



**NOAA
FISHERIES**

**Alaska Fisheries
Science Center**

**Results from the 37th Annual
Southeastern Bering Sea Shelf &
“Rapid Response” Northern Bering Sea
Bottom Trawl Surveys
May 31 to August 20, 2018**

**Resource Assessment &
Conservation Engineering Division
Groundfish Assessment Program**

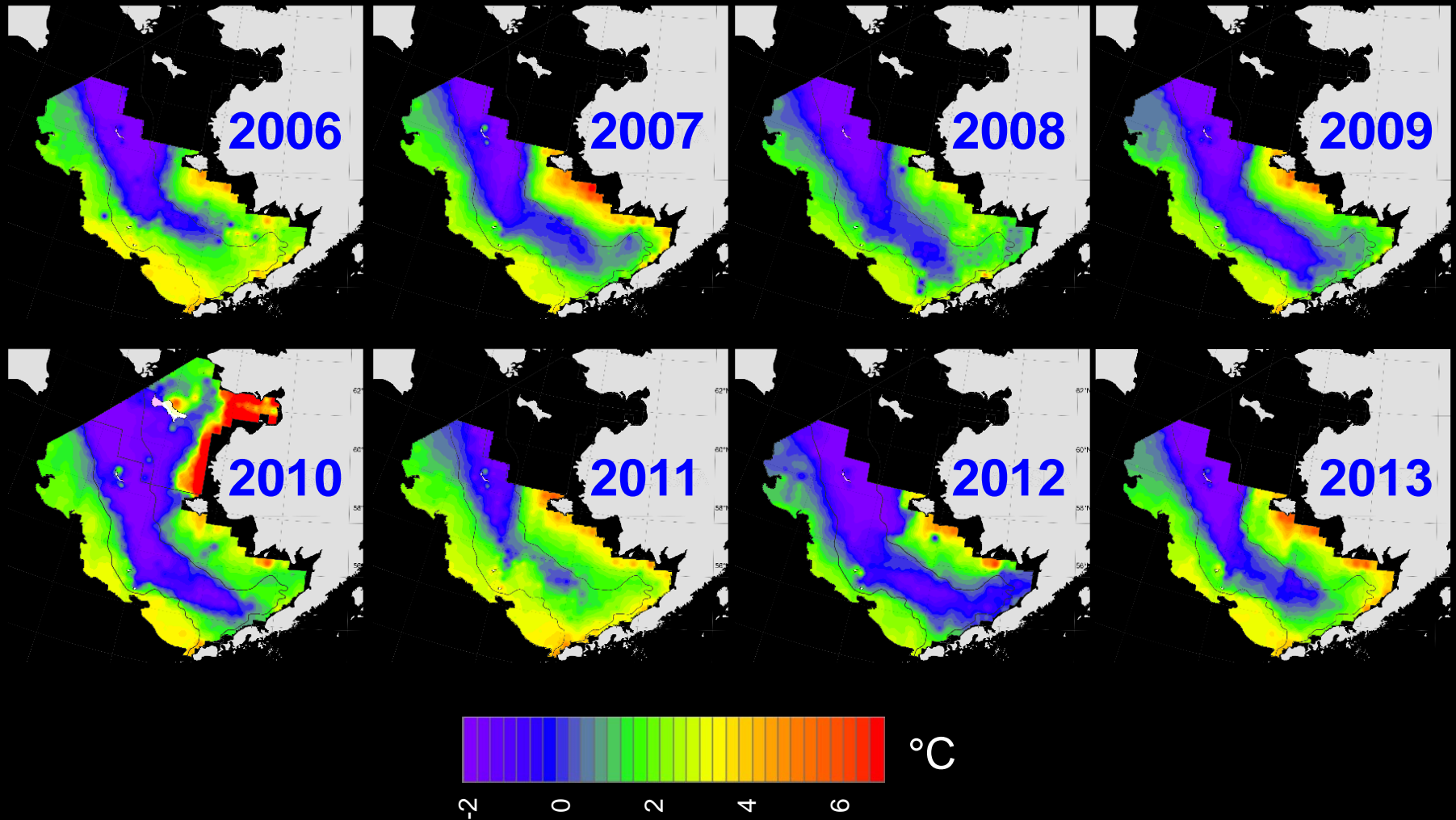
October 1-4, 2018



Eastern Bering Sea Shelf Environment

Ice extent/bottom temps shape fish/crab distribution

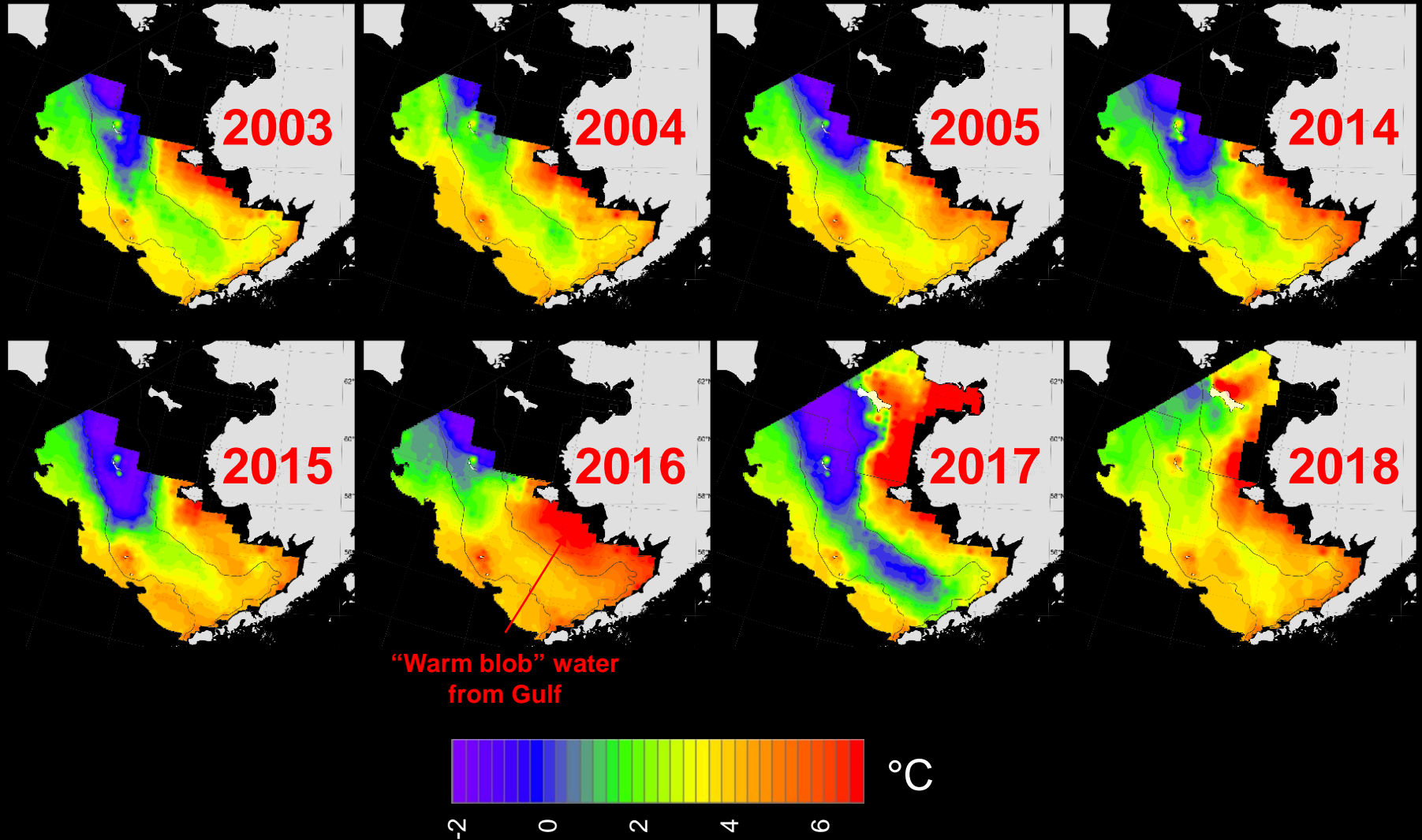
Colder years



Eastern Bering Sea Shelf Environment

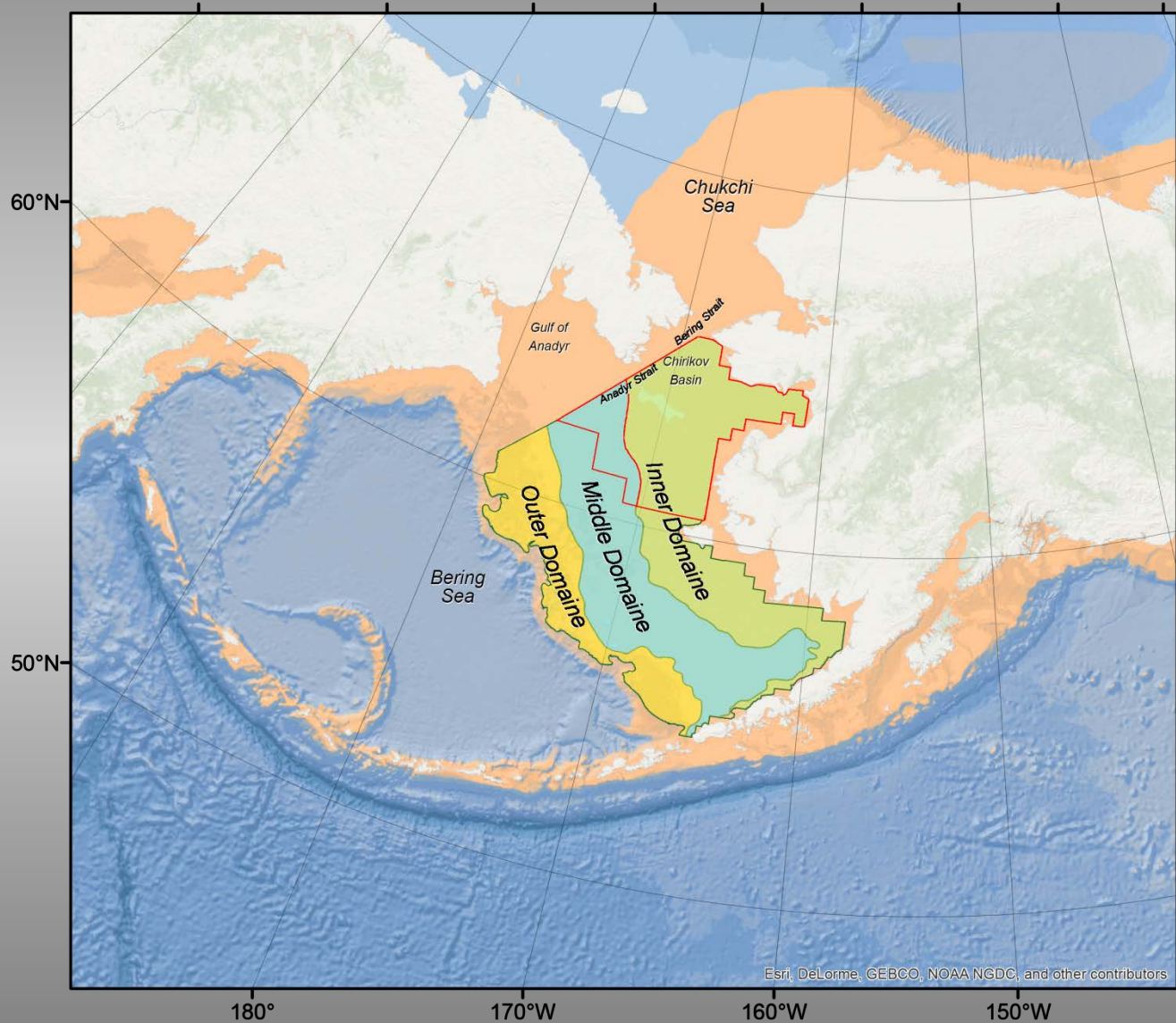
Ice extent/bottom temps shape fish/crab distribution

