



**NOAA  
FISHERIES**

**Alaska Fisheries  
Science Center**

# Results from the 35<sup>th</sup> Eastern Bering Sea Shelf Bottom Trawl Survey in 2016

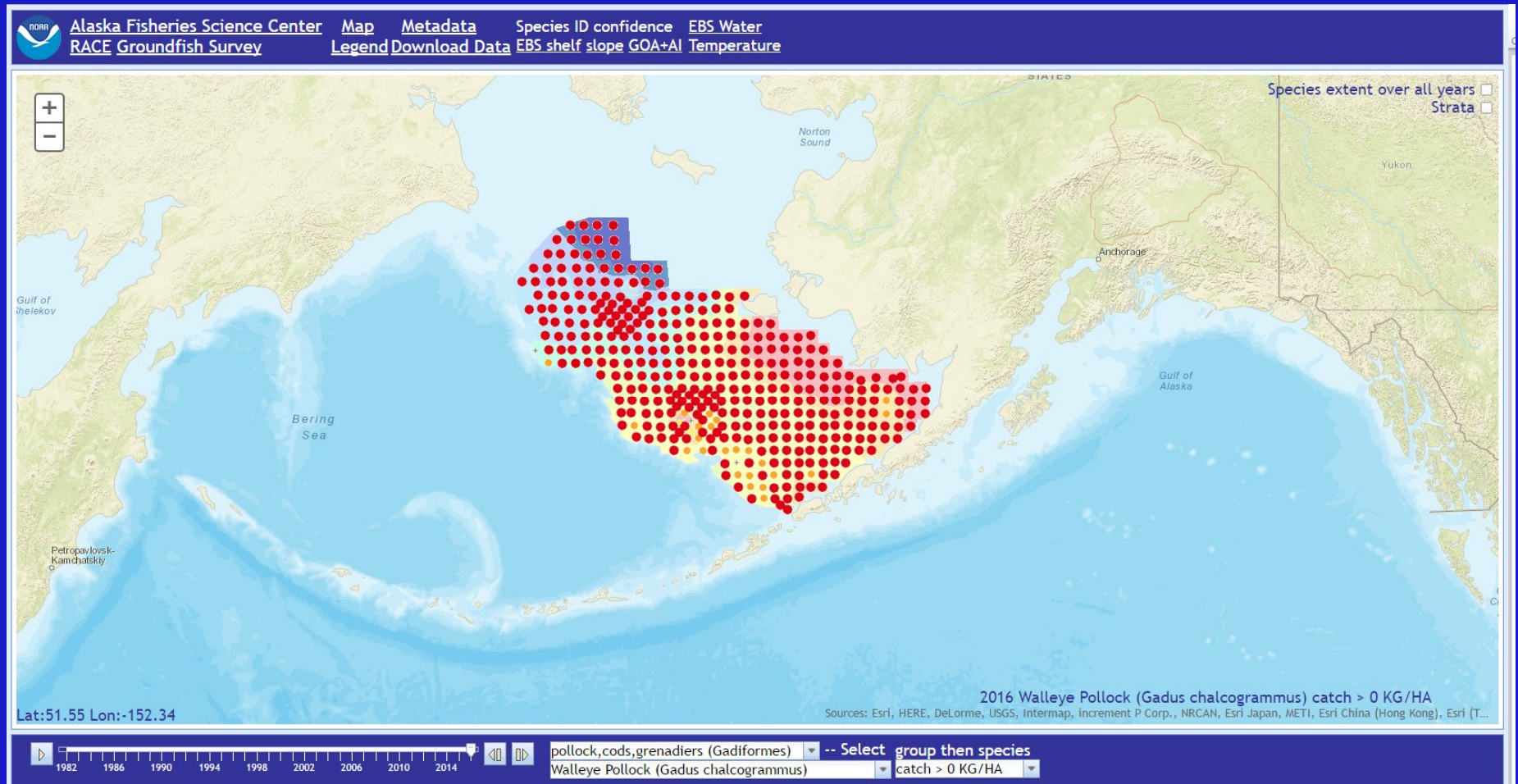


**Resource Assessment &  
Conservation Engineering Division  
Groundfish Assessment Program**

September 14, 2016

# 2016 EBS Shelf BT available ONLINE!

[http://www.afsc.noaa.gov/RACE/groundfish/survey\\_data/default.htm](http://www.afsc.noaa.gov/RACE/groundfish/survey_data/default.htm)



# EBS Shelf Survey Charters

## Eastern Bering Sea shelf (20–200 m)



*FV Alaska Knight*  
2010 -present  
7<sup>th</sup> year



*FV Vesteraalen*  
2014 -present  
3<sup>rd</sup> year

## Eastern Bering Sea upper continental slope (200–1200 m)



*FV Cape Flattery*  
2016  
1<sup>st</sup> year

# General

## Length measurements (total 170,196)

Taxon	Number
walleye pollock	46,296
yellowfin sole	26,727
northern rock sole	18,528
flathead sole	17,745
Pacific cod	17,175
arrowtooth flounder	15,545
Alaska plaice	6,312
Alaska skate	4,249
Kamchatka flounder	3,081
Bering flounder	2,700
Pacific halibut	2,248
plain sculpin	1,967
Arctic cod	1,724
yellow Irish lord	1,050
great sculpin	749
rex sole	642
Sakhalin sole	523
Greenland turbot	505
starry flounder	448
bigmouth sculpin	352
Other fish taxa	1,630

# General

## Age structure collections in 2016

### Length-stratified

<b>Pacific cod</b>	<b>854</b>
Yellowfin sole	884
Northern rock sole	526
Pacific halibut	560
Alaska plaice	488
Kamchatka flounder	524
Greenland turbot	335
Yellow Irish lord	256

### Random

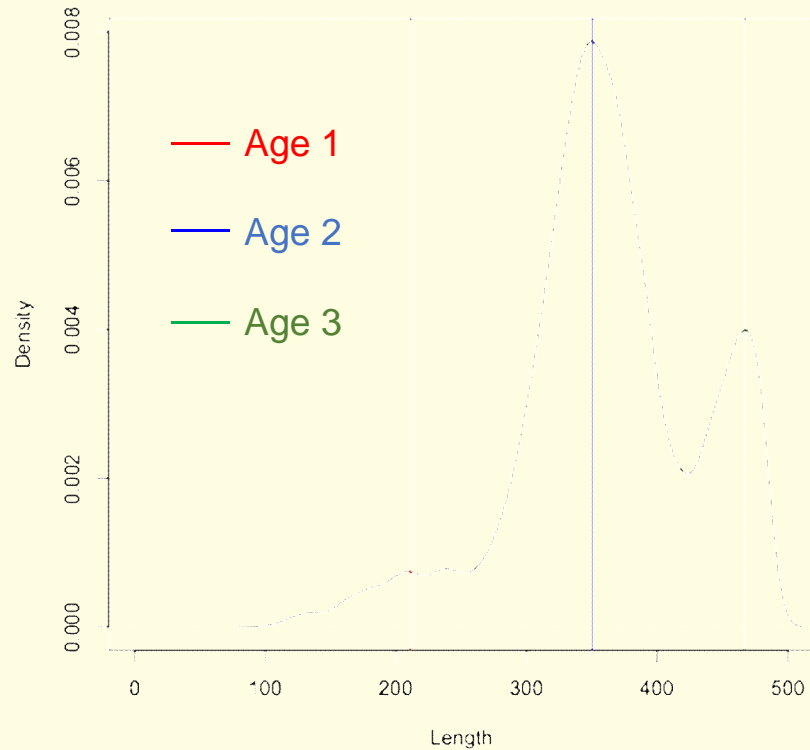
Walleye pollock* <sup>10</sup>	1,780
<b>Pacific cod (NPRB)**</b>	<b>780</b>
Arctic cod	Lots
Saffron cod	103
Flathead sole**	714
Arrowtooth flounder*	775

\* Years sampled randomly

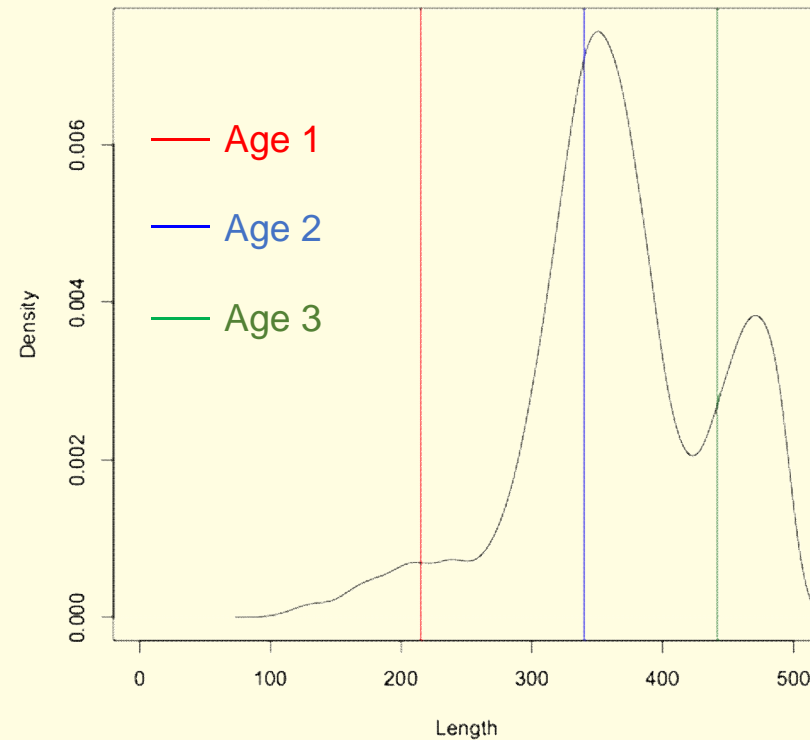
# Pacific cod size-at-age 2015

Cianelli et al. NPRB quarterly report (8/16)

