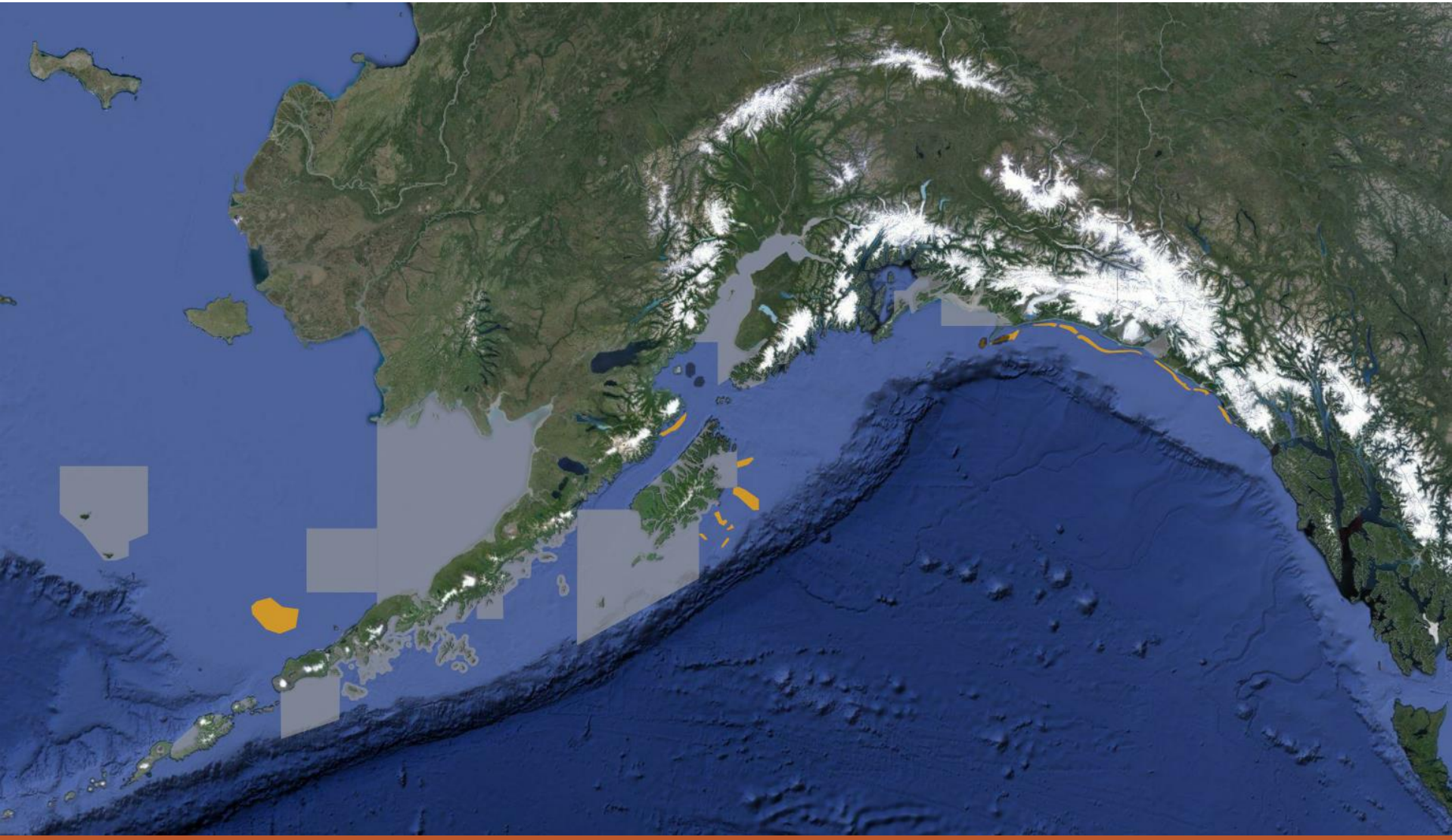
STOCK ASSESSMENT AND FISHERY EVALUATION REPORT FOR THE WEATHERVANE SCALLOP FISHERY OFF ALASKA

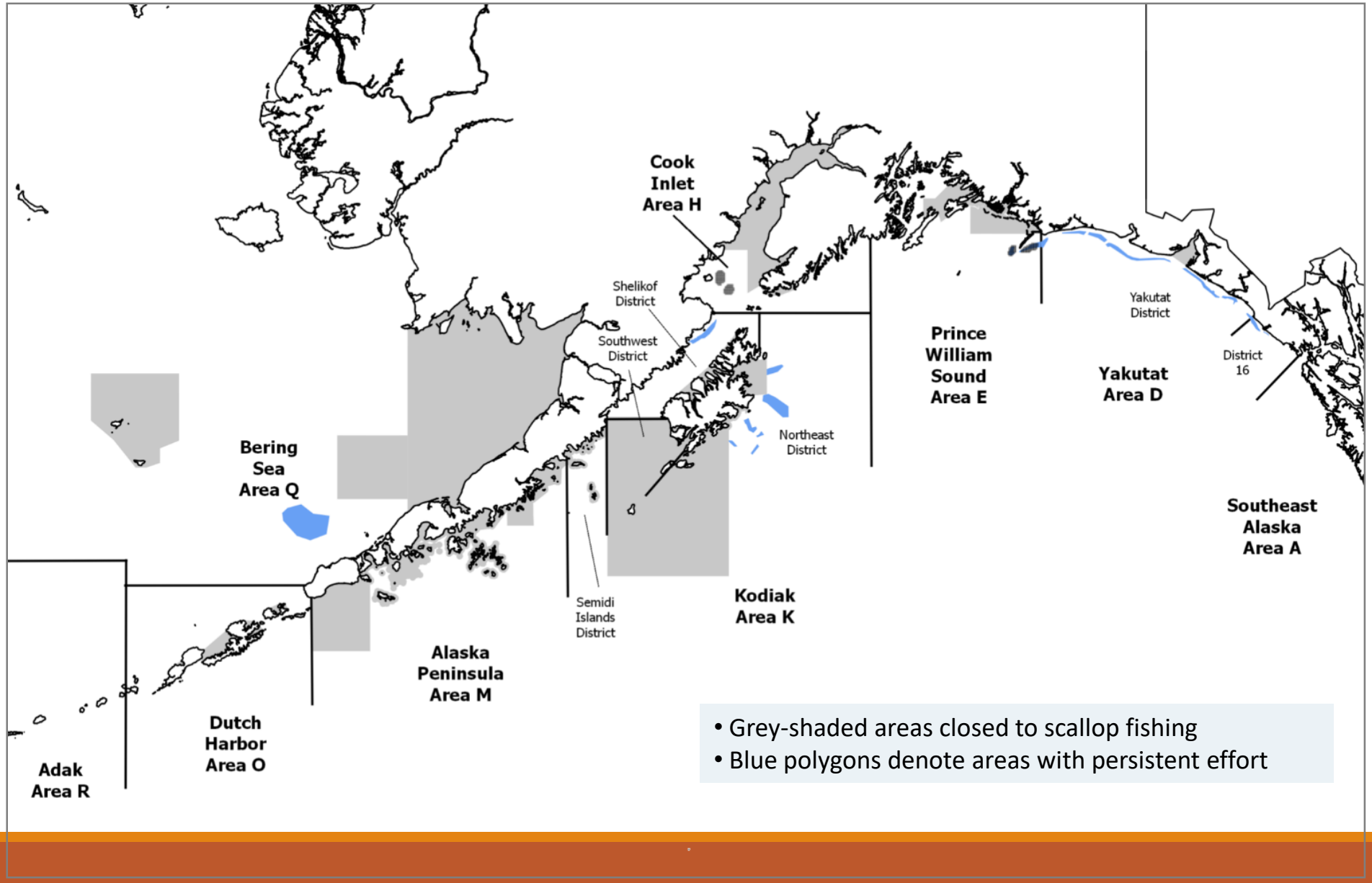
Compiled by the Scallop Plan Team, March 2019



- FISHERY OVERVIEW
- MANAGEMENT OVERVIEW
- 2018 ASSESSMENT RESULTS
- RECENT FISHERY PERFORMANCE
- PROGRAM UPDATES
- RESPONSE TO SSC COMMENTS