Warmer years



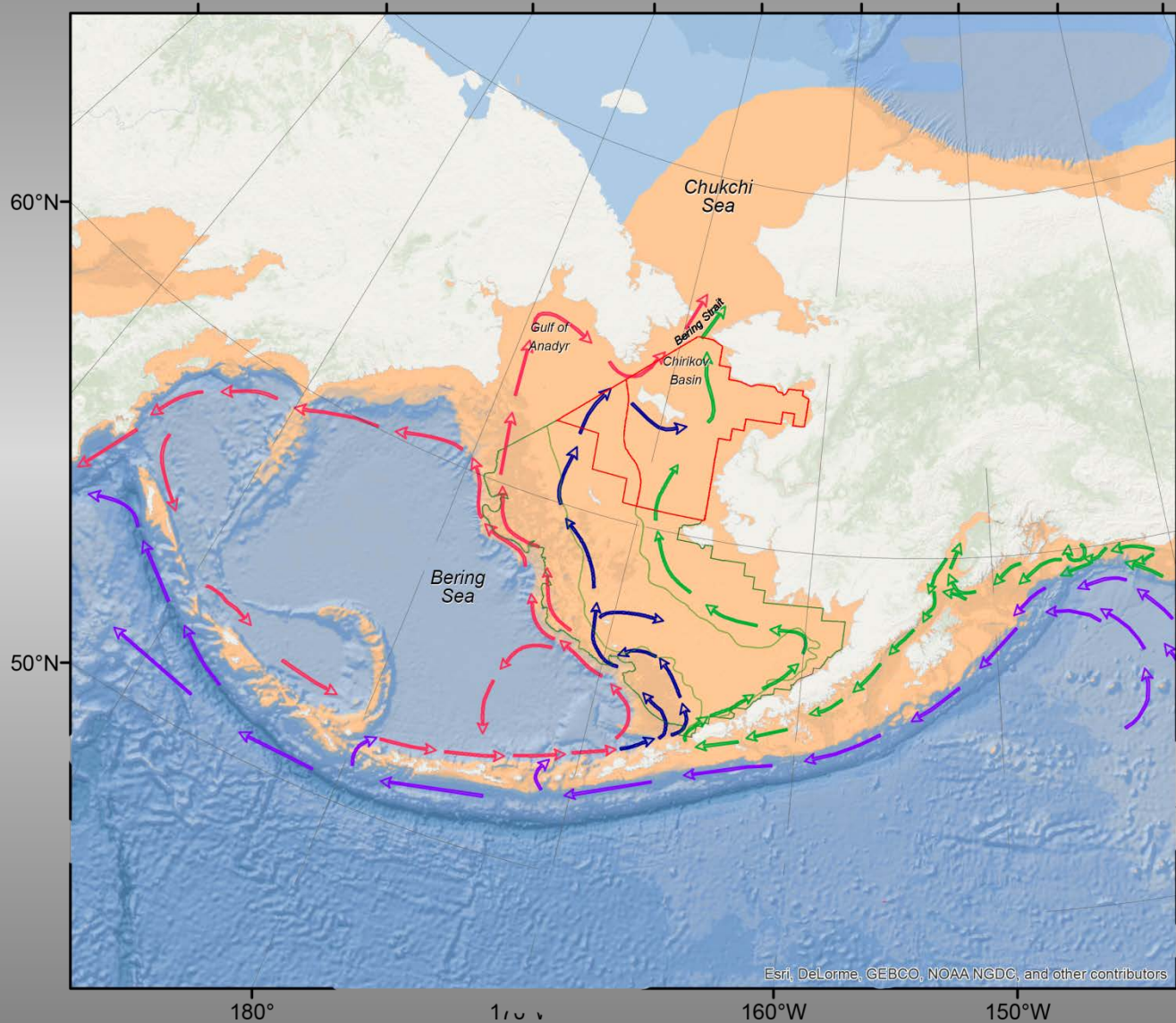
Eastern Bering Sea Shelf Environment

Bottom depth < 200m



Eastern Bering Sea Shelf Environment

Currents affect plankton productivity



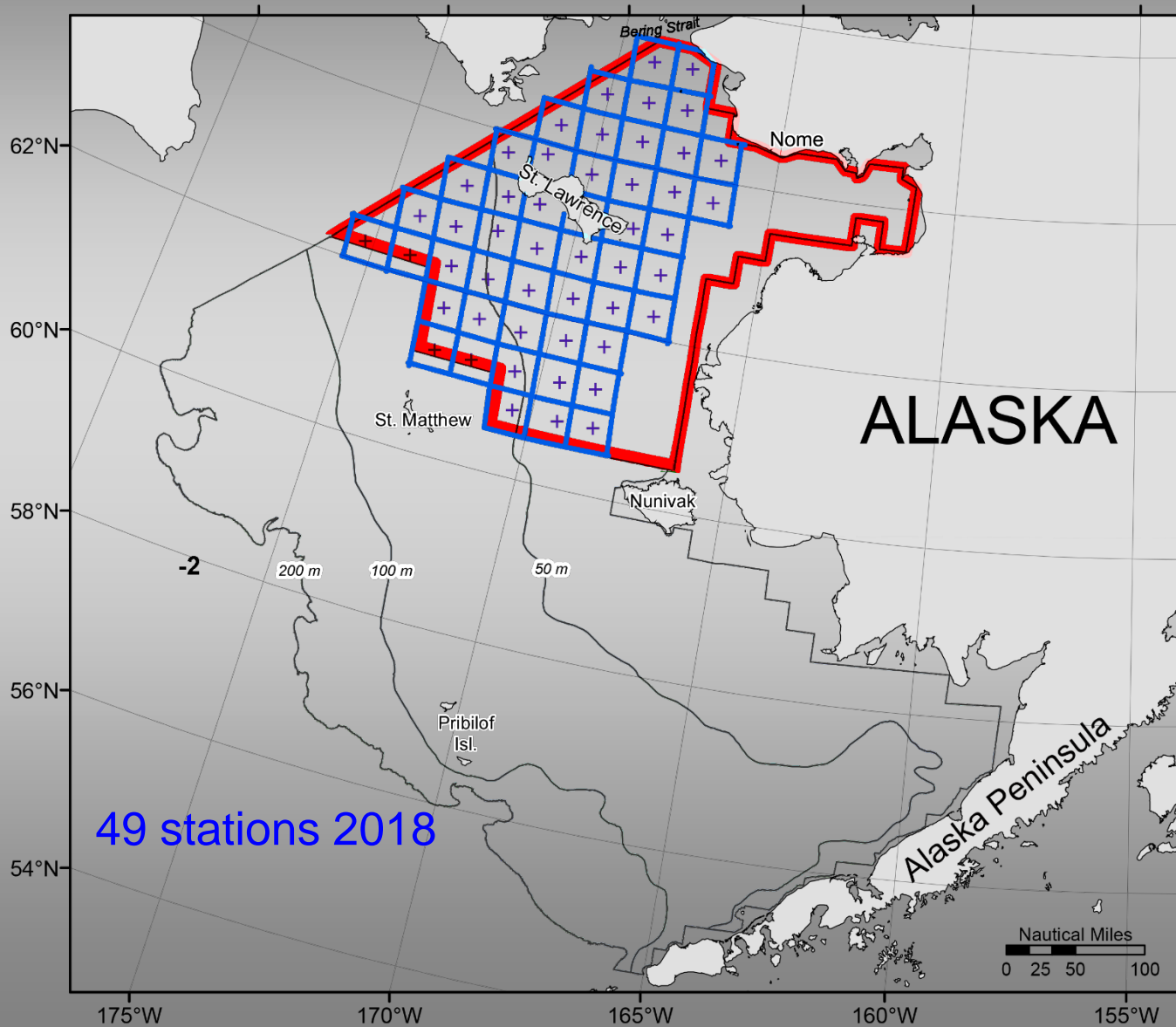
Standard Eastern Bering Sea Shelf Surveys

20 nm² grid pattern

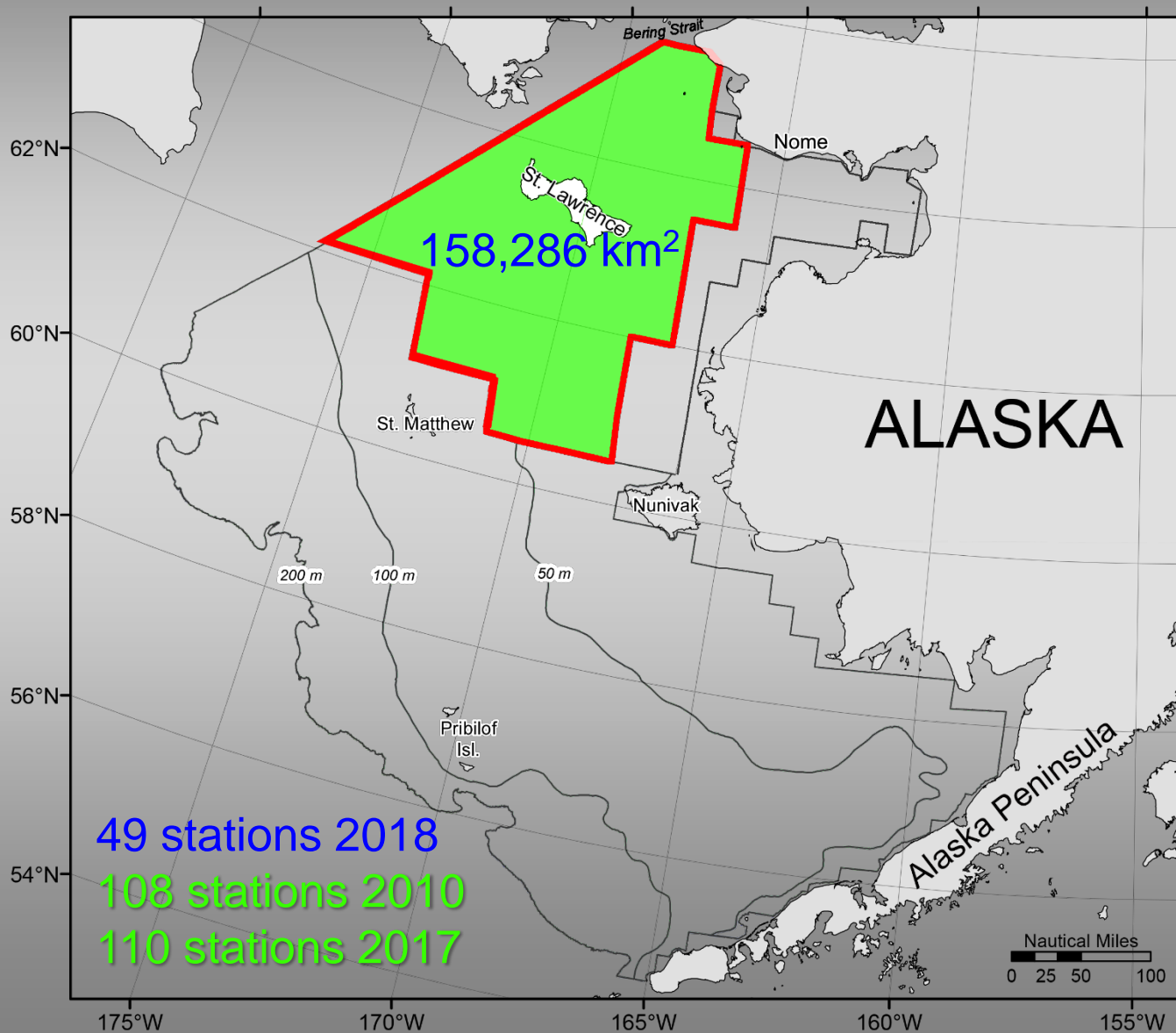


“Rapid response” 2018 NEBS survey

“Special” 30 nm² grid pattern



Comparing results 2010, 2017 & 2018



2018 Survey Charter Vessels

SEBS & NEBS

May 31 – August 20

SEBS only

May 31 – August 7



FV Alaska Knight
2010 -present
9^h year



FV Vesteraalen
2014 -present
5th year

Both vessels on contract to do standard **SEBS & NEBS** next year (charters fully funded). Thank you AFSC leadership and NOAA Fisheries HQ!

Length measurements SEBS & NEBS

walleye pollock	48,535	8,126
yellowfin sole	27,237	4,299
flathead sole	26,708	11
northern rock sole	25,765	2,540
arrowtooth flounder	18,689	12
Alaska plaice	12,992	1,992
Pacific cod	11,511	511
Alaska skate	10,376	376
Kamchatka flounder	7	7
rex sole	425	-
plain sculpin	1,899	290
Pacific halibut	1,828	63
Bering flounder	1,450	1,250
yellow Irish lord	1,354	1
starry flounder	1,024	54
great sculpin	782	24
longhead dab	498	72
bigmouth sculpin	346	-
Greenland turbot	249	10
other taxa (22)	2,817	1,431
TOTAL	213,302	

**Plus 1000's and
1000's of crabs!**

Age structures SEBS & NEBS

Random

Walleye pollock	1502 & 250	Aging completed
Pacific cod	1352 & 196	
Flathead sole	805	
Arrowtooth flounder	804	

Per cm/sex/area

Yellowfin sole	724
Northern rock sole	571
Alaska plaice	472
Kamchatka flounder	485
Greenland turbot	203
Pacific halibut	381
Yellow Irish lord	258

Other survey projects & samples

Genetic samples

Pacific cod 250

Crab pathology

Snow crab 783

Tanner crab 446

Pacific halibut

Wire tags 768

Tissue samples 181

Fin clips 518

Stomachs

Pollock Lots

Pacific cod &

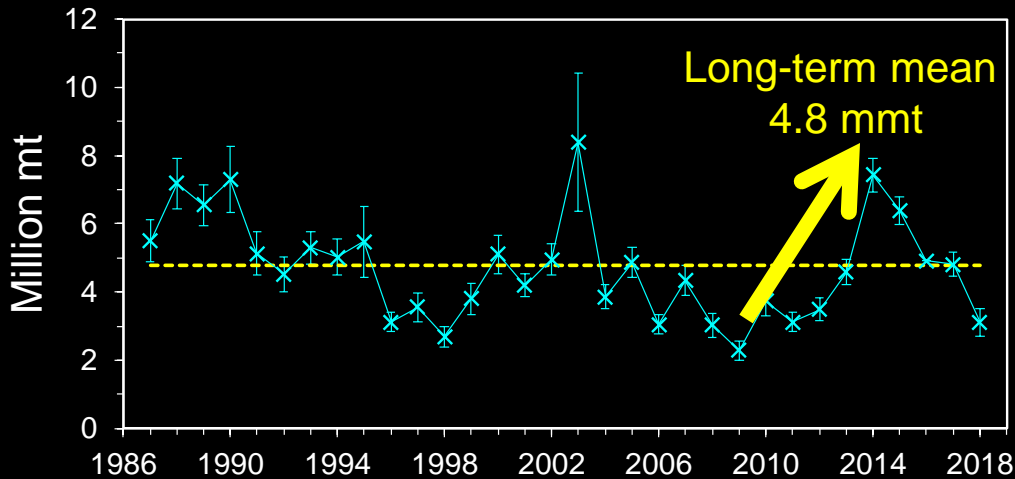
Halibut Lots

ATF

Other major projects

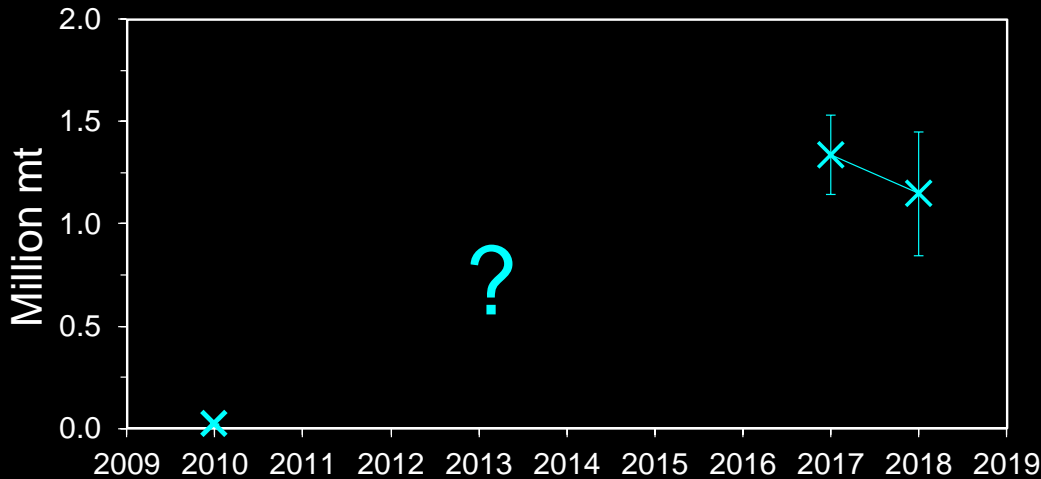
- Temporal-spatial variation of juvenile flatfish condition
- MACE “AVO” pollock index
- Estimation of catchability of the combined BT & AT survey for pollock
- CTD and light intensity data collections
- Population genomics of RKC and Tanner crabs
- Genetics and mating dynamics of snow crab
- Cooperative BSFRF Tanner crab catchability study