Random samples

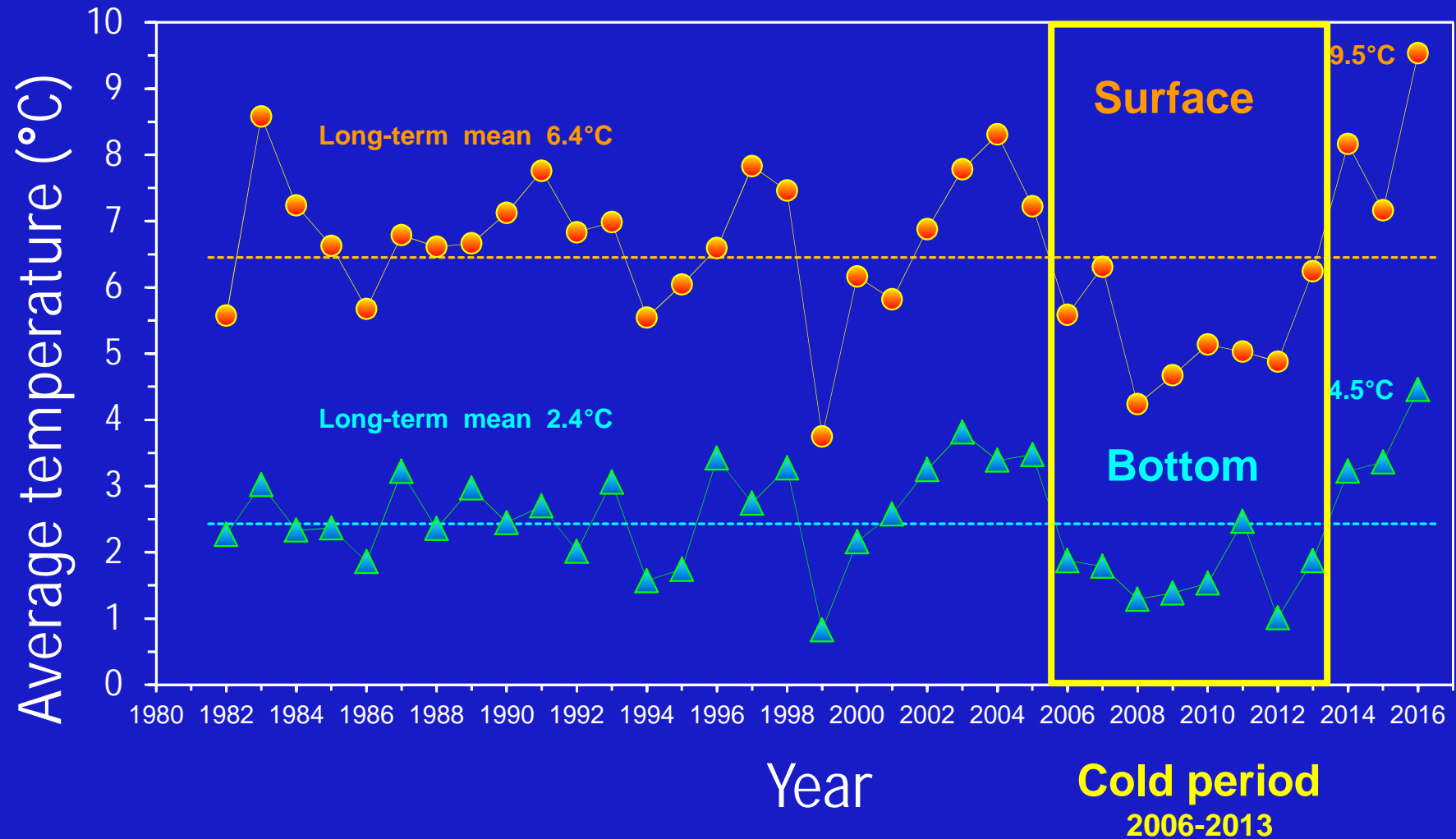


Length-stratified samples



# EBS shelf environment

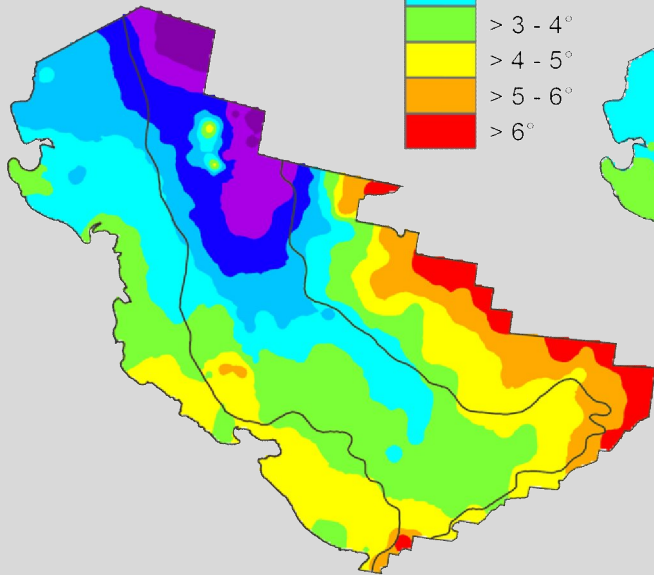
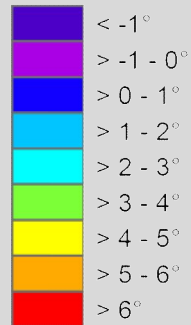
## Average surface and bottom temperatures



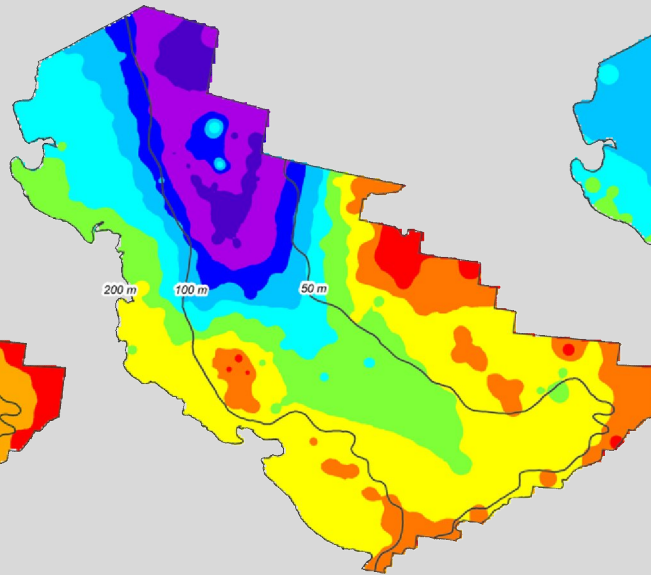
# EBS shelf environment

## Bottom temperatures

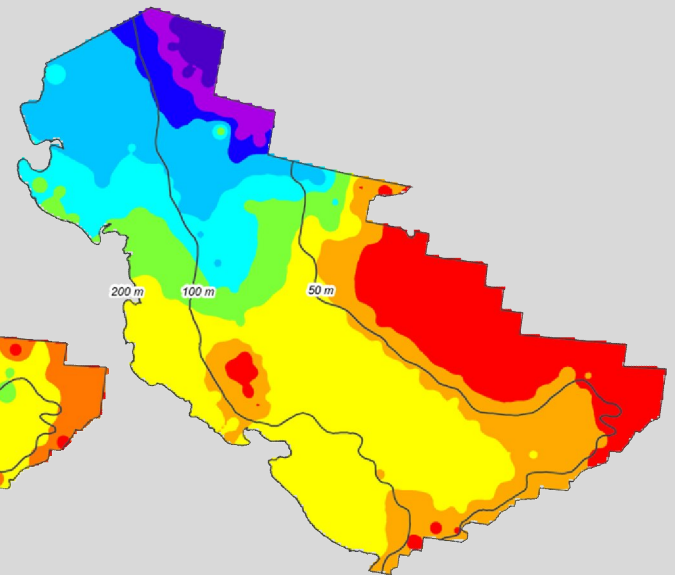
Bottom temperature °C



2014



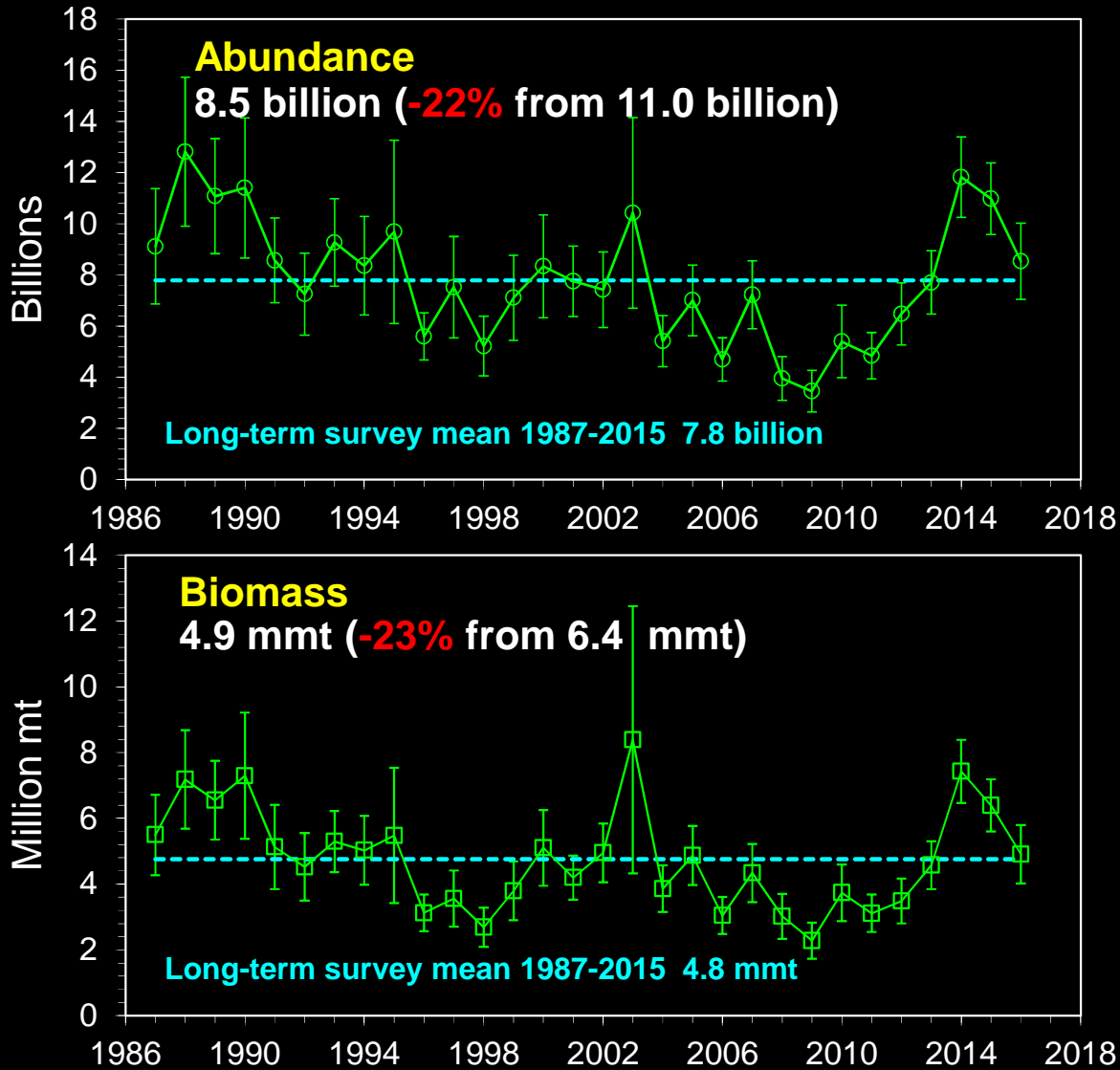
2015



2016



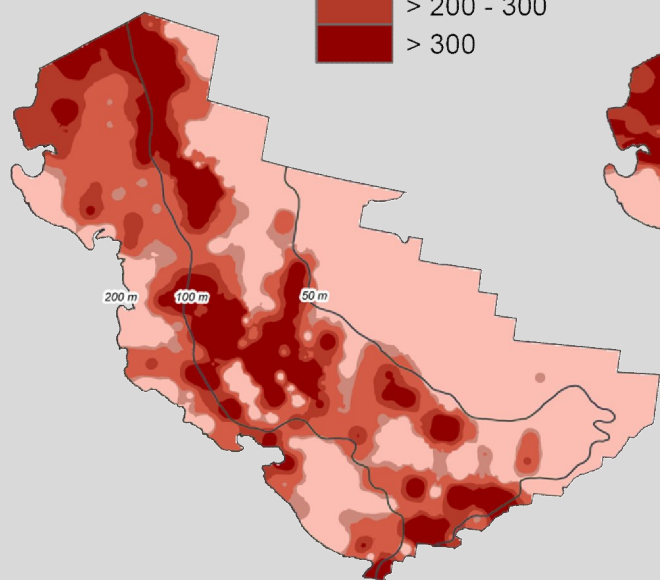
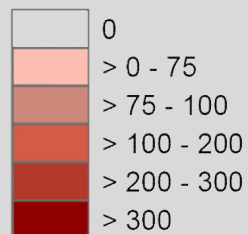
# Walleye pollock trends



