



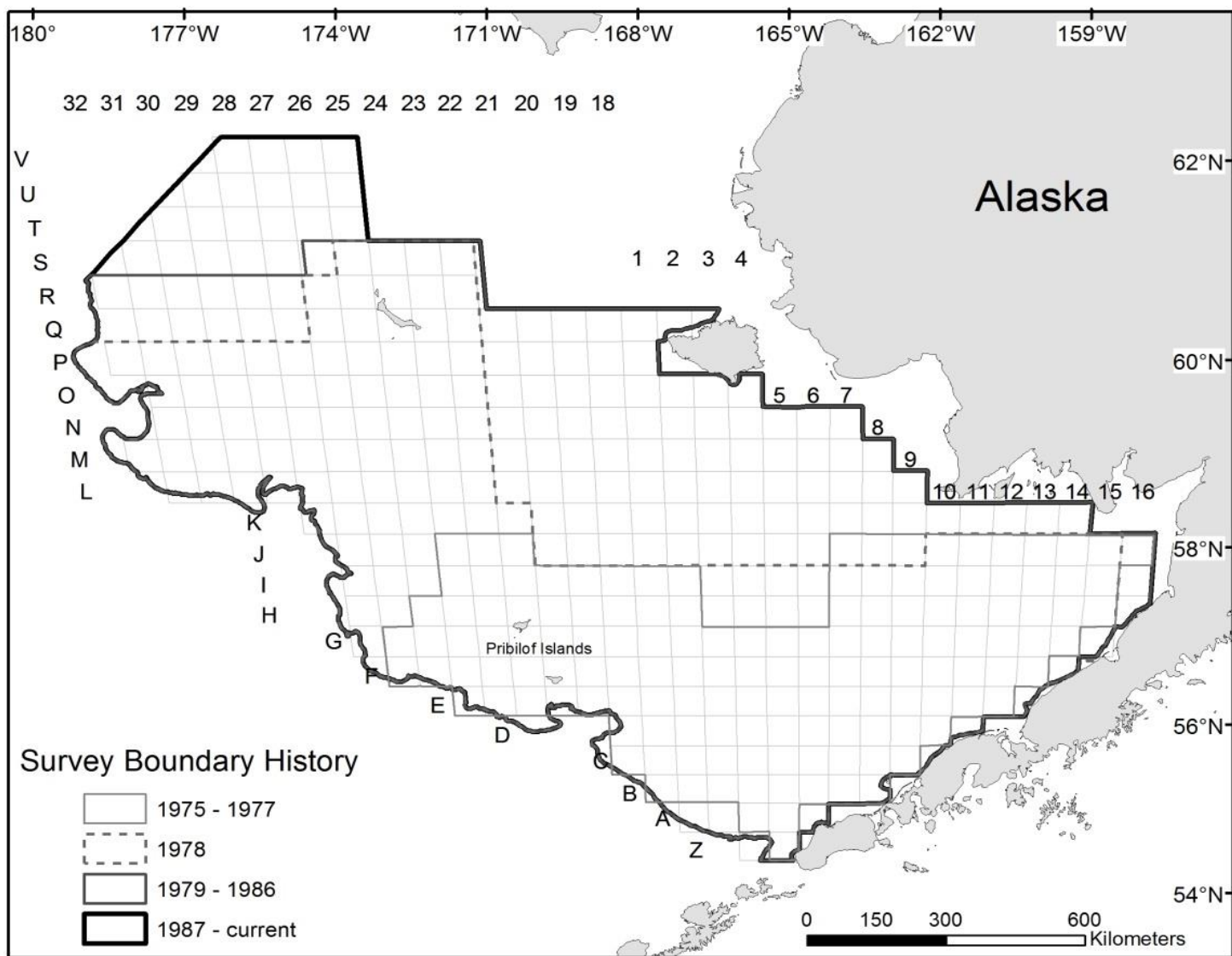
**NOAA
FISHERIES**

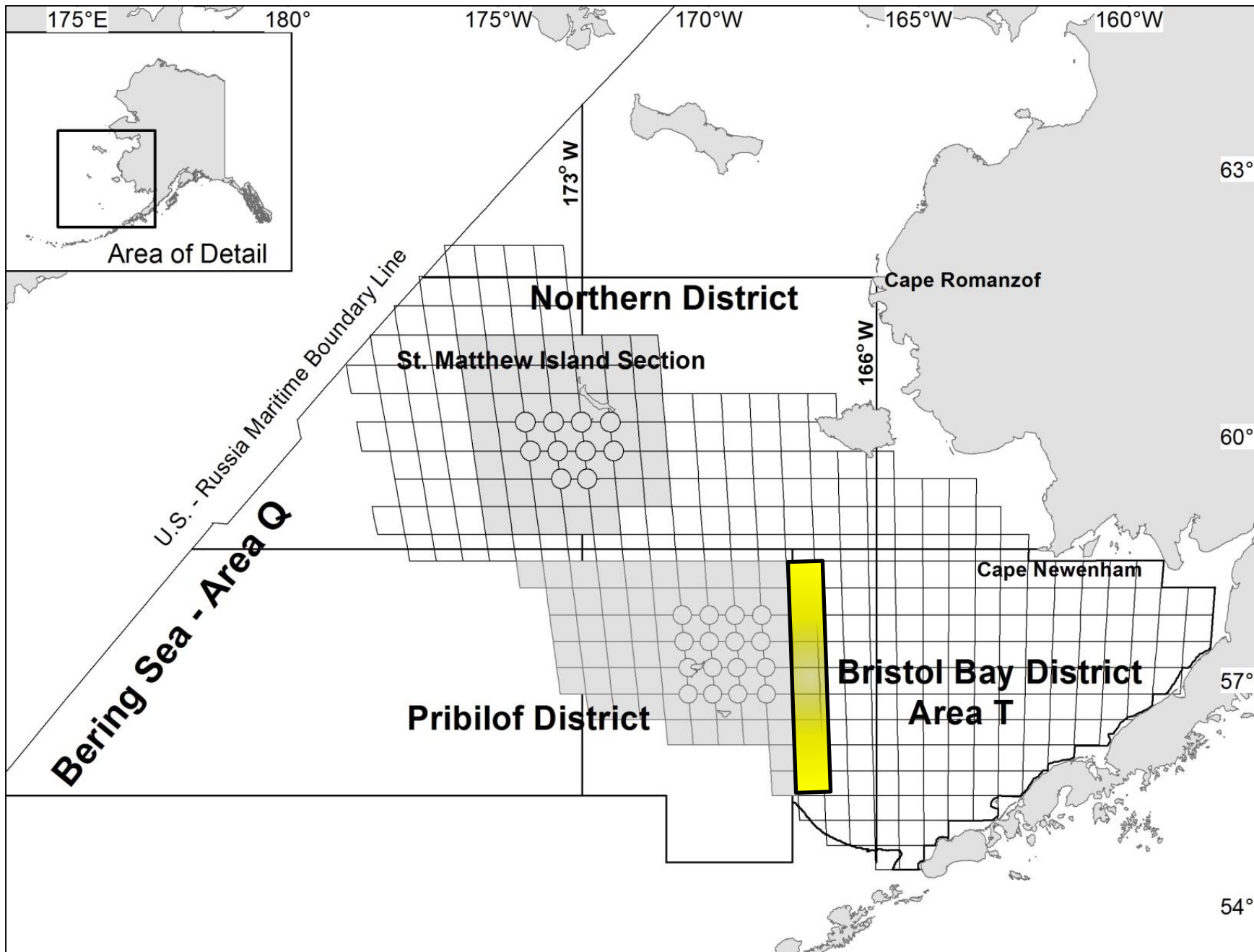
Alaska Fisheries
Science Center-
Kodiak Lab

The 2016 Eastern Bering Sea Continental Shelf Bottom Trawl Survey: Results for Commercial Crab Species

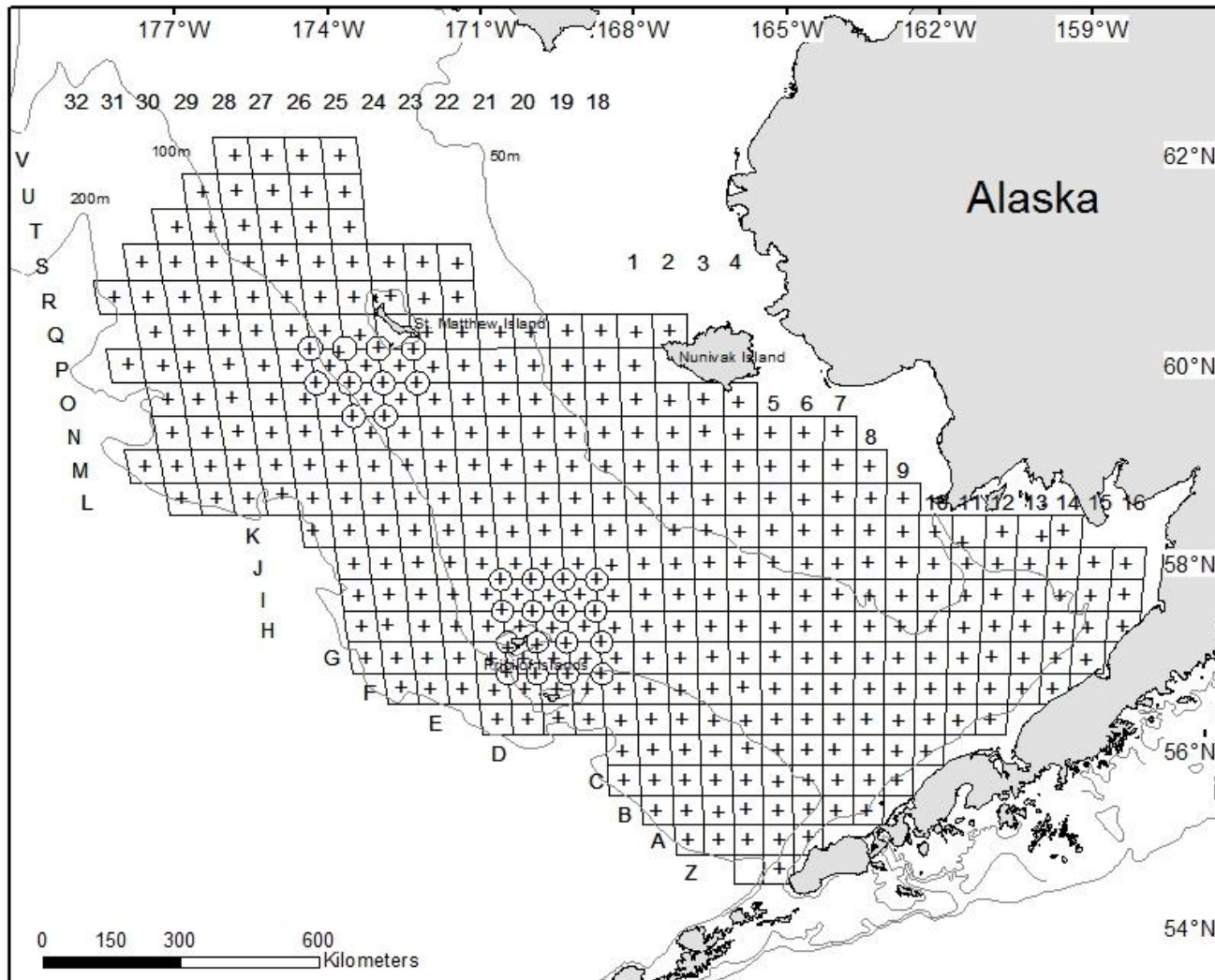
Ben Daly, Claire Armistead, Robert Foy, AFSC
SAP and GAP programs

Crab Plan Team
September 2016





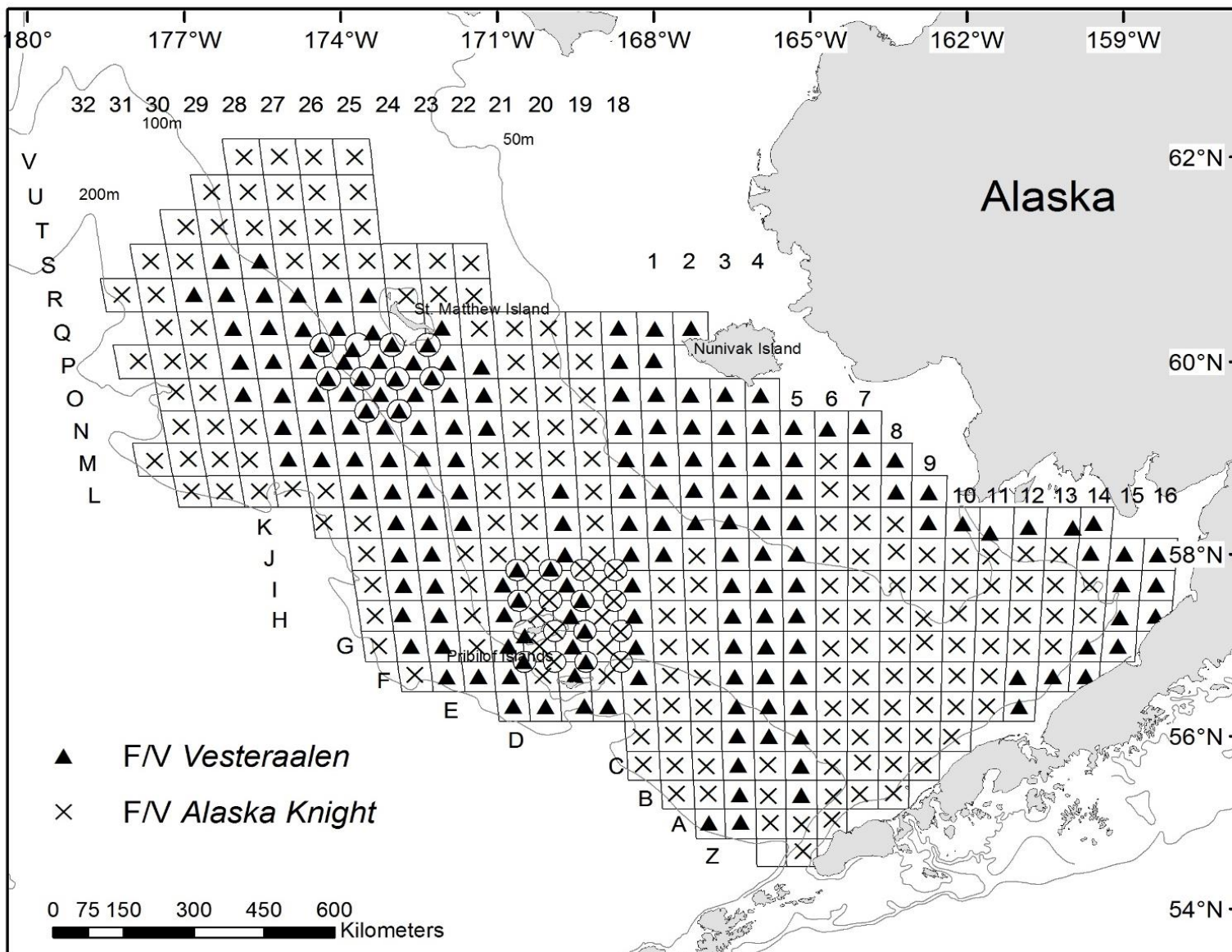
2016 standard Bering Sea survey



HIGHLIGHTS

- May 31 – July 26
- 375 standard stations
- 139,949 nm²
- 6 special crab projects
- Warm water!
- NO resample

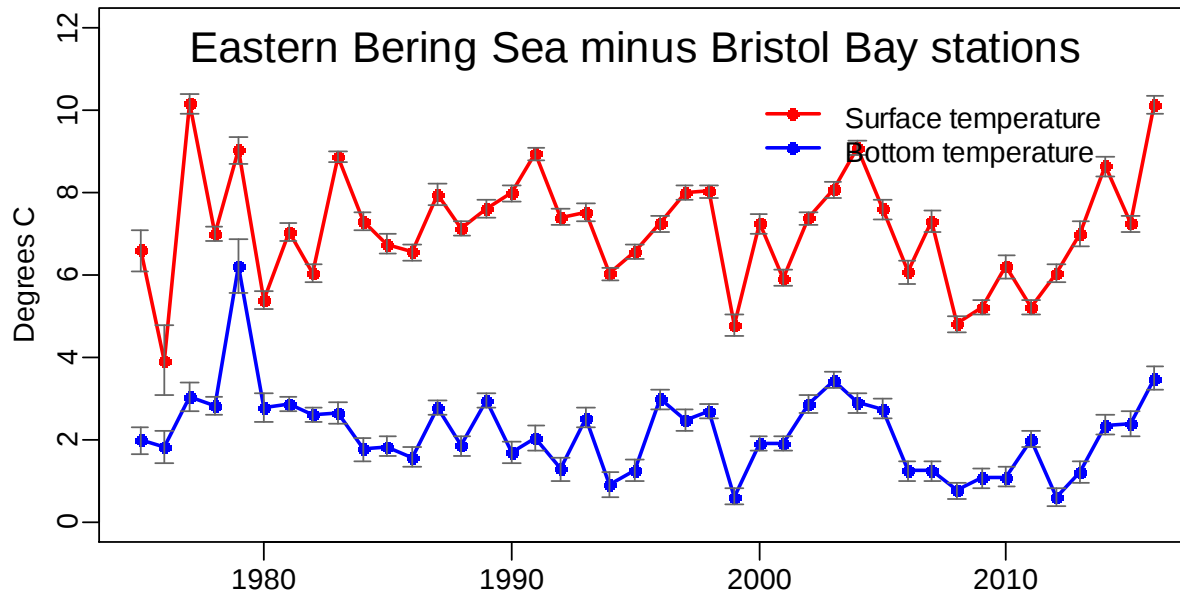
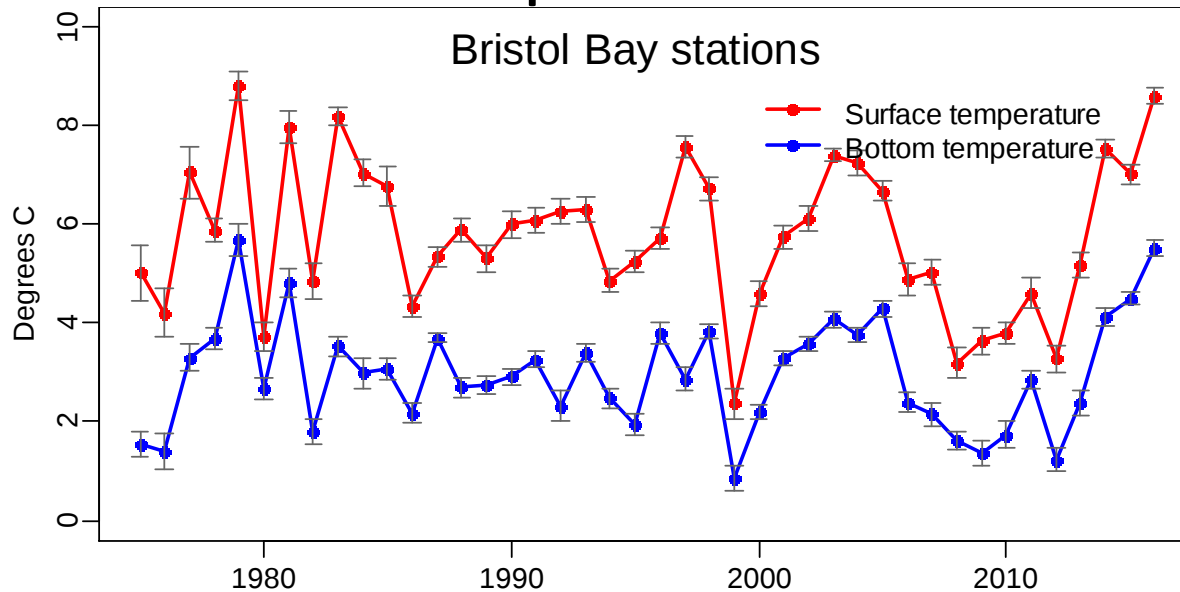
2016 standard Bering Sea survey