SEBS & NEBS Walleye pollock



SEBS Biomass
3.1 mmt

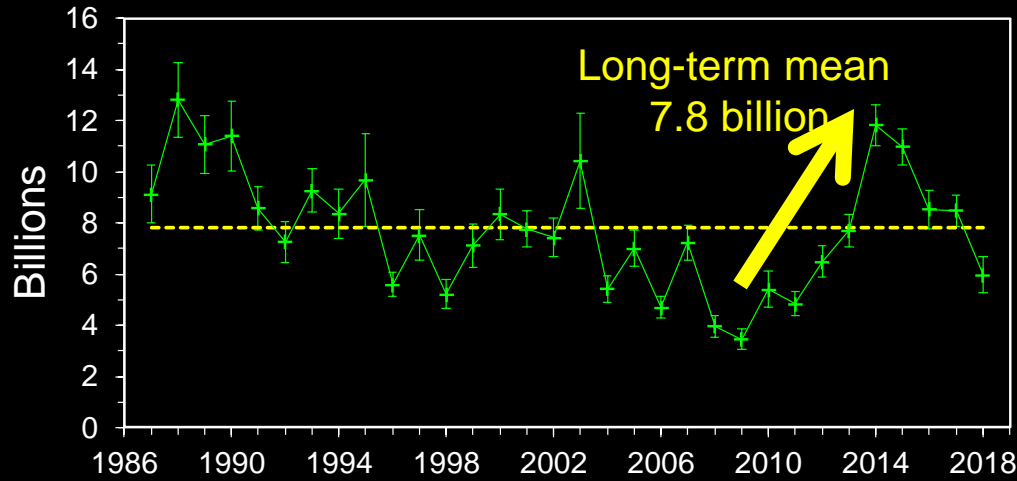
-35% from 2017 (4.8 mmt)



NEBS Biomass
1.15 mmt

-14% from 2017 (1.34 mmt)

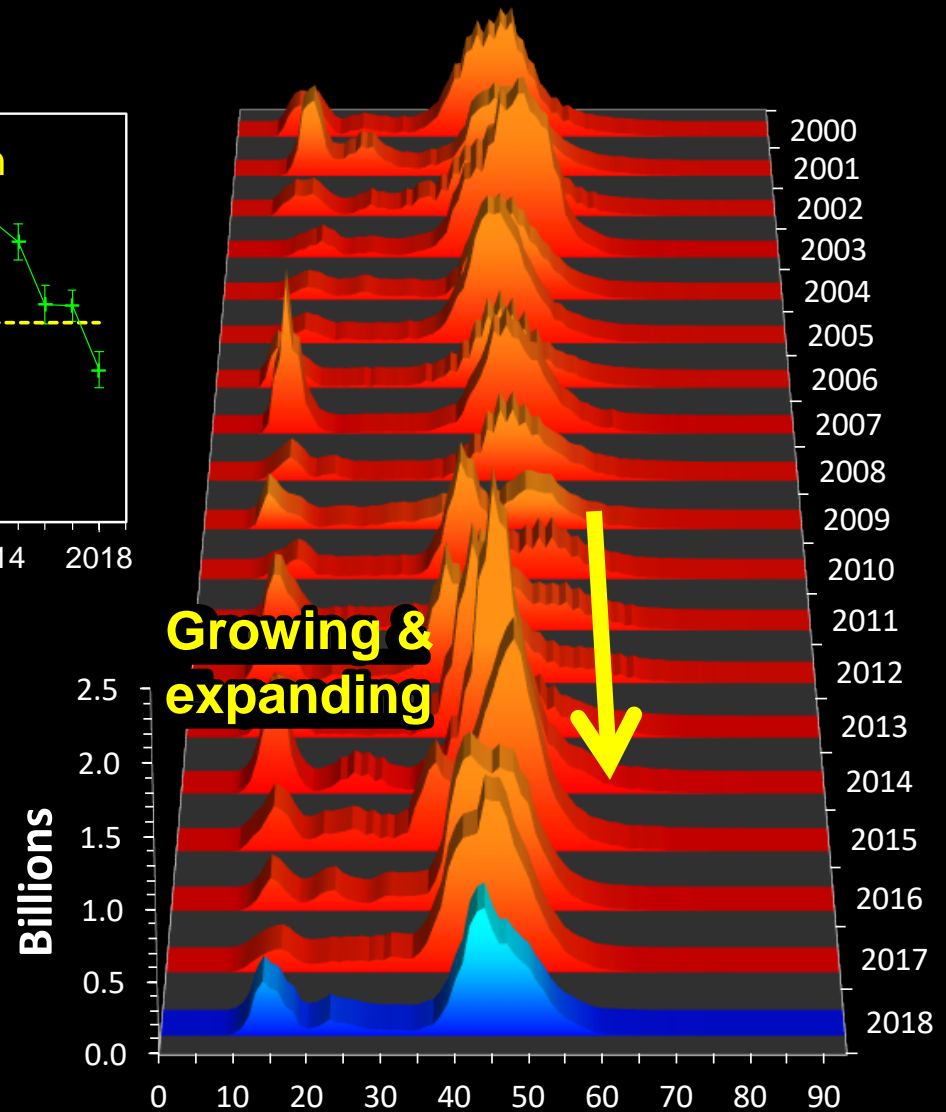
SEBS Walleye pollock



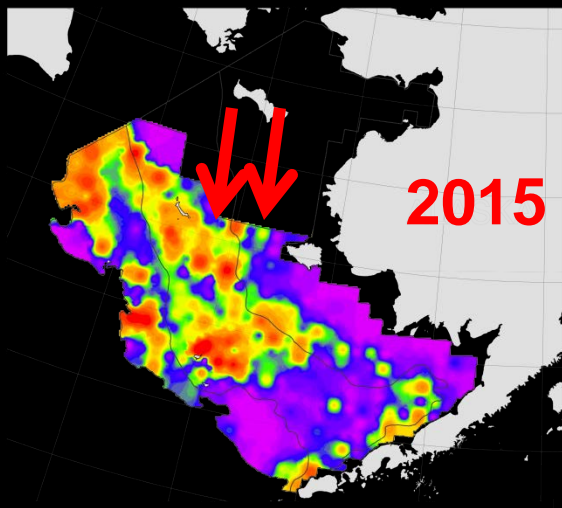
SEBS Abundance

6.0 billion

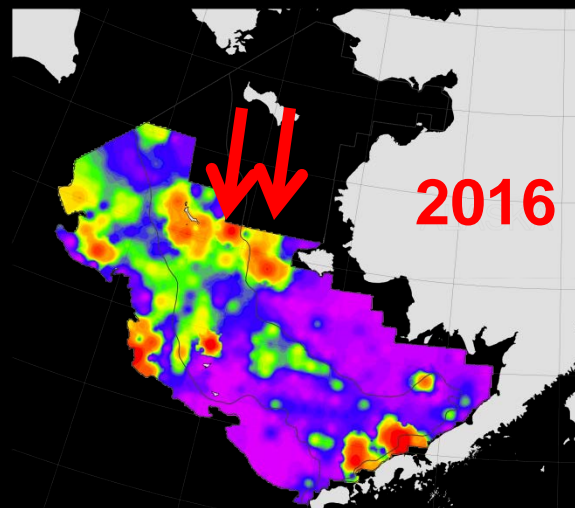
-30% from 2017 (8.5 billion)



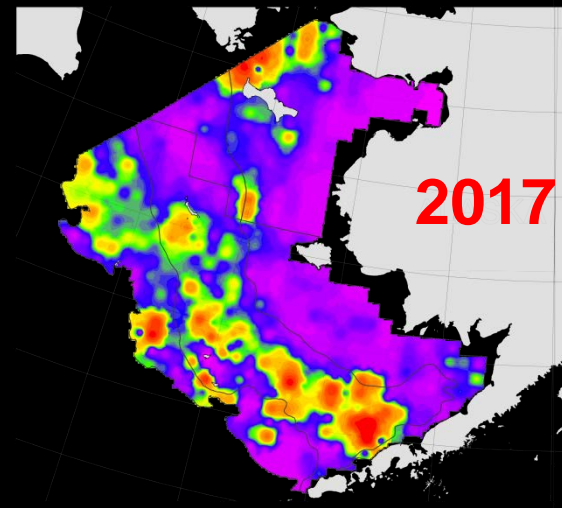
Walleye pollock distribution by catch weight