Fishery Overview

Weathervane Scallop Fishing Areas



Weathervane Scallop Fishery Overview

Federal Waters

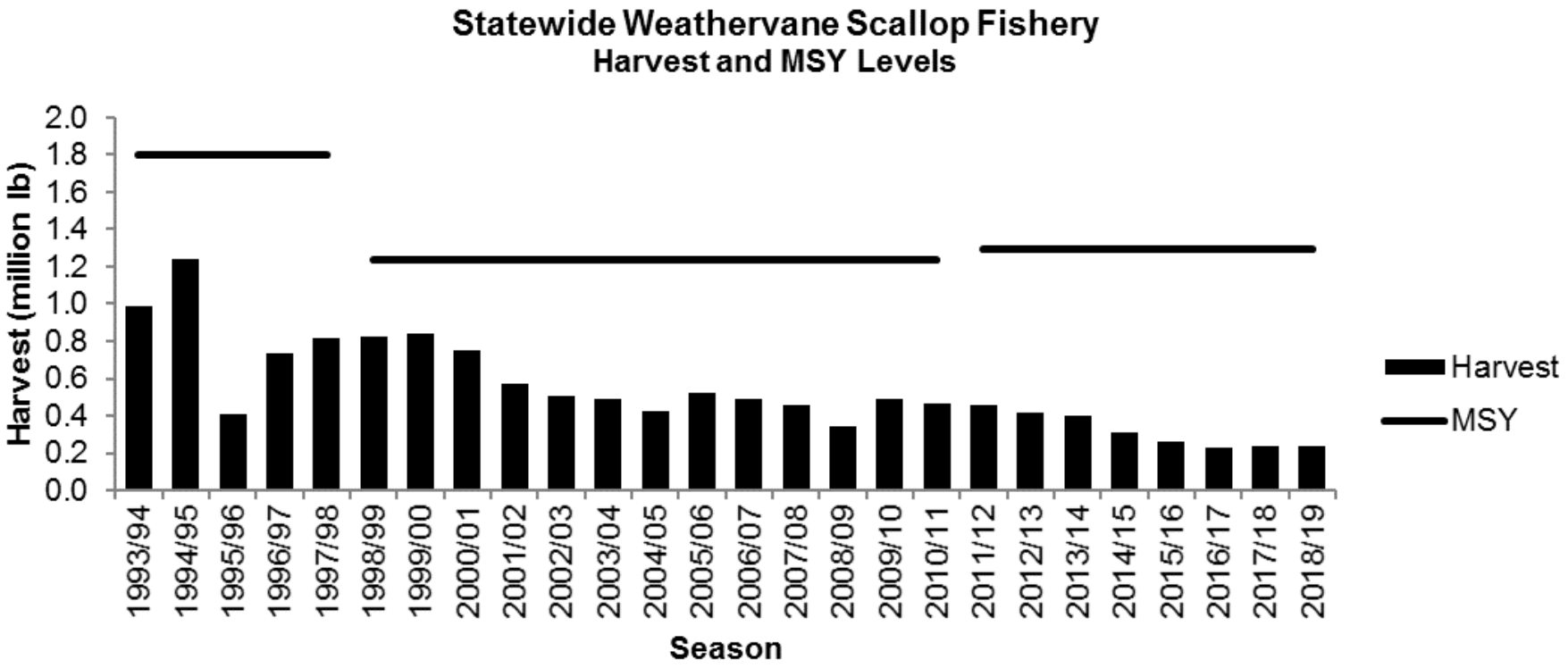
9 Federal LLPs

- 7 LLPs permitted to deploy two 15 ft dredges
- 2 vessels permitted to deploy two 10 ft dredges
- Cook Inlet: single 6 ft dredge

State waters

- Open access state water fishery beginning in 2014
- State waters closed to scallop fishing in many places
- Known scallop beds in state waters not closed to scallop fishing: District 16, Yakutat District, Area E (Kayak Island), Kodiak Shelikof District, and Area O (Dutch Harbor)

MSY, OY, and Overfishing Definition



- MSY = 1.29 million lb scallop meats
- MSY definition based on average 1990-1997 harvest with 1995 excluded
- In absence of spawning biomass estimate the OFL defaults to MSY
- maxABC = 90% of OFL
- SPT recommendation for ABC = 1.161 mil lb (90% of OFL) for 2019/20

Management Overview

Stock Assessment

Pre 2016

- 5% of harvest comes from locations with fishery independent assessment
- 95% of harvest managed from fishery dependent data sources

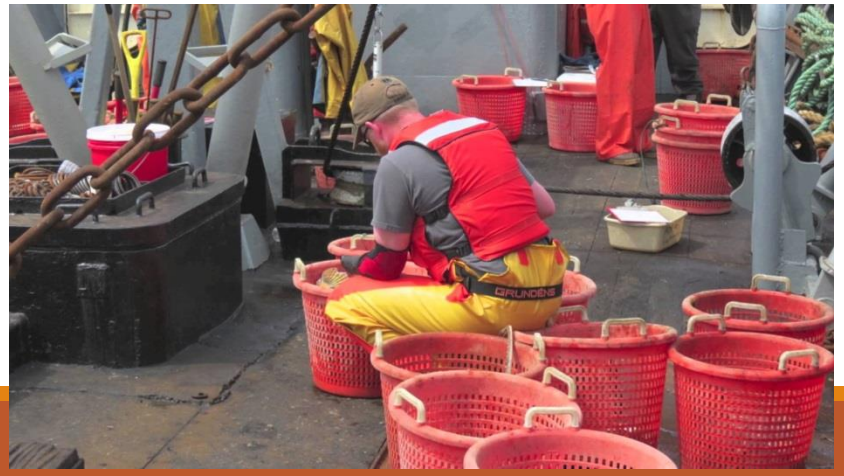
Post 2016

- Statewide survey to cover Shelikof Strait and Yakutat area biennially (~70% of mean harvest)

Observer Program

100% mandatory observer coverage (except in Cook Inlet)

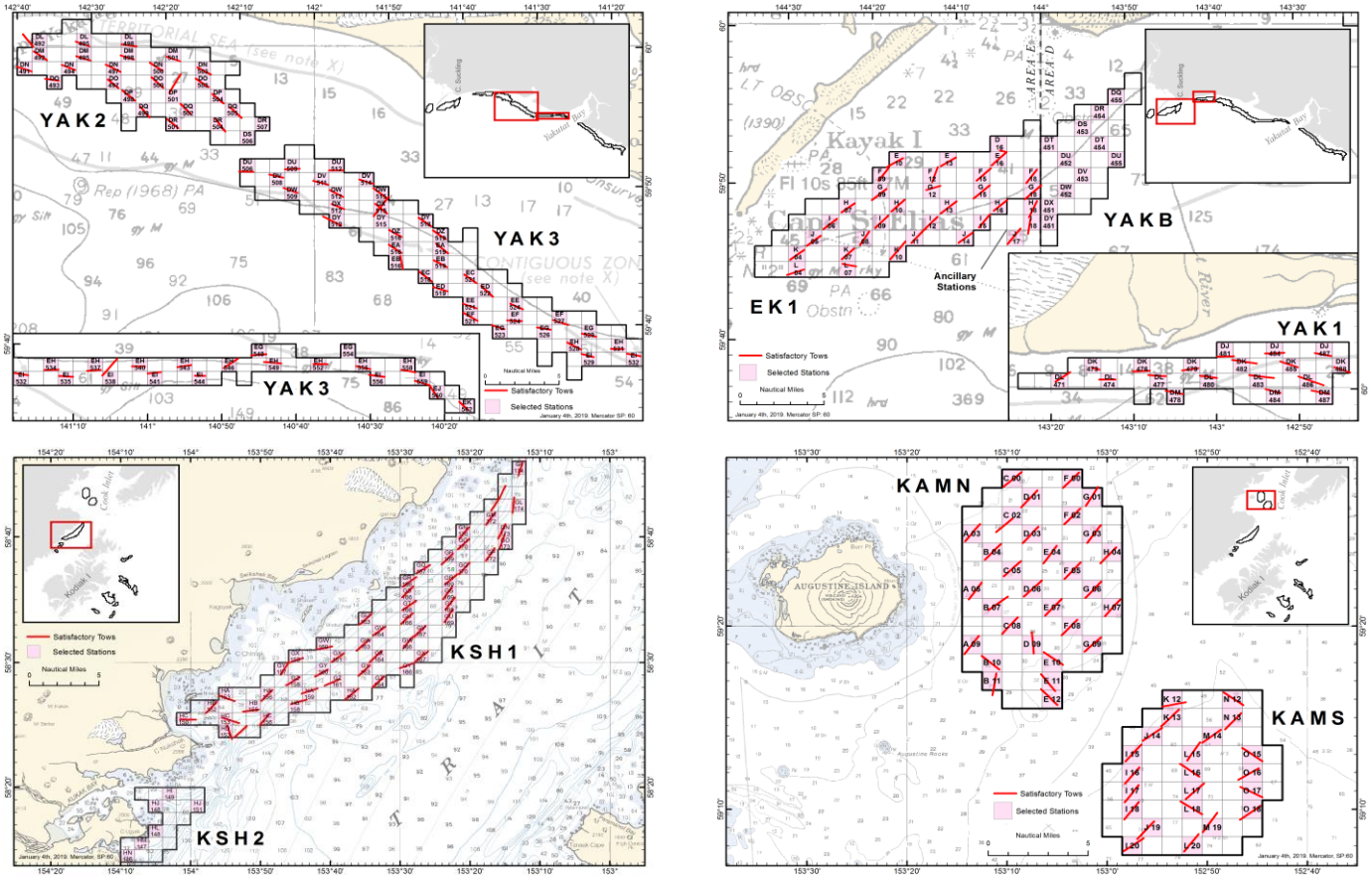
- CPUE
- Shell height
- Age
- Discard rates & condition
- Catch composition
- Harvest location
- Harvest depth
- Bycatch