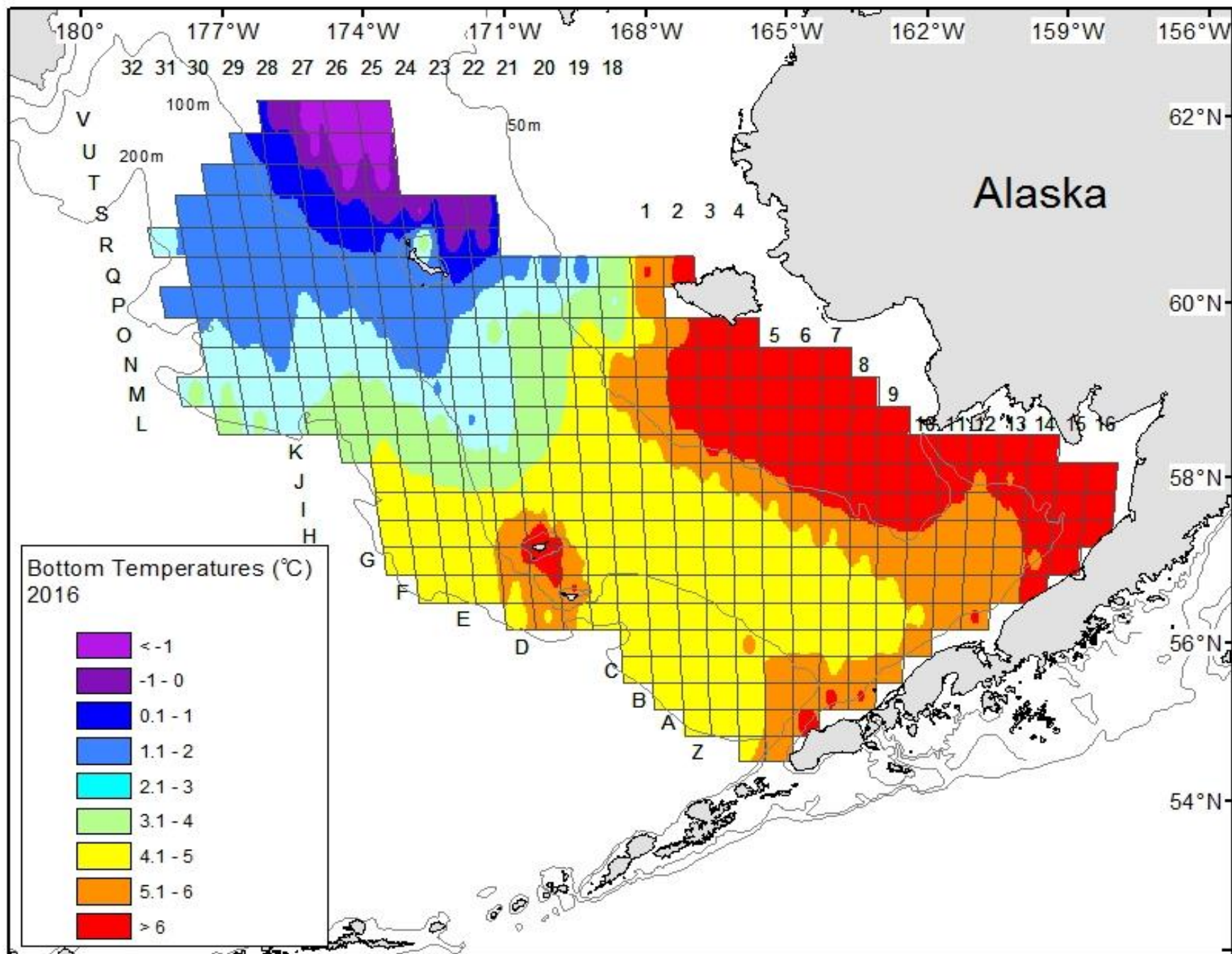


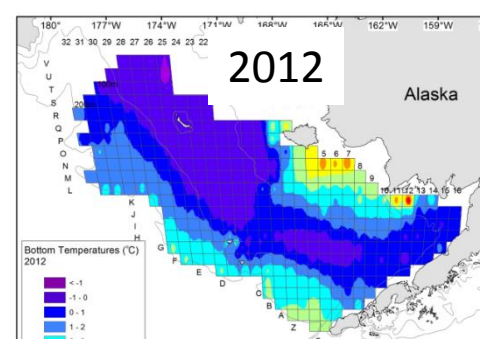
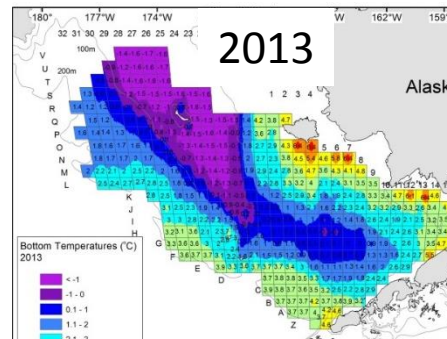
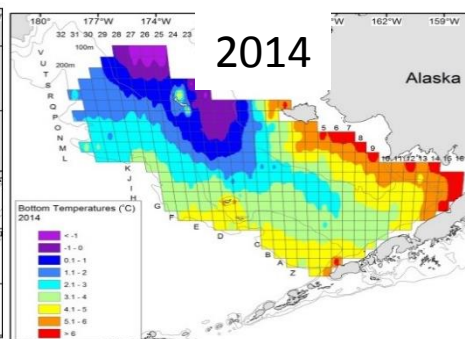
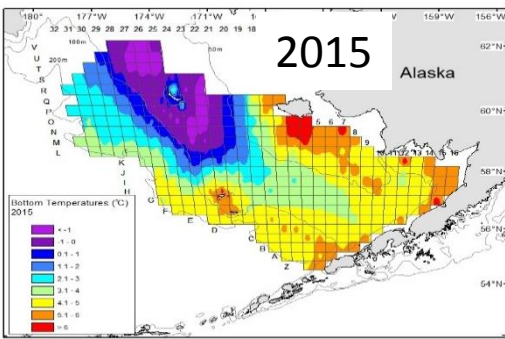
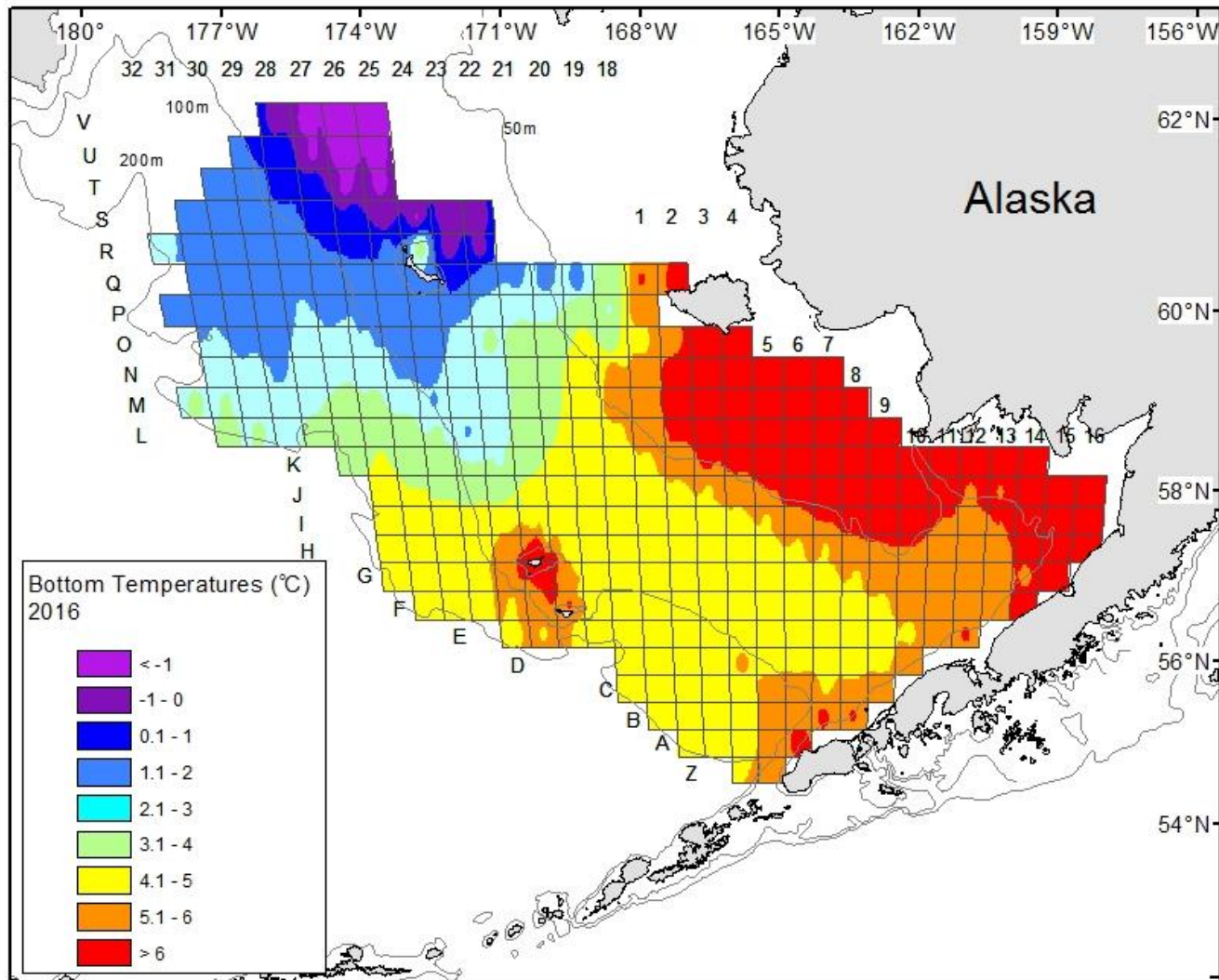
Special projects related to crab species

Project title	Principle Investigator	Agency
Bitter crab syndrome	Pam Jensen	RACE ¹ -SAP ²
Annual vs. biennial snow crab reproductive cycle	Kathy Swiney	RACE ¹ -SAP ²
Ocean acidification effects on red king crab	Kathy Swiney	RACE ¹ -SAP ²
Snow and Tanner crab growth	Cliff Ryer	RACE ¹ -FBE ³
Reproductive potential of female snow, Tanner, and Tanner hybrid crabs	Laura Slater	ADF&G ⁴
Snow crab age determination	Joel Webb	ADF&G ⁴

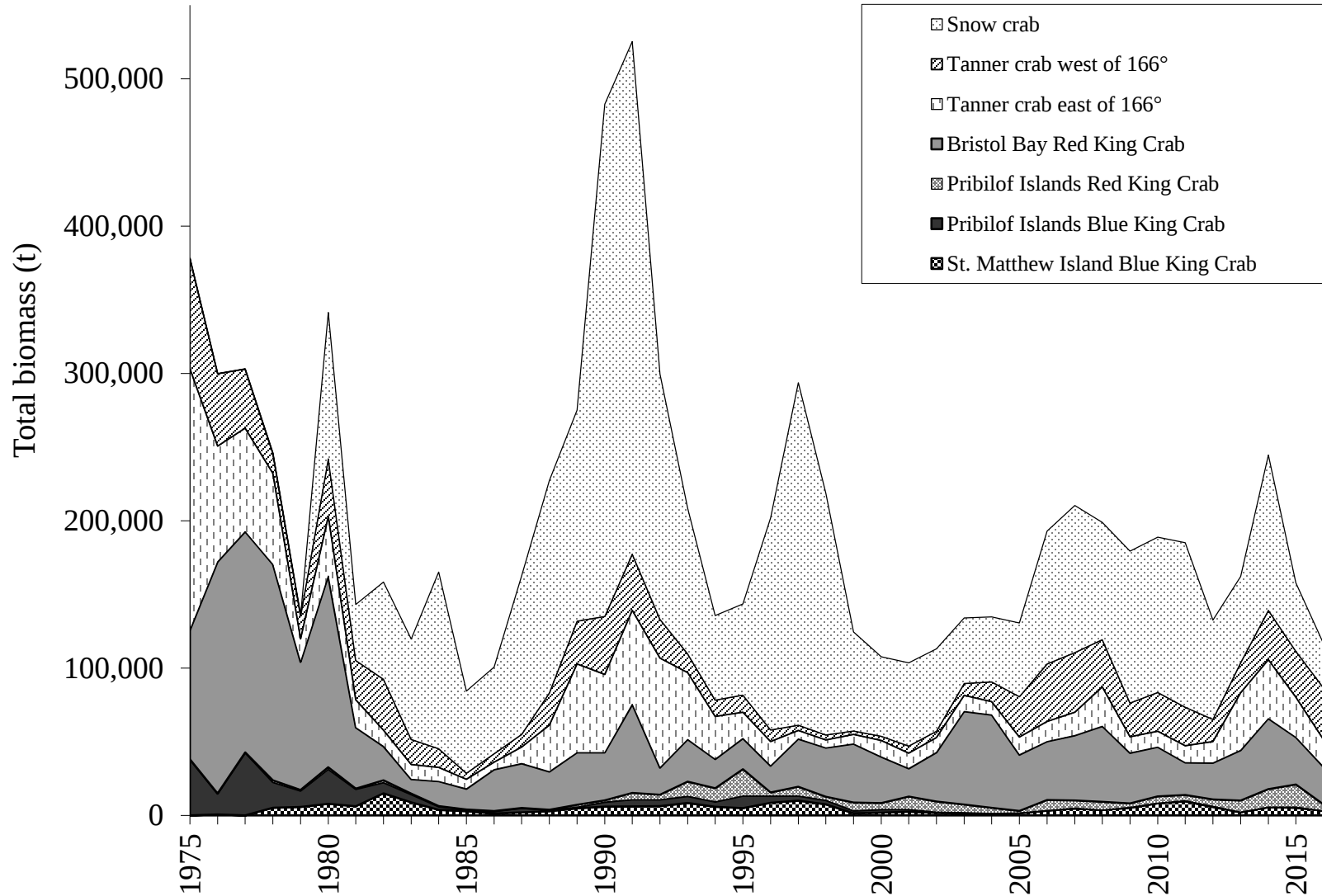
Bristol Bay Surface (red) and Bottom (blue) temperatures