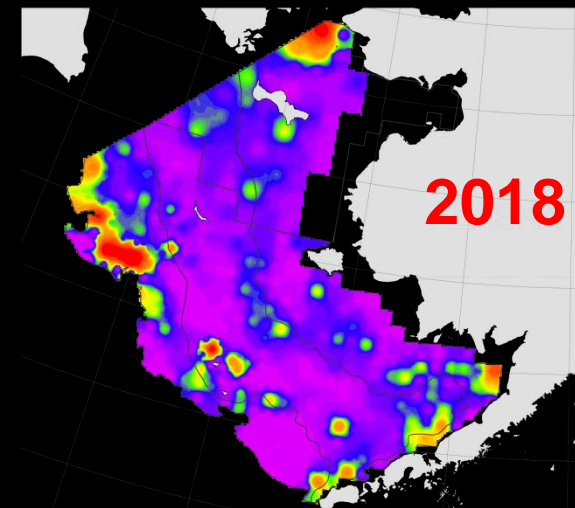
2015



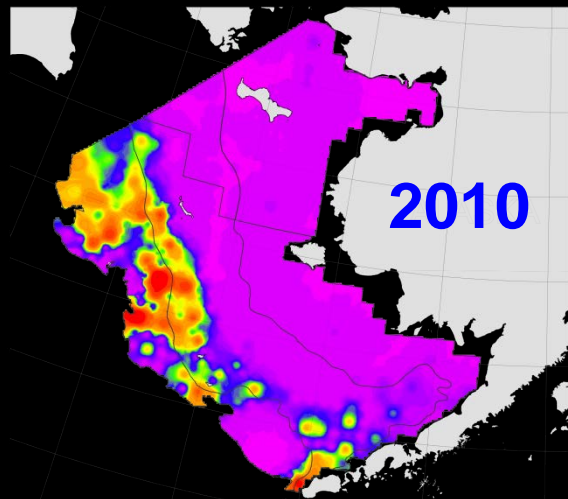
2016



2017

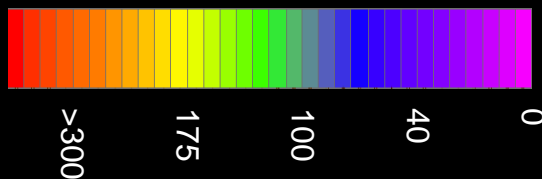


2018



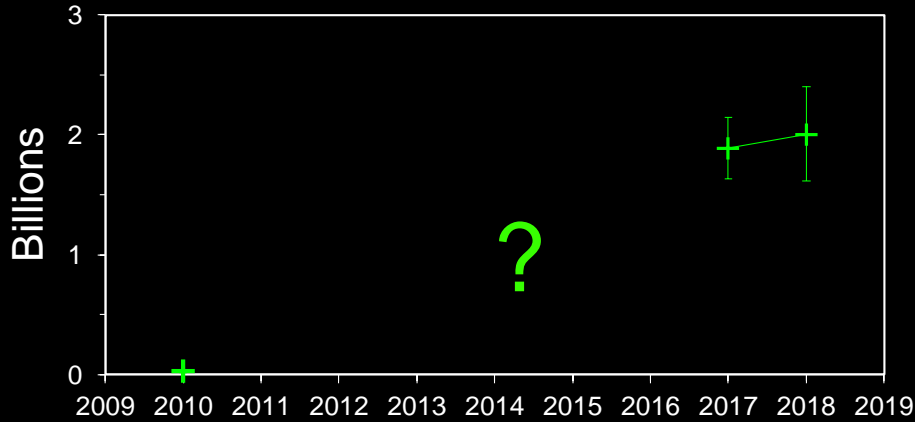
2010

kg/ha

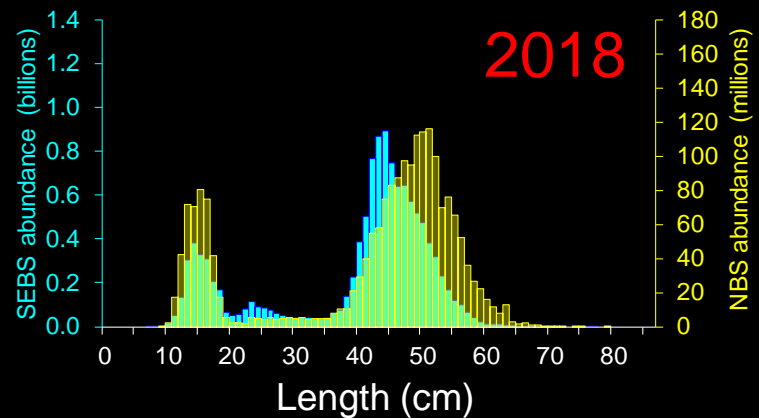
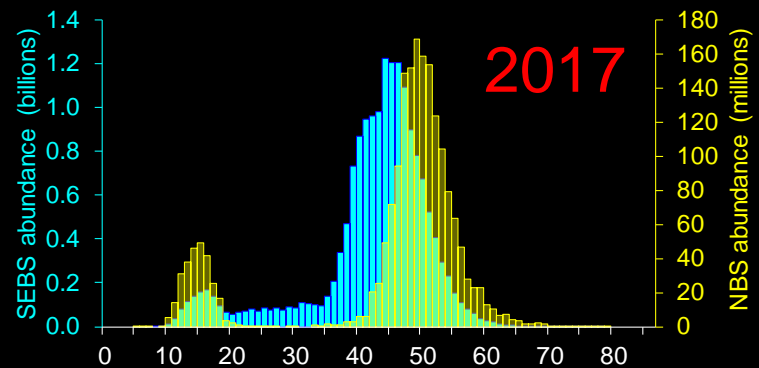
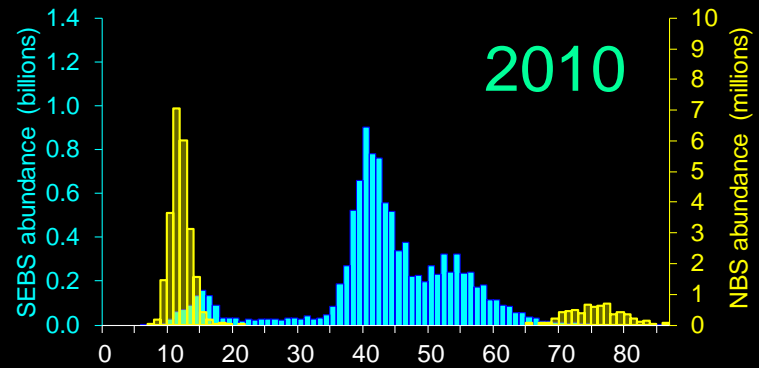


>300
175
100
40
0

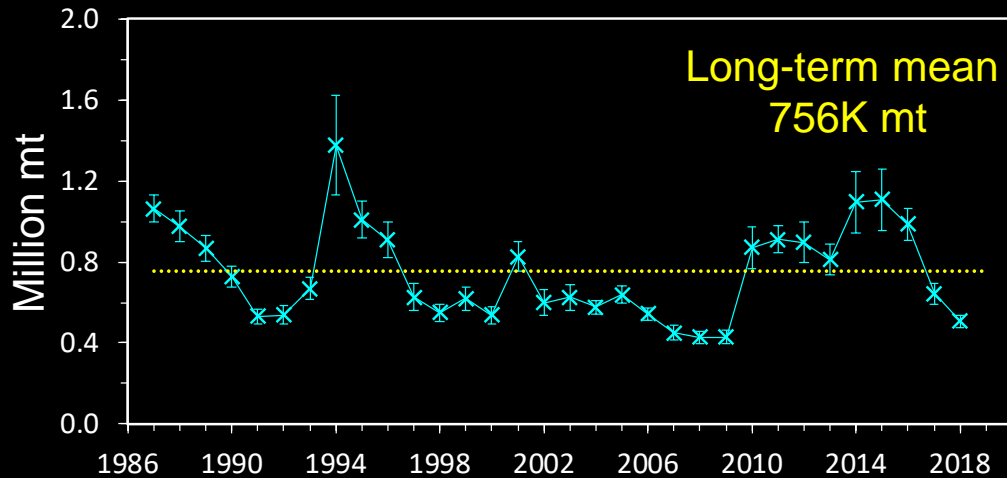
NEBS Walleye pollock



NEBS Abundance
2.0 billion
+6% from 2017 (1.9 billion)

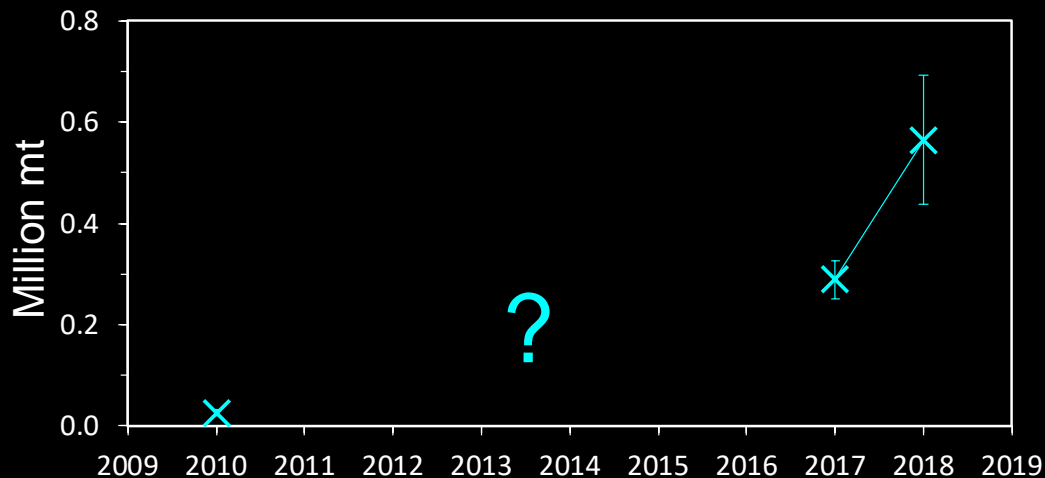


SEBS & NEBS Pacific cod



SEBS Biomass
507K mt

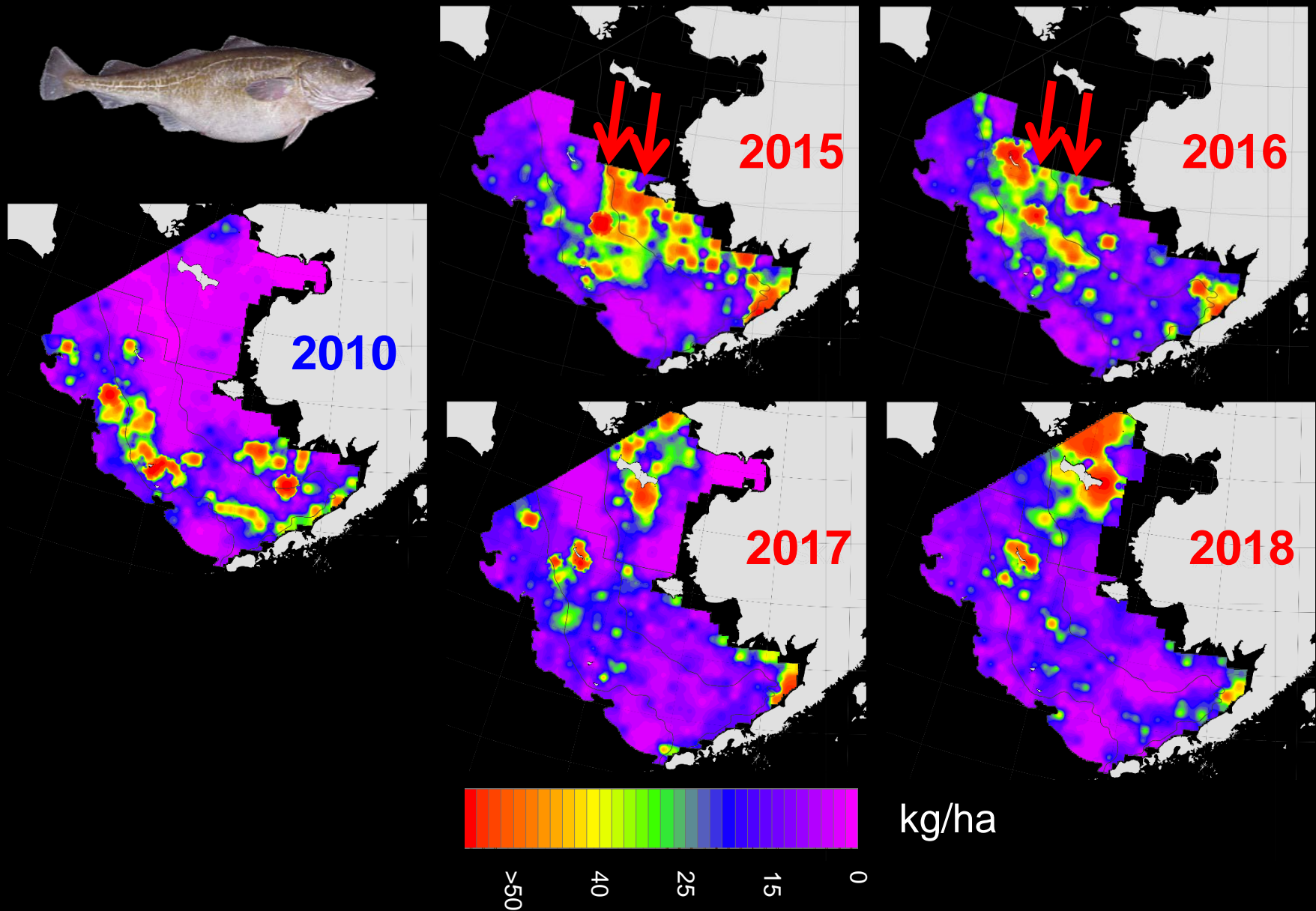
-21% from 2017 (644K mt)



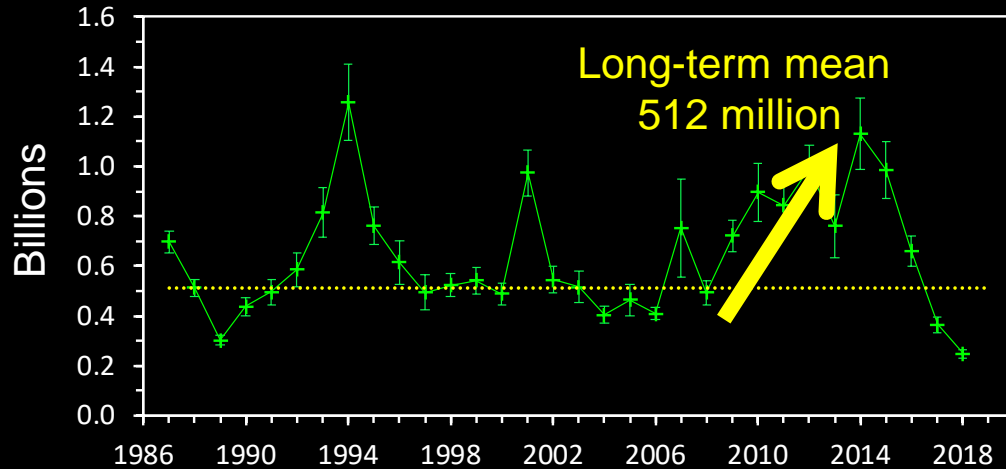
NEBS Biomass
565K mt

+95% from 2017 (289K mt)

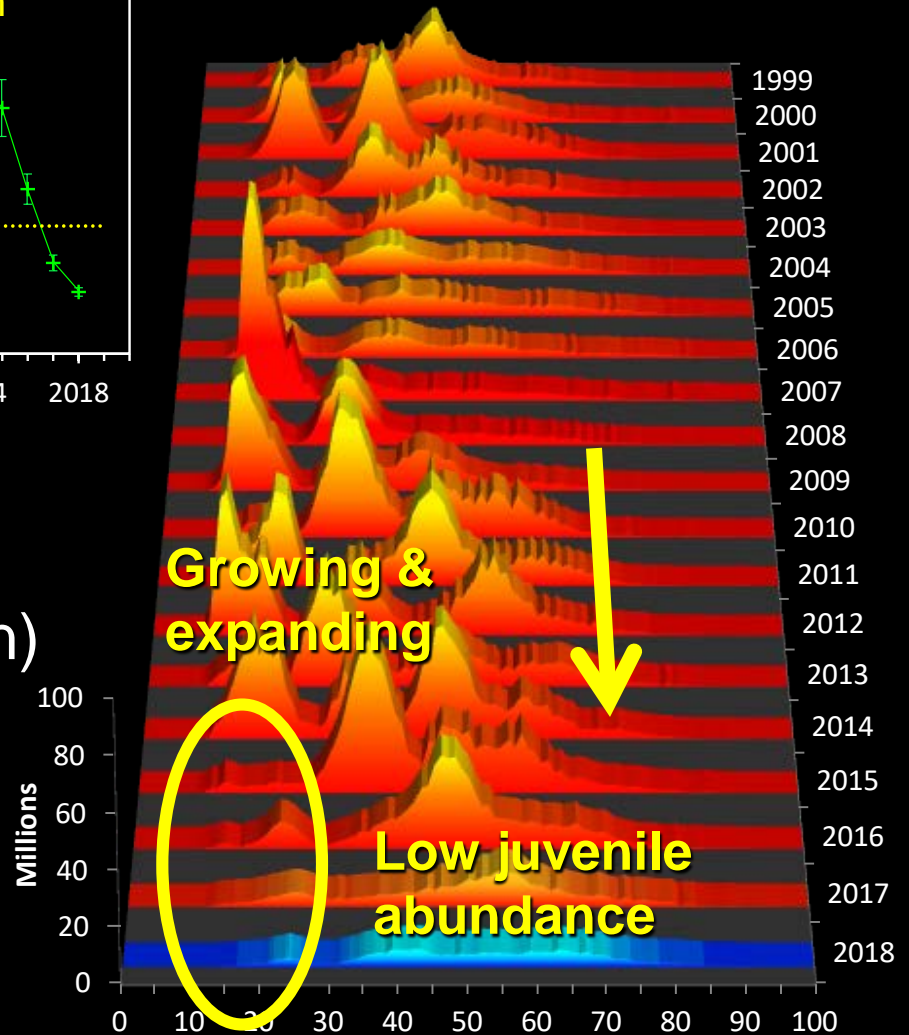
Pacific cod distribution by catch weight