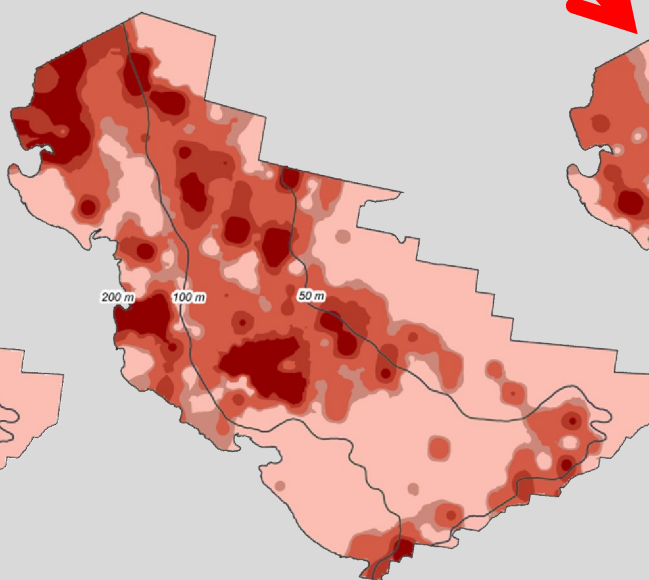
# Walleye pollock

## Distribution and Abundance

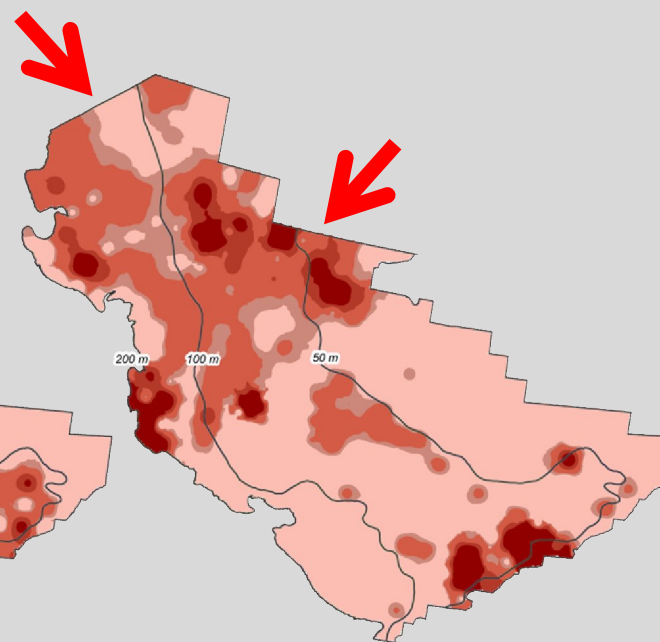
Pollock kg/ha



2014



2015

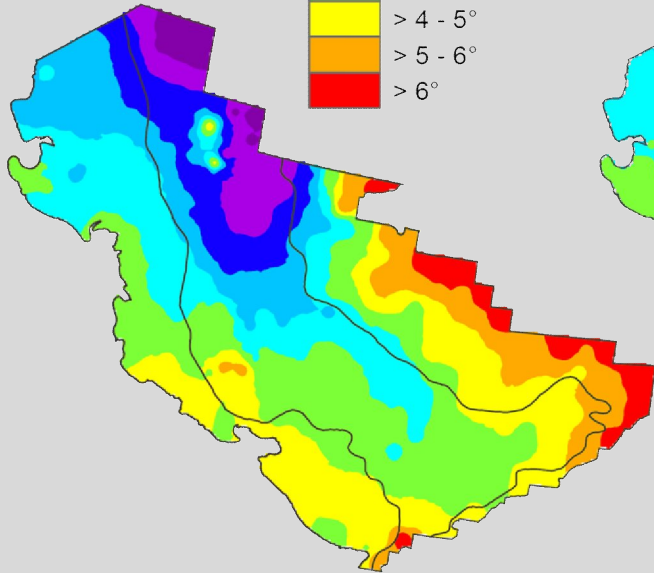
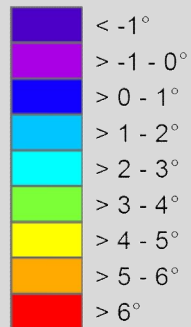


2016

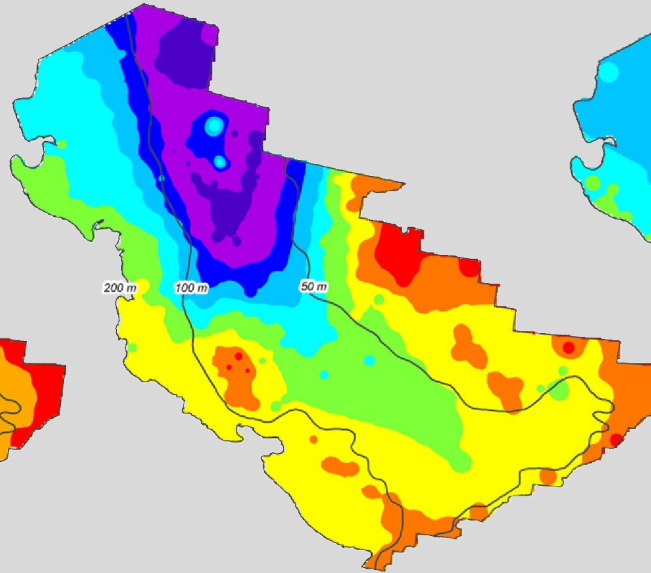
# EBS shelf environment

## Bottom temperatures

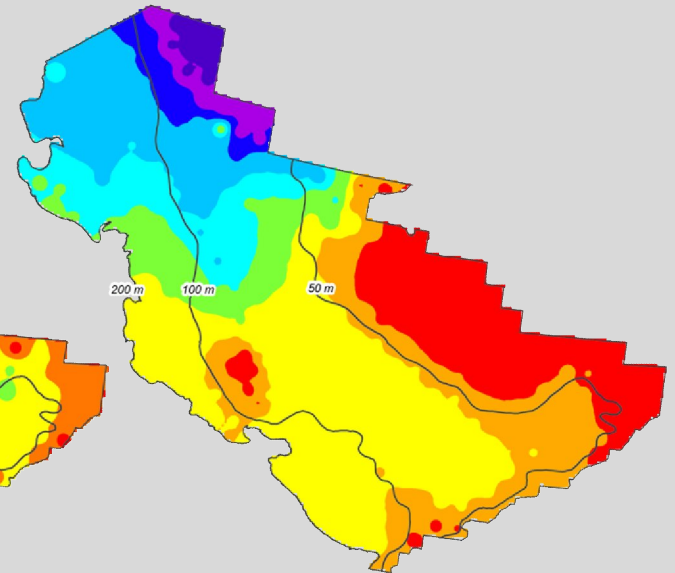
Bottom temperature °C



2014



2015



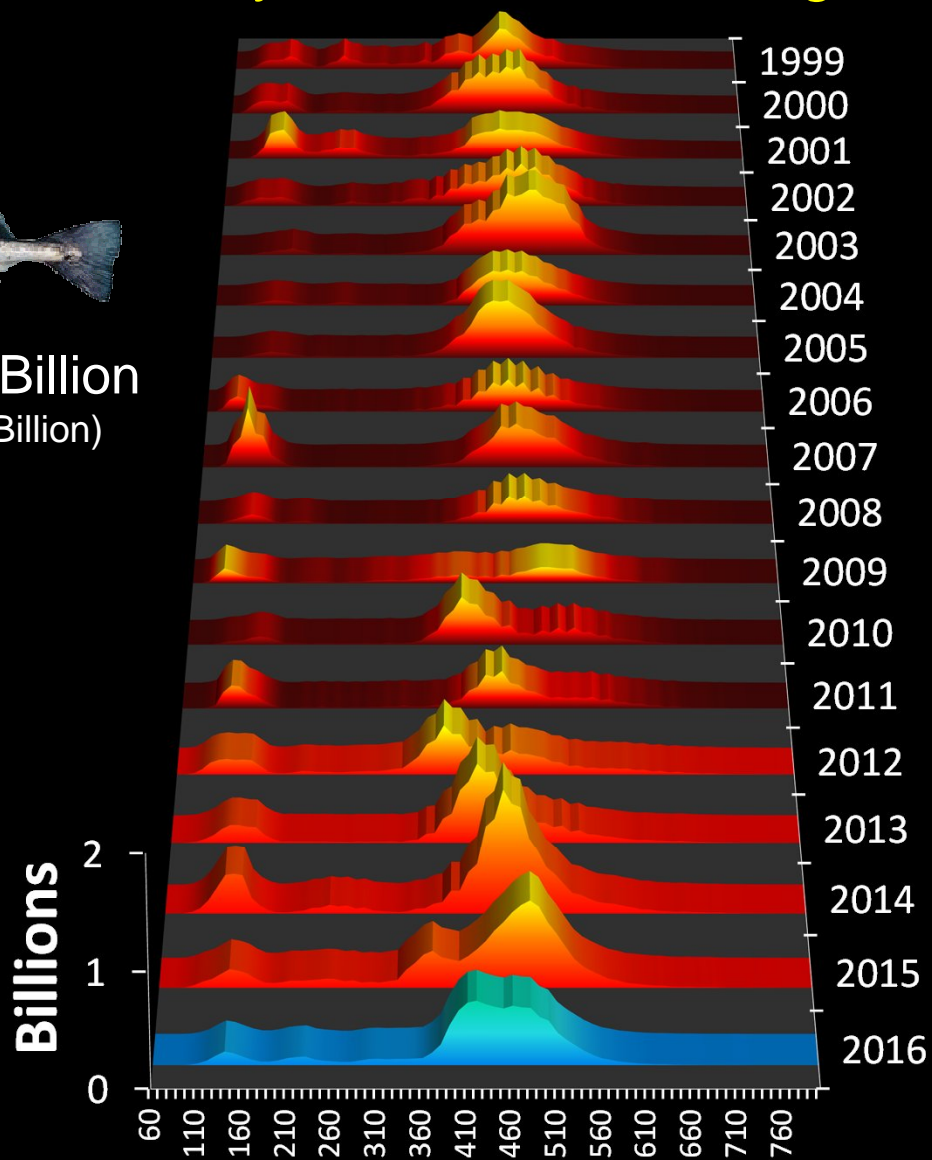
2016

# Walleye pollock

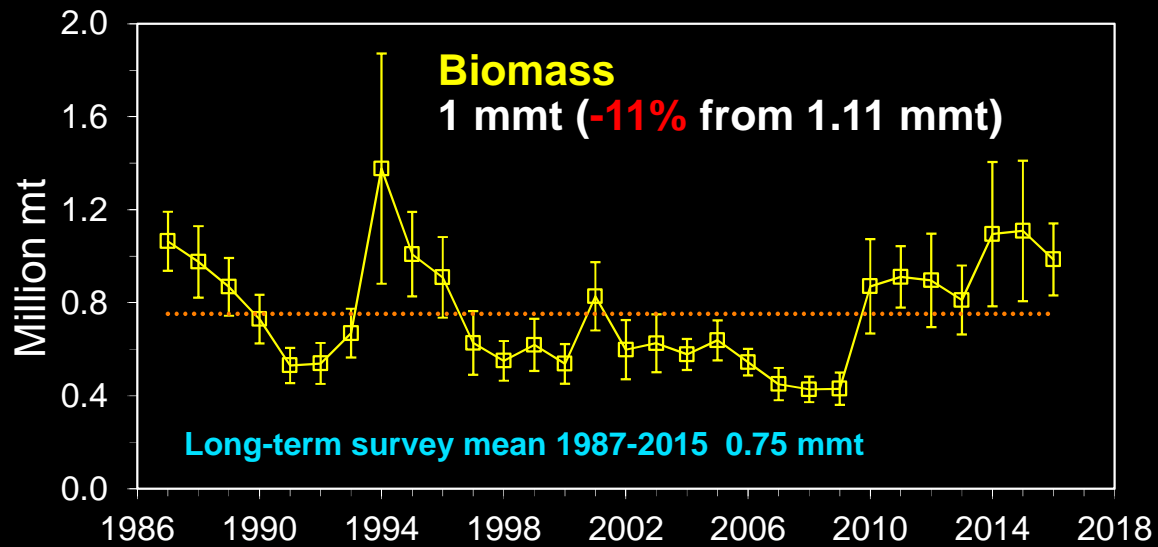
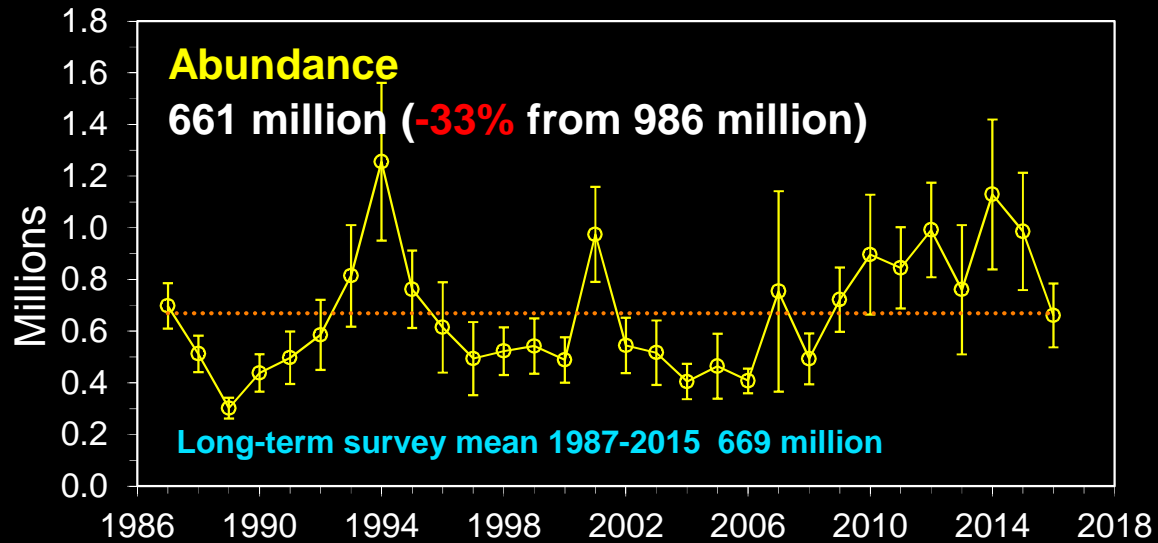
## Survey abundance-at-length



Tot. abund. = 8.5 Billion  
(-22% from 2015 - 11 Billion)