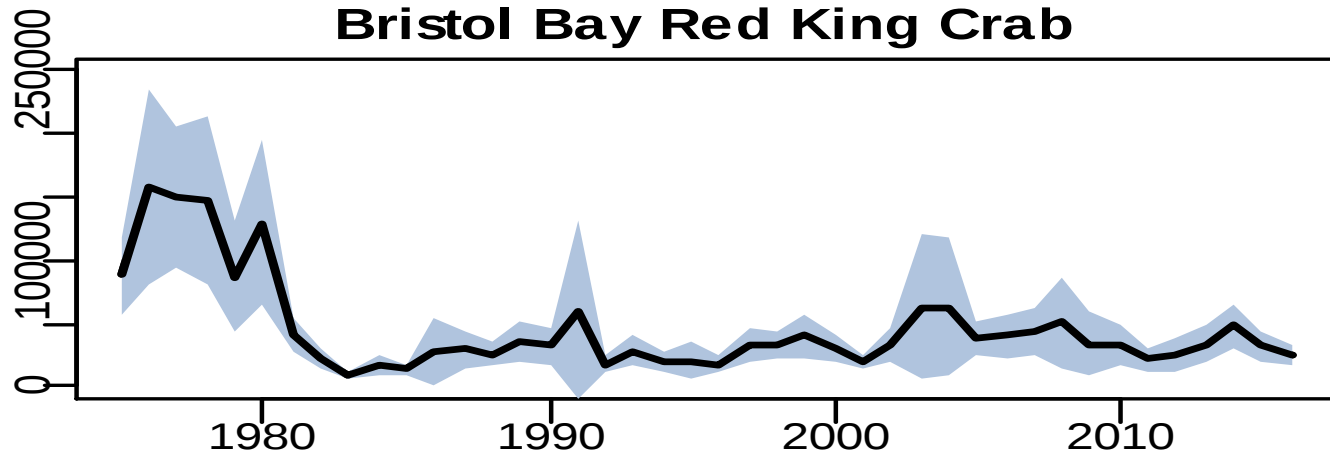




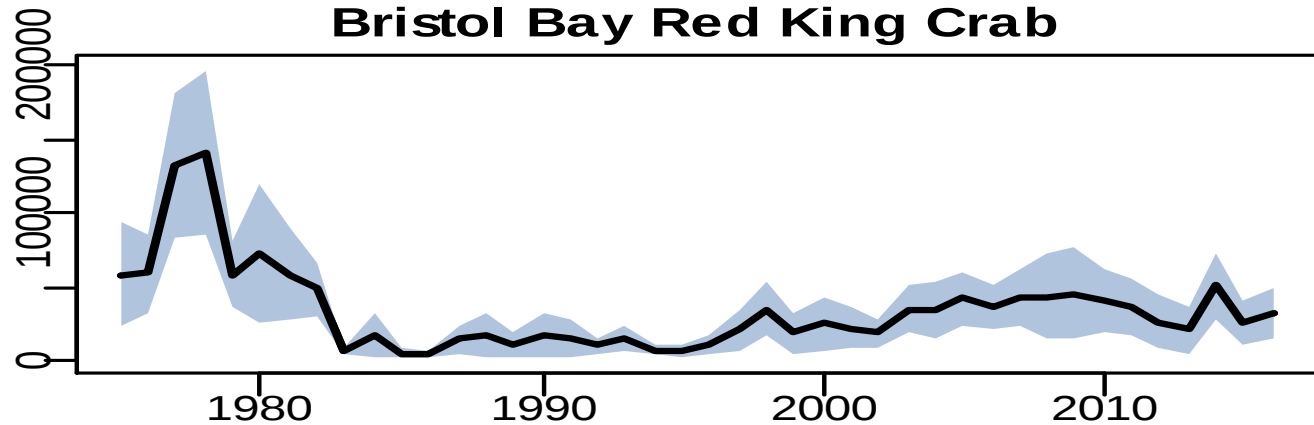
Mature male biomass



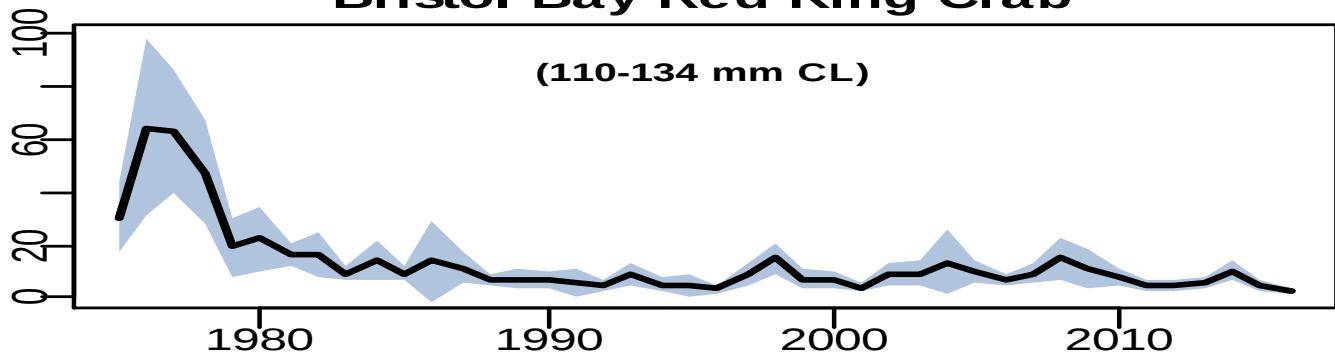
Bristol Bay Red King Crab



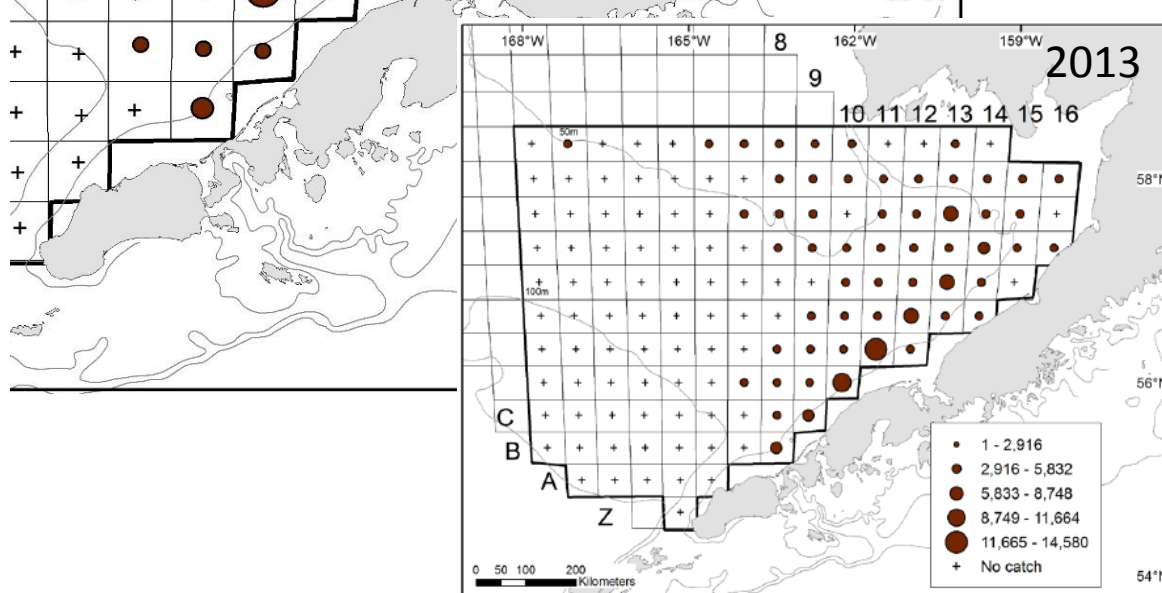
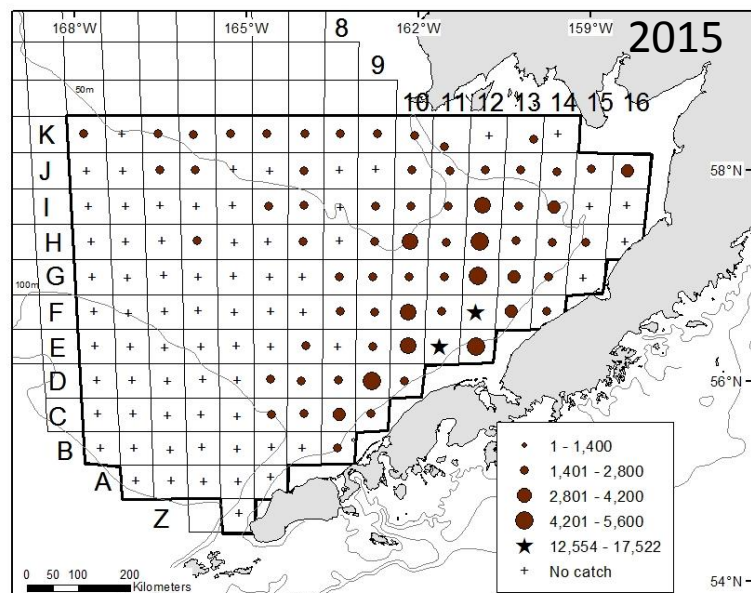
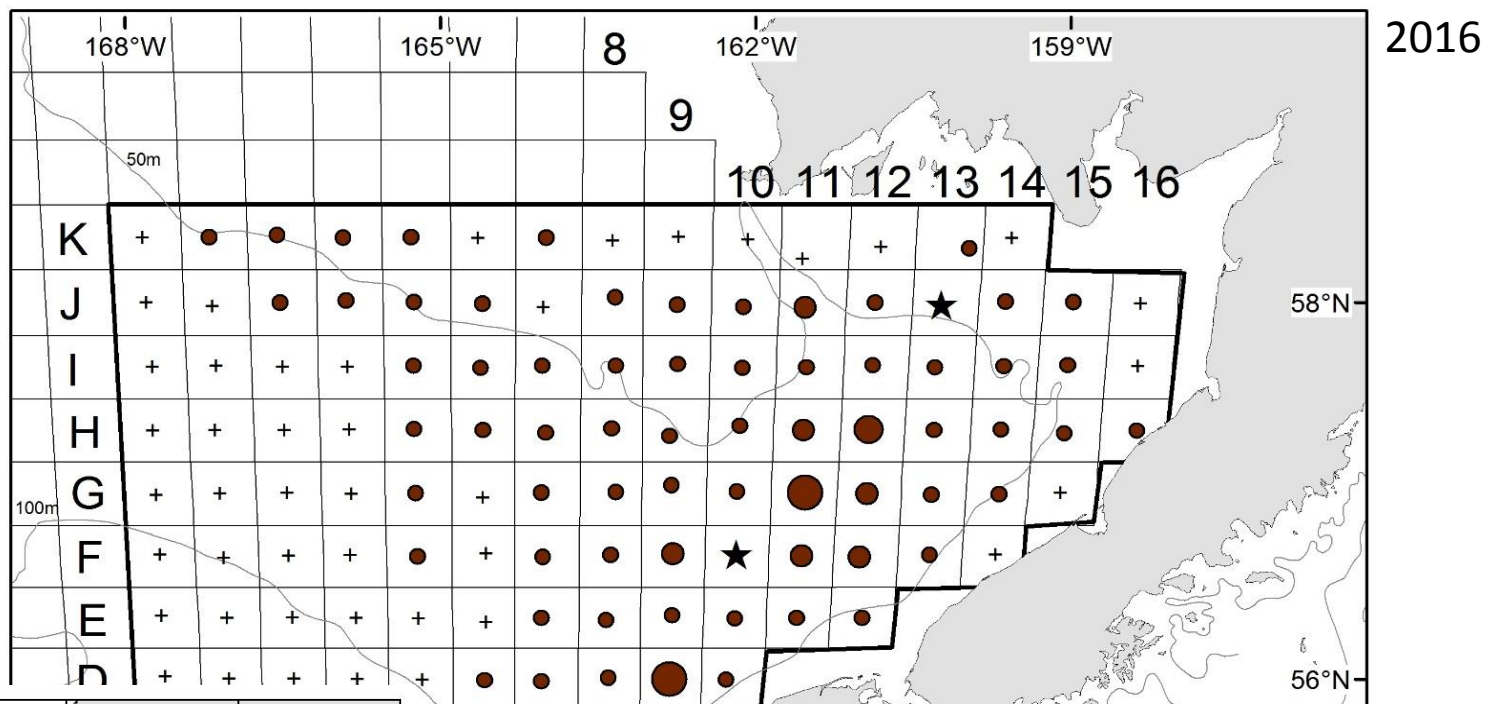
Bristol Bay Red King Crab



Bristol Bay Red King Crab

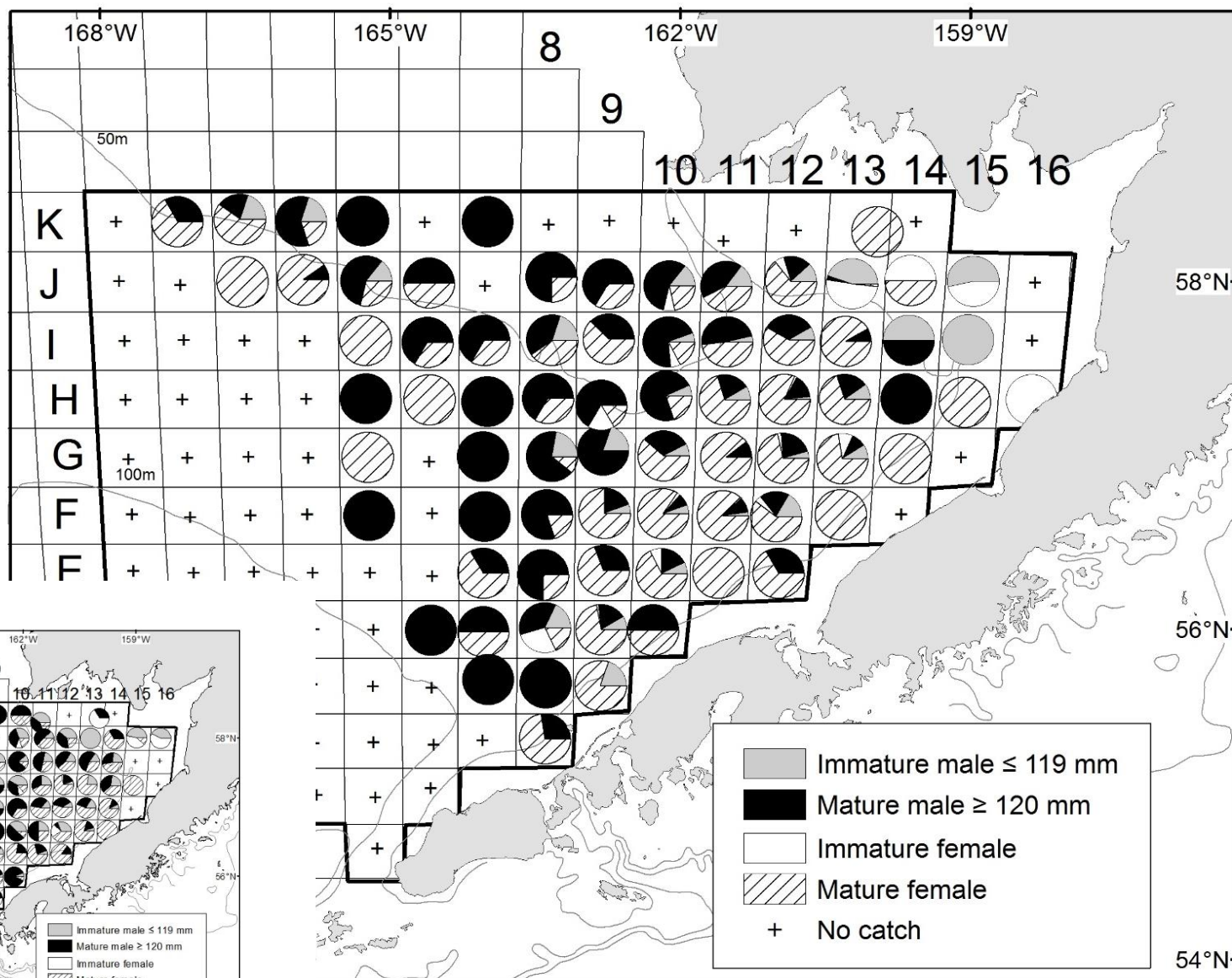


Bristol Bay red king crab (*Paralithodes camtschaticus*) total density

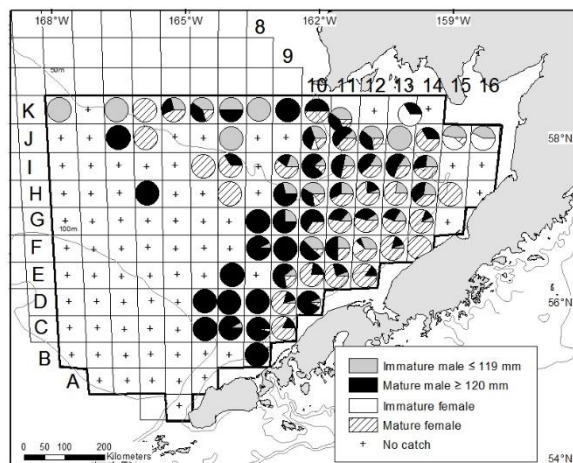


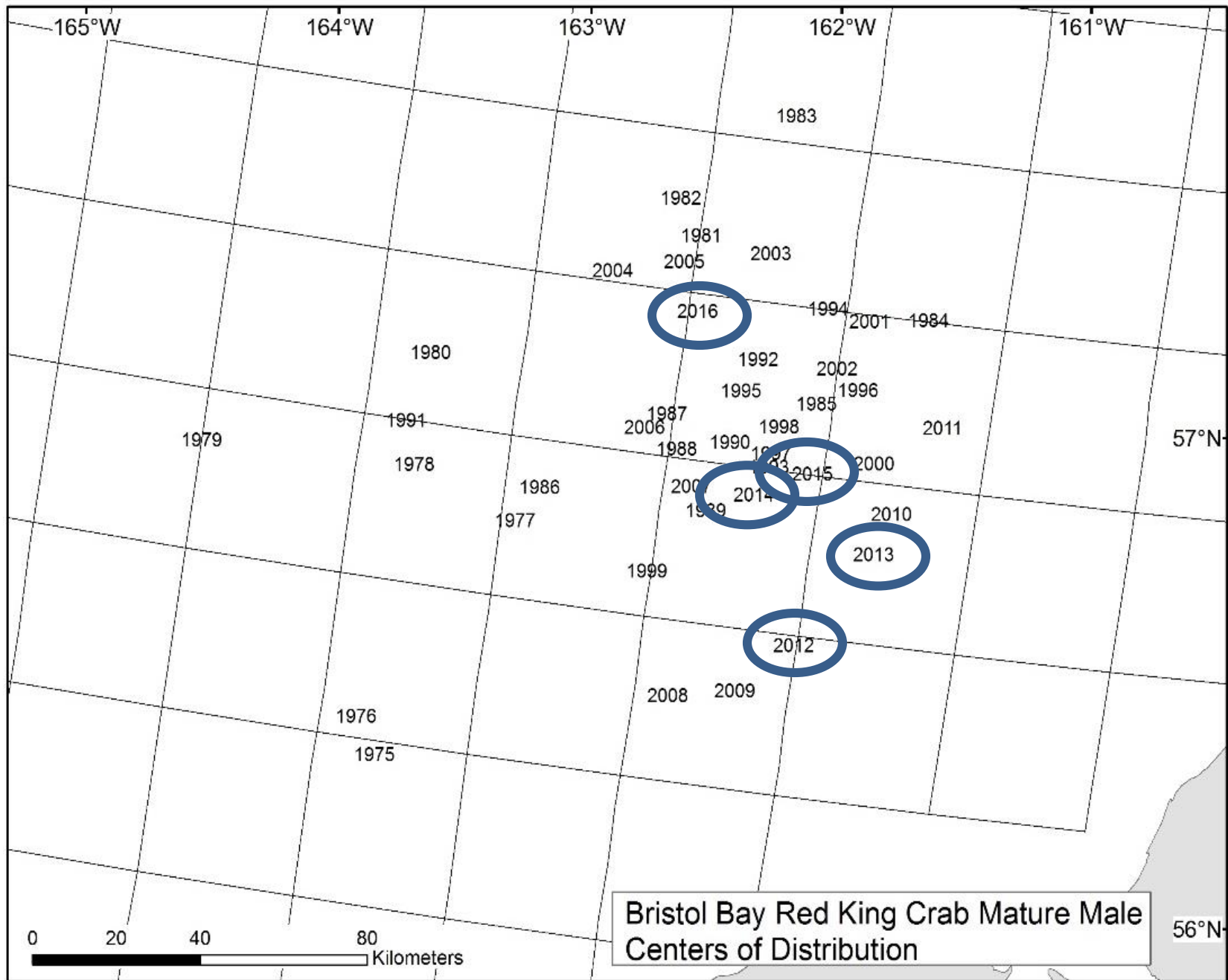
Bristol Bay red king crab (*Paralithodes camtschaticus*)

2016

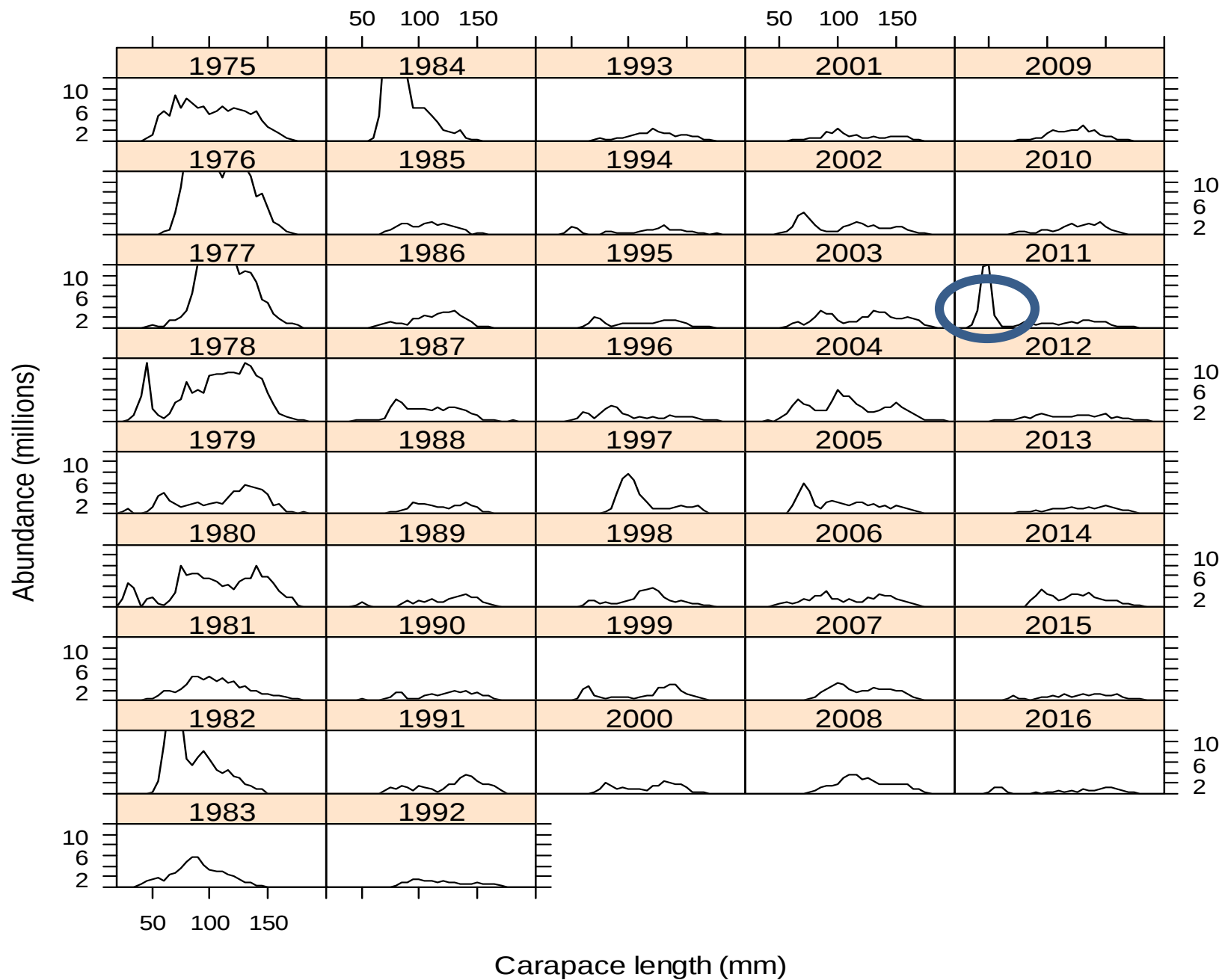


2015

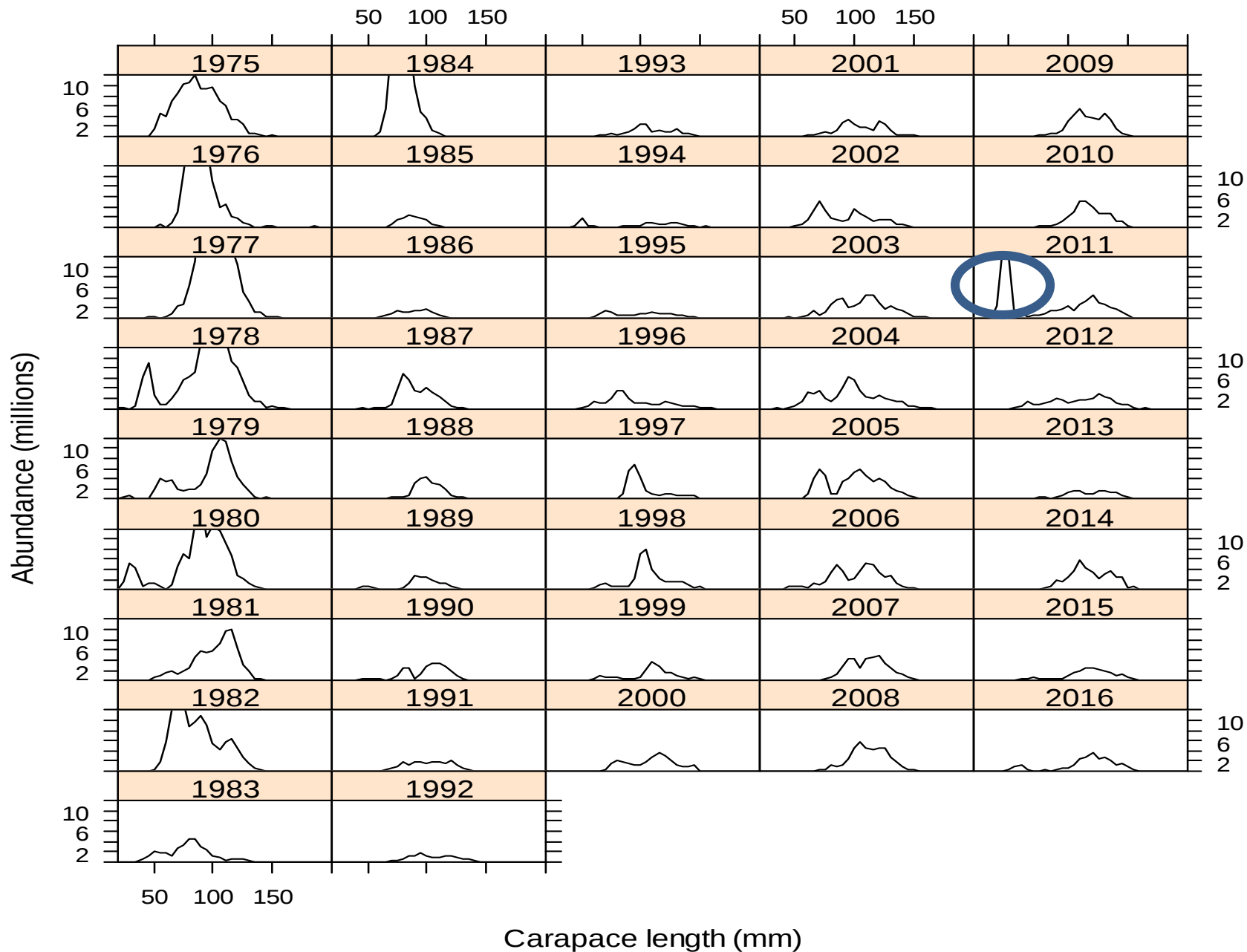




Bristol Bay Red King Crab (male)



Bristol Bay Red King Crab (female)



Bristol Bay Red King Crab (male)