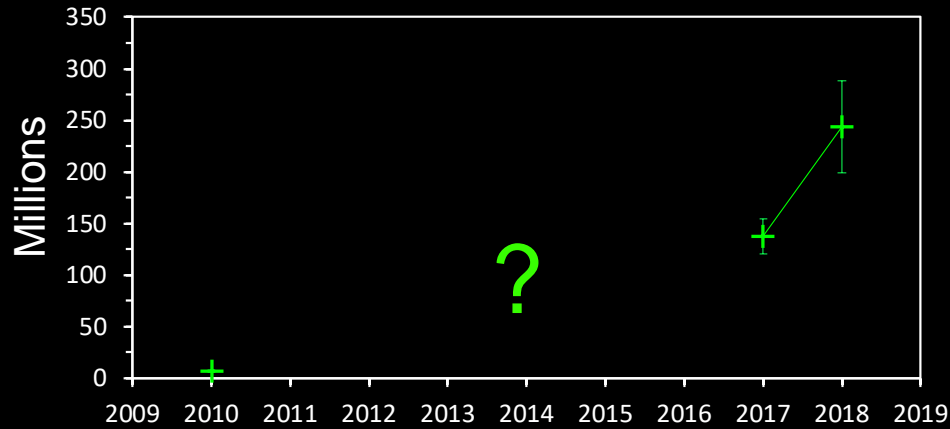
SEBS Pacific cod



SEBS Abundance
248 million
-32% from 2017 (364 million)

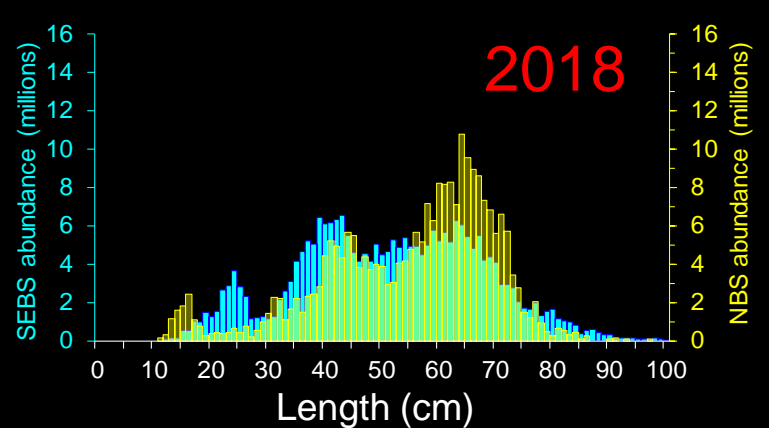
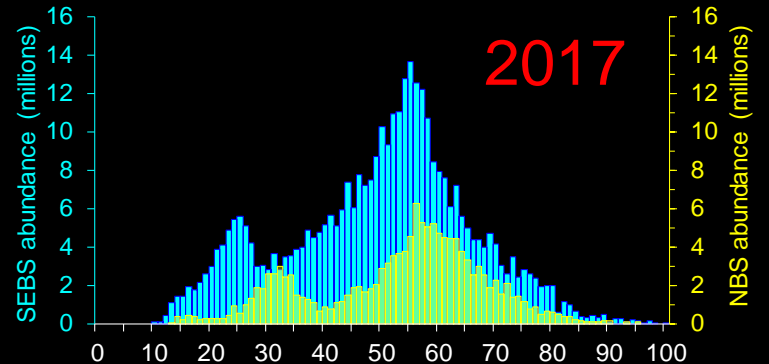
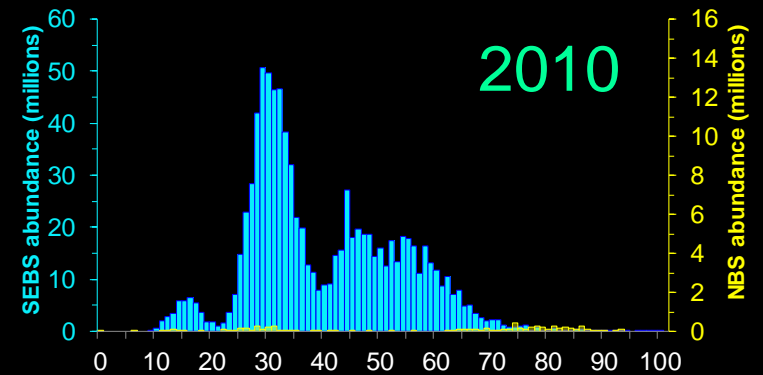


NEBS Pacific cod



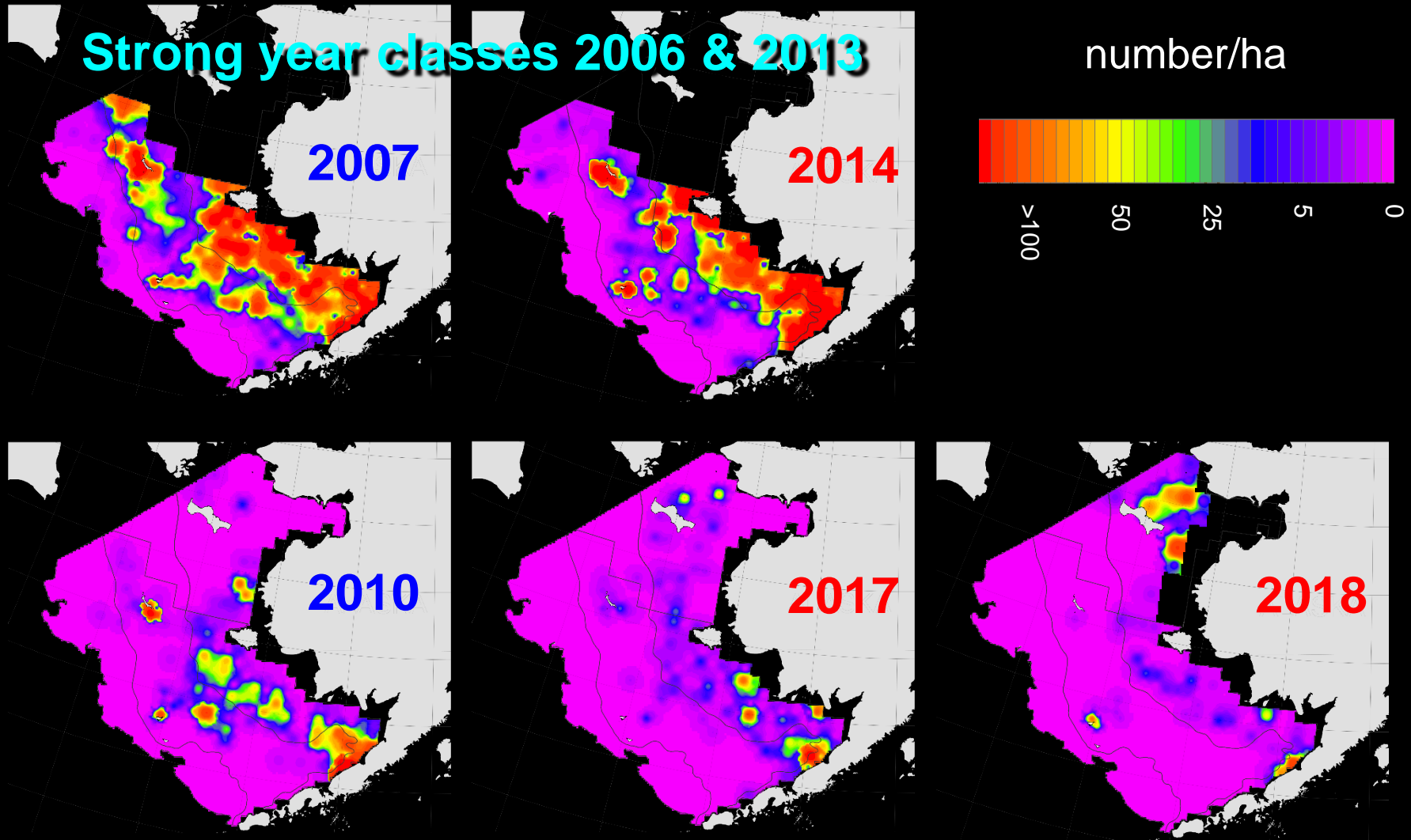
NEBS Abundance
244 million

+78% from 2017 (137 million)



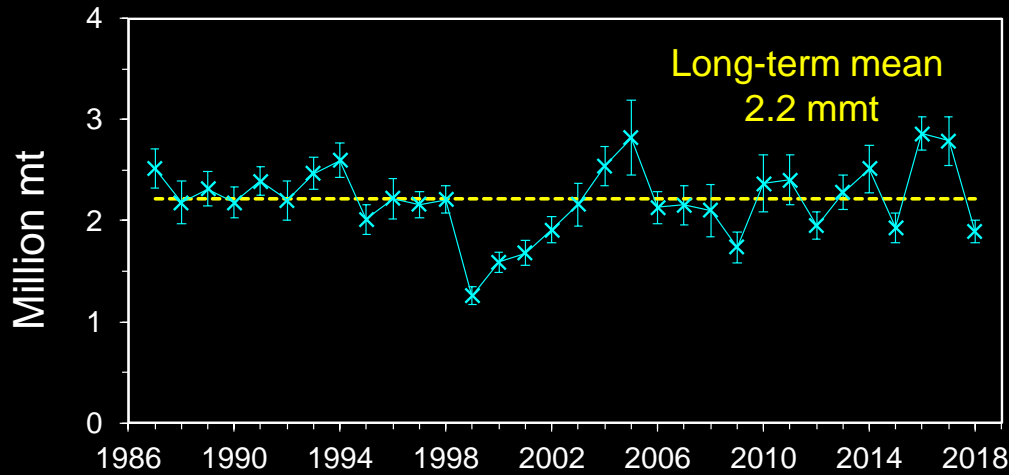
Juv. Pacific cod distribution <20 cm

Low abundance since 2015



SEBS & NEBS Yellowfin sole

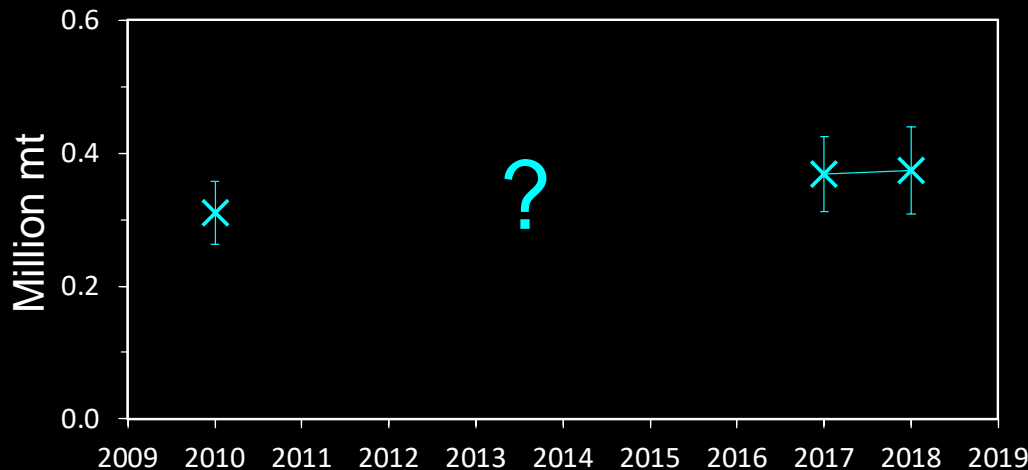
Spawning migration affected by bottom temps



SEBS Biomass

1.9 mmt

-32% from 2017 (2.8 mmt)



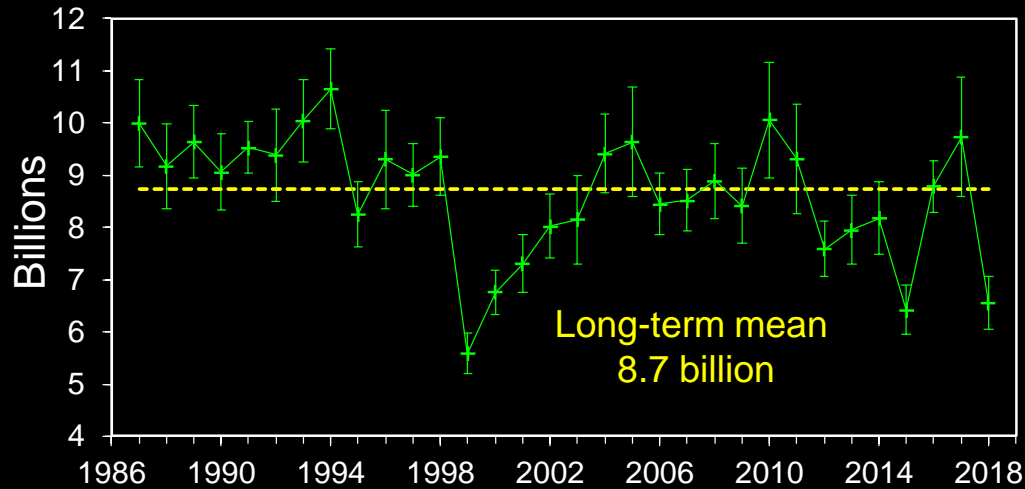
NEBS Biomass

373K mt

+1% from 2017 (368K mt)