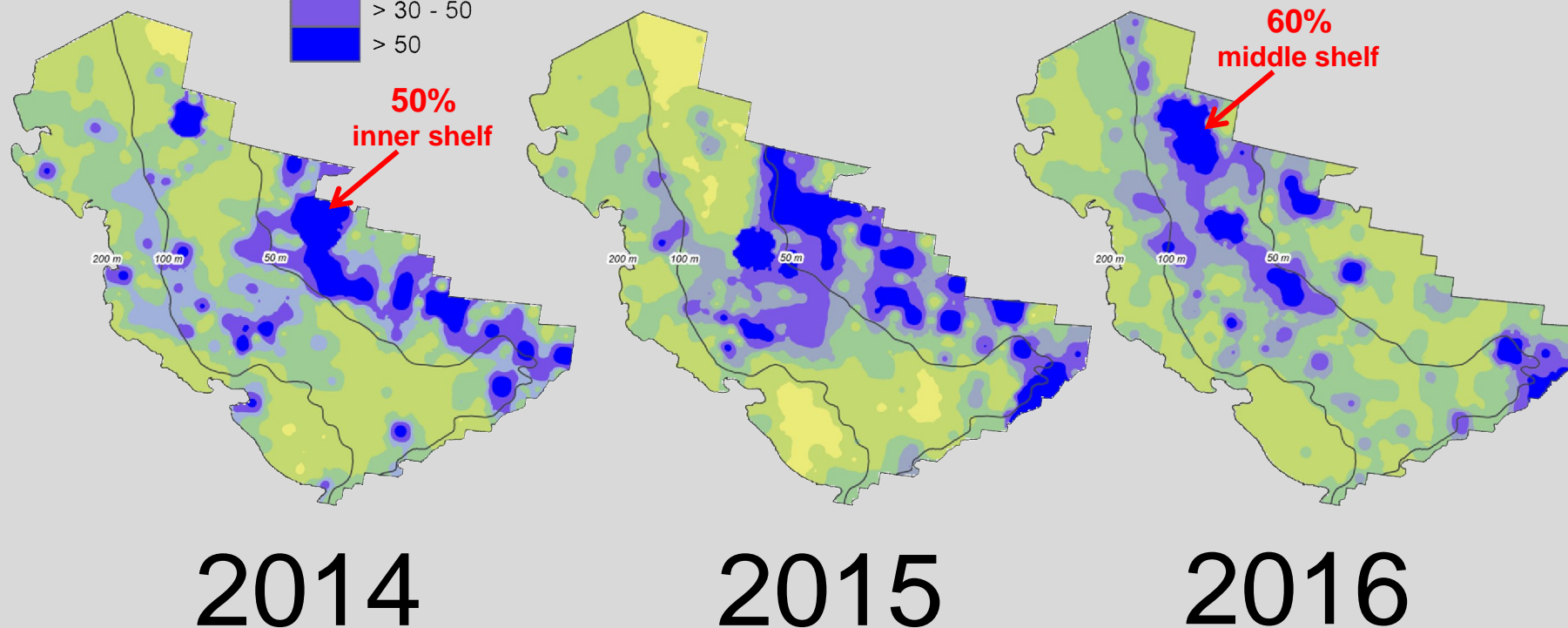
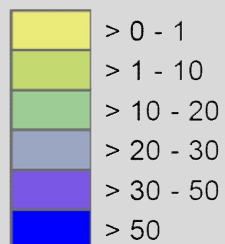
# Pacific cod trends



# Pacific cod

## Distribution and Abundance

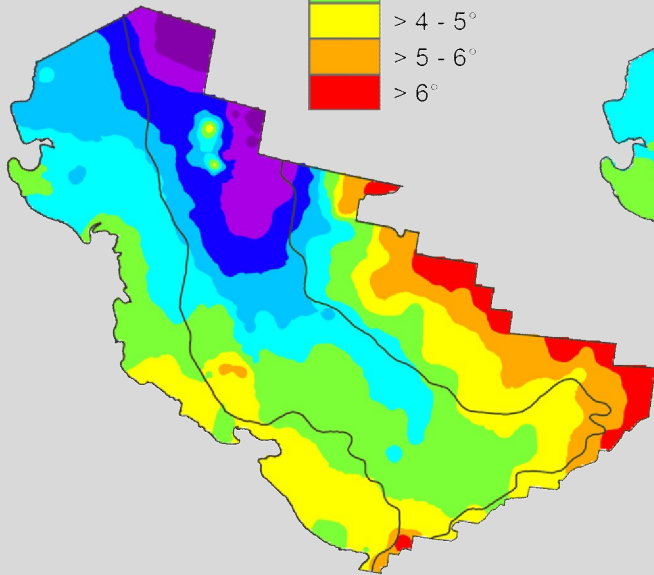
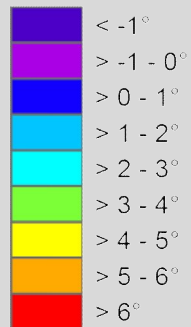
Pacific cod kg/ha



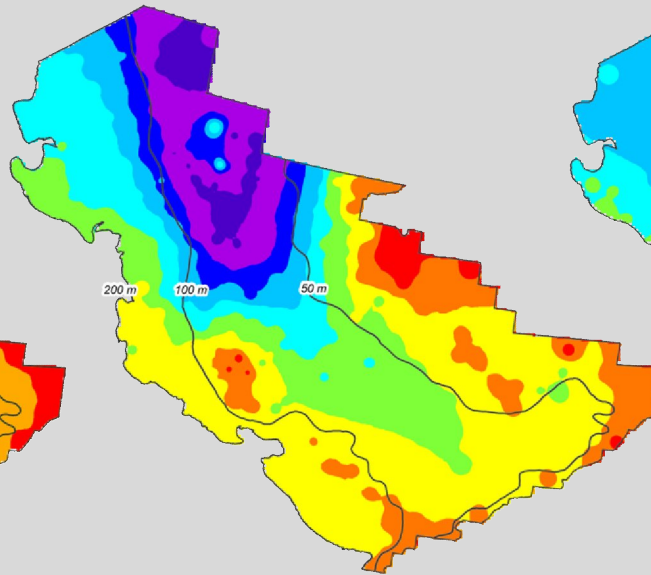
# EBS shelf environment

## Bottom temperatures

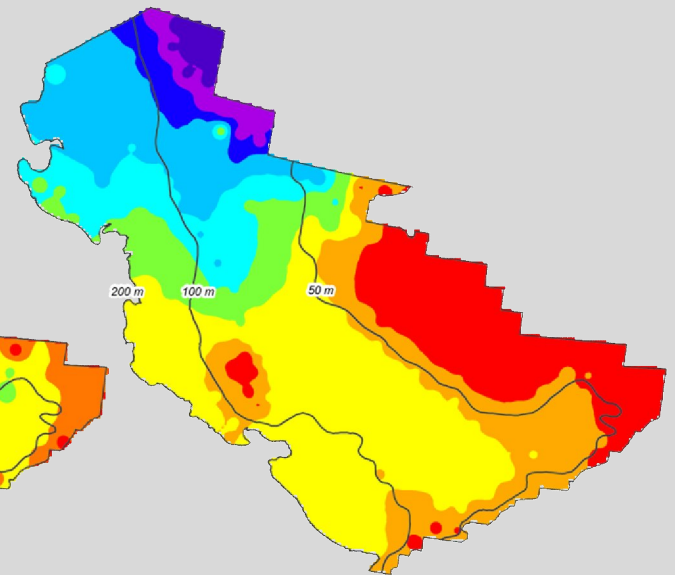
Bottom temperature °C



2014



2015



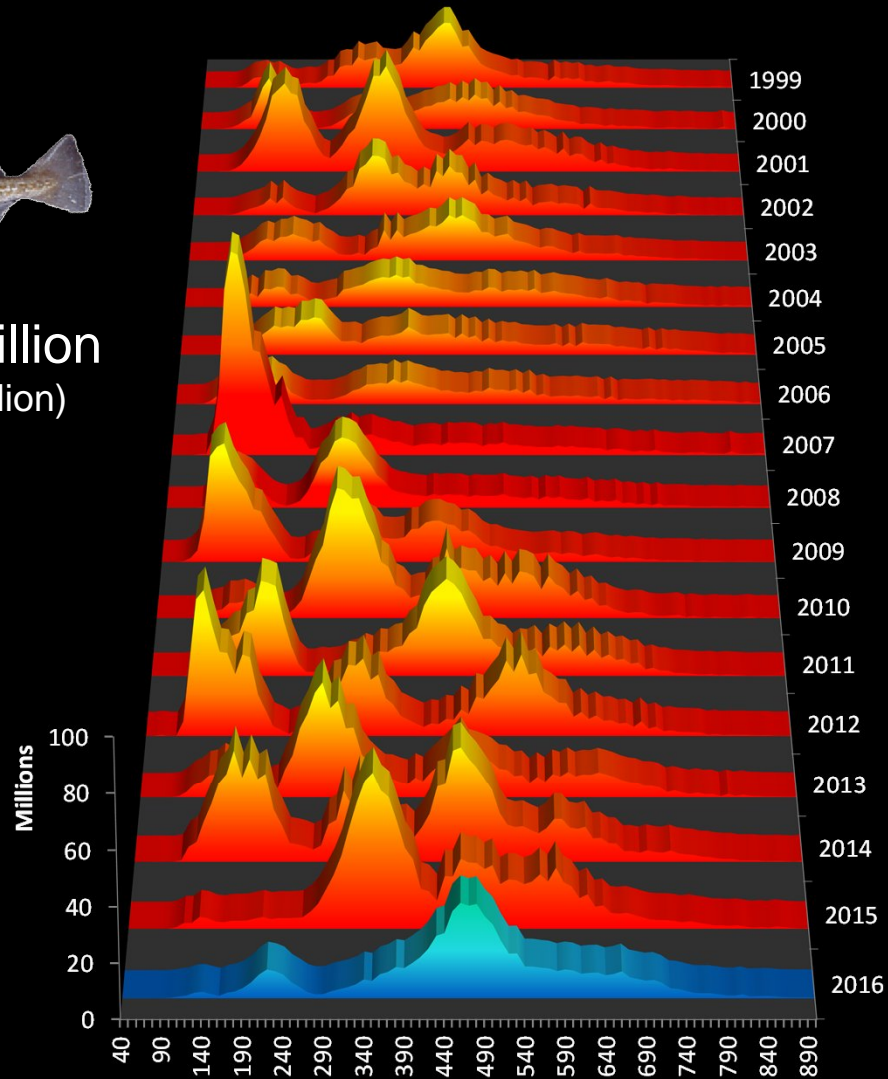
2016

# Pacific cod

## Survey abundance-at-length



Tot. abund. = 661 million  
(-33% from 2015 – 986 million)

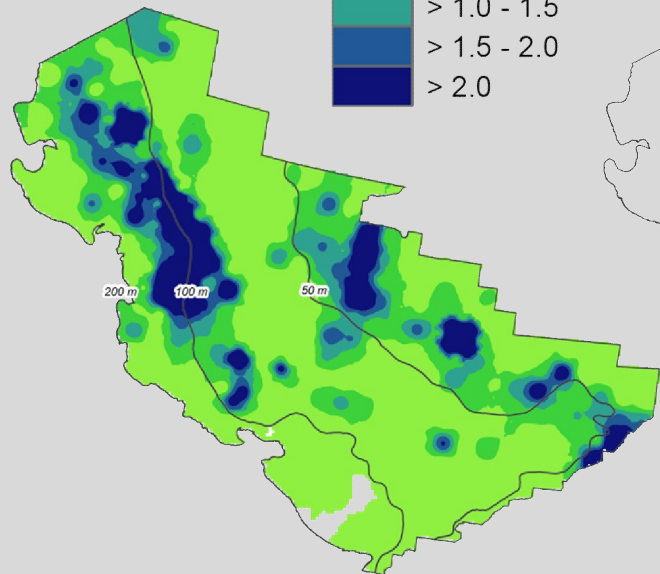
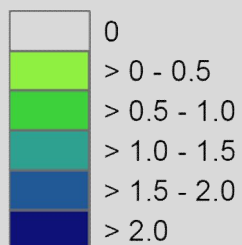