Shell condition

Soft & molting



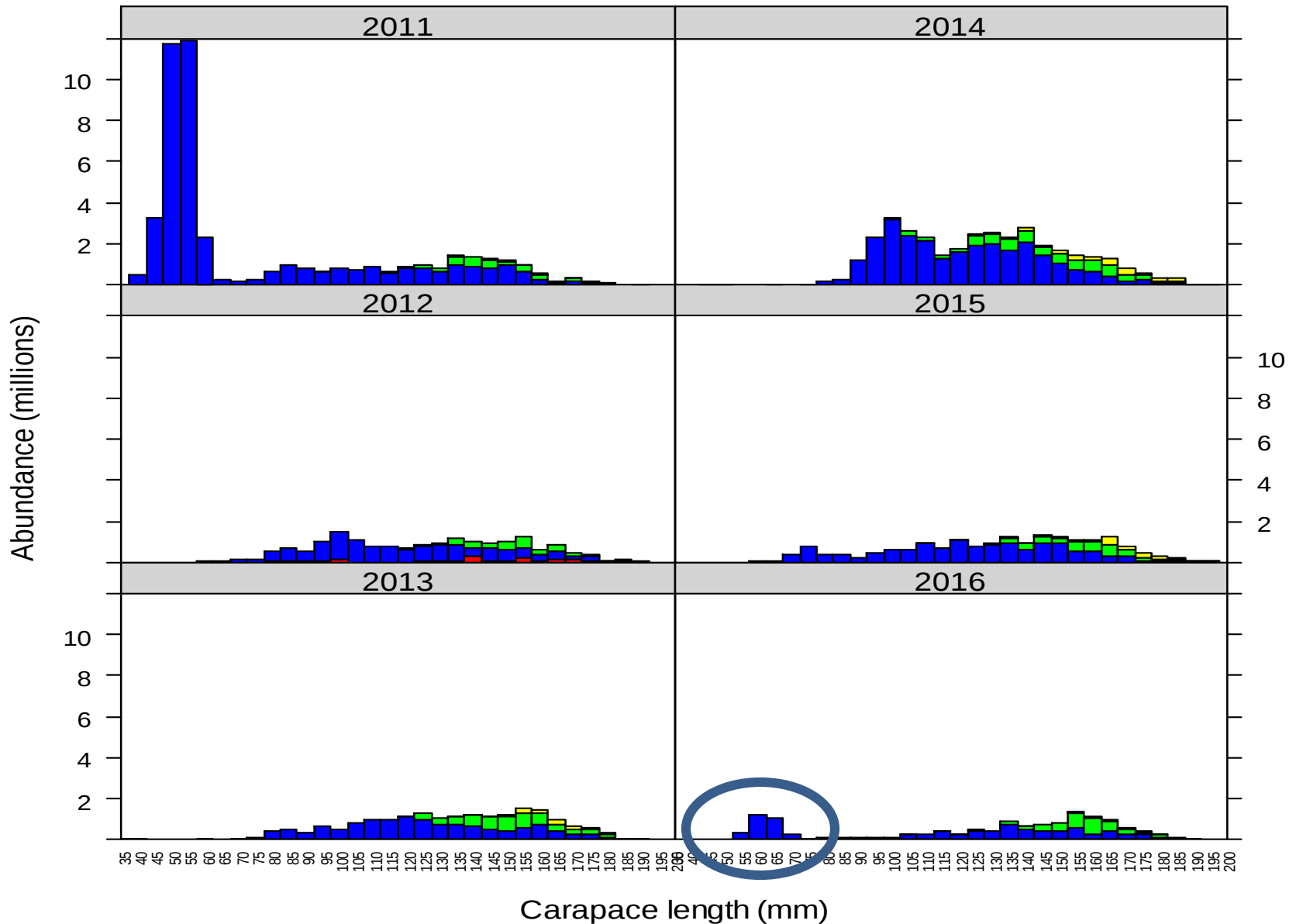
New - hard



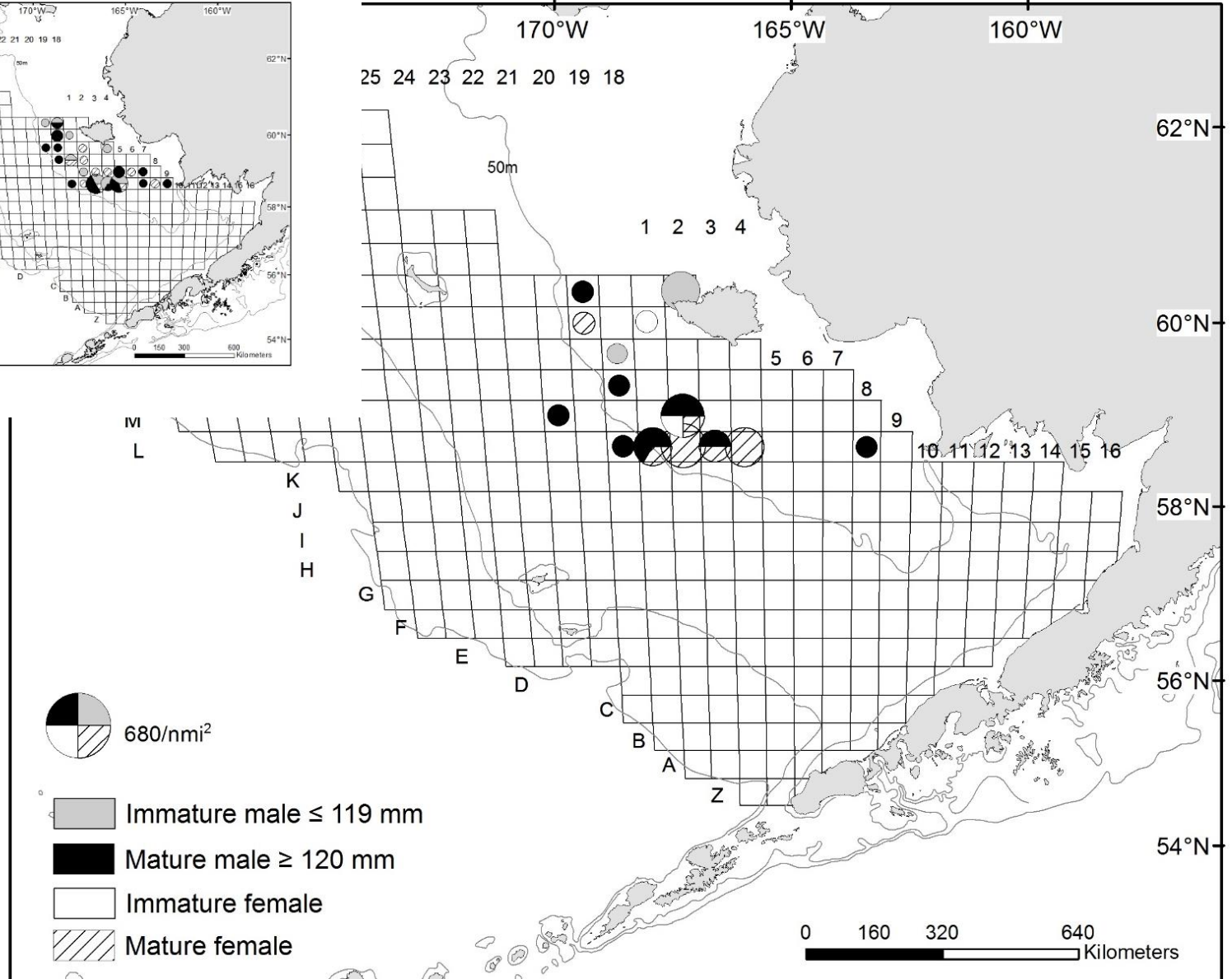
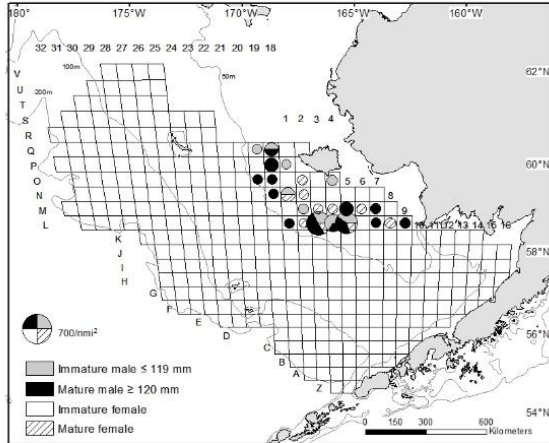
Old



Very old



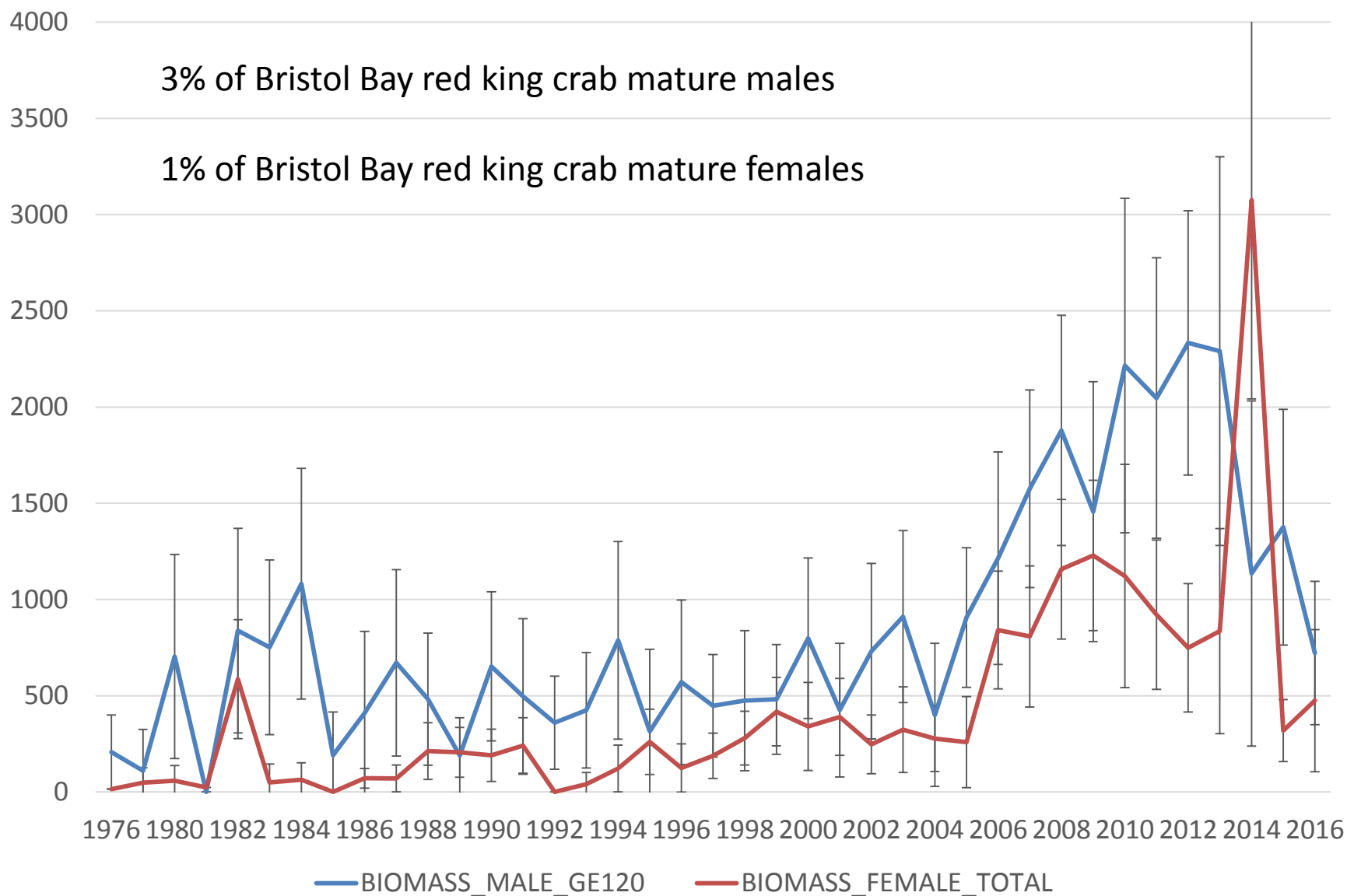
Unstratified red king crab (*Paralithodes camtschaticus*)



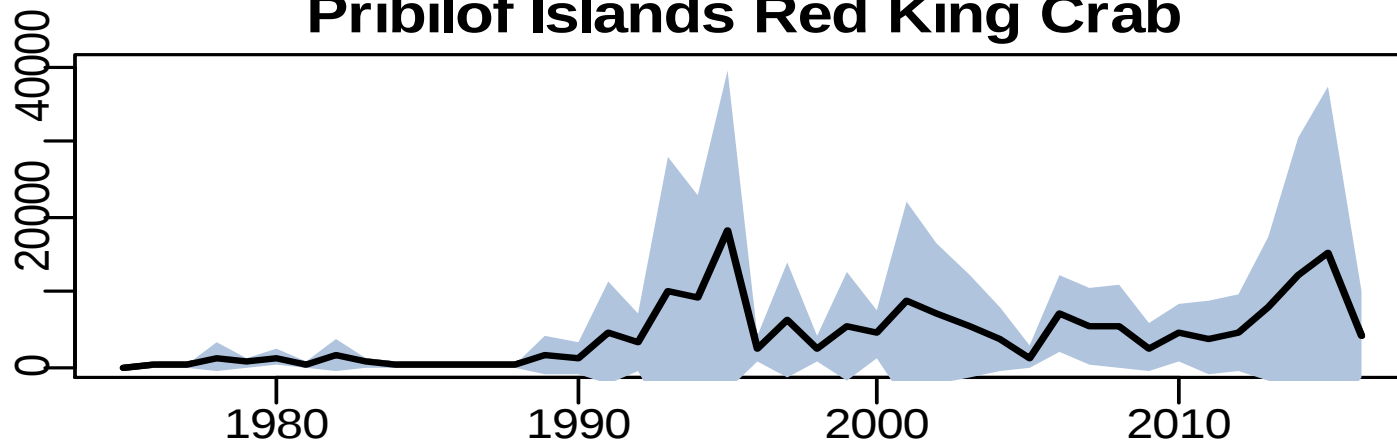
Unstratified red king crab (*Paralithodes camtschaticus*)

3% of Bristol Bay red king crab mature males

1% of Bristol Bay red king crab mature females

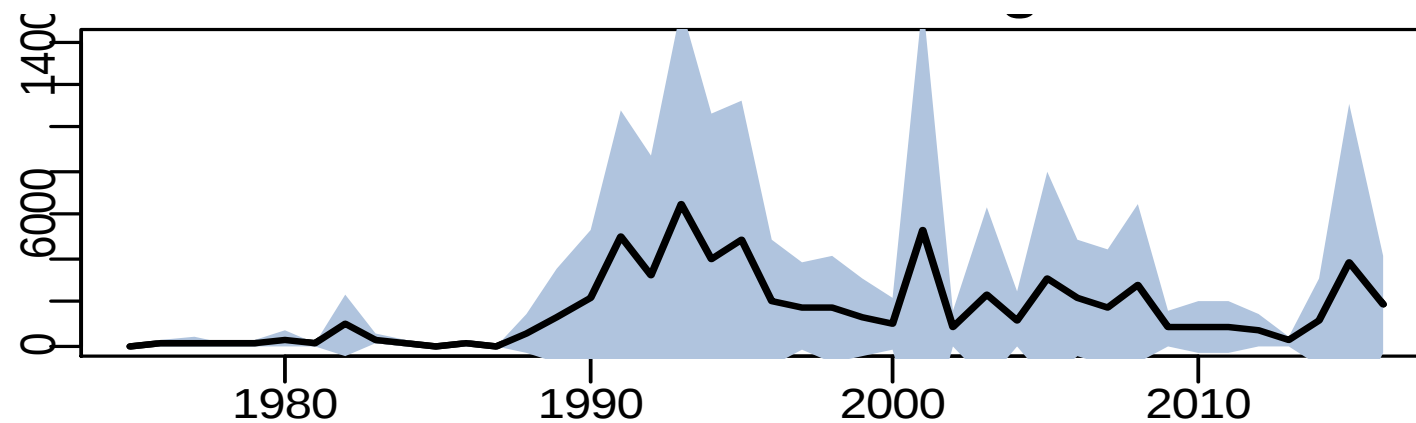


Pribilof Islands Red King Crab



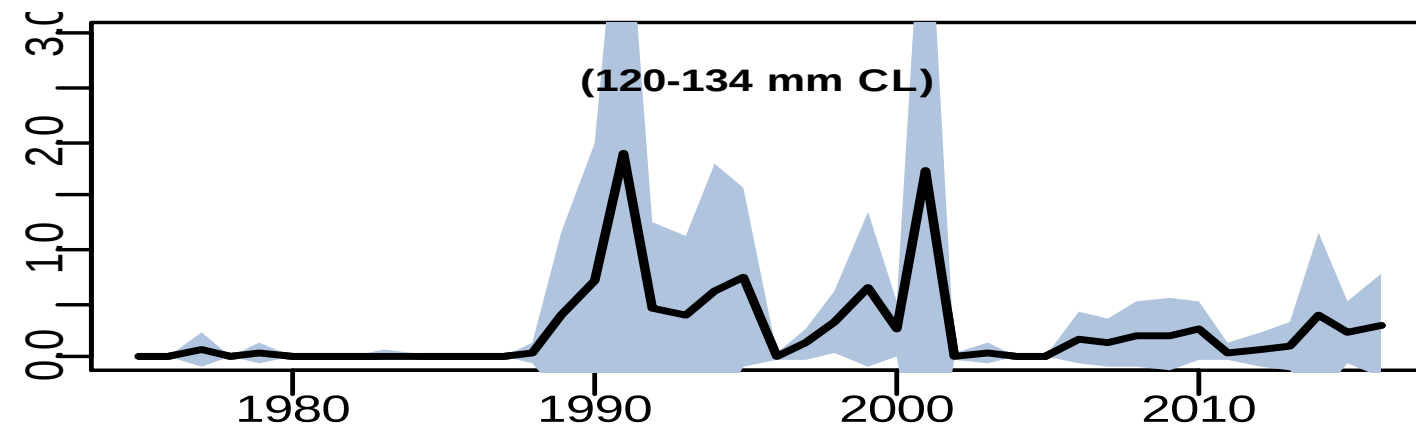
Mature male
biomass (t)

-73%



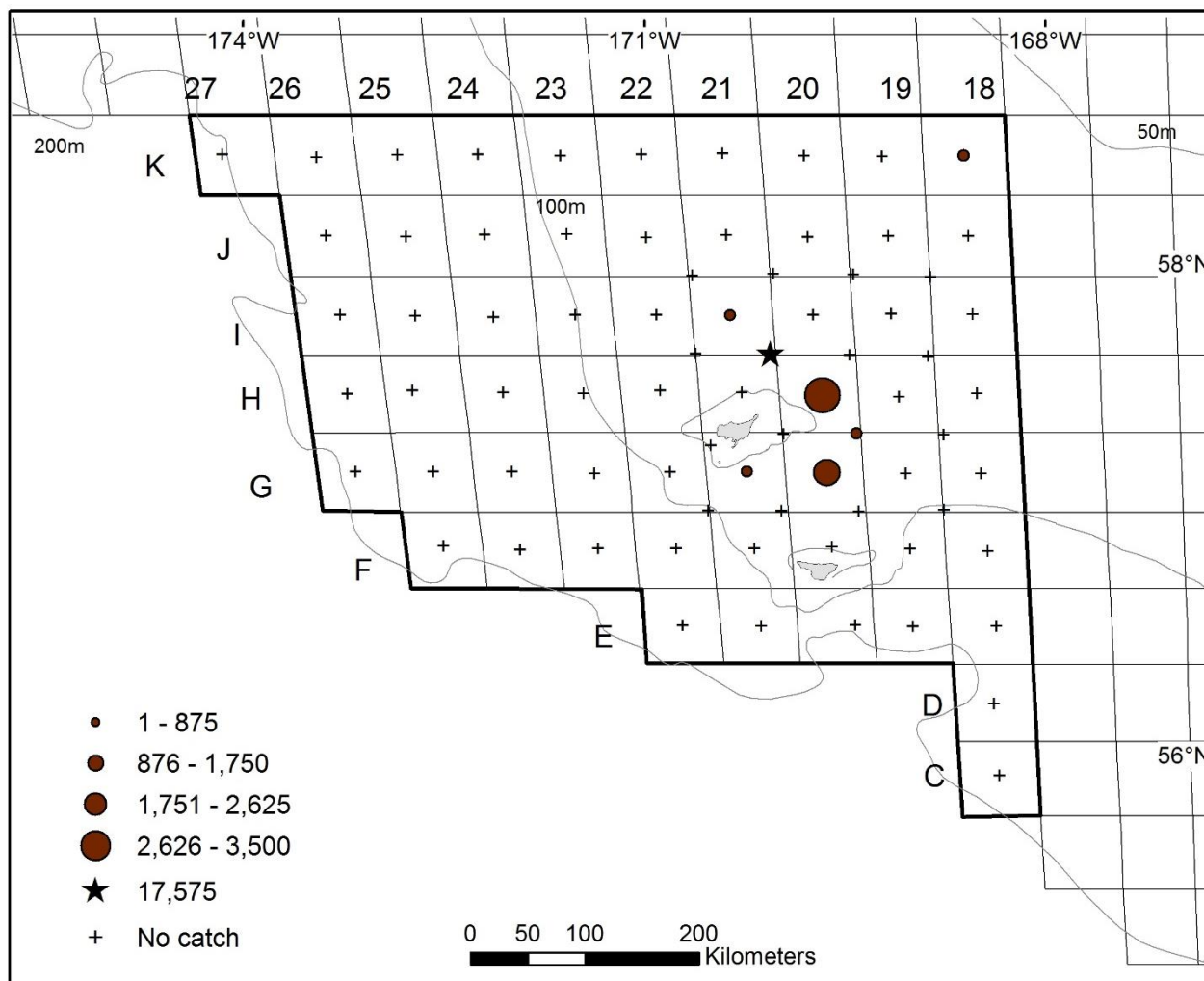
Mature females
biomass (t)