SEBS Yellowfin sole

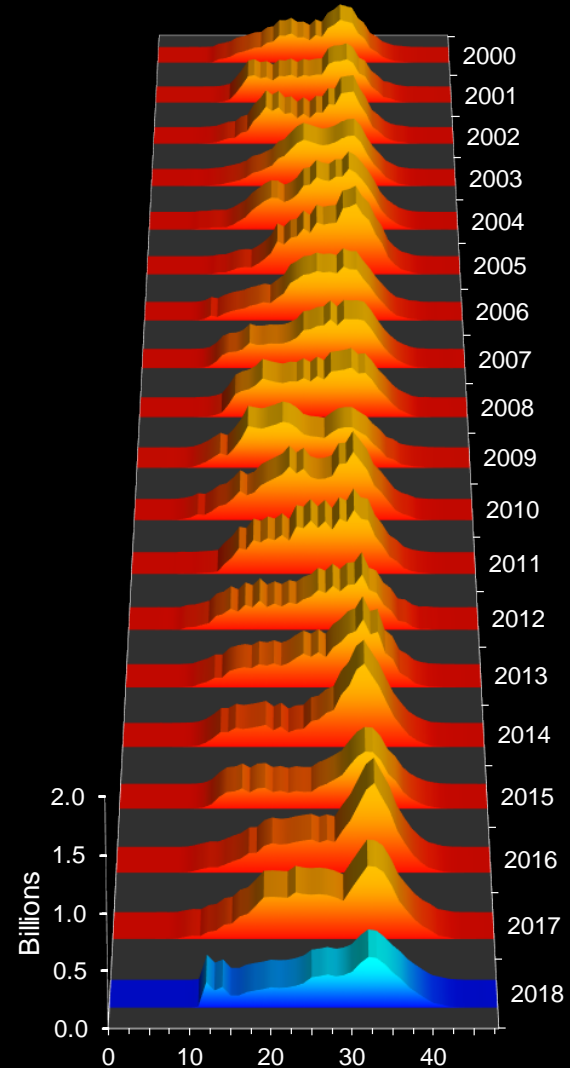
Spawning migration affected by bottom temps



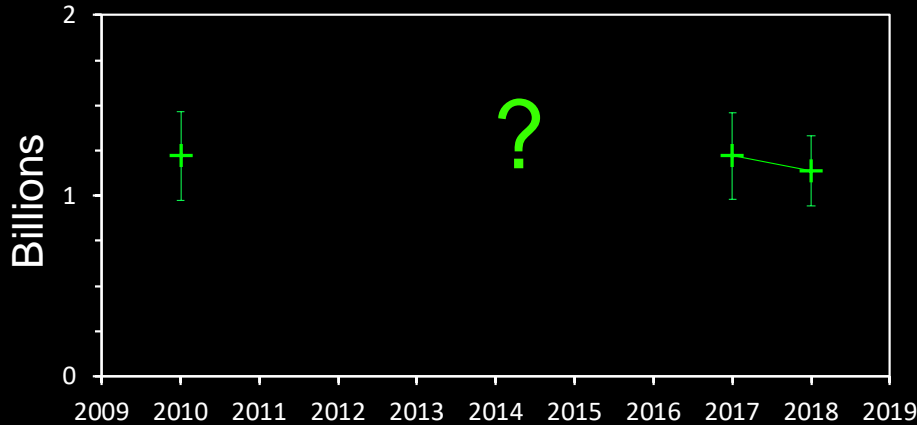
SEBS Abundance

6.5 billion

-33% from 2017 (9.7 billion)



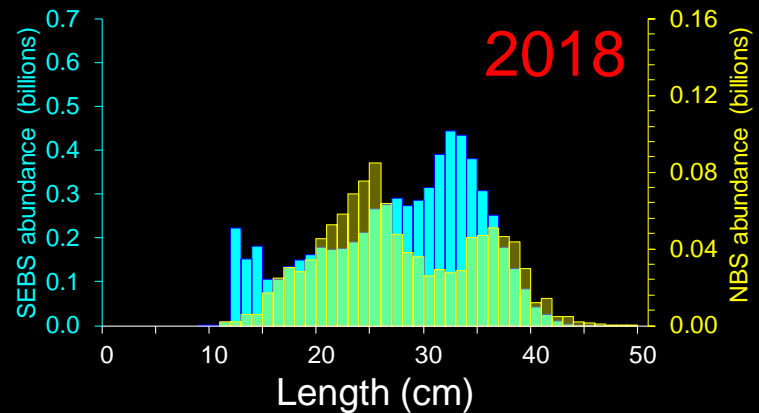
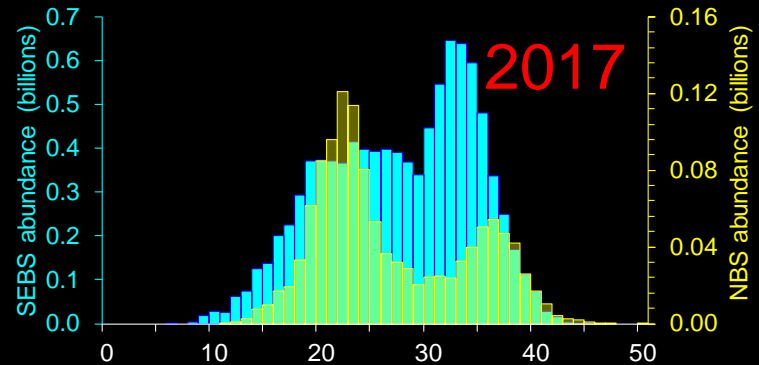
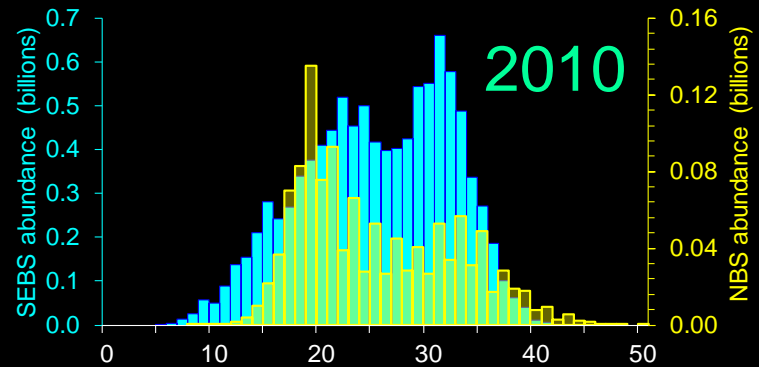
NEBS Yellowfin sole



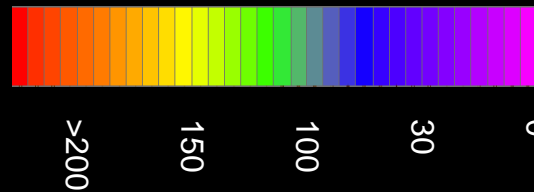
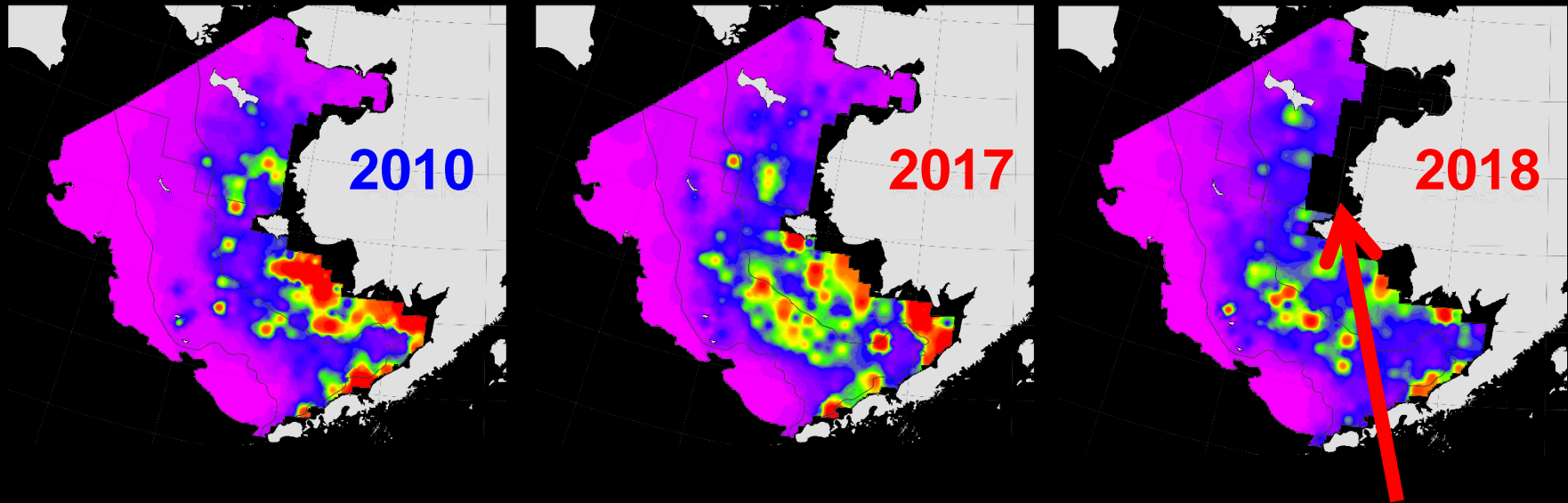
NEBS Abundance

1.1 billion

-7% from 2017 (1.2 billion)

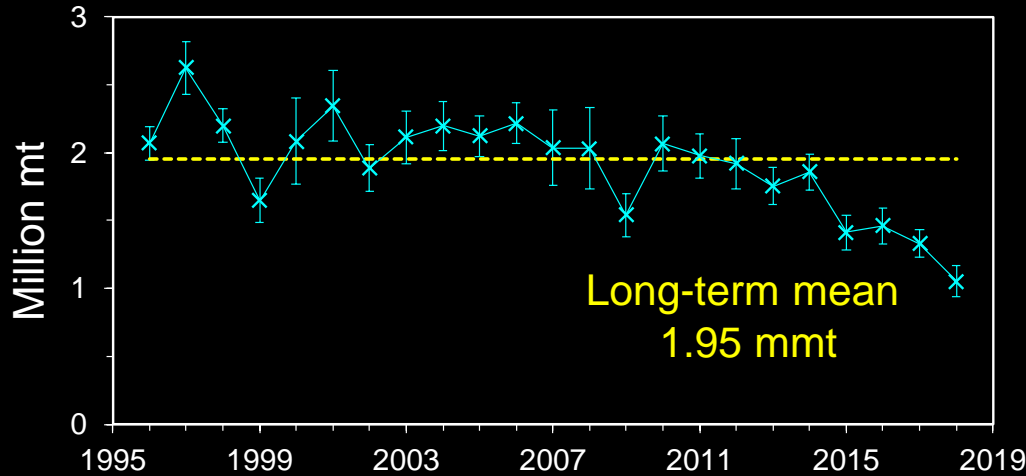


Yellowfin distribution by catch weight



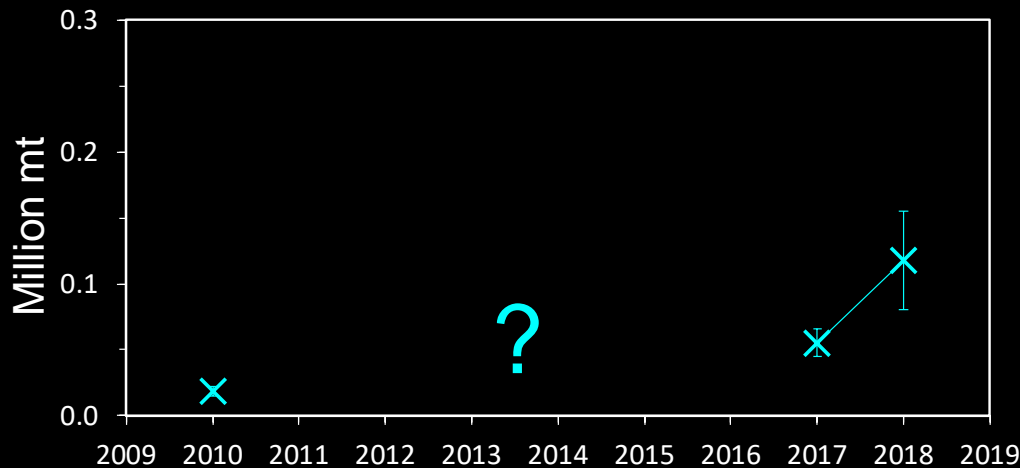
Poor survey coverage <30 m

SEBS & NEBS Northern rock sole



SEBS Biomass
1.05 mmt

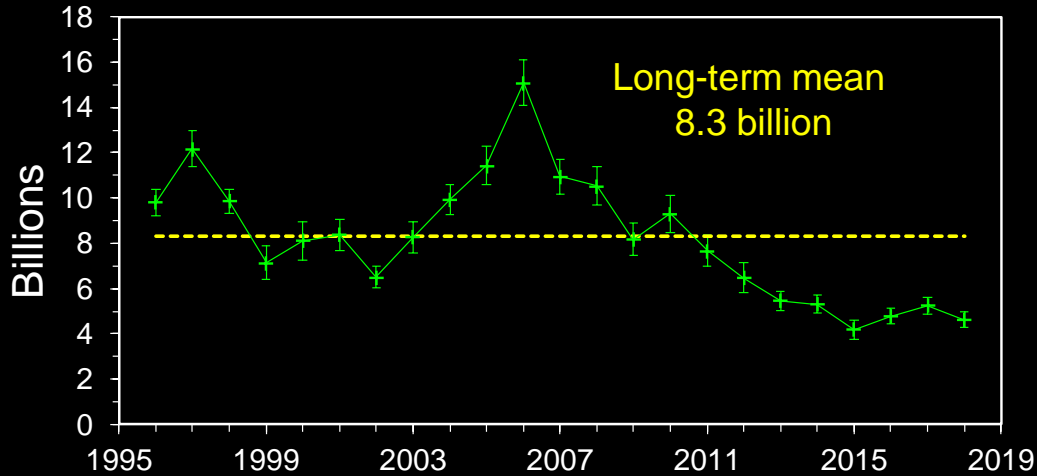
-21% from 2017 (1.33 mmt)