# Pacific cod

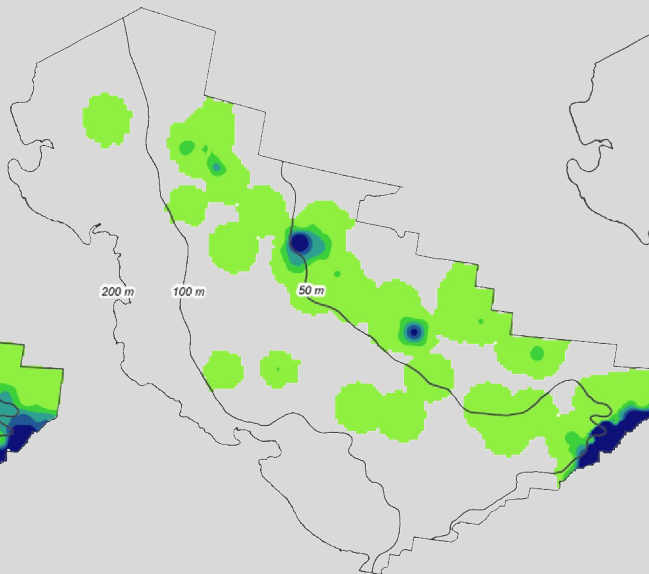
## Distribution and Abundance 1-year olds ( $\leq 180$ mm)

Pacific cod no/ha



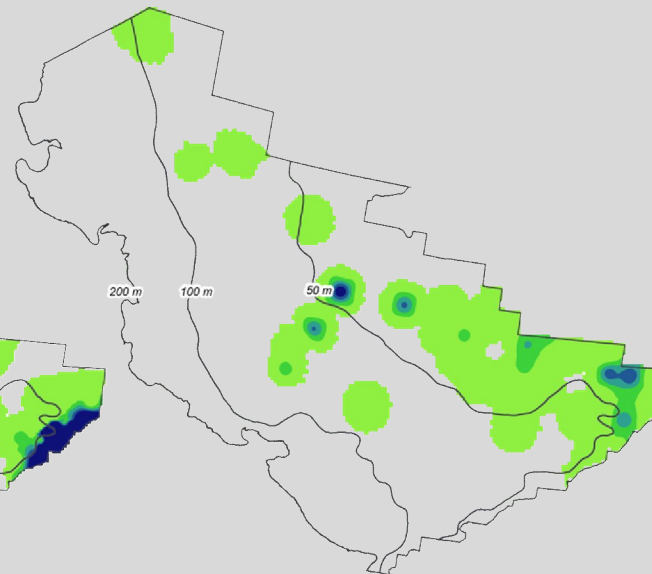
2006-2013

(average)



2015

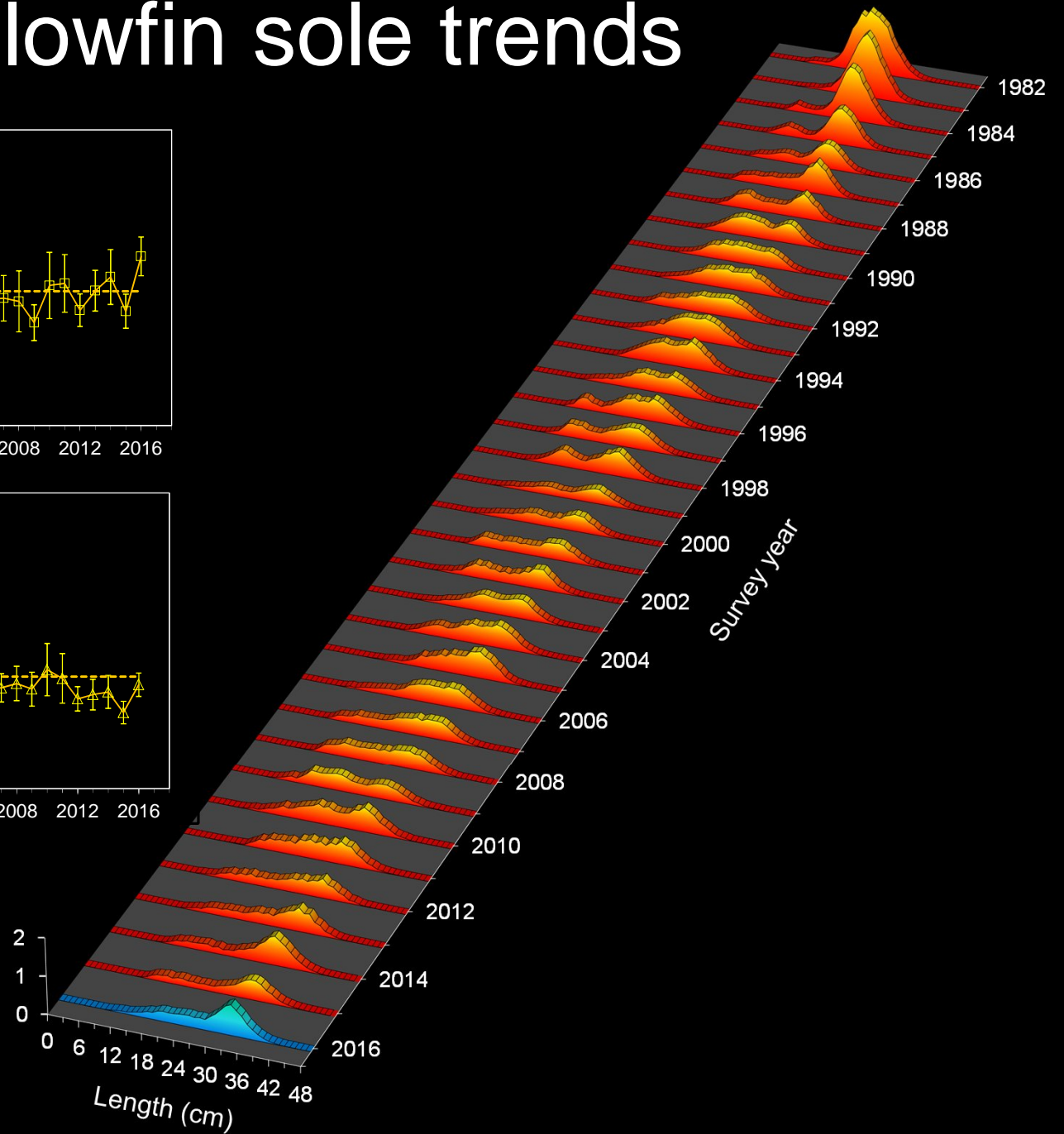
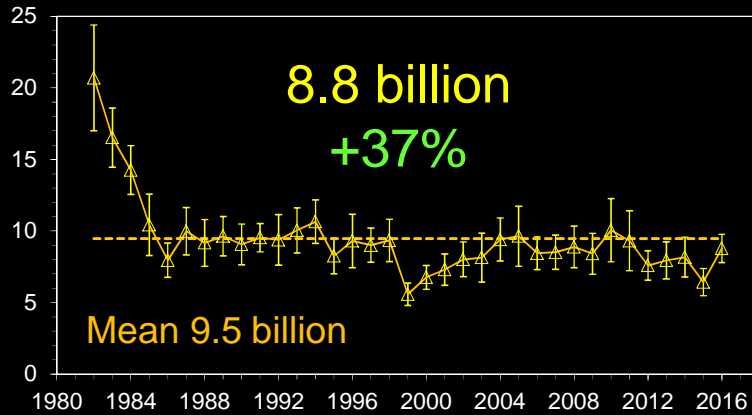
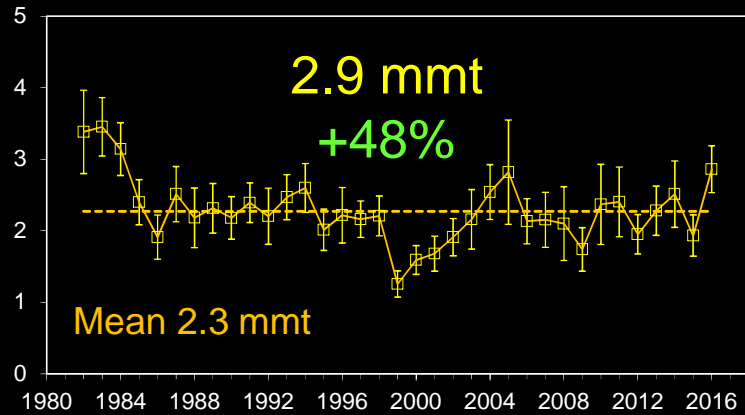
(2014 year class)



2016

(2015 year class)

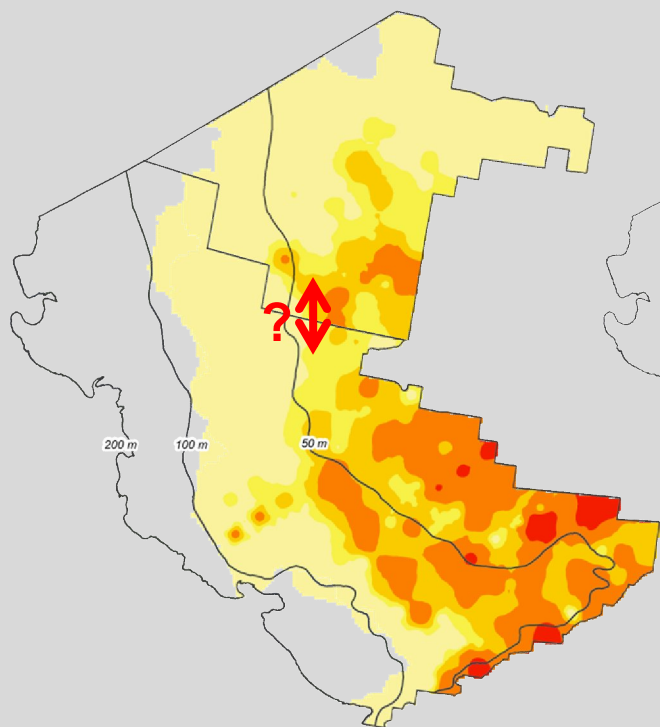
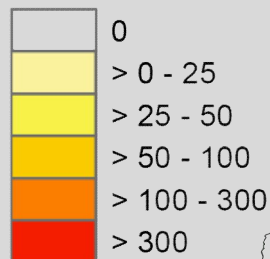
# Yellowfin sole trends