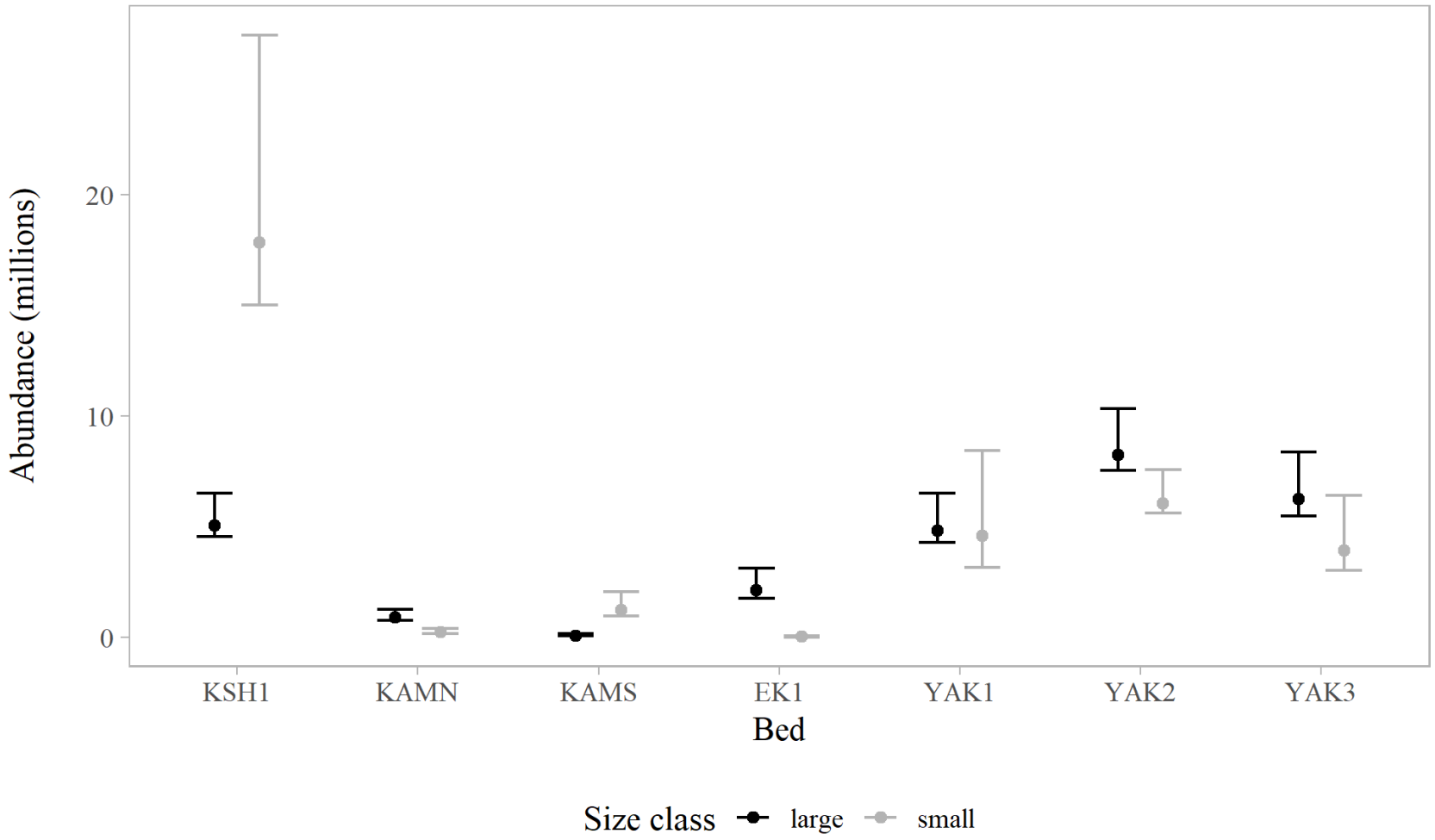
2018 Assessment Results

(see SAFE Chapter 2)

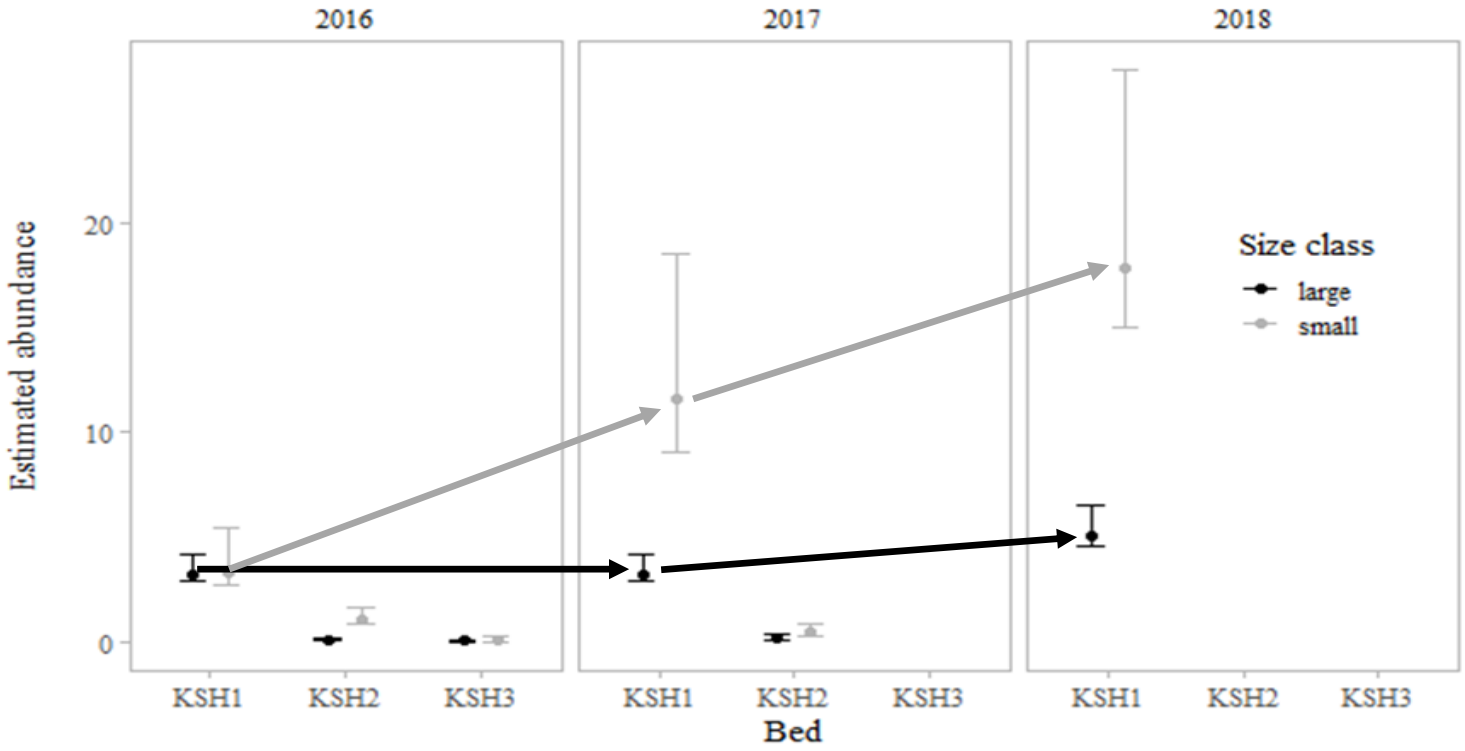
Surveyed Yakutat, Shelikof, Kayak, and Kamishak