-51%

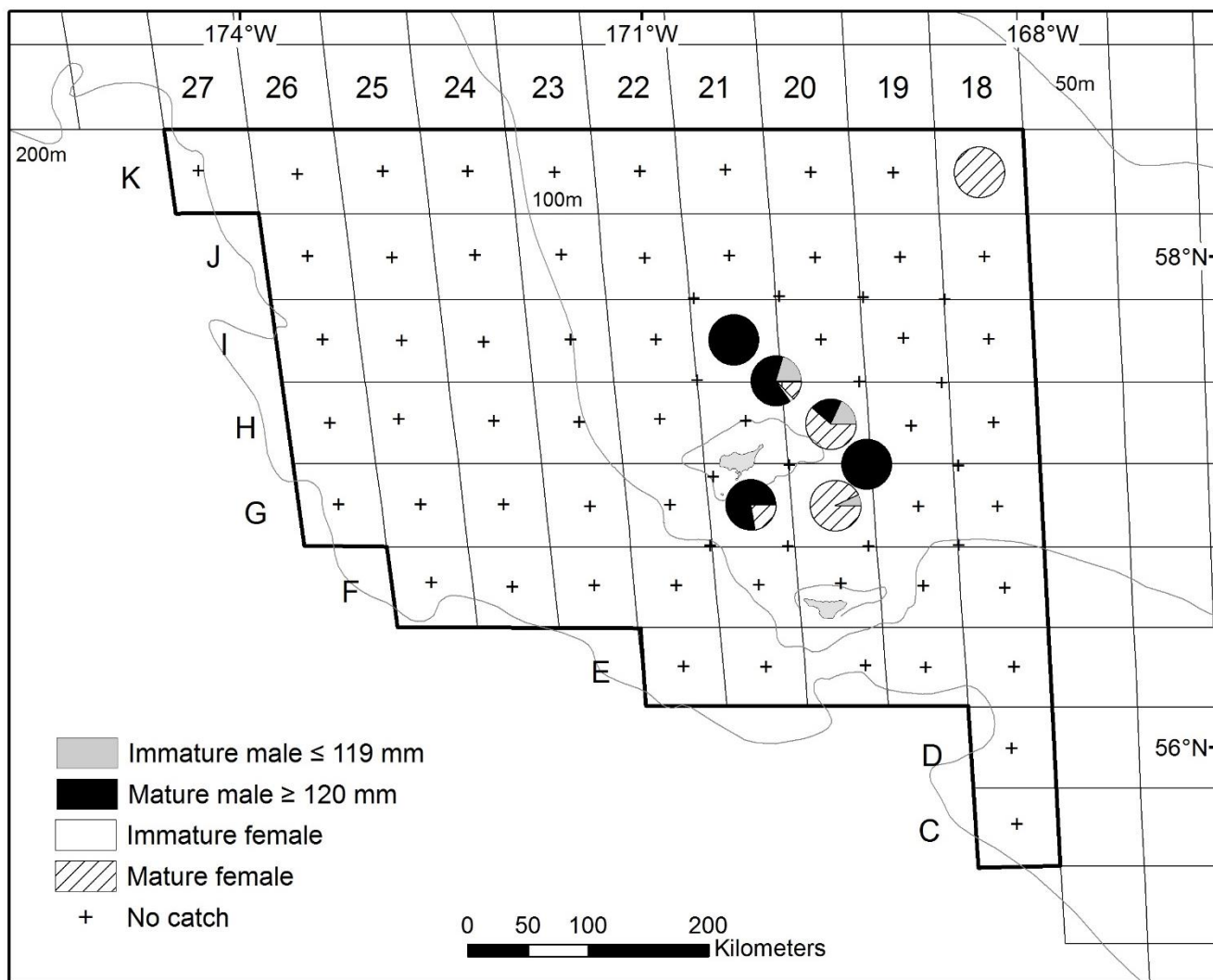


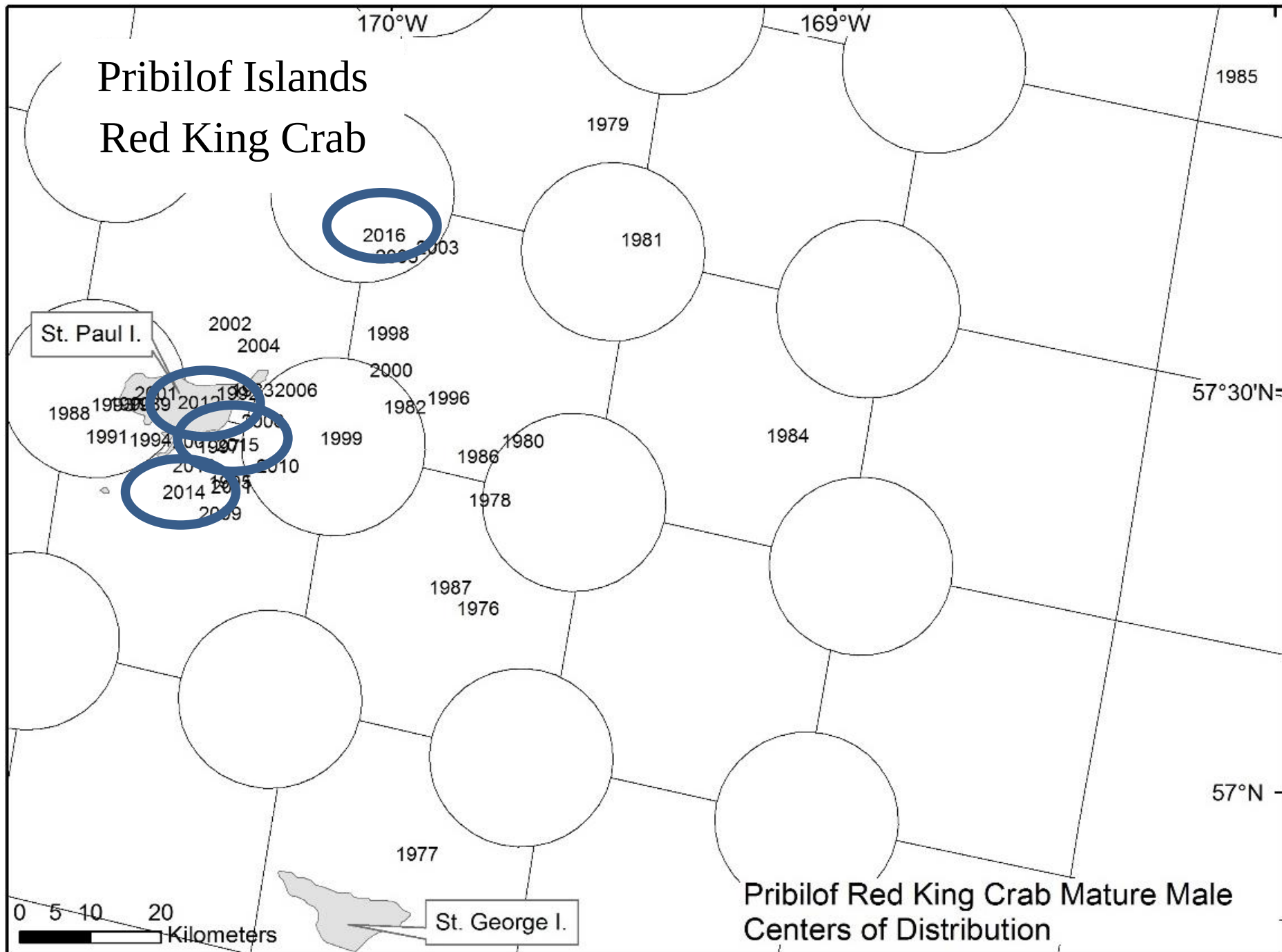
(120-134 mm CL)

Juvenile
abundance
(millions)



73% of
mature males
at star

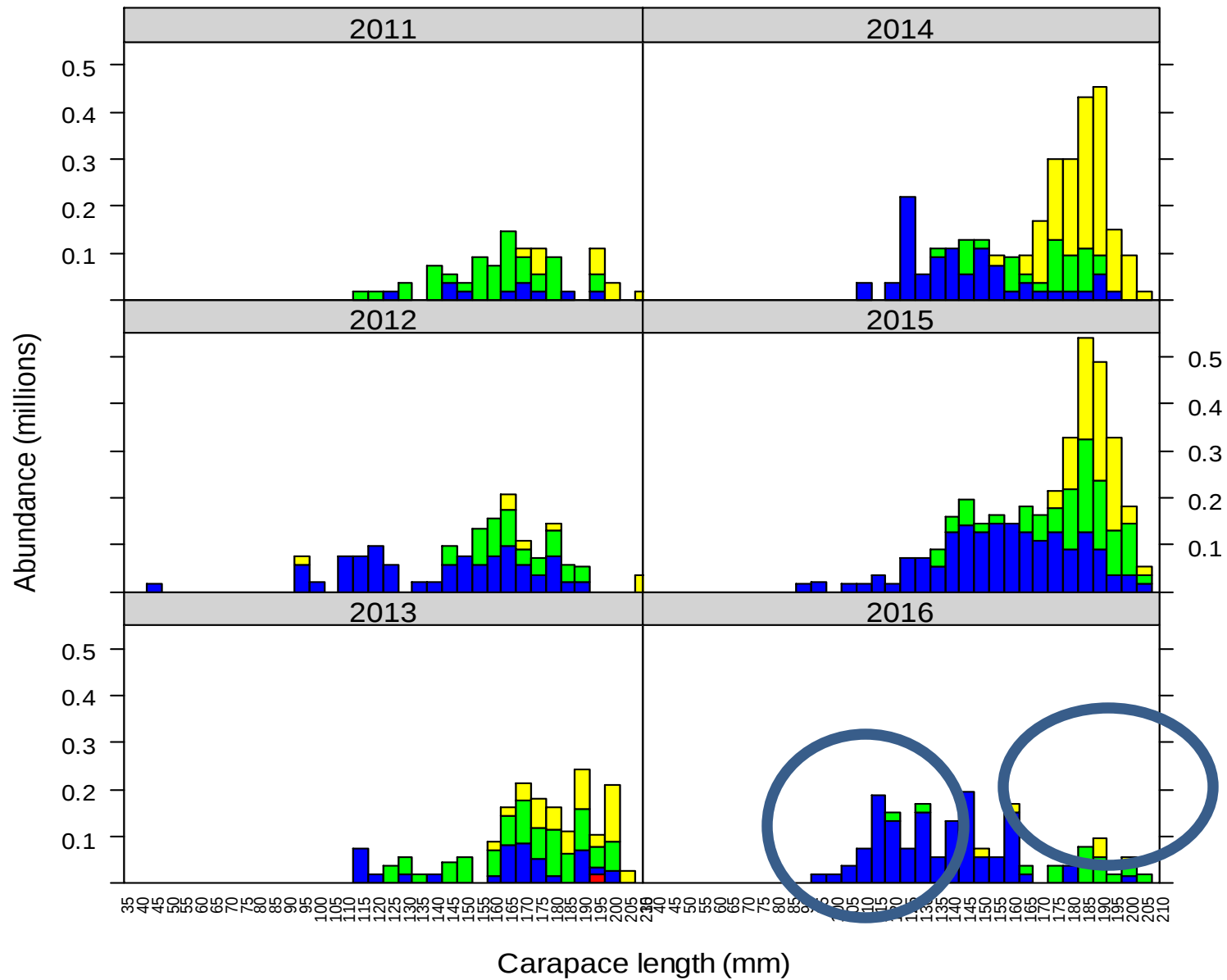




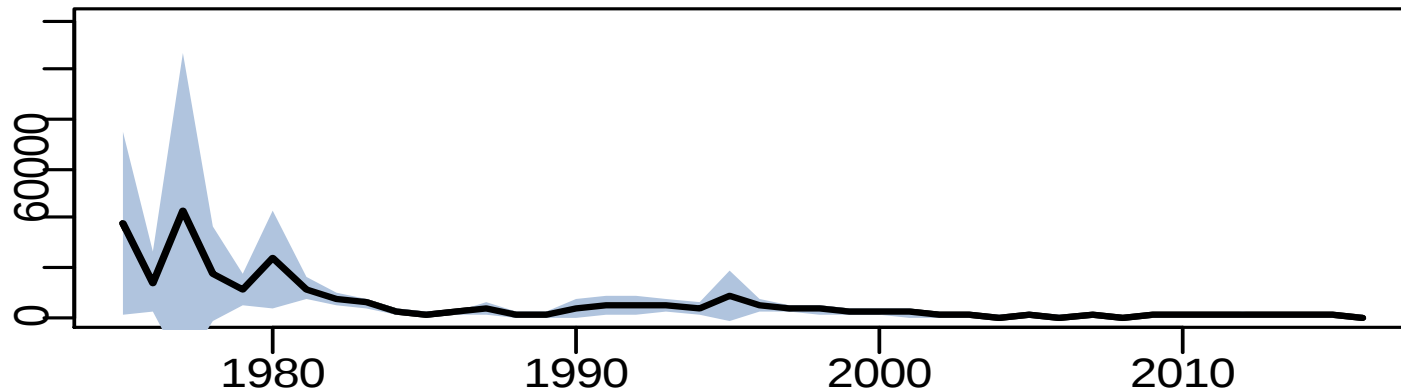
Pribilof Islands Red King Crab (male)

Shell condition

Soft & molting ■ New - hard ■ Old ■ Very old ■

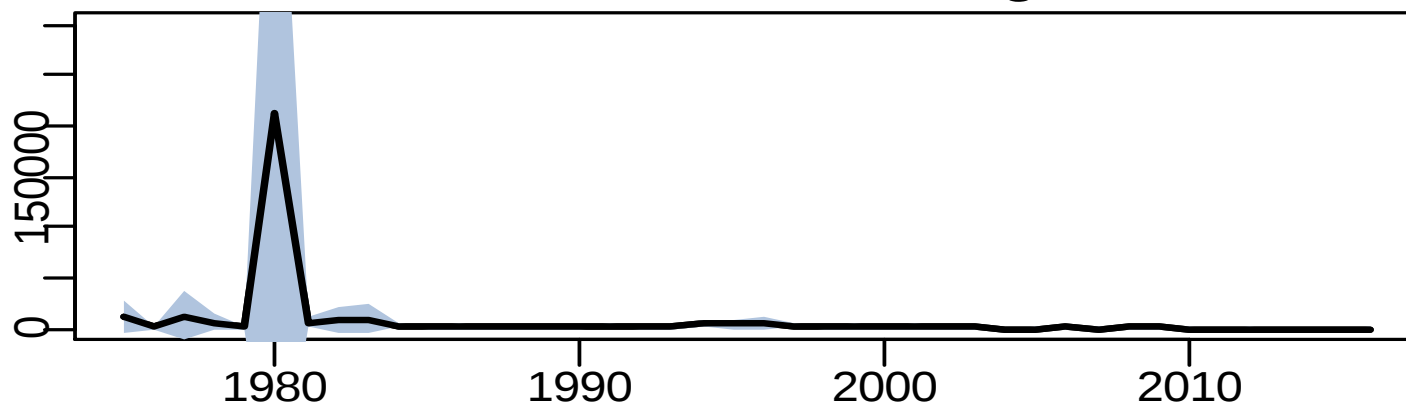


Pribilof Islands Blue King Crab



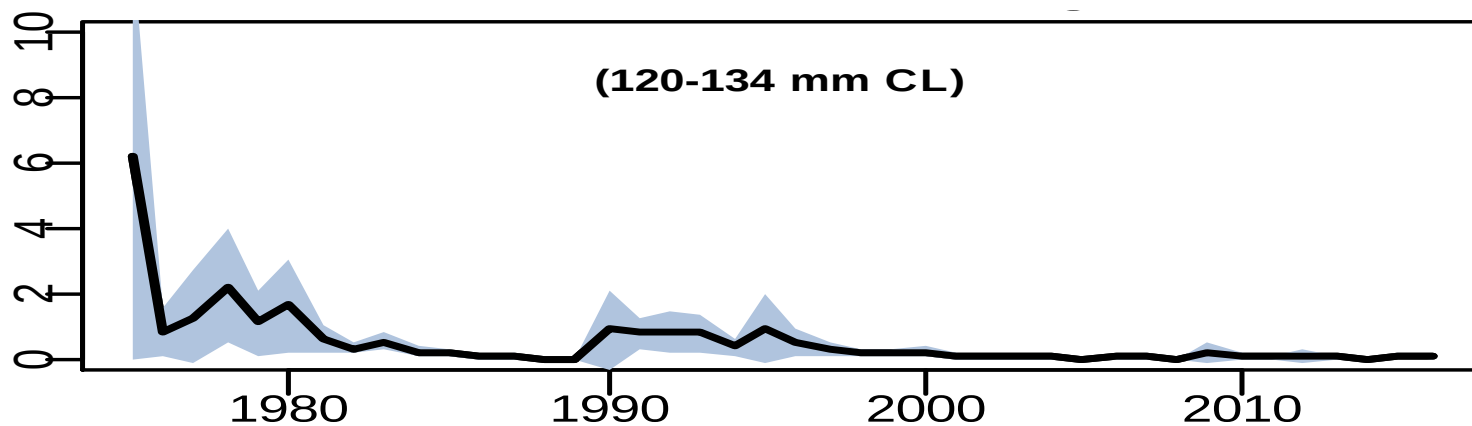
Mature male
biomass (t)

-79%



Mature female
biomass (t)

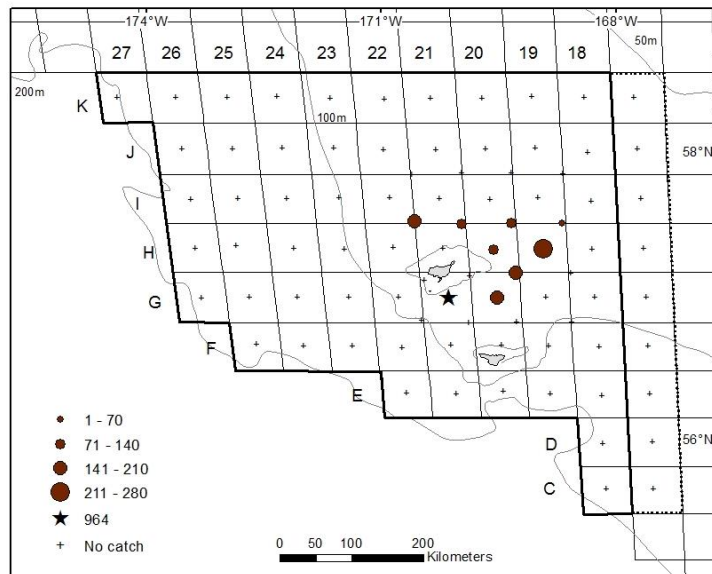
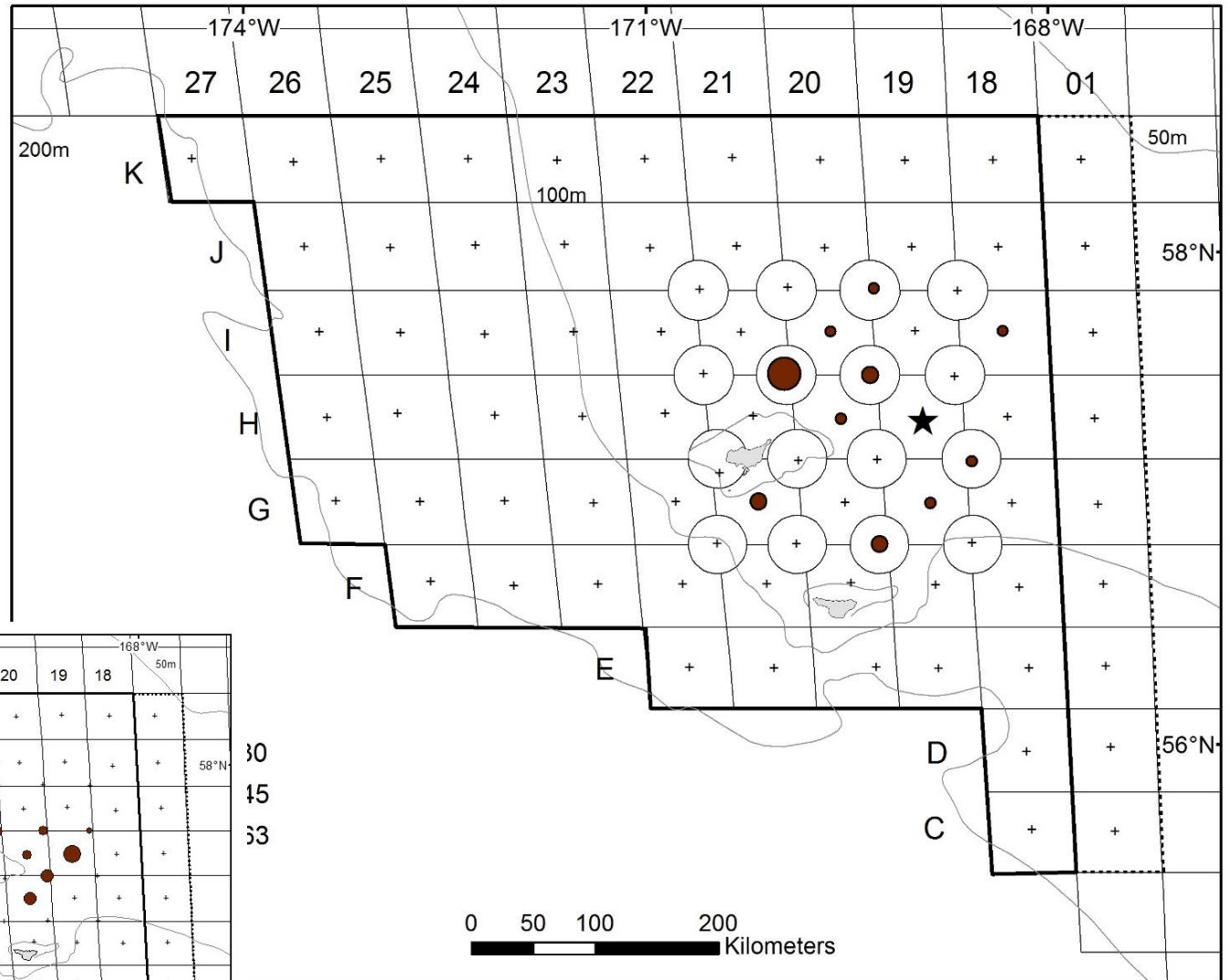
+120%