NEBS Biomass
118K mt

+113% from 2017 (55K mt)

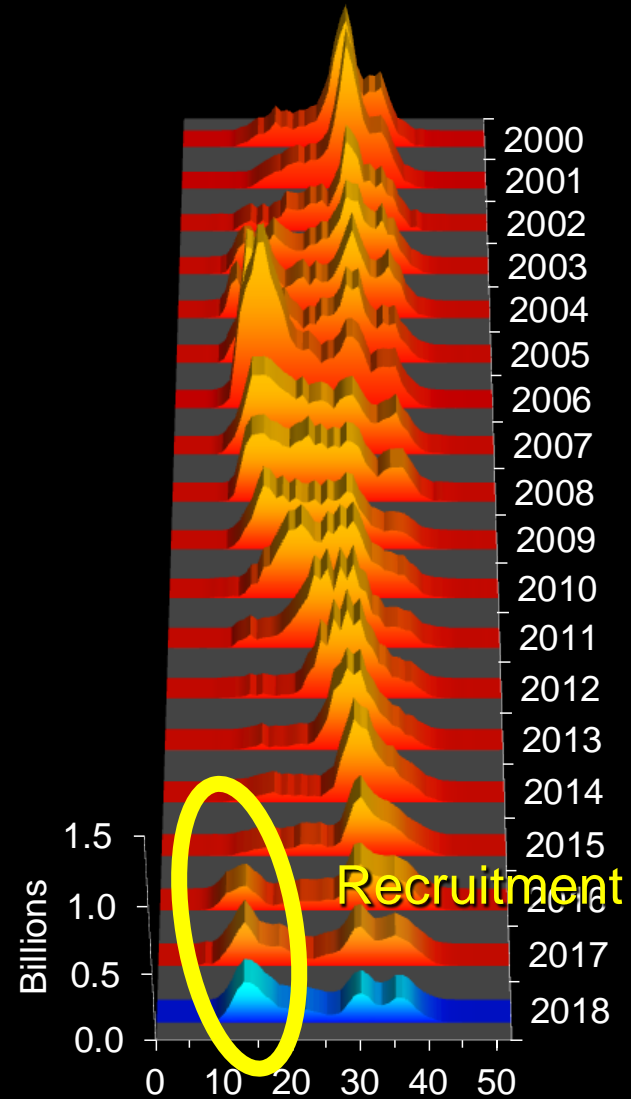
SEBS Northern rock sole



SEBS Abundance

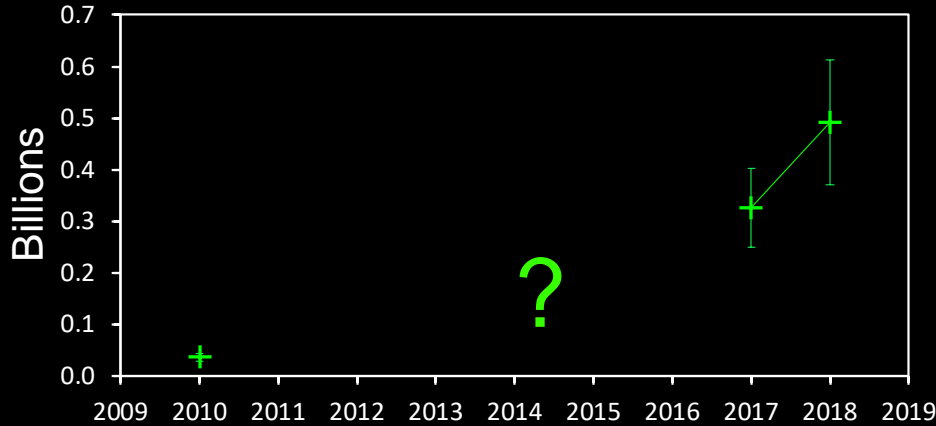
4.63 billion

-12% from 2017 (5.26 billion)

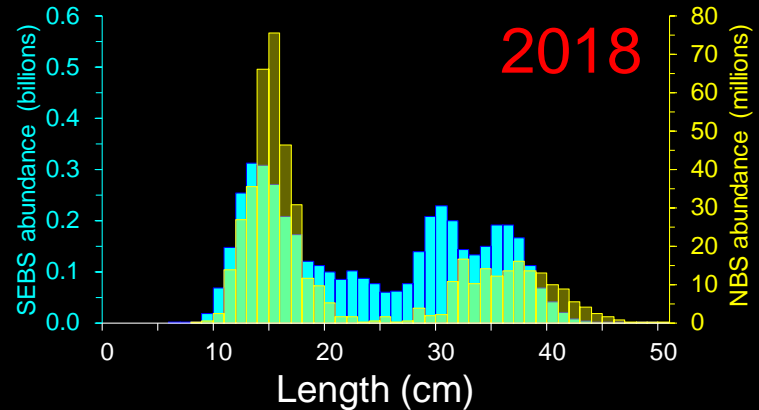
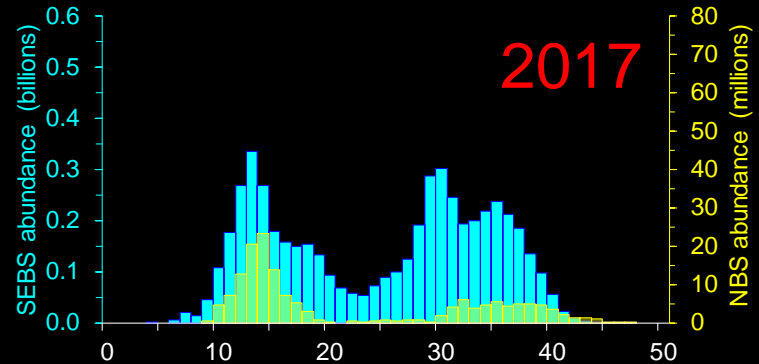
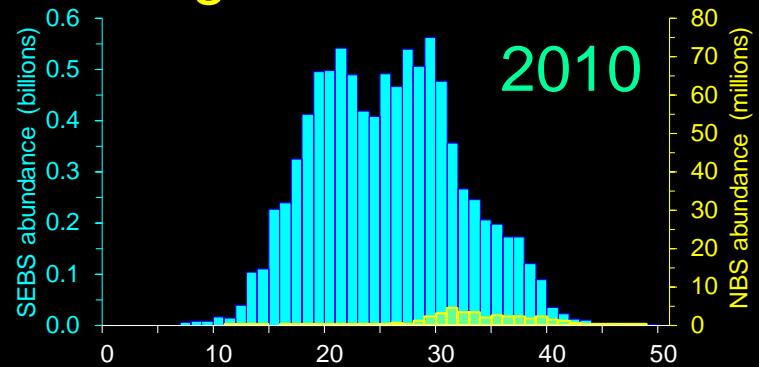


NEBS Northern rock sole

Juveniles recruiting



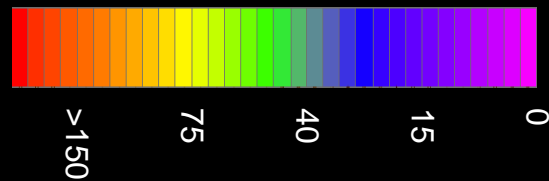
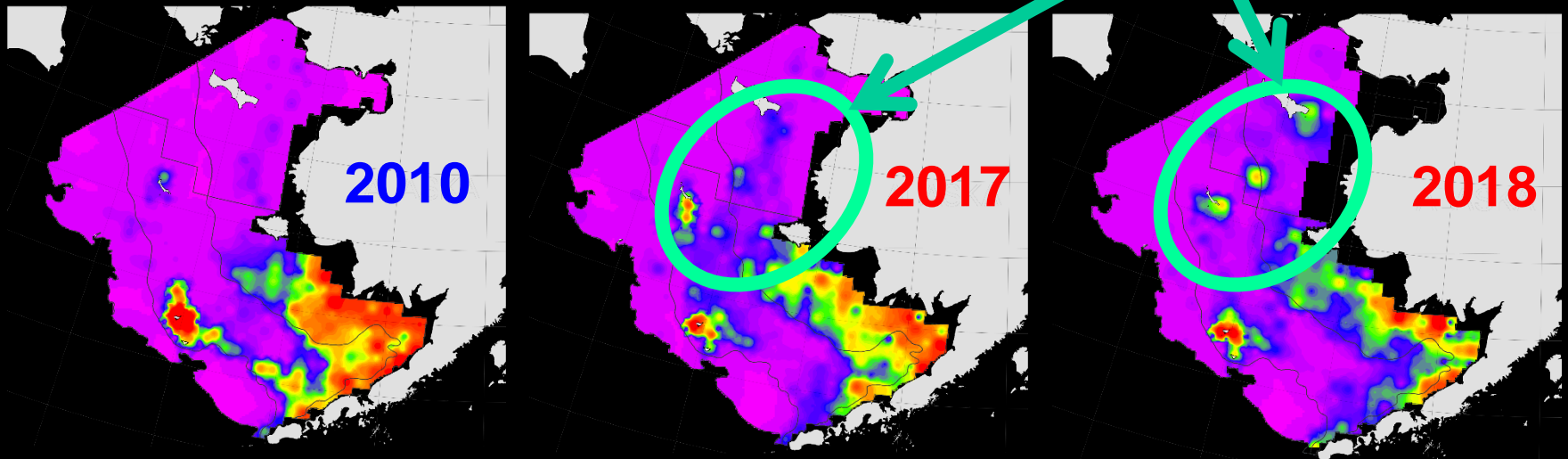
NEBS Abundance
491 million
+51% from 2017 (326 million)



Northern rock sole distribution



recruitment



kg/ha

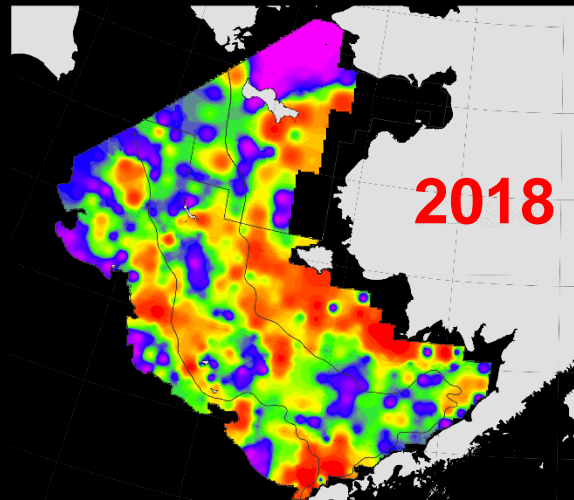
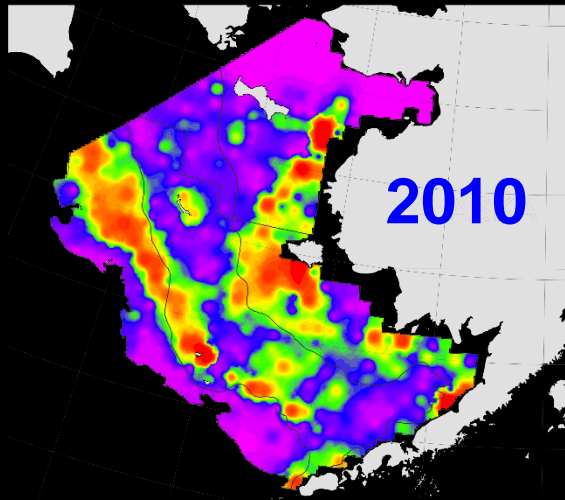
Other 2018 survey results

SEBS

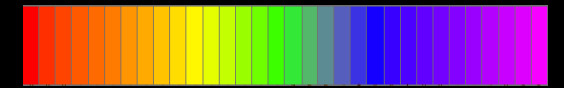
NEBS

Taxon	Year	SEBS		NEBS	
		Biomass mt	Abund. X1000	Biomass mt	Abund. X1000
Arrowtooth fl.	2017	424,194	742,123	-	-
	2018	511,192	1,086,953	852	1,056
Kamchatka fl.	2017	48,084	111,180	99	93
	2018	44,000	93,721	758	548
Greenland turbot	2017	21,519	10,518	62	94
	2018	18,017	7,361	1,116	685
Pacific halibut	2017	126,684	52,718	15,022	4,220
	2018	125,702	50,416	18,397	4,607
Flathead sole	2017	538,018	2,099,347	83	180
	2018	492,623	2,329,667	510	1,028
Bering fl.	2017	27,404	122,044	20,712	239,346
	2018	12,995	61,152	30,025	275,082
Alaska plaice	2017	491,050	666,201	336,841	438,662
	2018	419,509	569,754	274,543	310,564
Alaska skate	2017	544,657	118,976	82,399	18,497
	2018	545,994	126,778	116,835	27,670