# Yellowfin sole

## Distribution and Abundance

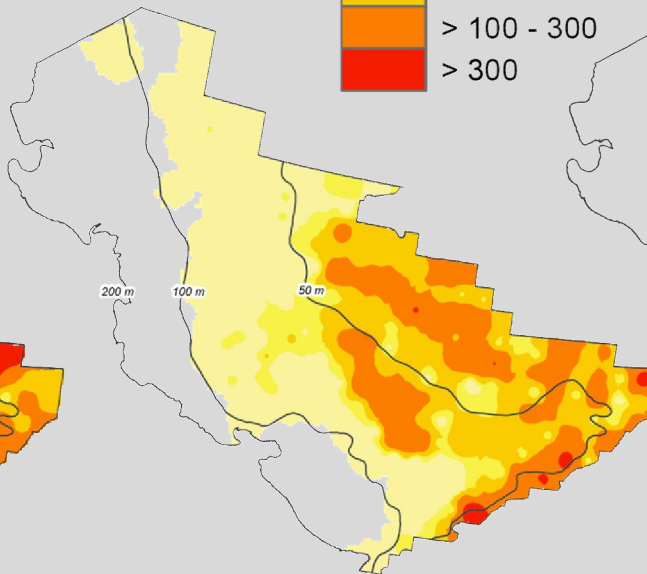
Yellowfin sole kg/ha



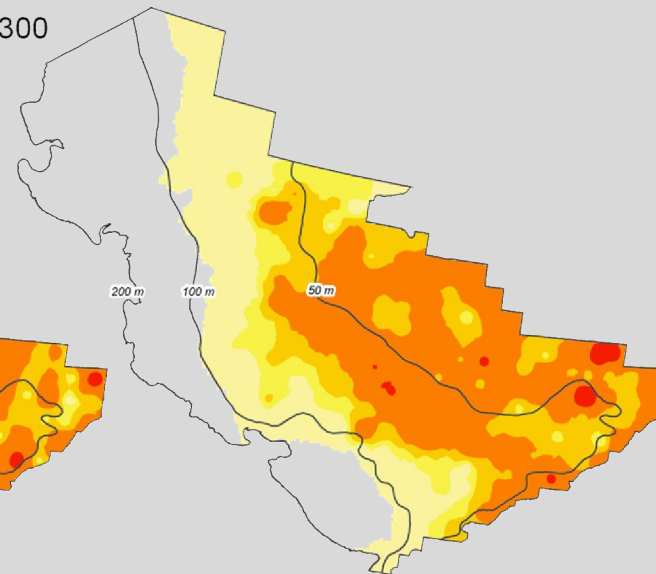
2010

Cold year

15% biomass in NBS

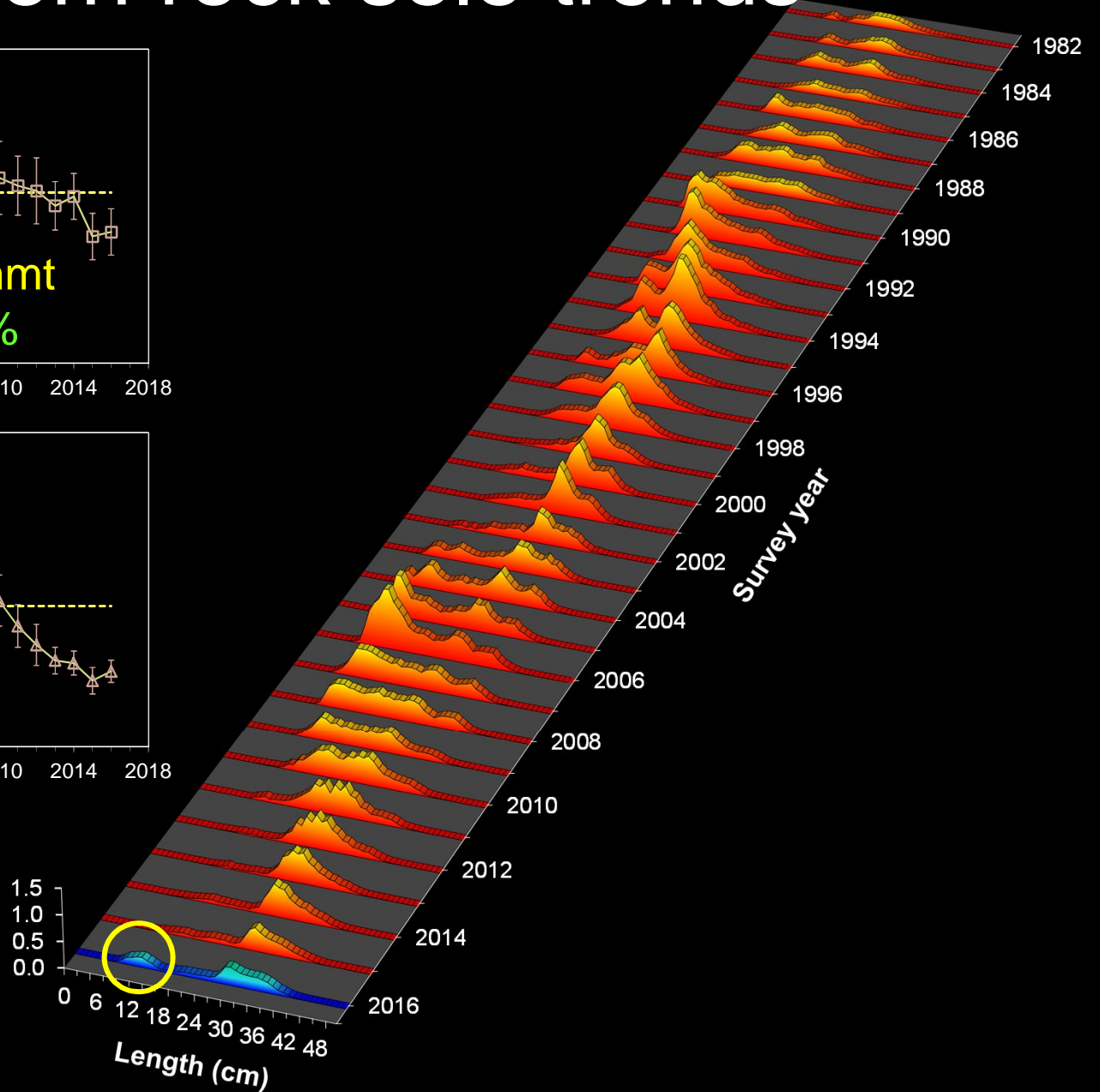
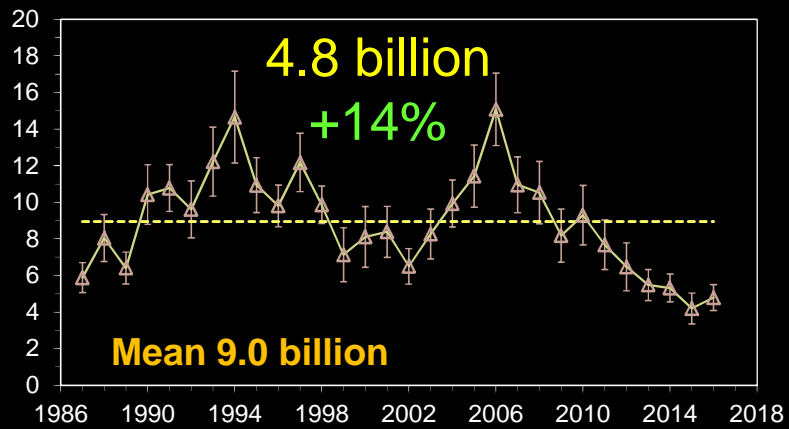
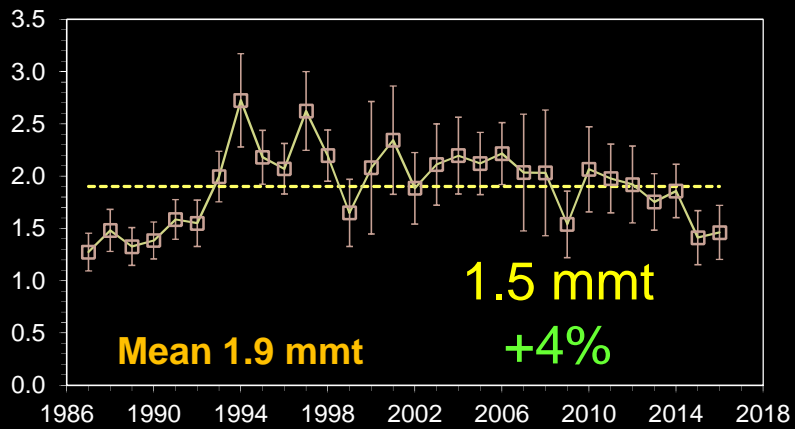