(120-134 mm CL)

Juvenile
abundance
(millions)

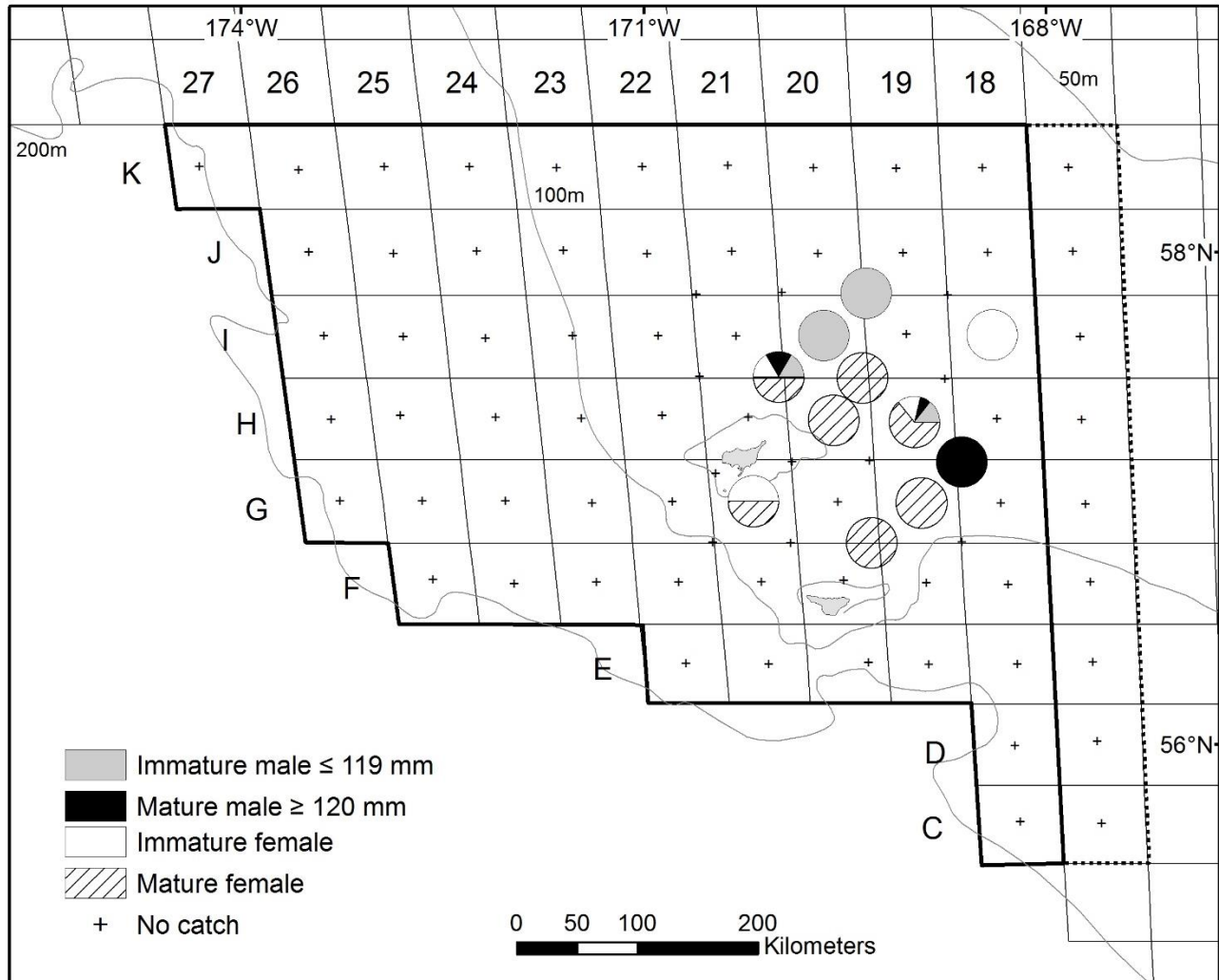
Pribilof Islands Blue King Crab



- 1 - 70
- 71 - 140
- 141 - 210
- 211 - 280
- ★ 964
- + No catch

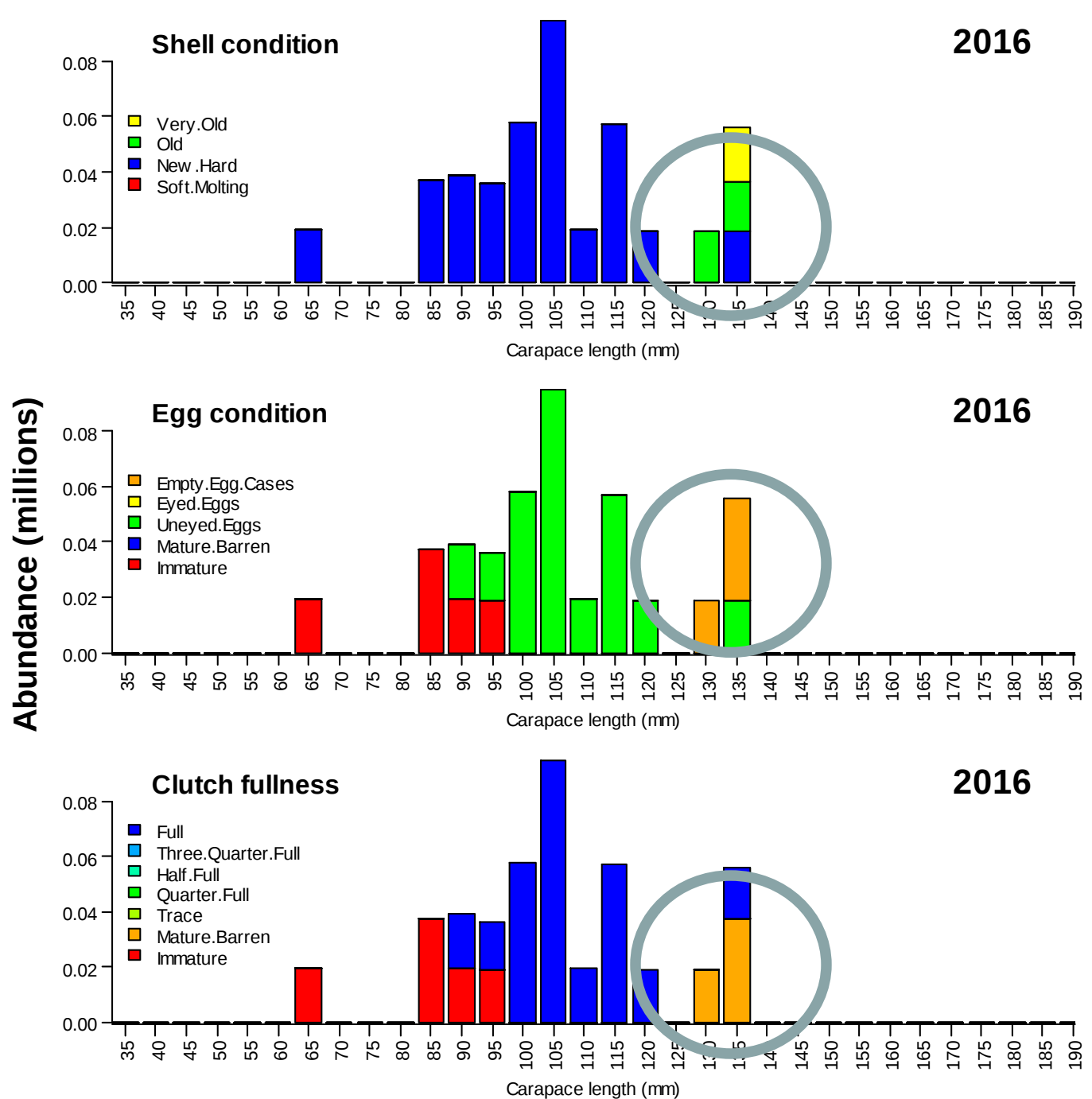
0 50 100 200
Kilometers

Pribilof Islands Blue King Crab

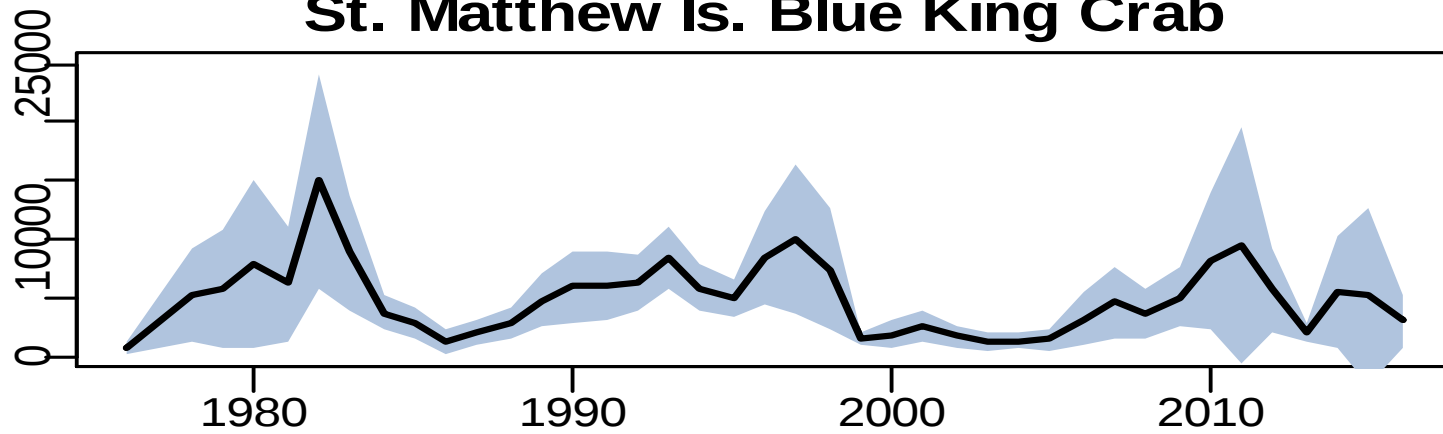


Pribilof Islands

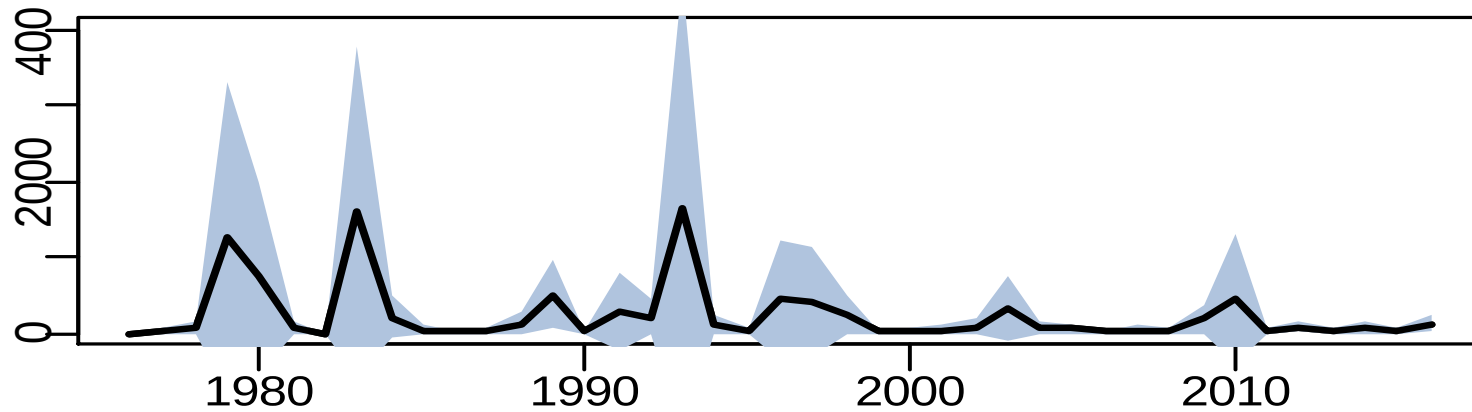
Blue King Crab



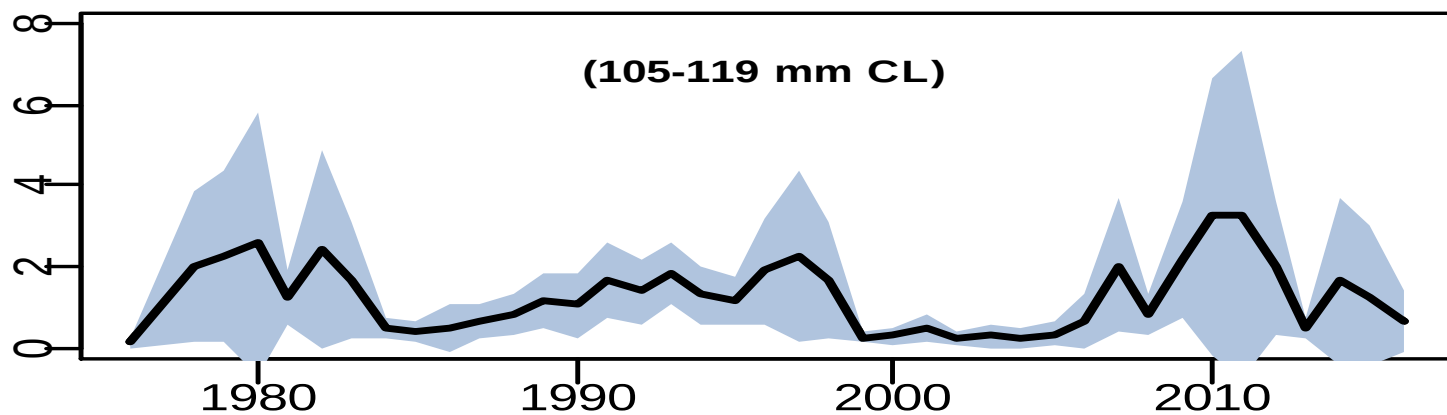
St. Matthew Is. Blue King Crab



Mature
male
biomass (t)
-40%



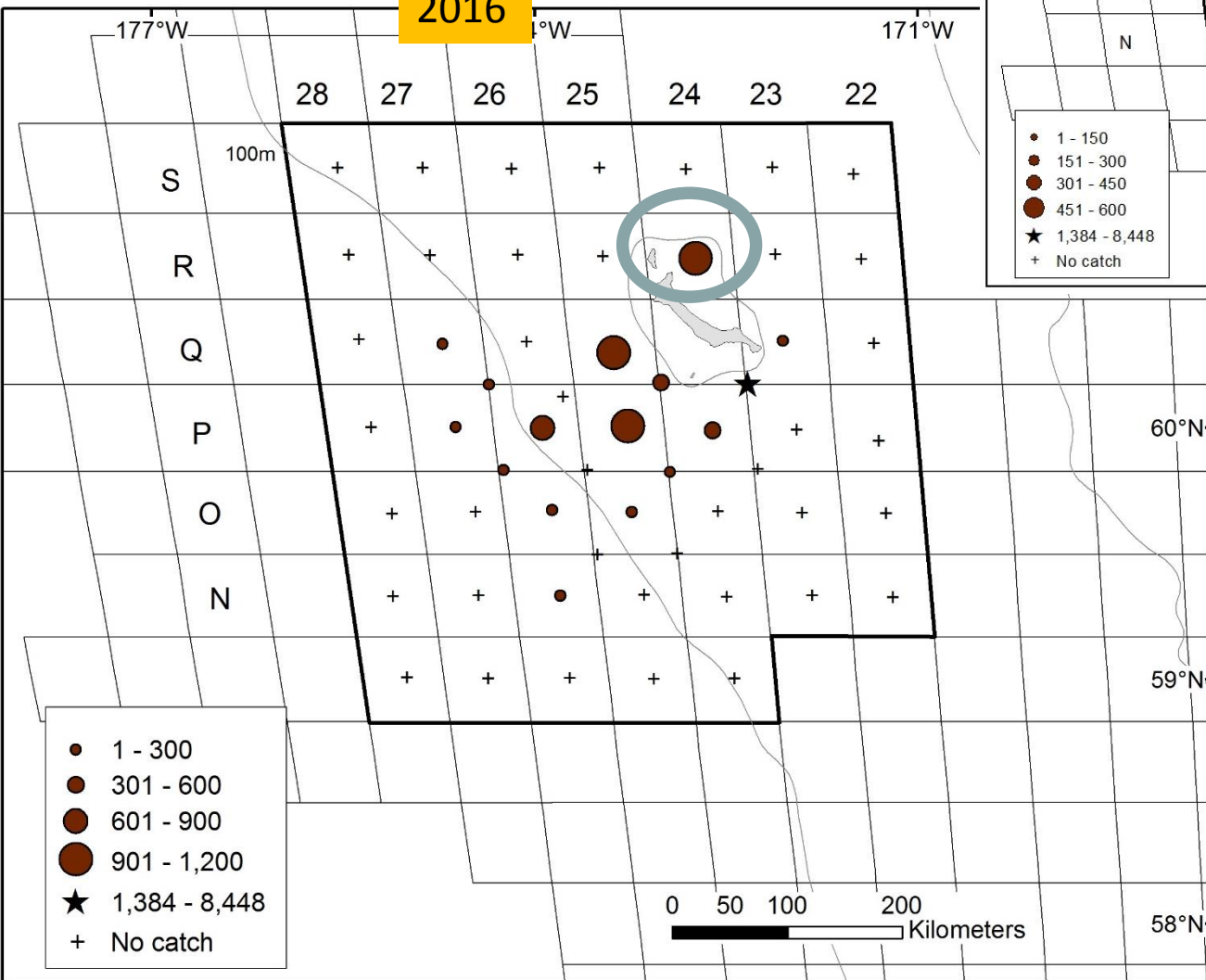
Mature
female
biomass (t)



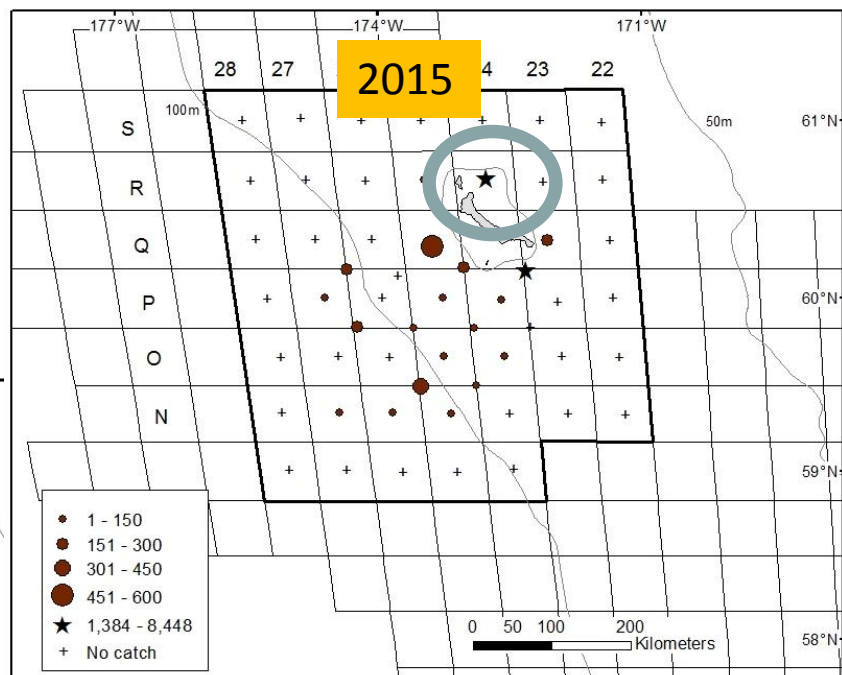
Juvenile
abundance
(millions)