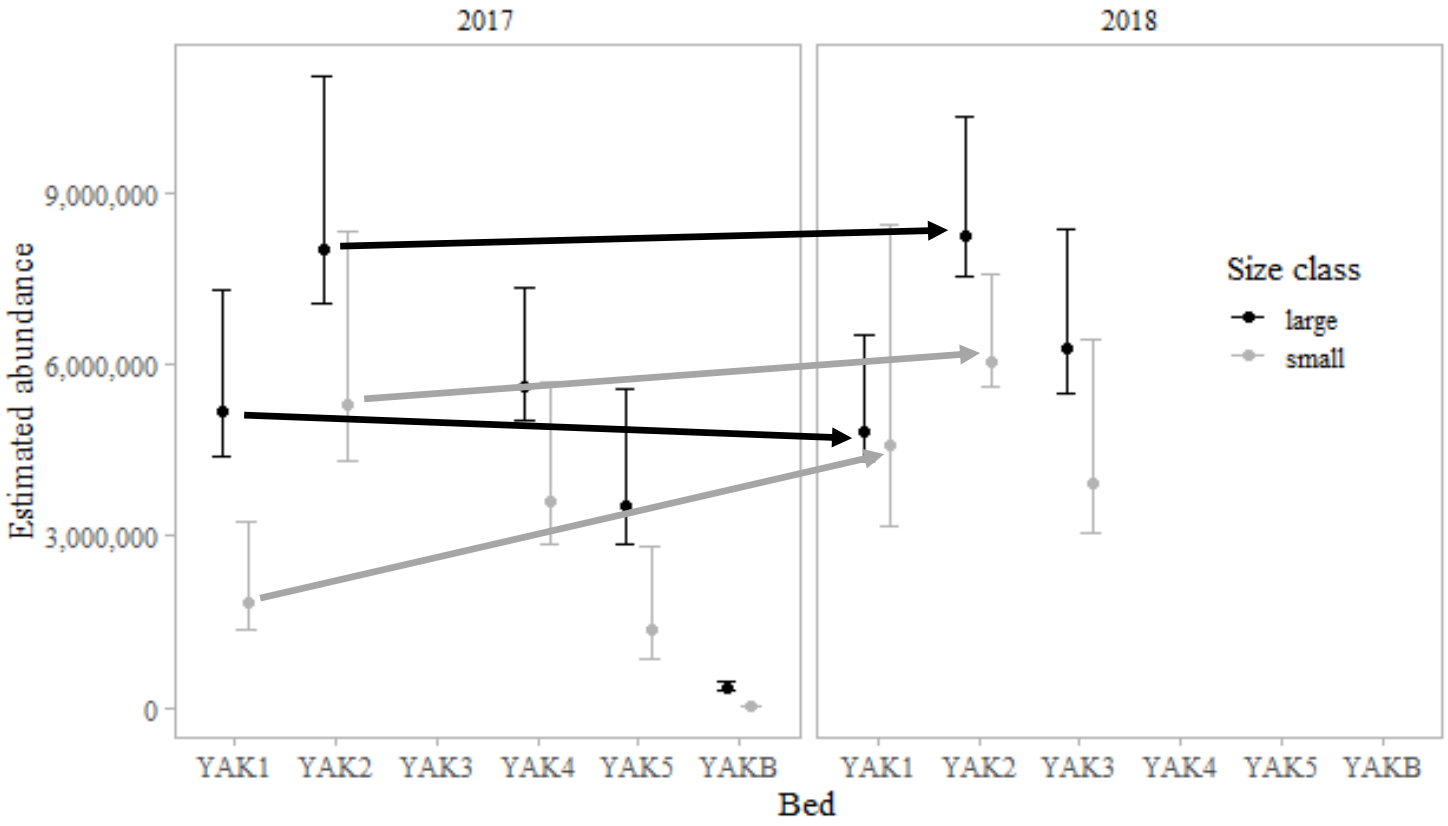
Abundance Estimate



Abundance Comparison

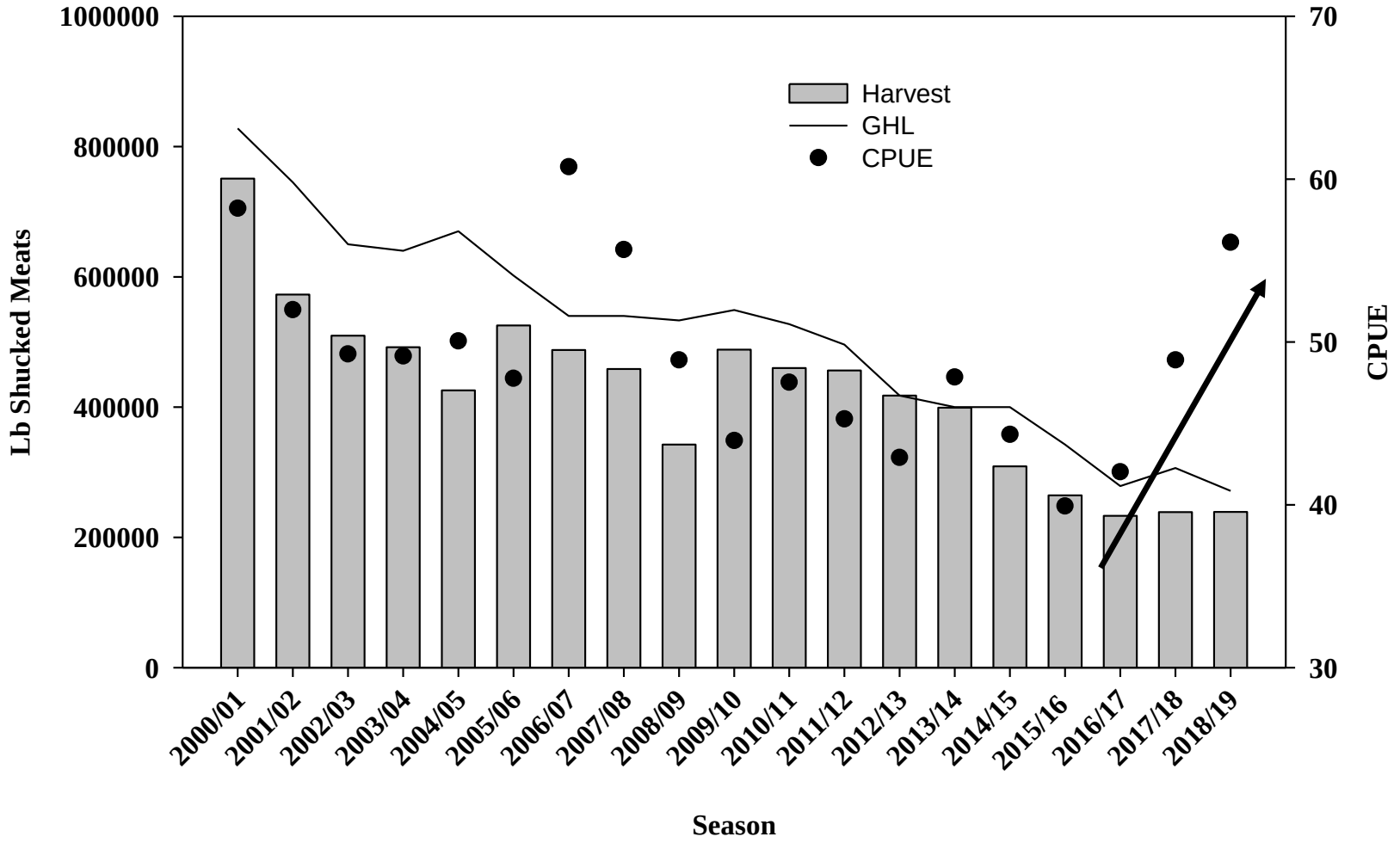


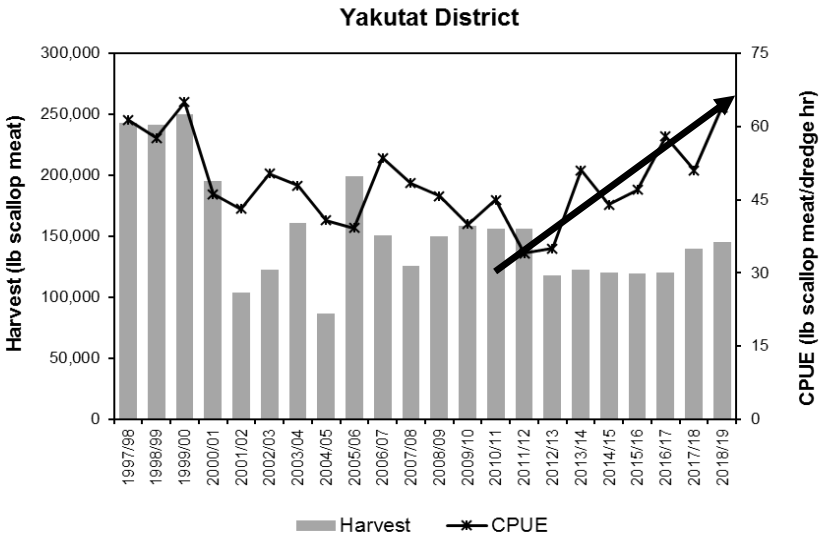
Abundance Comparison

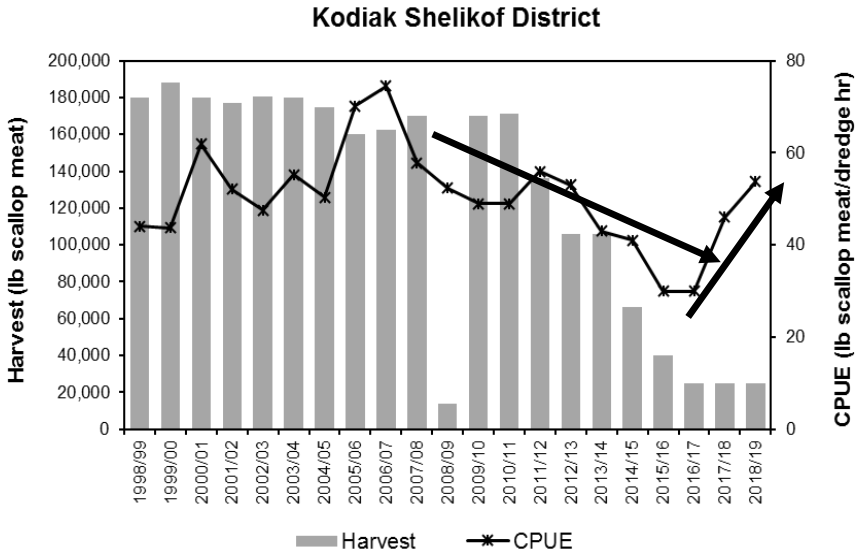


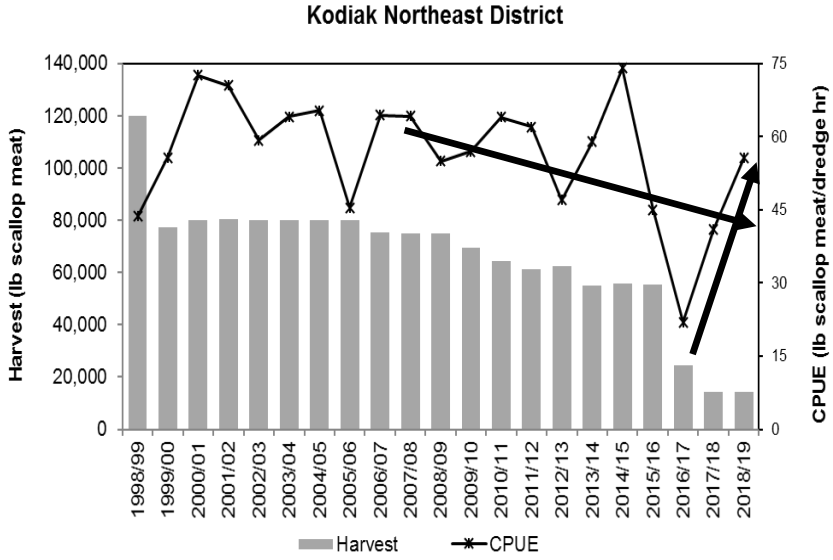
Recent Fishery Performance

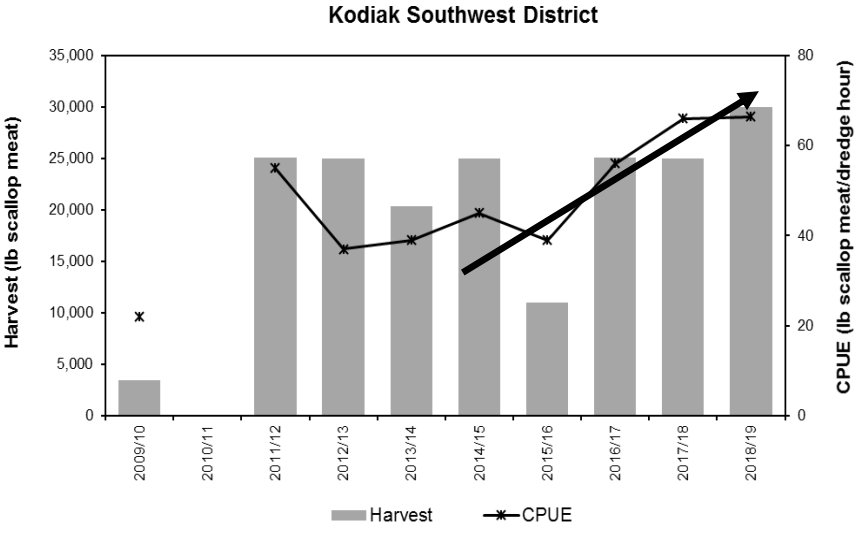
Statewide Harvest

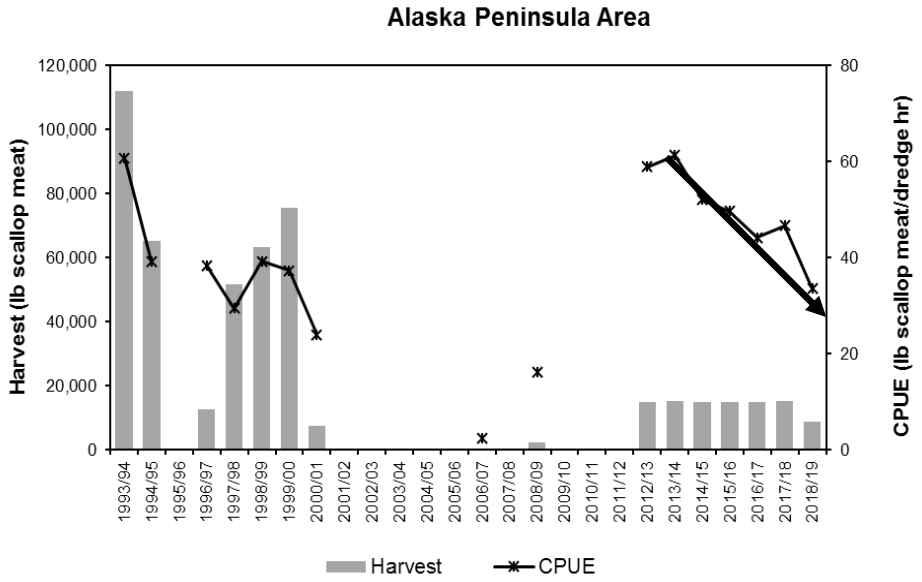


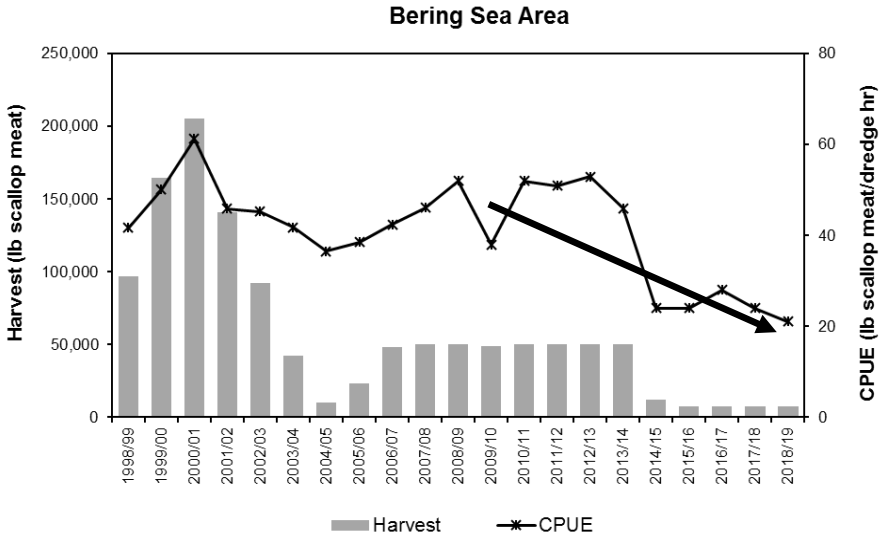

Yakutat District
Harvest (lb scallop meat)
CPUE (lb scallop meat/dredge hr)
300,000
250,000
200,000
150,000
100,000
50,000
0
75
60
45
30
15
0
1997/98
1998/99
1999/00
2000/01
2001/02
2002/03
2003/04
2004/05
2005/06
2006/07
2007/08
2008/09
2009/10
2010/11
2011/12
2012/13
2013/14
2014/15
2015/16
2016/17
2017/18
2018/19
Harvest
CPUE

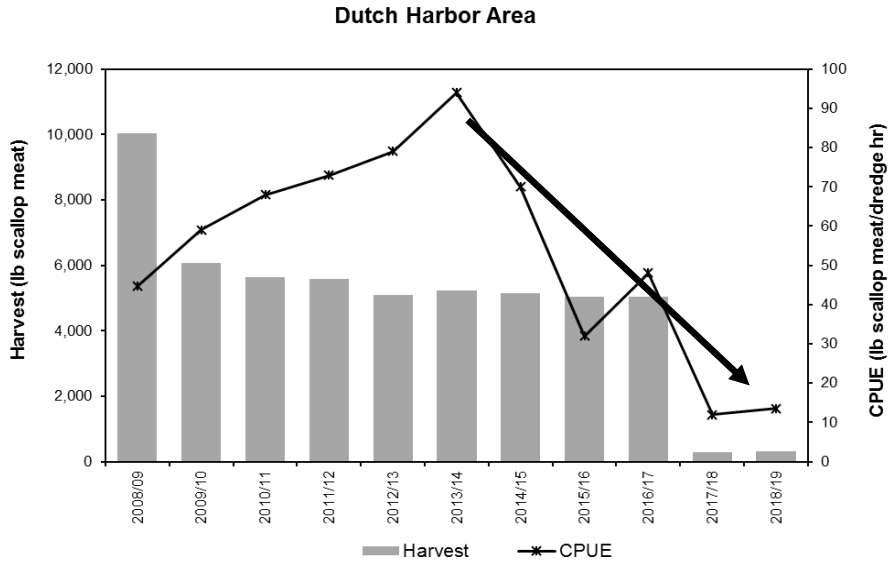

Kodiak Shelikof District
Harvest (lb scallop meat)
CPUE (lb scallop meat/dredge hr)
200,000
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
80
60
40
20
0
1998/99
1999/00
2000/01
2001/02
2002/03
2003/04
2004/05
2005/06
2006/07
2007/08
2008/09
2009/10
2010/11
2011/12
2012/13
2013/14
2014/15
2015/16
2016/17