2015



2016

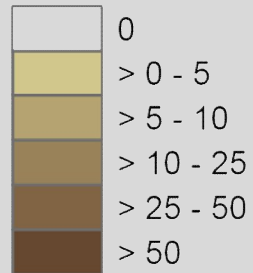
# Northern rock sole trends



# Arrowtooth flounder

## Distribution and Abundance

Arrowtooth fl. kg/ha



**Biomass 475K mt**

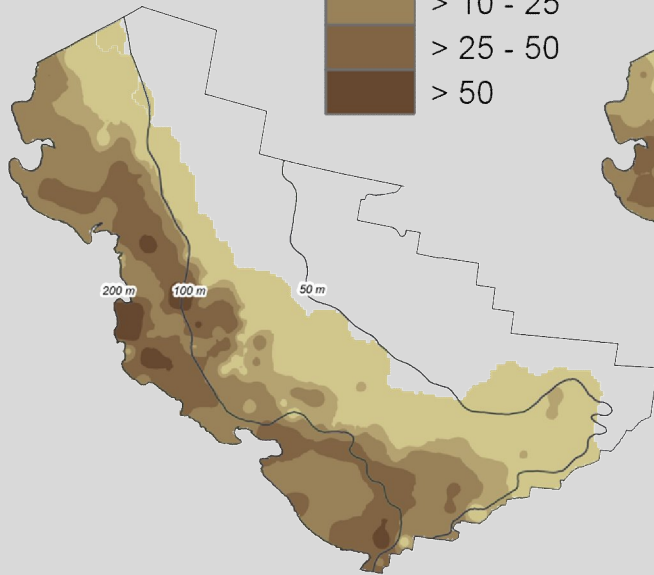
**+16%**

Mean 451K mt

**Abundance 838 million**

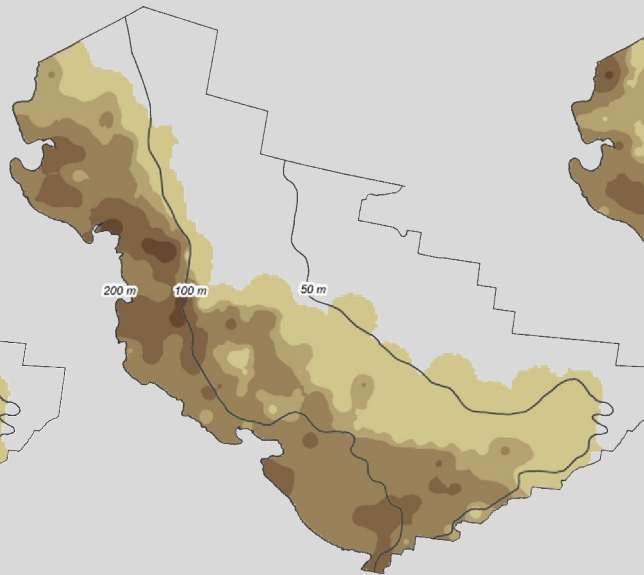
**+36%**

Mean 838 million

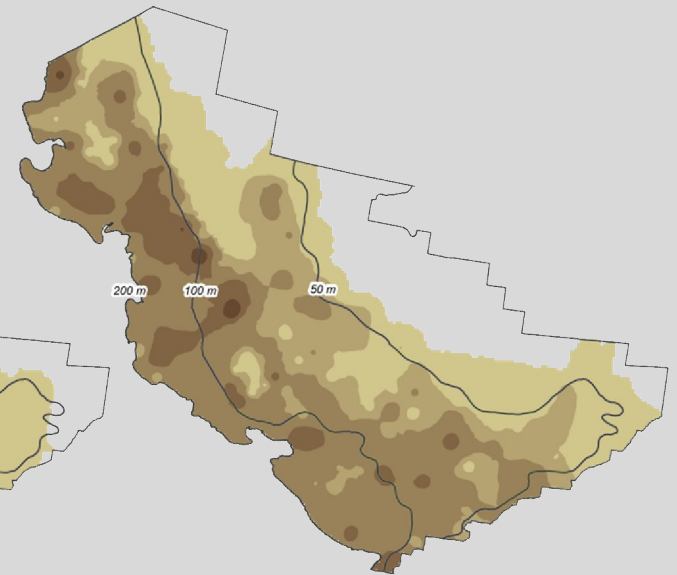


**2014**

Cold year

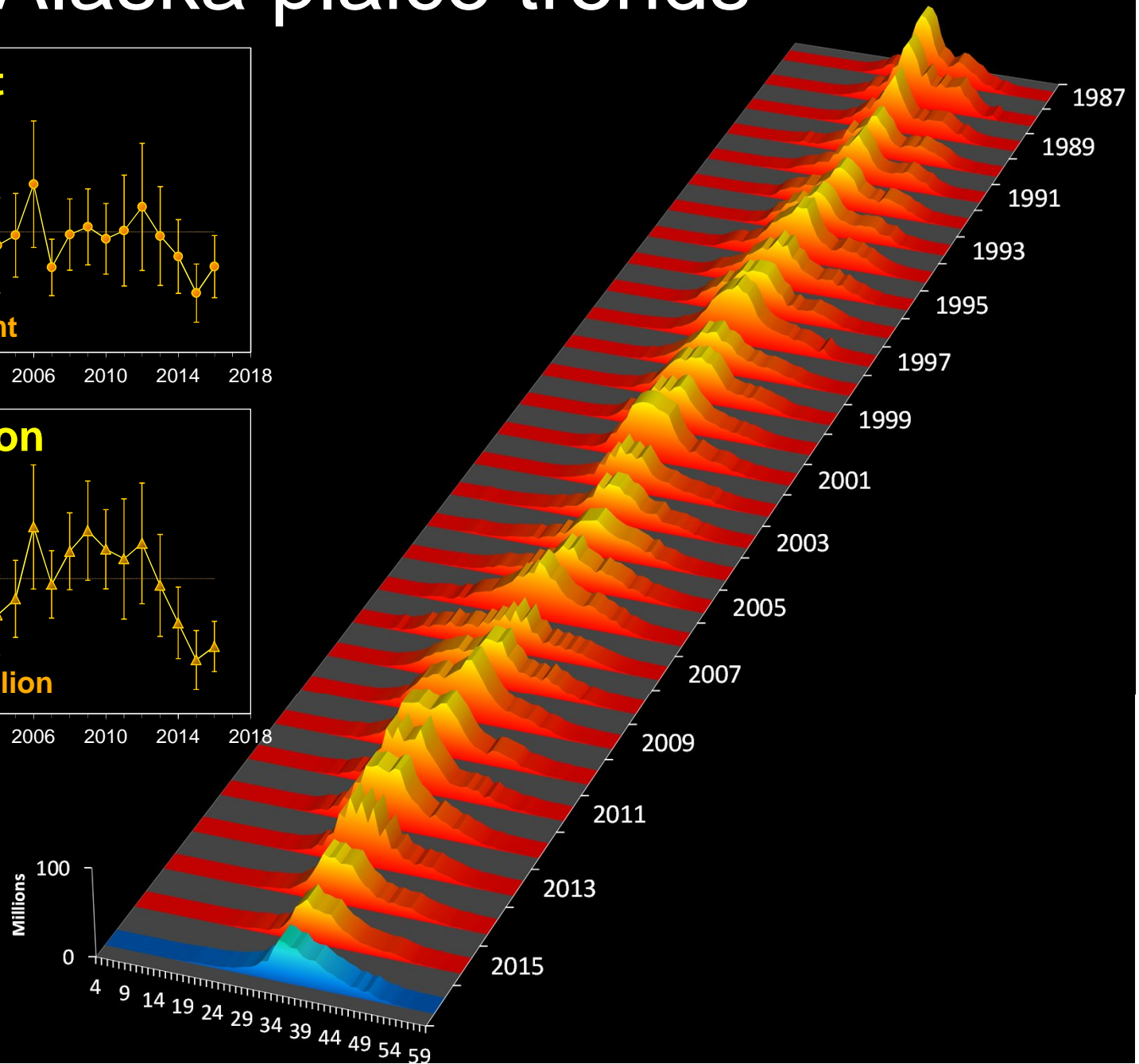
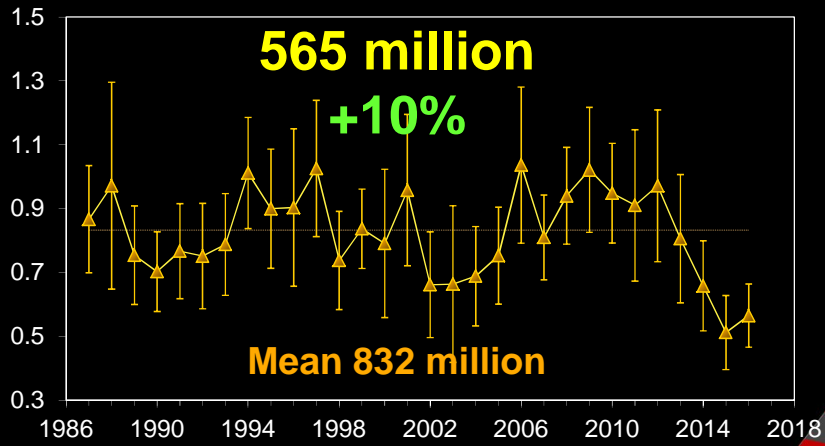
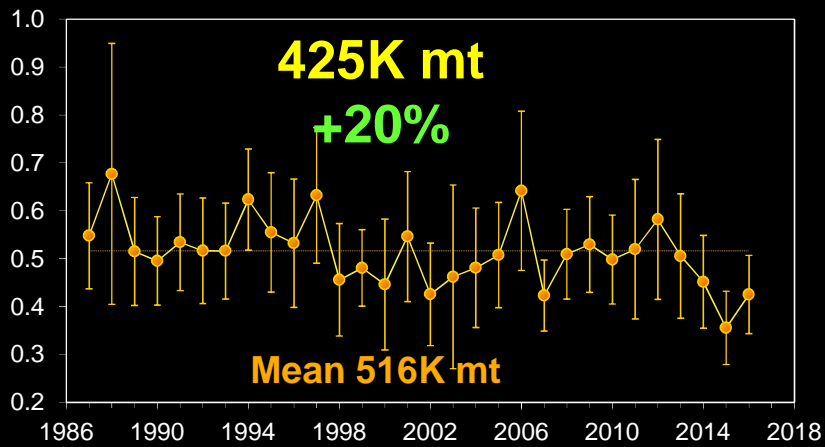


**2015**



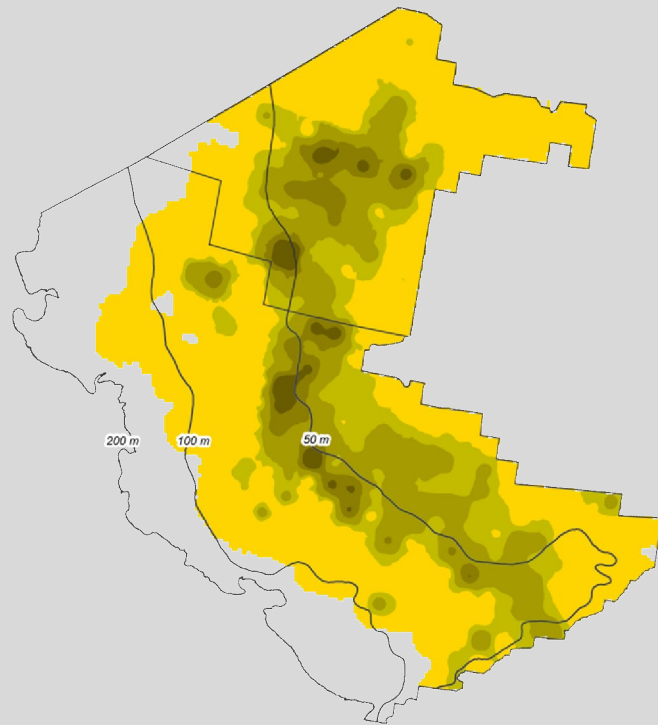
**2016**

# Alaska plaice trends



# Alaska plaice (cold pool species)

## Distribution and Abundance

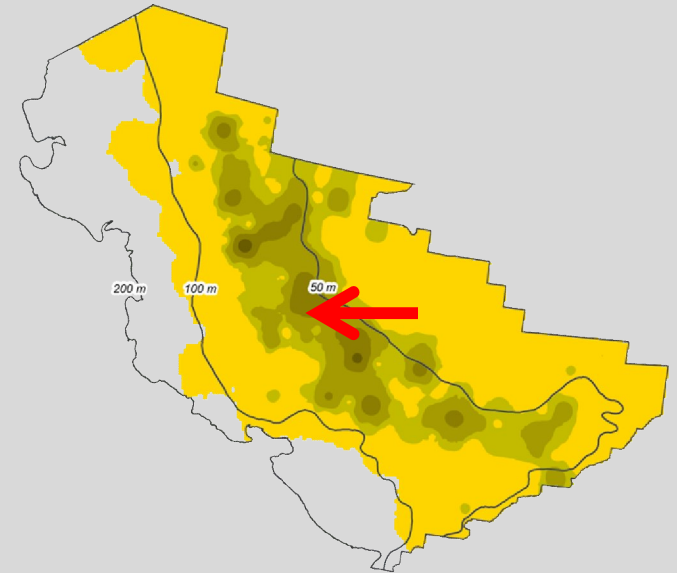
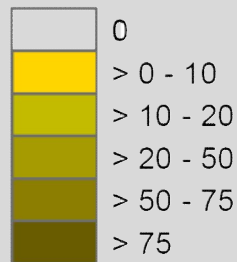


2010

38% biomass in NBS

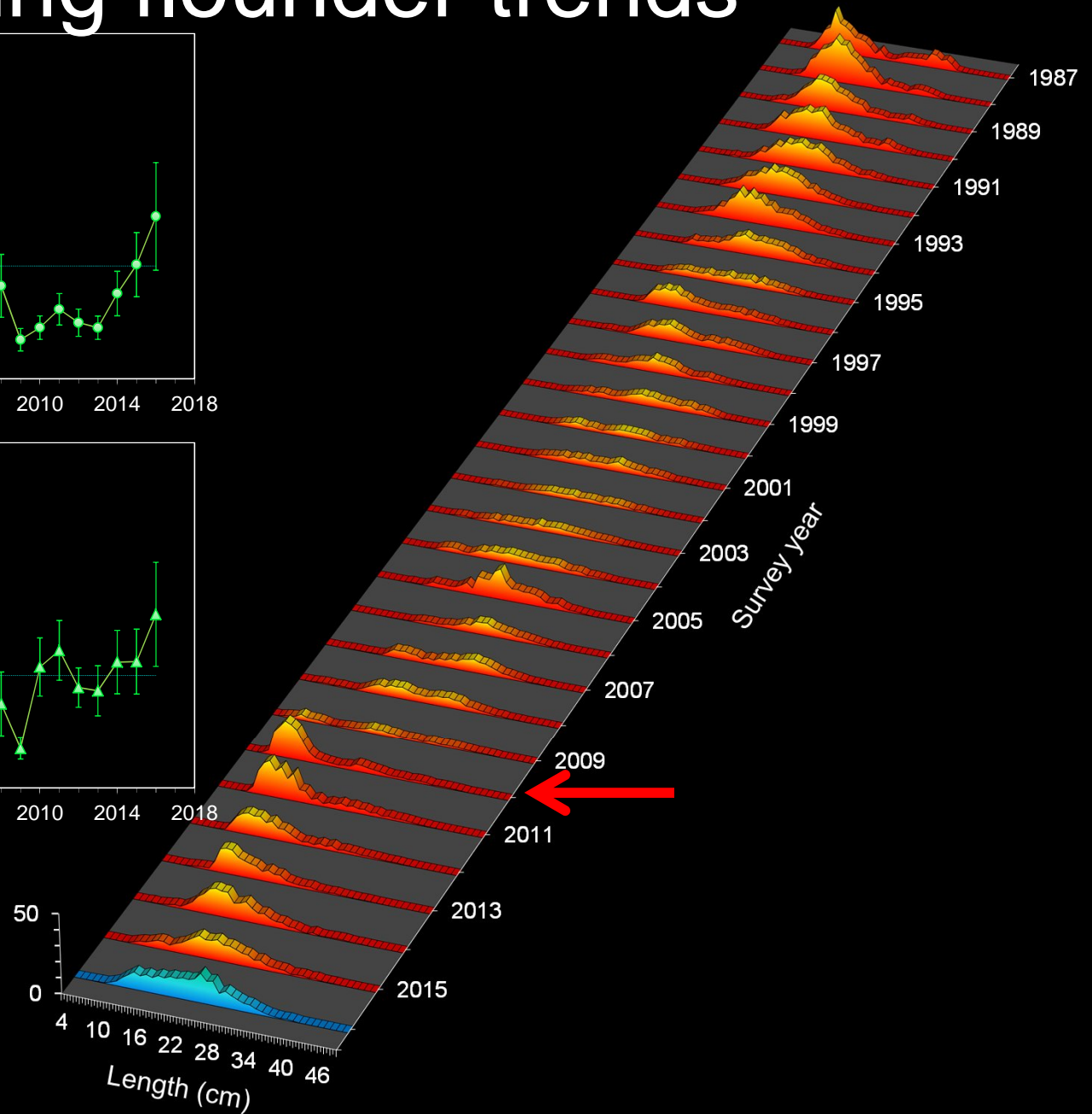
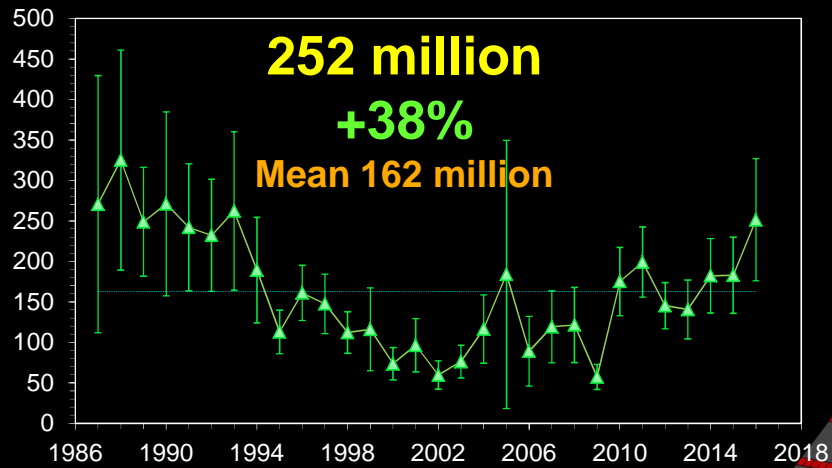
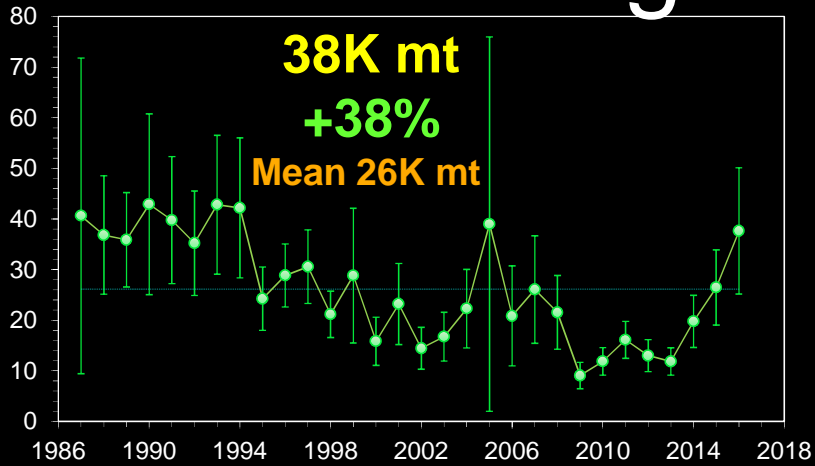
Cold year