St Matthew Island blue king crab

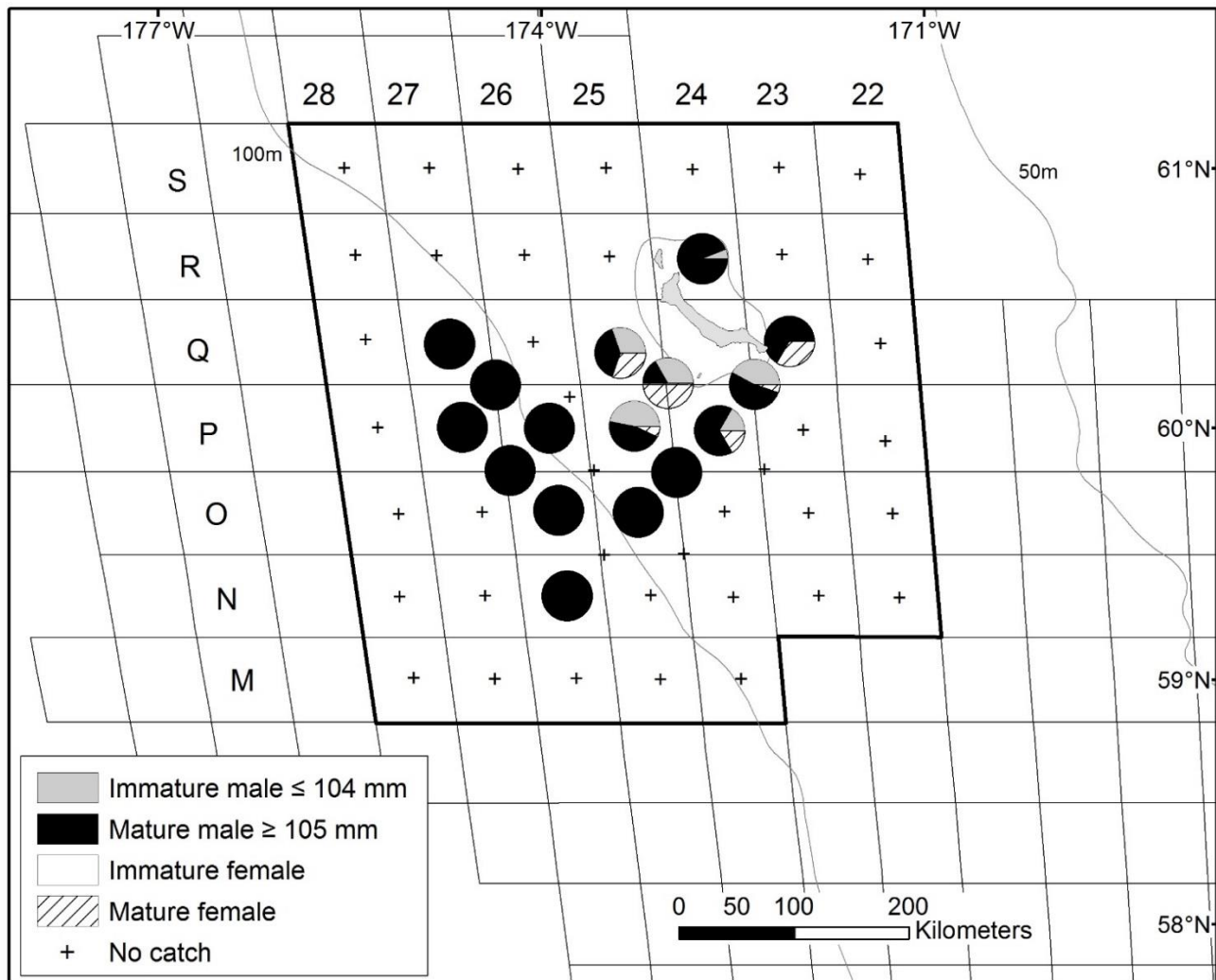
2016



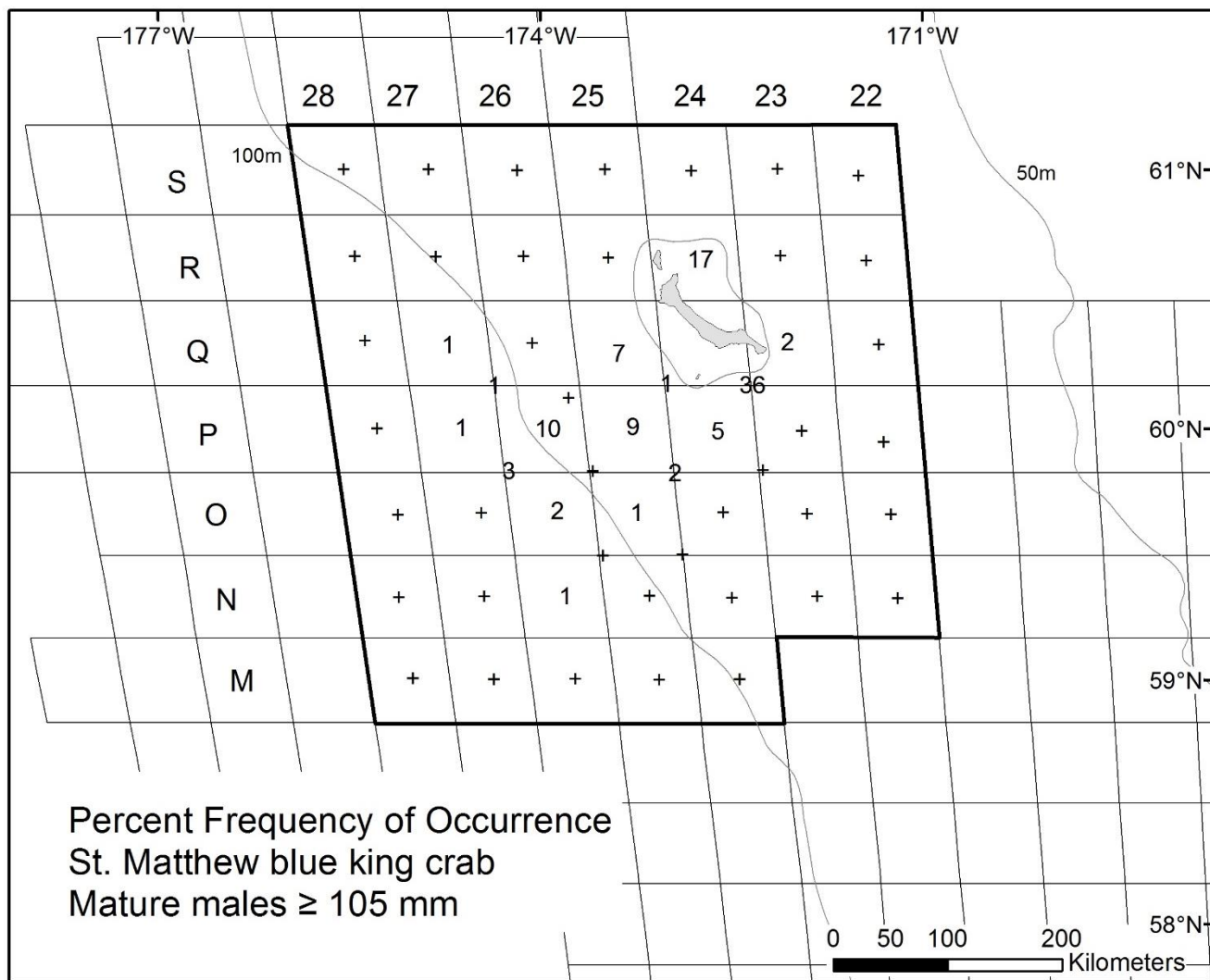
2015



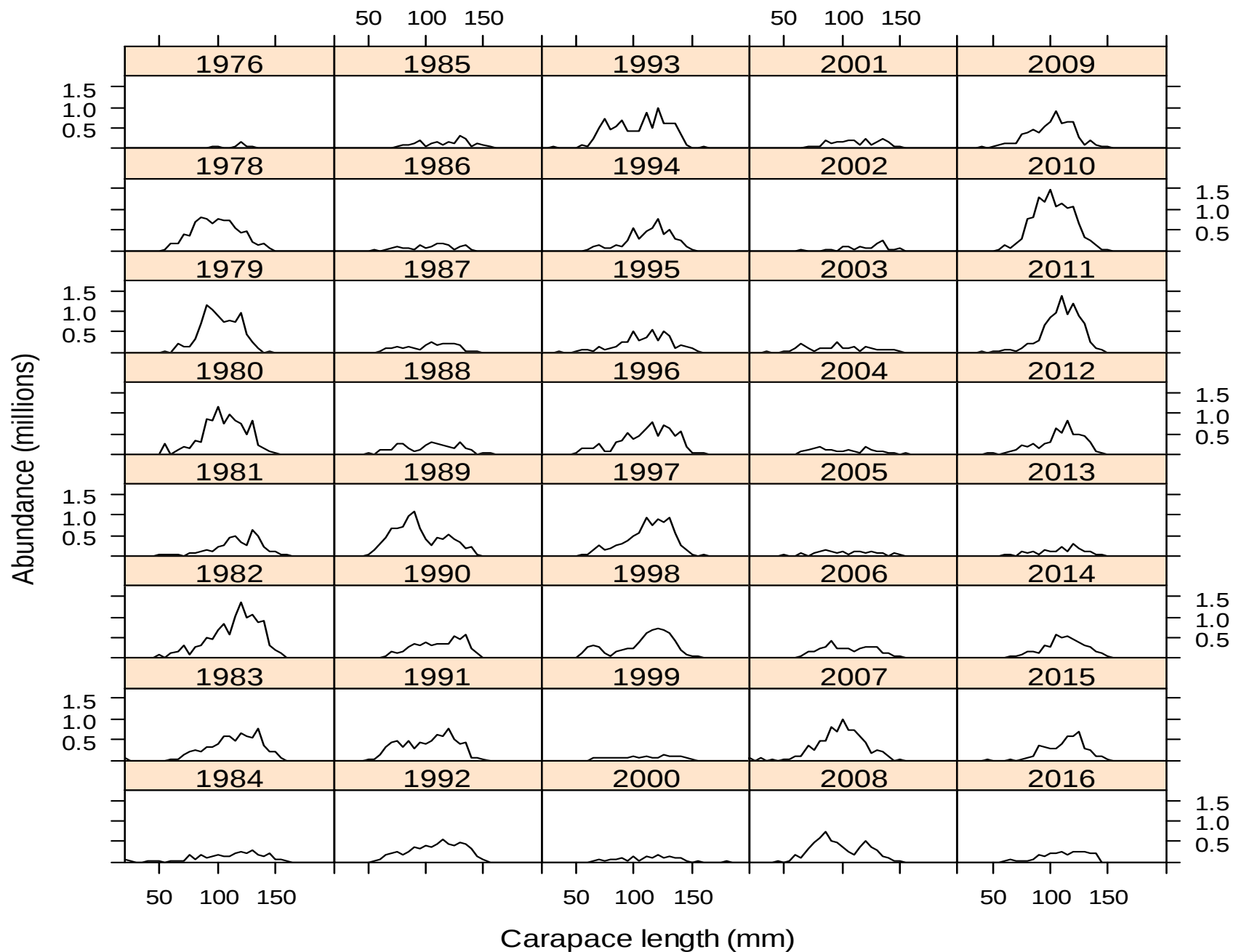
St Matthew Island blue king crab



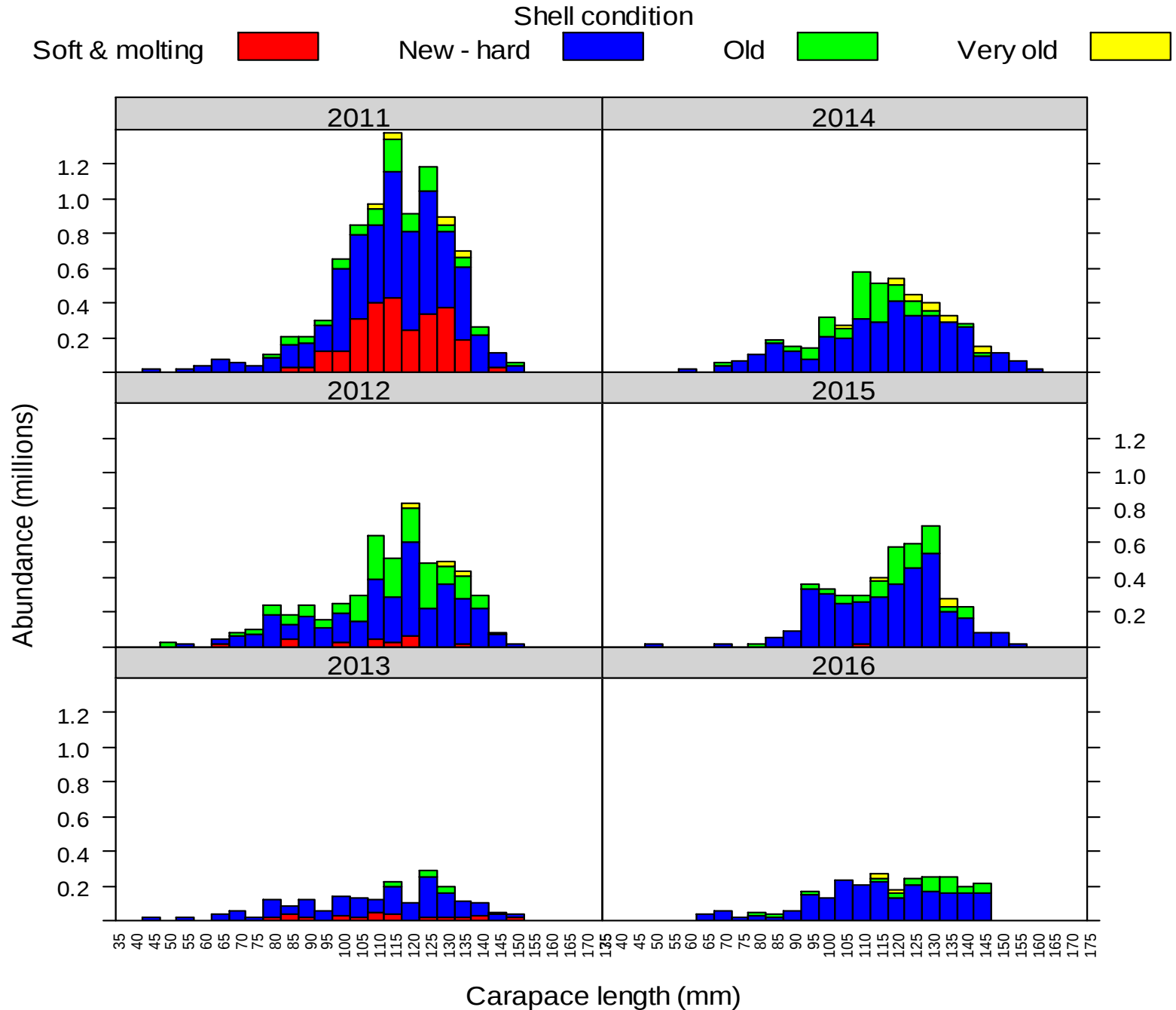
St Matthew Island blue king crab



St. Matthew Island Blue King Crab (male)

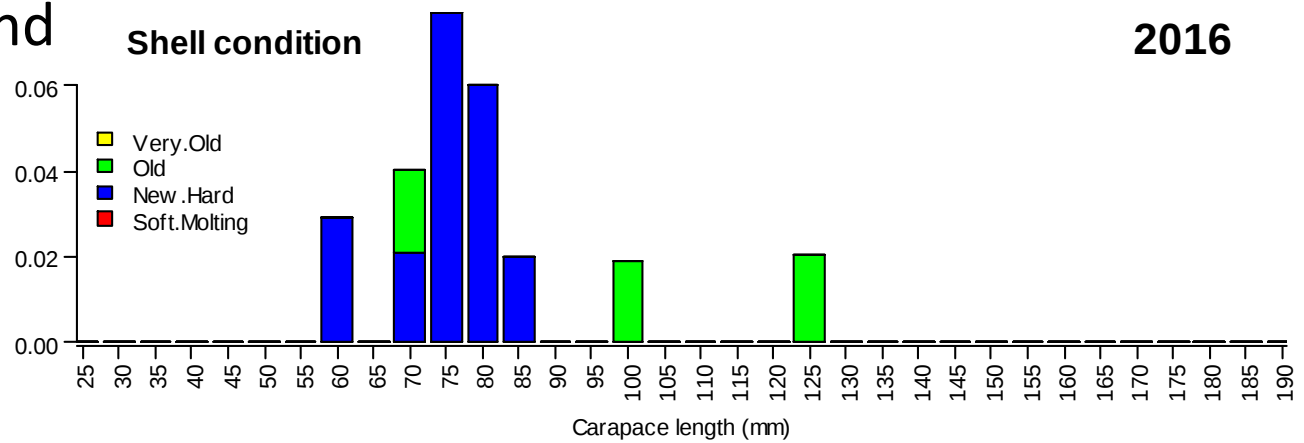


St. Matthew Island Blue King Crab (male)

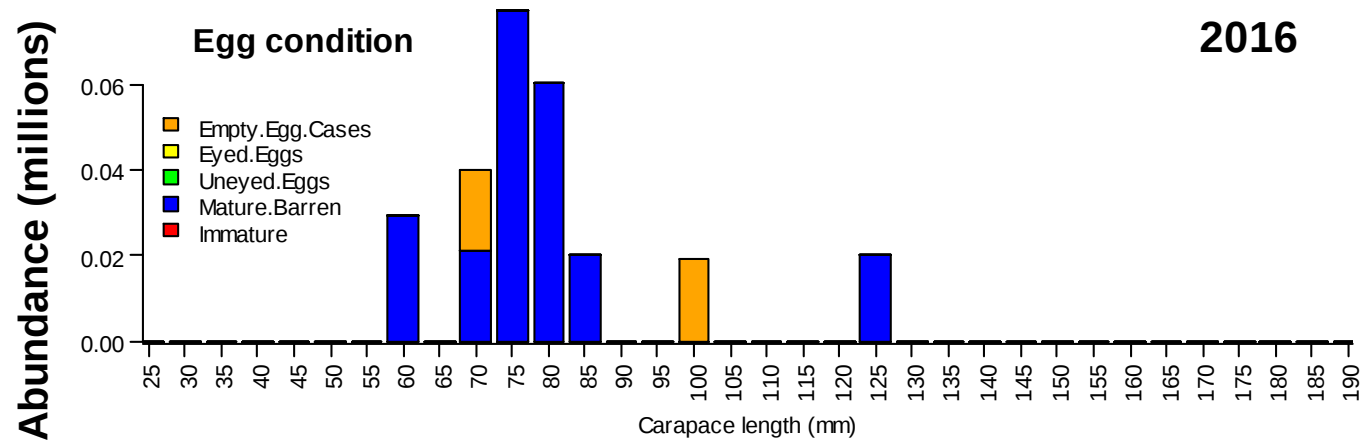


St Matthew Island
blue king crab 0.06

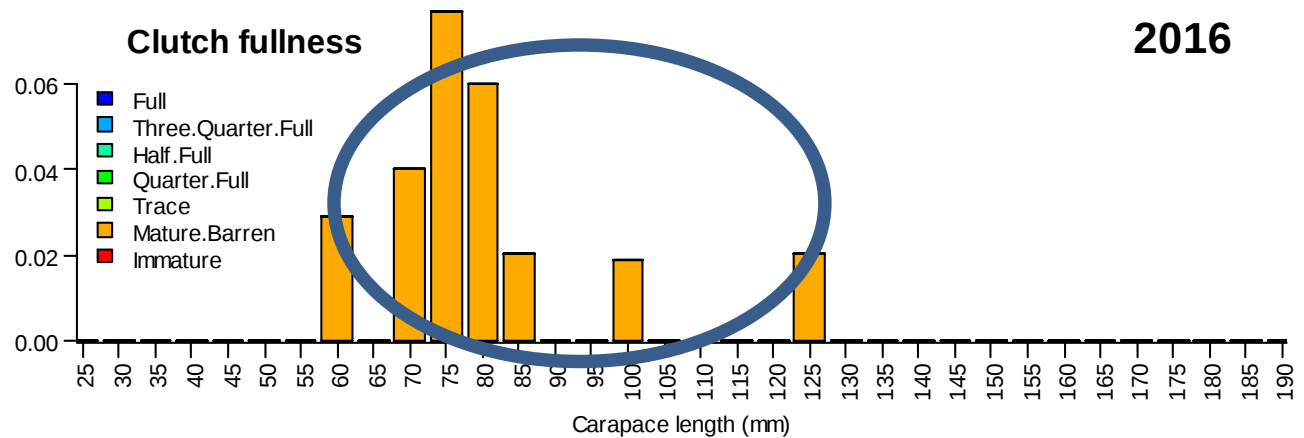
2016



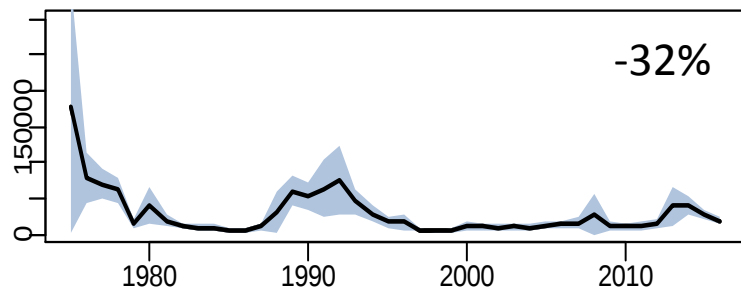
2016



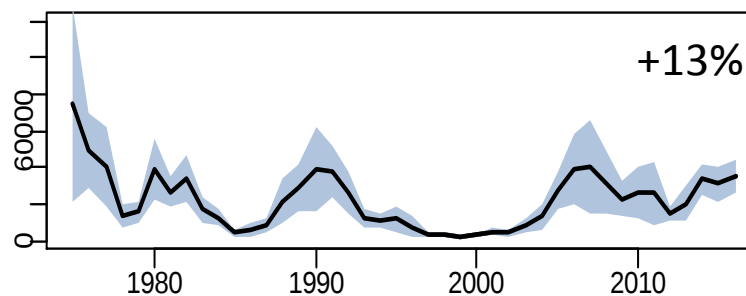
2016



Tanner Crab east of 166° W

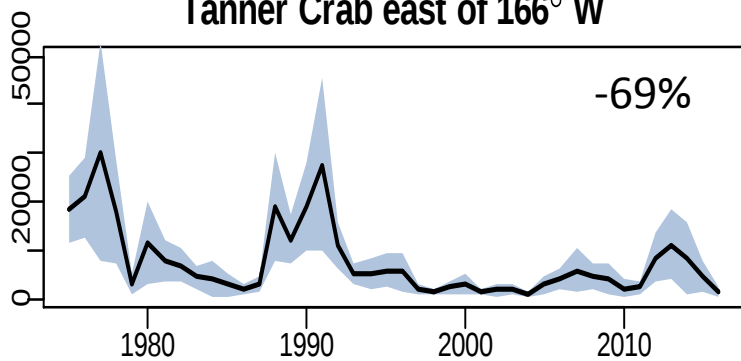


Tanner Crab west of 166° W

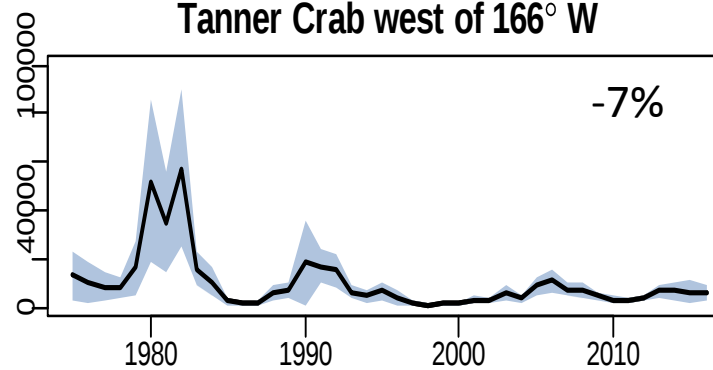


Mature
male
biomass (t)