2017/18
2018/19
Harvest
CPUE


Kodiak Northeast District
Harvest (lb scallop meat)
CPUE (lb scallop meat/dredge hr)
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
75
60
45
30
15
0
1998/99
1999/00
2000/01
2001/02
2002/03
2003/04
2004/05
2005/06
2006/07
2007/08
2008/09
2009/10
2010/11
2011/12
2012/13
2013/14
2014/15
2015/16
2016/17
2017/18
2018/19
Harvest
CPUE


Kodiak Southwest District
Harvest (lb scallop meat)
CPUE (lb scallop meat/dredge hour)
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
80
60
40
20
0
2009/10
2010/11
2011/12
2012/13
2013/14
2014/15
2015/16
2016/17
2017/18
2018/19
Harvest
CPUE


Alaska Peninsula Area
Harvest (lb scallop meat)
CPUE (lb scallop meat/dredge hr)
120,000
100,000
80,000
60,000
40,000
20,000
0
80
60
40
20
0
1993/94
1994/95
1995/96
1996/97
1997/98
1998/99
1999/00
2000/01
2001/02
2002/03
2003/04
2004/05
2005/06
2006/07
2007/08
2008/09
2009/10
2010/11
2011/12
2012/13
2013/14
2014/15
2015/16
2016/17
2017/18
2018/19
Harvest
CPUE


Bering Sea Area
Harvest (lb scallop meat)
CPUE (lb scallop meat/dredge hr)
250,000
200,000
150,000
100,000
50,000
0
80
60
40
20
0
1998/99
1999/00