Alaska plaice kg/ha



2016

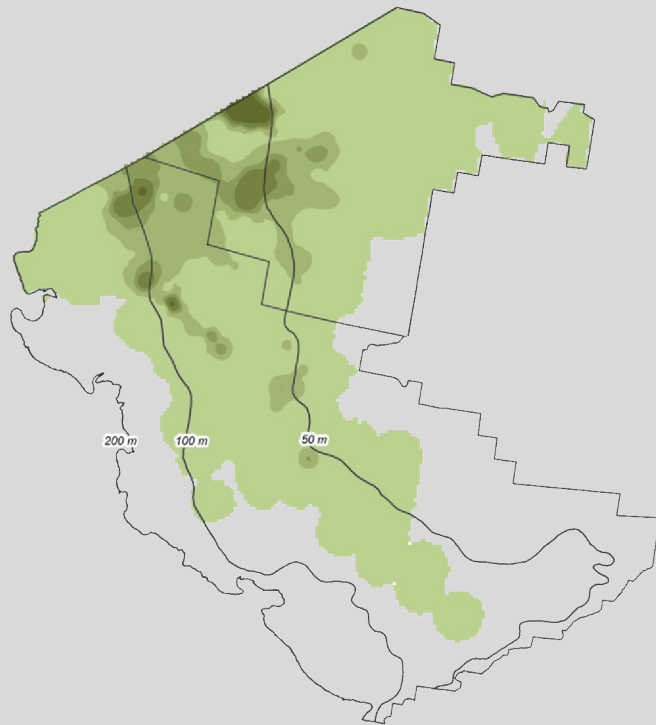
# Bering flounder trends





# Bering flounder (cold pool species)

## Distribution and Abundance

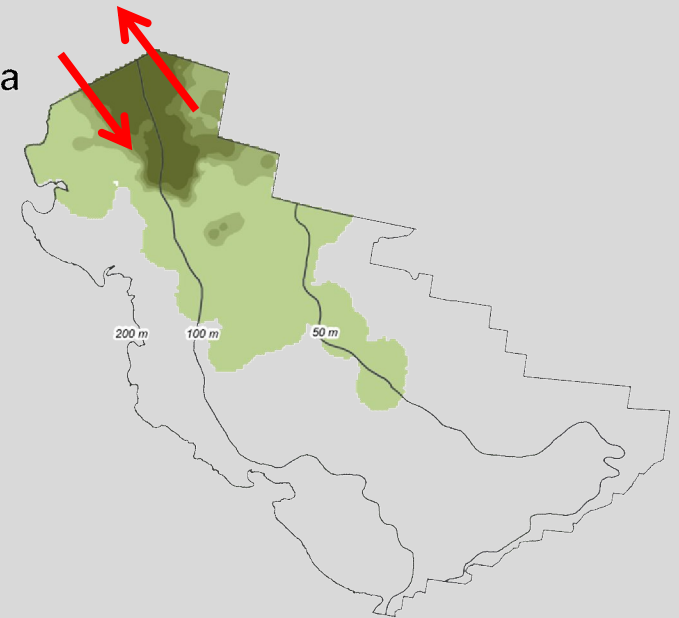
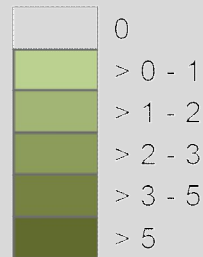


2010

51% biomass in NBS!

Cold year

Bering flounder kg/ha



2016

# Flathead sole trends

**Abundance 1.6 billion**

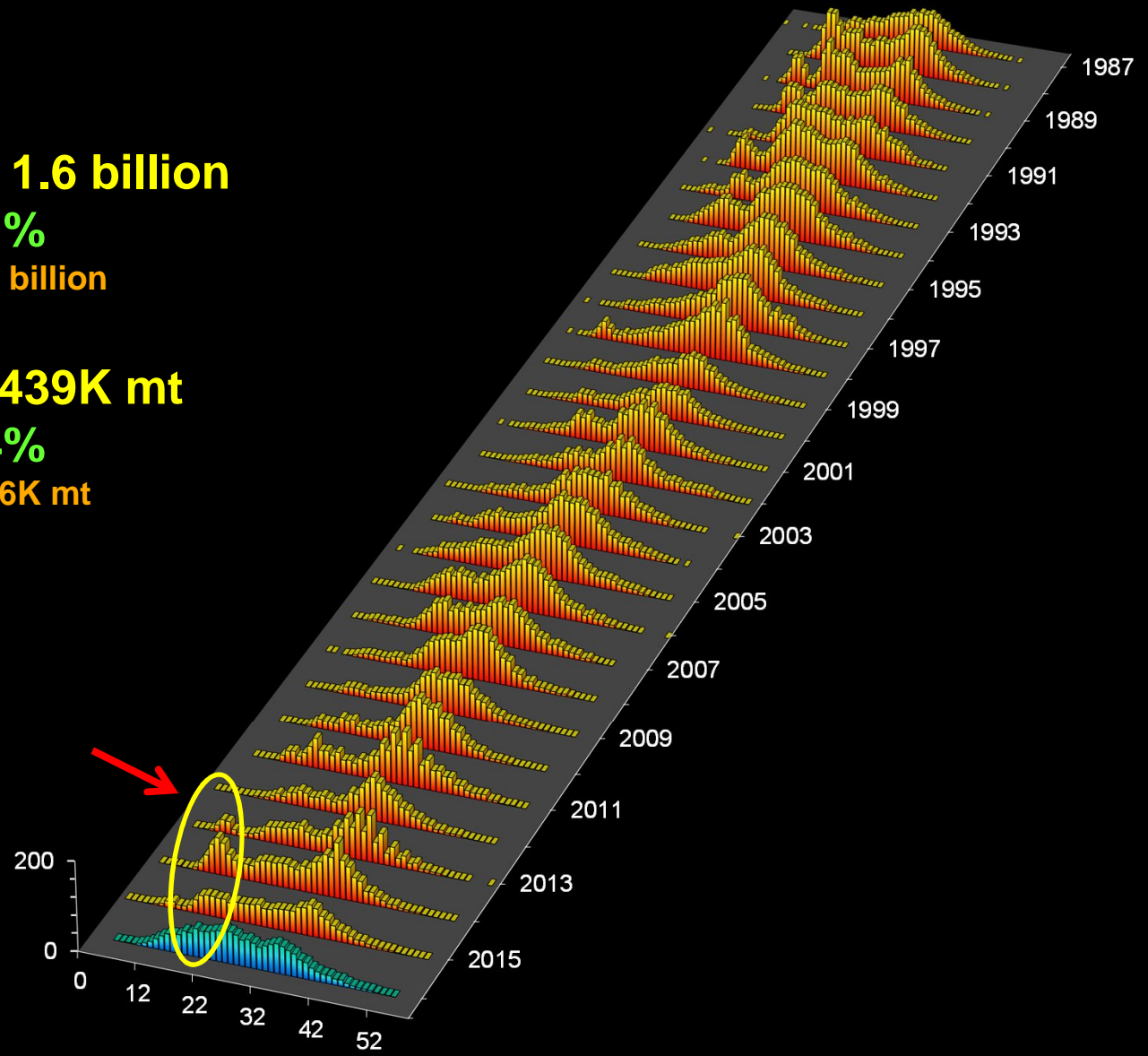
**+21%**

**Mean 1.8 billion**

**Biomass 439K mt**

**+14%**

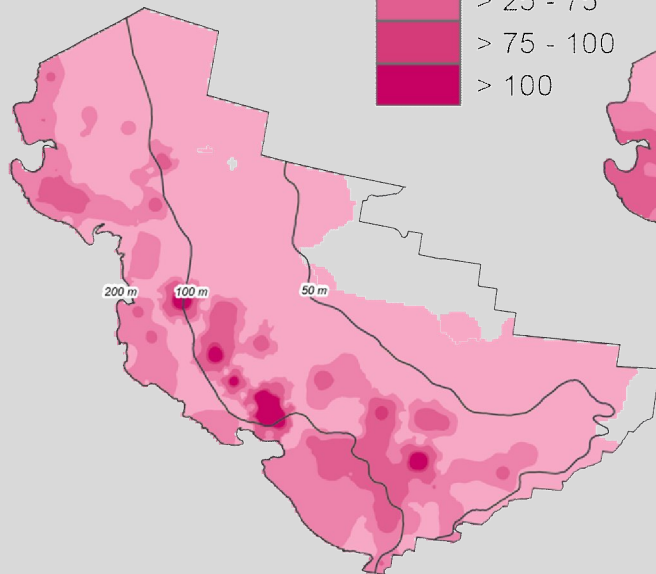
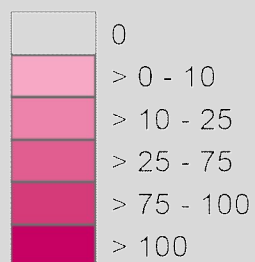
**Mean 536K mt**



# Flathead sole

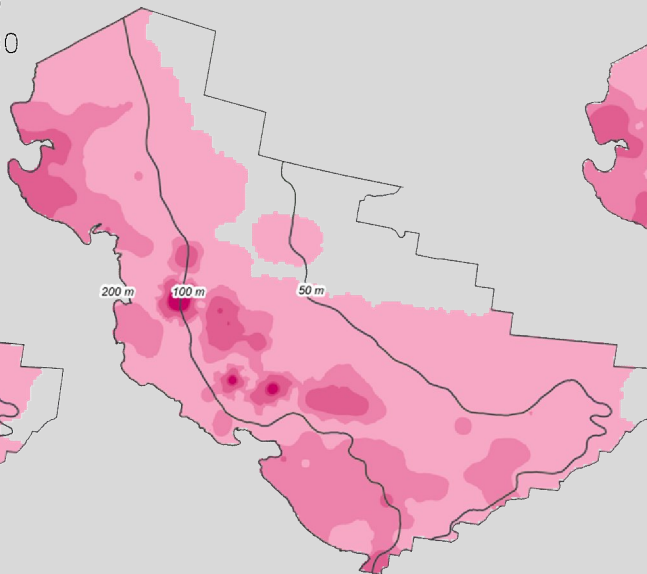
## Distribution and Abundance

Flathead sole kg/ha

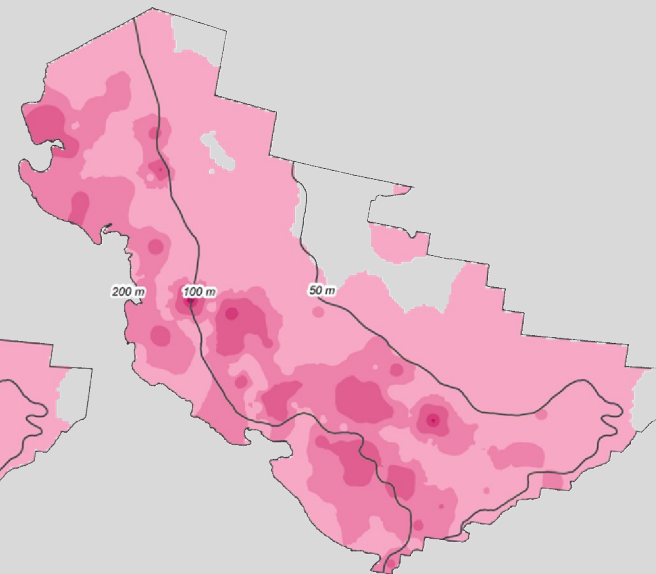


2014

Cold year



2015



2016

# EBS Shelf Survey Results

## Other Flatfishes and Alaska skate

Taxon	Year	Survey Biomass (Thousands mt)	% change	Survey Abundance (Millions)	% change
Kamchatka fl.	2015	60		123	
	2016	55	-8%	124	1%
Greenland turbot	2015	25		21	
	2016	22	-11%	14	-34%
Pacific halibut	2015	172		64	
	2016	154	-11%	66	3%
Alaska skate	2015	448		110	
	2016	551	23%	122	11%