Distributions of sub-Arctic species

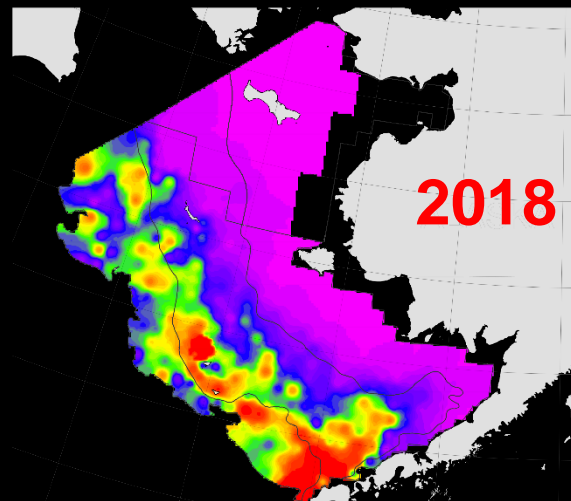
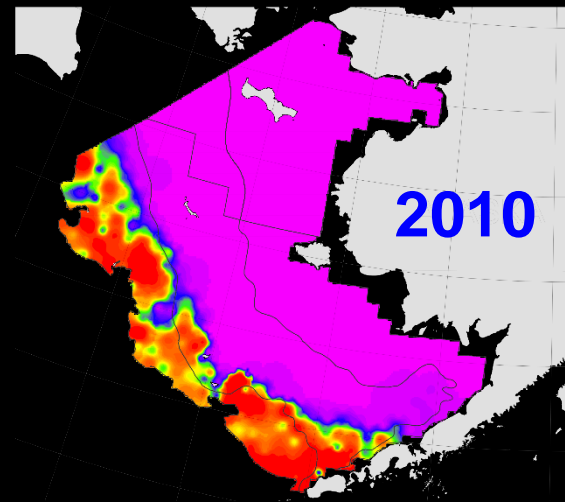


Alaska skate

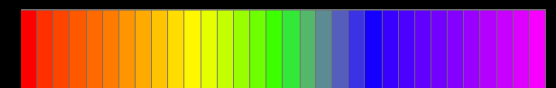


>20 10 5 2 0

kg/ha



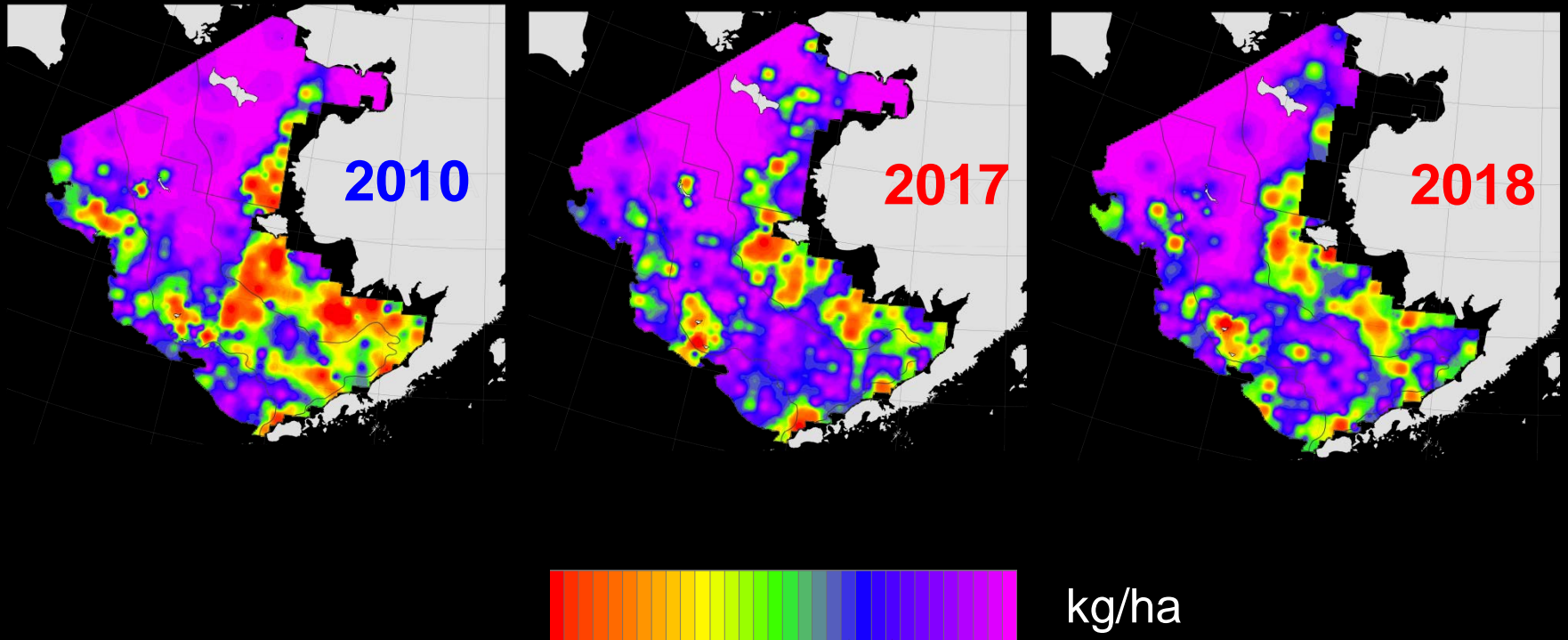
Arrowtooth fl.



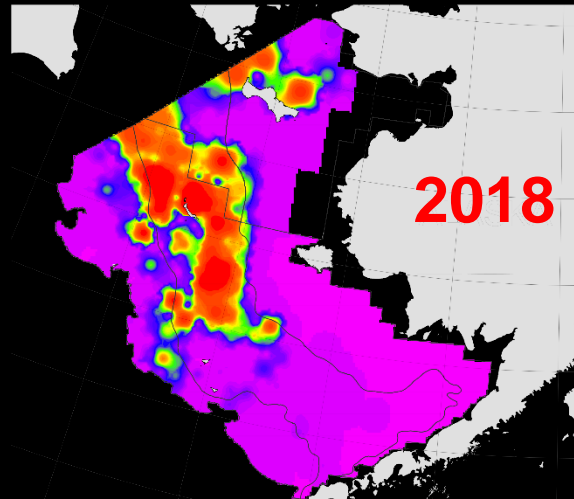
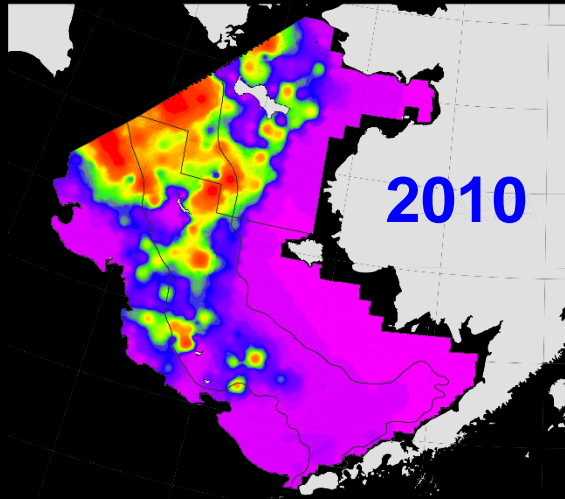
>20 15 10 5 0

kg/ha

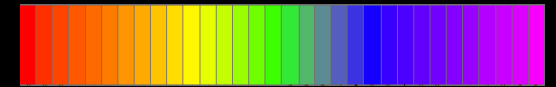
Pacific halibut distribution



Distributions of Arctic species

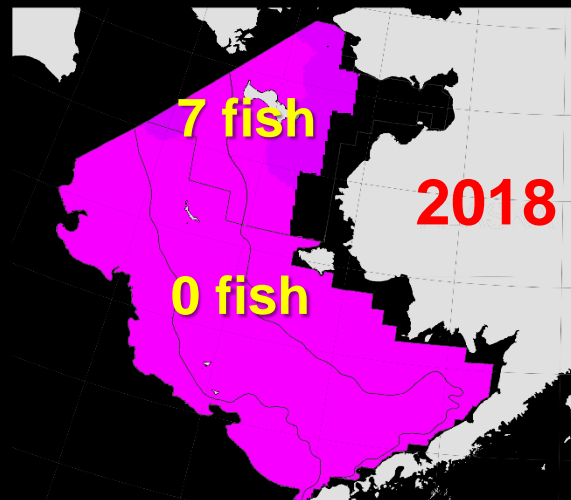
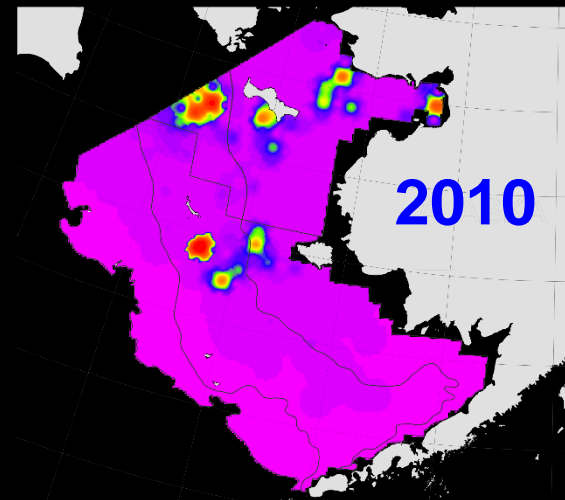


Snow crab

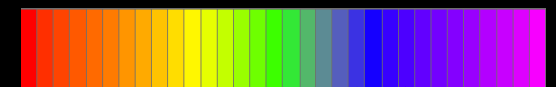


>40 25 15 5 0

kg/ha



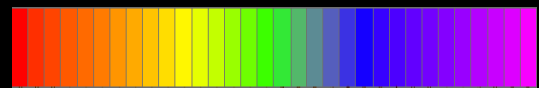
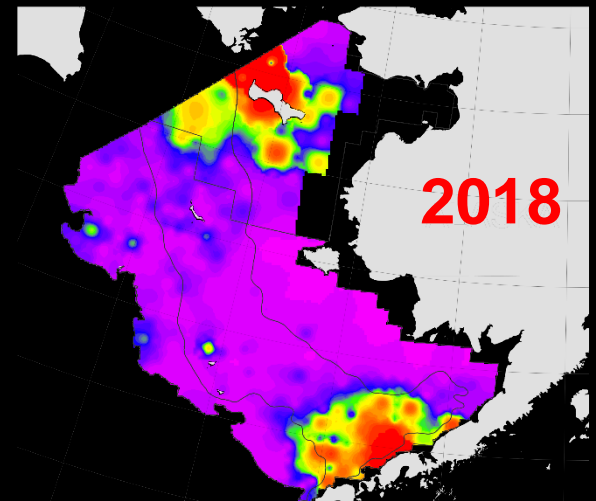
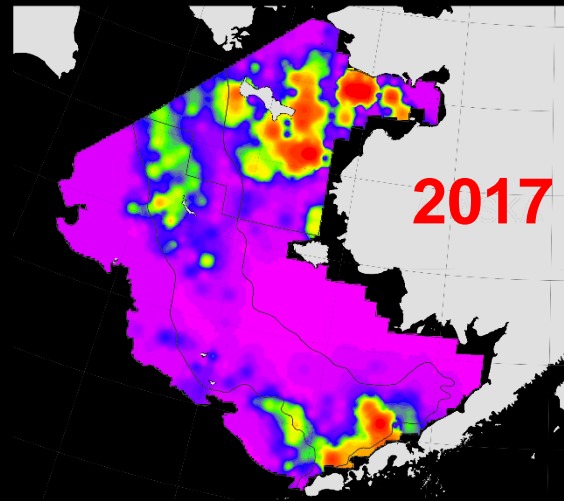
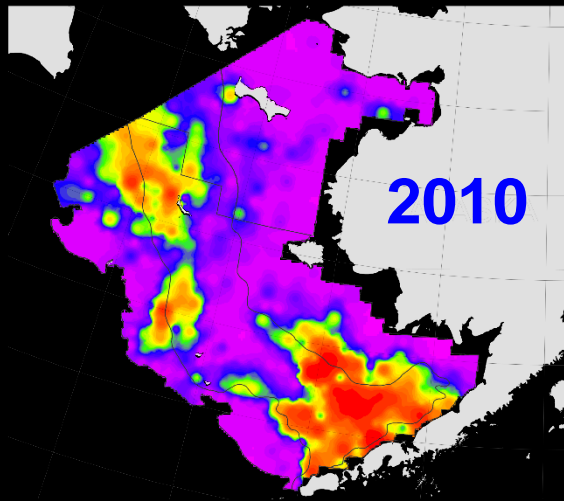
Arctic cod



>20 10 5 2 0

kg/ha

Jellyfish distribution



>150 75 40 15 0

kg/ha

General summary

- NEBS surveys 2010 & 2017-18 offer cold/warm snapshots
- Sub-Arctic species expanding, dispersing and recruiting (spawning?)
- Arctic species retracting
- Next planned standard NBS survey in 2019
- Long-term biennial monitoring of NBS necessary

Unknowns

- Anomaly, transition or anomalous is “new normal”?
- Will 2019 be warm or cold year?
- Extent of winter sea ice, migration, mortality, survival in NEBS or under ice?
- Population stock structure (western or eastern Bering Sea?)
- NEBS survey funding beyond 2019

Implications

- Impact of large influx of pelagic consumers into the NBS ecosystem?
- Combine surveys? **EBS** = SEBS + NEBS
- Management of EBS fisheries?