2000/01
2001/02
2002/03
2003/04
2004/05
2005/06
2006/07
2007/08
2008/09
2009/10
2010/11
2011/12
2012/13
2013/14
2014/15
2015/16
2016/17
2017/18
2018/19
Harvest
CPUE


Dutch Harbor Area
Harvest (lb scallop meat)
CPUE (lb scallop meat/dredge hr)
12,000
10,000
8,000
6,000
4,000
2,000
0
100
90
80
70
60
50
40
30
20
10
0
2008/09
2009/10
2010/11
2011/12
2012/13
2013/14
2014/15
2015/16
2016/17
2017/18
2018/19
Harvest
CPUE

2017/18 Scallop Fishery Tanner Crab Bycatch

SAFE Table 3-4

Area/District	Chionoecetes bycatch cap	Est number crab	% of cap	Est weight (lb)[a]
Yakutat District	NE	2,083	NA	164
Yakutat District 16	NE	44	NA	0.2
Prince William Sound	1,600	75	4.7%	1
Cook Inlet	3,933	0	0.0%	0
Kodiak Northeast District	19,388	5,593	28.8%	1,512
Kodiak Shelikof District	63,926	3,639	5.7%	2,155
Kodiak Southwest District	12,000	6,945	57.9%	706
Alaska Peninsula Central District	NE	0	NA	0
Alaska Peninsula Unimak Bight District	12,000	5,058	42.2%	357
Dutch Harbor	10,000	8	0.1%	1
Bering Sea *C. bairdi*	65,000	6,905	10.6%	5,590
Bering Sea *C. opilio* and hybrids	300,000	4,199	1.4%	5,638
Statewide total	487,847	34,549	7.1%	16,124

Commercial Weathervane Scallop Real Wholesale Value

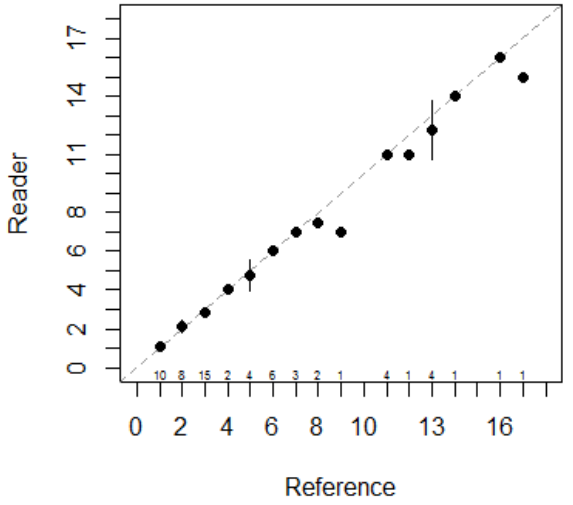
SAFE Table 5-1

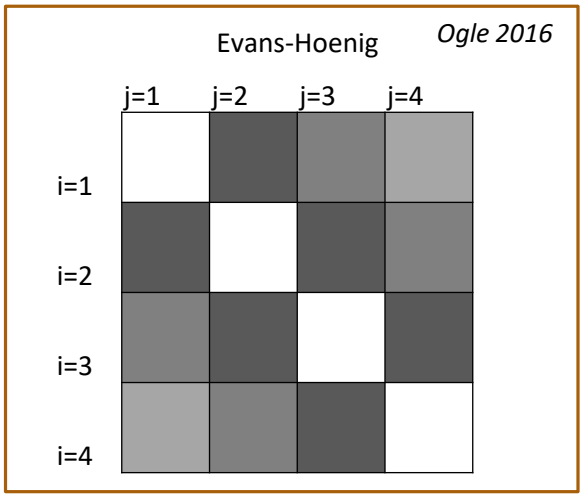
Year	Vessels	Catch (lb shucked meats)[a]	Nominal Average Price / lb	Inflation Factor[b]	Real Average Price/lb	Real Wholesale Value
2005/06	5	525,357	$7.58	1.39	$10.52	$5,525,127
2006/07	4	487,473	$7.86	1.28	$10.09	$4,916,922
2007/08	4	458,313	$5.94	1.29	$7.64	$3,499,537
2008/09	4	342,434	$6.34	1.39	$8.79	$3,009,430
2009/10	3	488,059	$6.48	1.2	$7.80	$3,807,175
2010/11	3	459,759	$8.35	1.09	$9.11	$4,269,364
2011/12	4	456,058	$10.39	1.2	$12.47	$5,678,577
2012/13	4	417,551	$10.63	1.01	$10.72	$4,488,507
2013/14	4	399,134	$12.25	1.02	$12.50	$4,988,904
2014/15	4	308,888	$12.39	1.06	$13.11	$1,050,401
2015/16	3	264,316	$12.22	0.98	$11.92	$3,152,920
2016/17	2	233,003	$12.53	1.03	$12.95	$3,017,693
2017/18	2	238,710	$11.54	1.00	$11.54	$2,755,060
2018/19[c]	2	238,808	$11.60	1.00	$11.60	$2,770,173
10-Year Average	**3**	**351,366**	**$10.84**		**$11.37**	**$3,897,877**

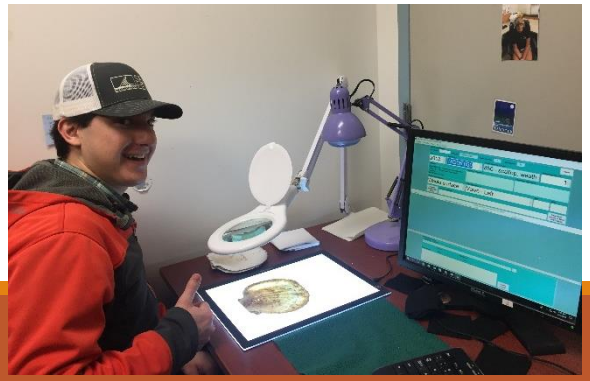
Program Updates

Staffing Update

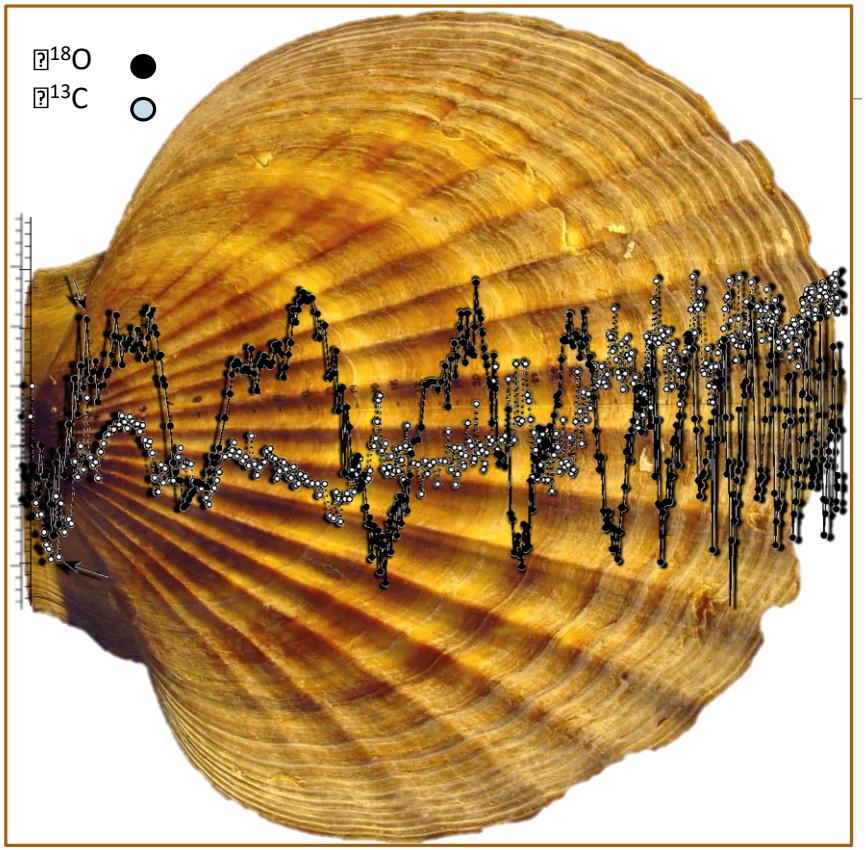
- Shell Ageing operations transferred to Age Determination Unit of the ADF&G Mark, Tag, and Age Lab in Juneau.
- Scallop Biometrician position remains unfilled, currently in reclassification.



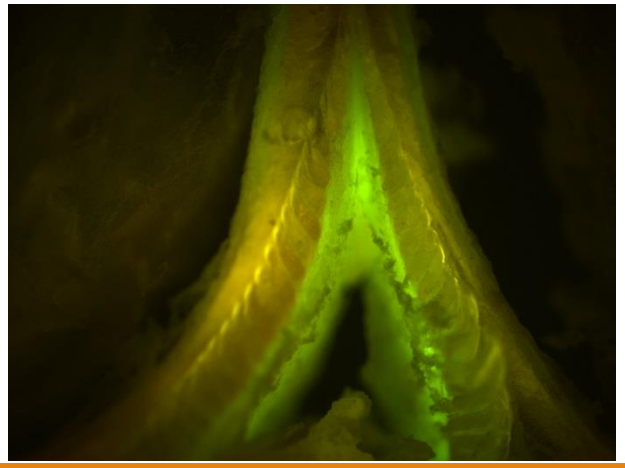




Shell Aging Update

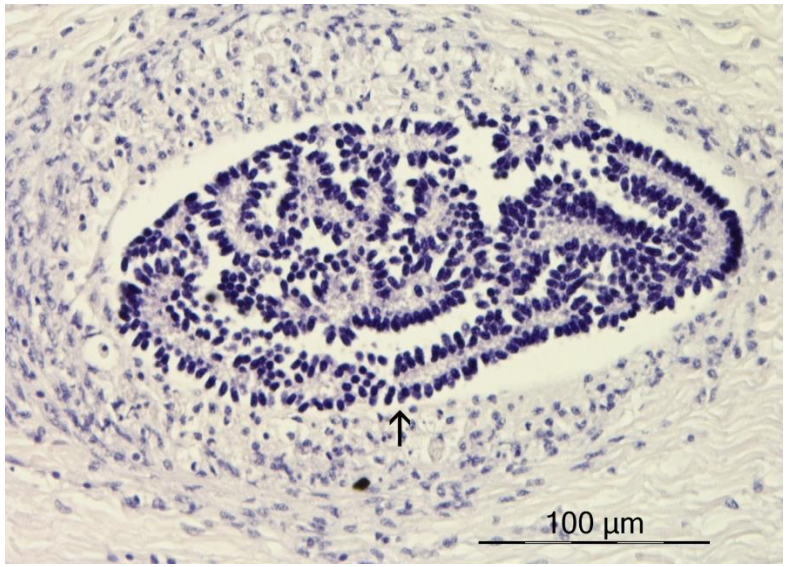


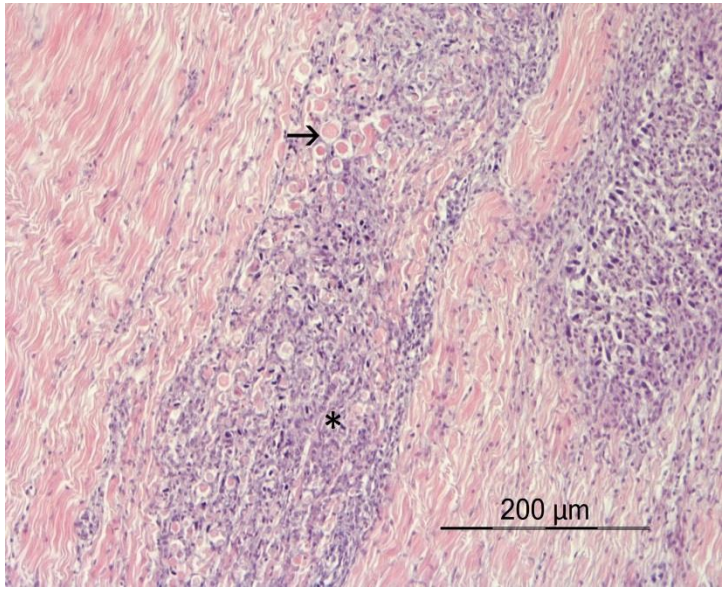
- Validating seasonal banding interpretation
  - $\delta^{18}O$ & $\delta^{13}C$ stable isotope analysis
  - Laboratory growth and calcium binding dye studies
- Develop area specific growth models to improve quality control procedures



Parasite Update

- Observer Coordinator continuing to collaborate with Atlantic researchers
  - *Buccinum* newly discovered vector
- Observer program and ADFG Pathology lab planning on expanded collections during 2019/20 season to build on pilot study conducted in 2015





Responses to 2018 SSC Comments

SSC Comment 2018-1

The SSC encourages attempts to develop age- or size-based models for data-poor areas to determine the general applicability of these methods for scallops throughout Alaska.

- *This will be completed as staffing and funding allow.*
- *The SPT also considered other possible model frameworks at the 2019 meeting including Barefoot Ecologists Toolbox, Stock Synthesis 3, and Gmac.*
- *General consensus was that age based fits the current assessment methodology the best.*
- *Further work on the age based model is scheduled in 2019.*

SSC Comment 2018-2

The SSC recommends examining catchability for different depths, bottom types, and other factors, which may affect catchability. Size selectivity needs to be considered so that fishery independent survey results can be accurately interpreted.

- *The SPT agrees with the need for further studies into catchability.*
- *Due to weather and equipment breakdown there were very few paired tows completed in the 2018 surveys. Paired tows are on the schedule for the 2019 surveys in Yakutat beds 3-5.*
- *Further studies will be designed and implemented as staffing and funding allow.*

SSC Comment 2018-3

The SSC requests the Scallop Plan Team explore the application of OFL calculations analogous to Tier 5 used for groundfish.

- *Advances on biomass and natural mortality estimates are dependent on model development, and accumulation of survey data.*
- *The majority of fished areas have 1-3 years of survey data which is insufficient for estimation for the large majority of the scallop stocks.*
- *Once sufficient survey data has been collected calculations will be completed as staffing and time allow.*

SSC Comment 2018-4

The ecosystem section would be enriched by considering the detailed spatiotemporal analysis of observed scallop bycatch reported by Glass and Kruse (2017)

- *This suggestion has been followed and is reflected in the 2019 SAFE.*

SSC Comment 2018-5

Since for scallop, there is no stand-alone Economic Considerations chapter … the Scallop SAFE would benefit from a series of tables tracking a time series of annual quantitative indicators of sustained community participation, per National Standard 8…

- *Intent is to expand Chapter 5 to include this information*
- *Work curtailed for 2019 SAFE due to Federal Government Shutdown*
- *Specific questions answered in text*

SSC Comment 2017-1

The SSC strongly supports … continued efforts to implement a statewide scallop survey. This will provide for fishery-independent GHLs that do not rely on standardization of fishery CPUE, and may support a refinement of the OFL/ABC …

- *The Team agrees that fishery survey-based estimates of scallop biomass and/or abundance is desirable.*
- *The State scallop survey is conducted according to the availability of funding, and efforts to compare survey and fishery dredges will continue, though difficulties in recent attempts are explained in Response 2018-2 (Wx and breakdown).*
- *Survey-based estimation of OFL is addressed in Response 2018-3 (short data set).*

SSC Comment 2017-2

Progress on assessment modelling remains a priority for this species… Efforts should first rely on bed-specific modelling, but could be extended to incorporate meta-population considerations (and possibly genetic information)... The SSC is encouraged that ADF&G is in the process of hiring a Biometrician II to tackle this modelling in the near future.

- *A biometrician has not yet been hired.*

SSC Comment 2017-3

The SSC reiterates the need to compare and evaluate survey-based scallop abundance estimates and fishery CPUE…

- *Standardization of fishery CPUE is ongoing, and as fishery independent data become more available, these examinations can take place.*

SSC Comment 2017-4

The ageing protocol represents an important framework for future aging efforts. The SSC recommends using this protocol, but emphasizes that validation of some sort (perhaps O18-based methods) is still required … the methods in the ageing protocol should not be confused with actual bias or precision. … naïve estimates of reader agreement … tend to overstate precision.

- *O18 study is being planned and funding being sought.*
- *Reexamination of methods and reading test parameters will be conducted as staff time and funding allow.*

SSC Comment 2017-5

The SSC reiterates its concern that a 'plus group' may be required for older ages at which reader agreement and/or relative bias may be unacceptable.

- *Reexamination ageing protocols will be conducted as staff time and funding allow.*

SSC Comment 2017-6

The SSC recommends continuing to consider collecting data (survey and fishery) and managing in numbers rather than shucked or round weight – both of which appear seasonally variable.

- *The Plan Team reviews catches expressed in meat weight and round weight, and is developing methods for interpreting data in terms of numbers of scallops*
- *ADF&G is examining methods to manage fishery in terms of number of animals*

SSC Comment 2017-7

The SSC continues to look forward to improved estimates of discard mortality rates, based on information provided in previous analyses.

- *This issue continues to be a high priority for the Plan Team and will be needed for development of an age-structured model.*

Thank You

Additional Harvest Limitation Mechanisms

Minimum performance standards

Area	Minimum Performance Standard (CPUE)	Basis Year
Yakutat Area		
Yakutat	34	2011/12
Kodiak Area		
Northeast District		
Statistical Area 525630	45	2005/06
Statistical Area 525702	52	2002/03
Remainder of NE District	43	2005/06
Shelikof District		
Combined North/South Bed	47	2003/04
Bristol Bay-Bering Sea	43	2004/05 - 2009/10[a]

[a] Based on average CPUE during the 2004/05 to 2009/10 seasons

Scallop Fishery Crab Bycatch Limits

SAFE Table 3-2

Area/District	Red King Crab	*C. bairdi*	*C. opilio*
Yakutat District 16	NE[a]	NE	NA[b]
Yakutat District	NE	NE	NA
Prince William Sound	NE	0.5%	NA
Cook Inlet Kamishak District	30 crab	0.5%	NA
Kodiak Northeast District	0.5% or 1.0%	0.5% or 1.0%	NA
Kodiak Shelikof District	0.5% or 1.0%	0.5% or 1.0%	NA
Kodiak Southwest District	50[c]	12,000[c]	NA
Kodiak Semidi Islands District	NE	NE	NA
Alaska Peninsula	0.5% or 1.0%	0.5% or 1.0%	NA
Alaska Peninsula Unimak Bight District	50[c]	12,000[c]	NA
Bering Sea	500 crab[c]	3 tier approach	3 tier approach
Dutch Harbor	0.5% or 1.0%	0.5% or 1.0%	NA
Adak[d]	50	10,000 crab	NA

2001–2010 Trawl Survey Catch of Weathervane Scallops