Tanner Crab east of 166° W

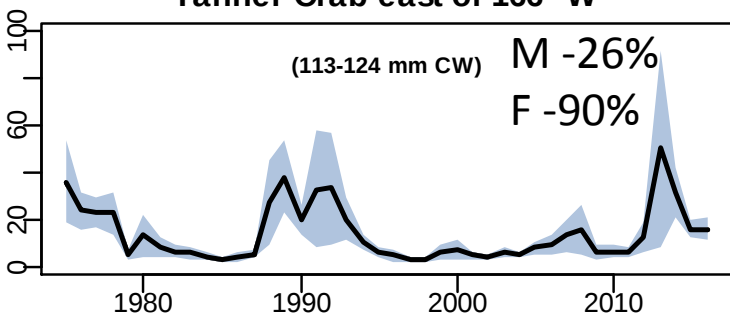


Tanner Crab west of 166° W

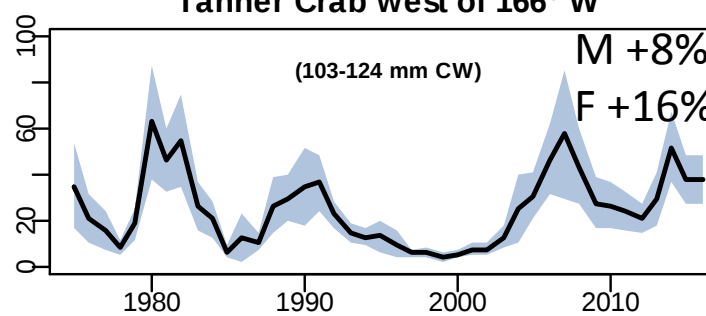


Mature
females
biomass (t)

Tanner Crab east of 166° W

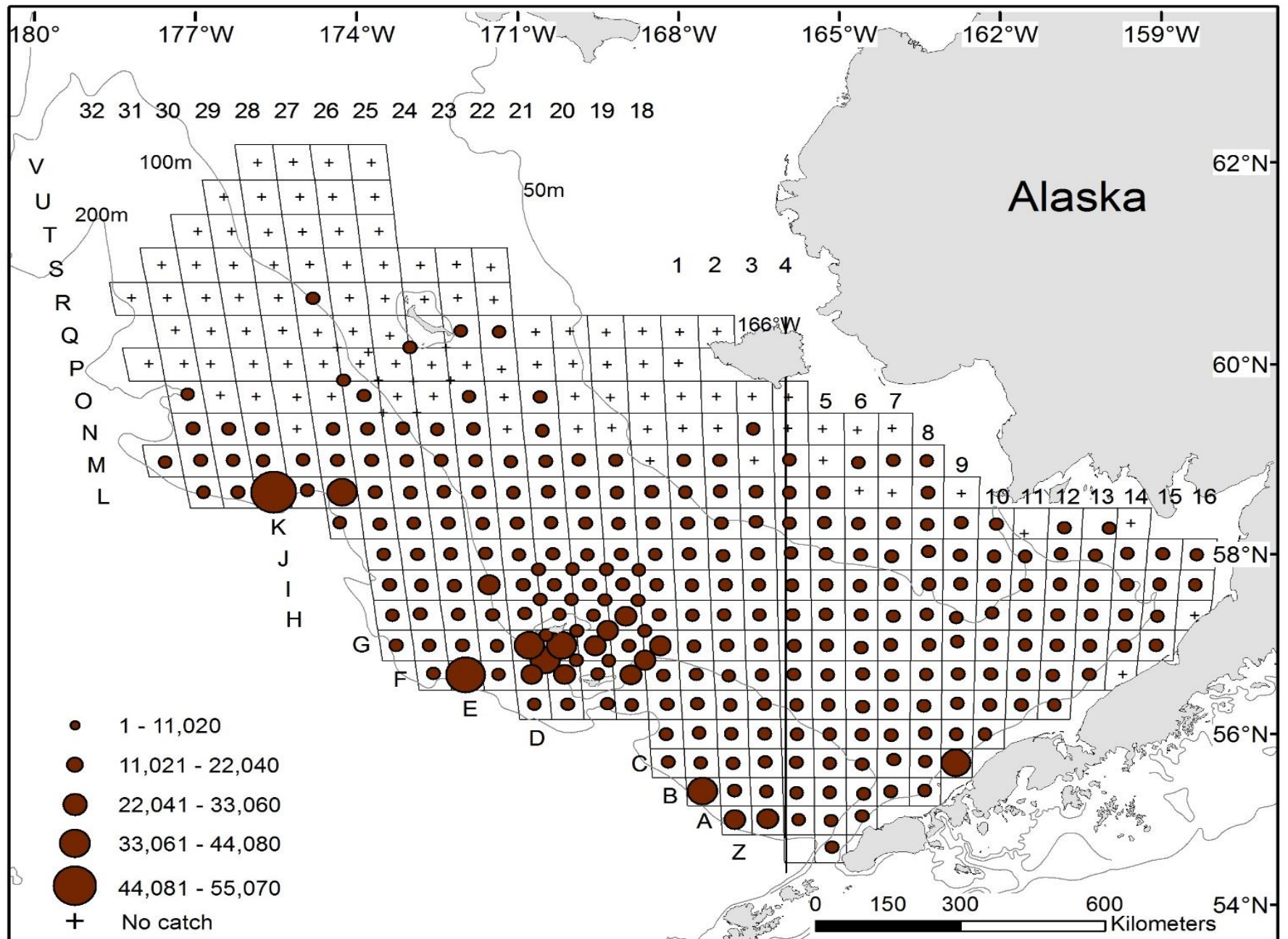


Tanner Crab west of 166° W

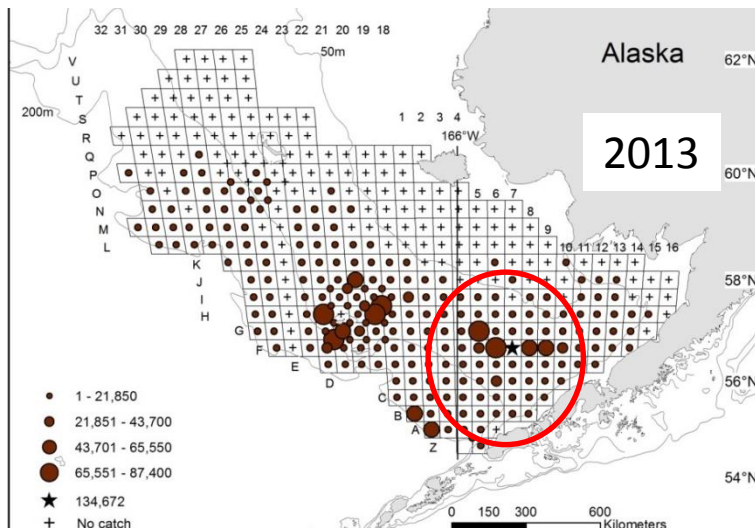
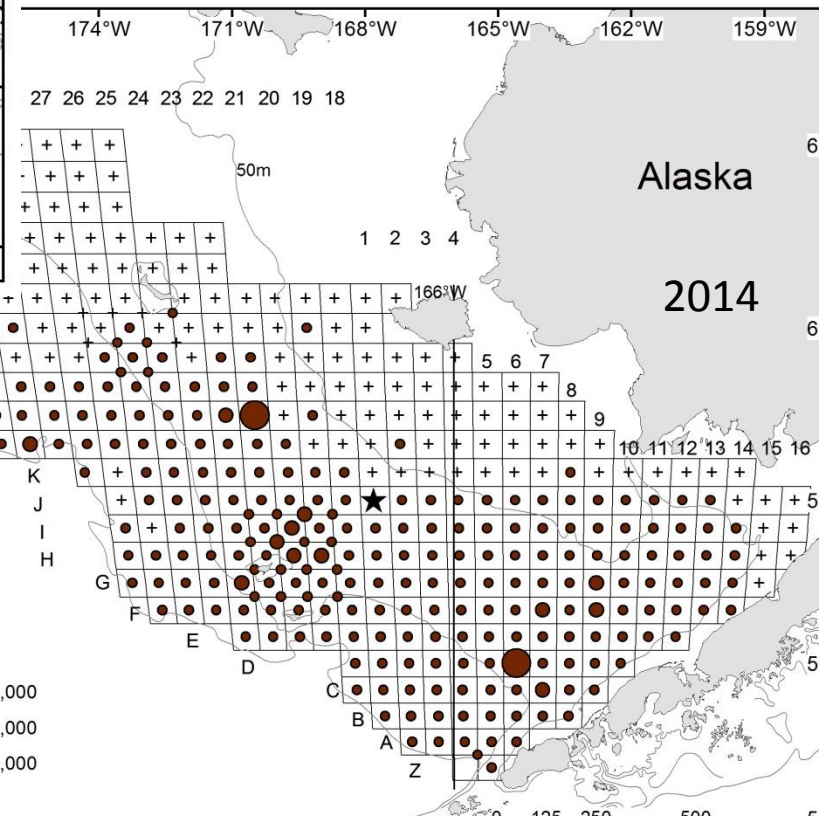
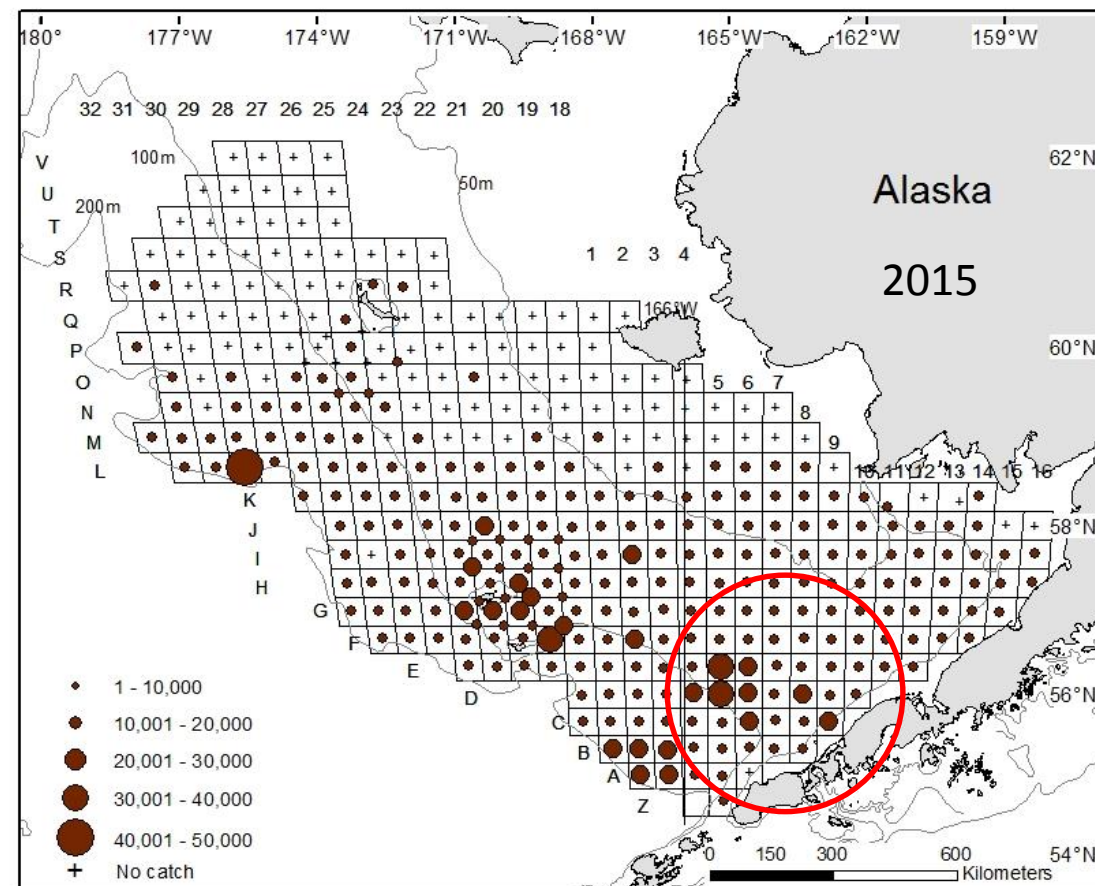


Juvenile
abundance
(millions)

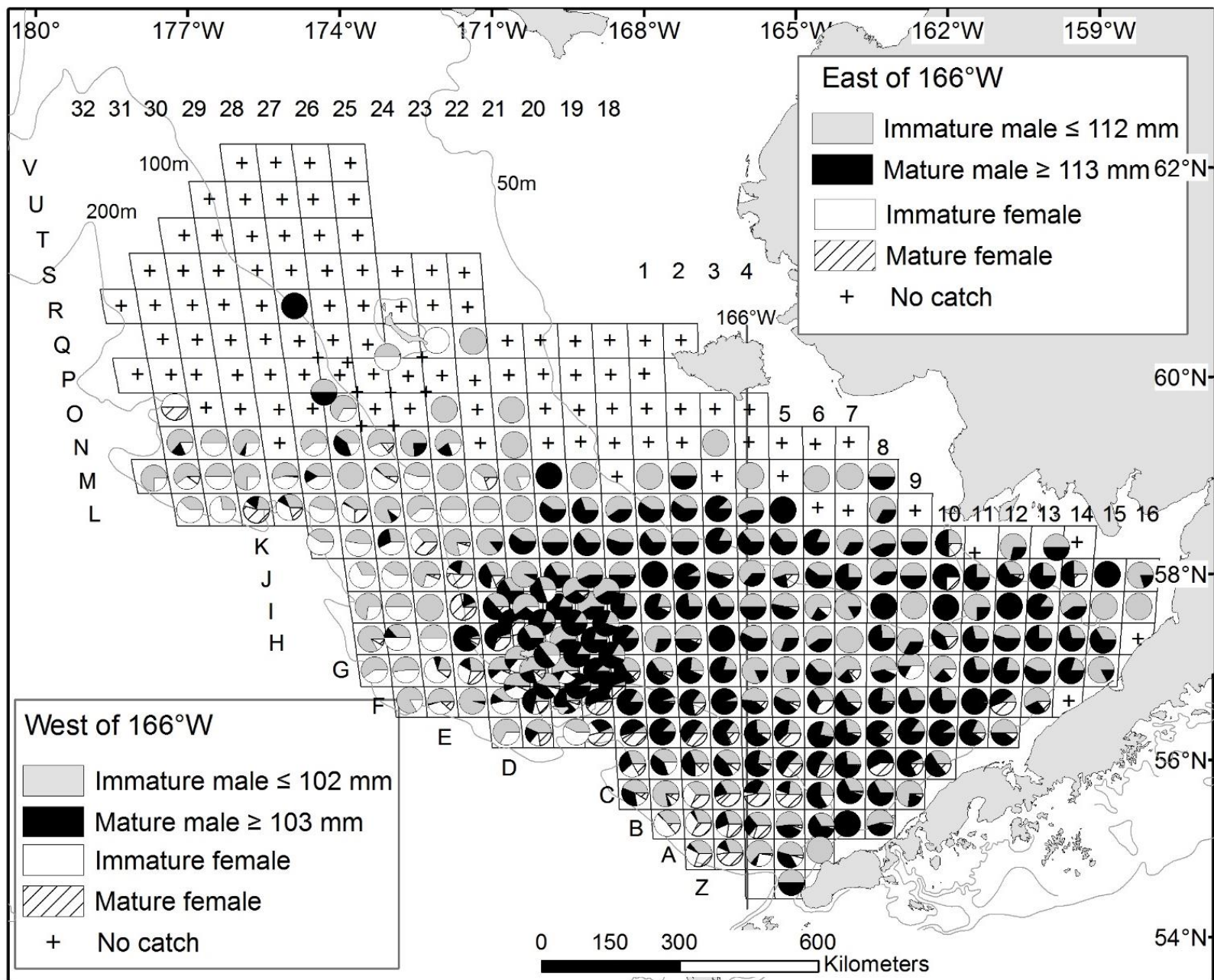
Tanner crab (*Chionoecetes bairdi*) total density



Tanner crab (*Chionoecetes bairdi*) total density



Tanner crab



Tanner Crab east of 166°W (male)

Shell condition

Soft & molting



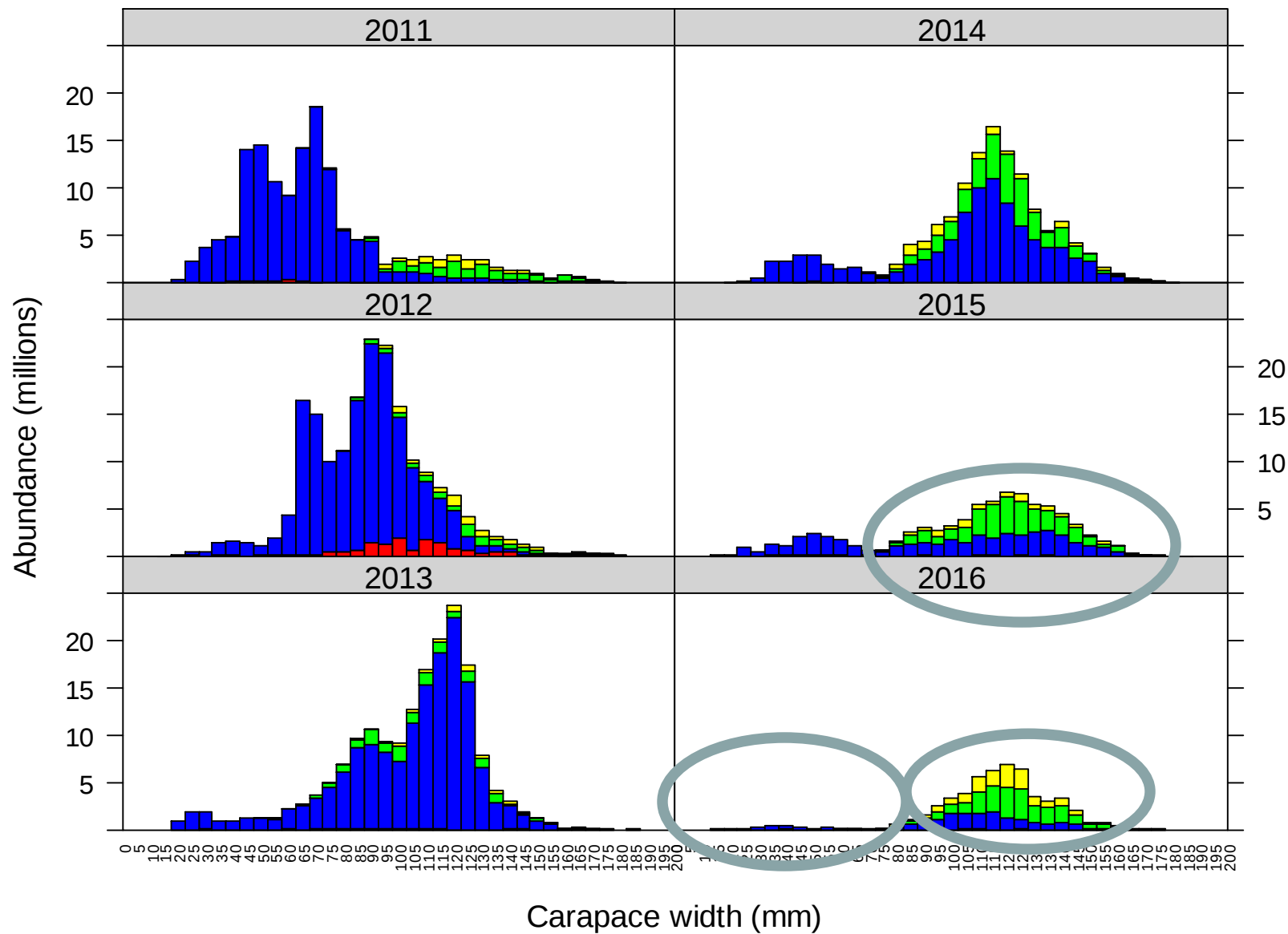
New - hard



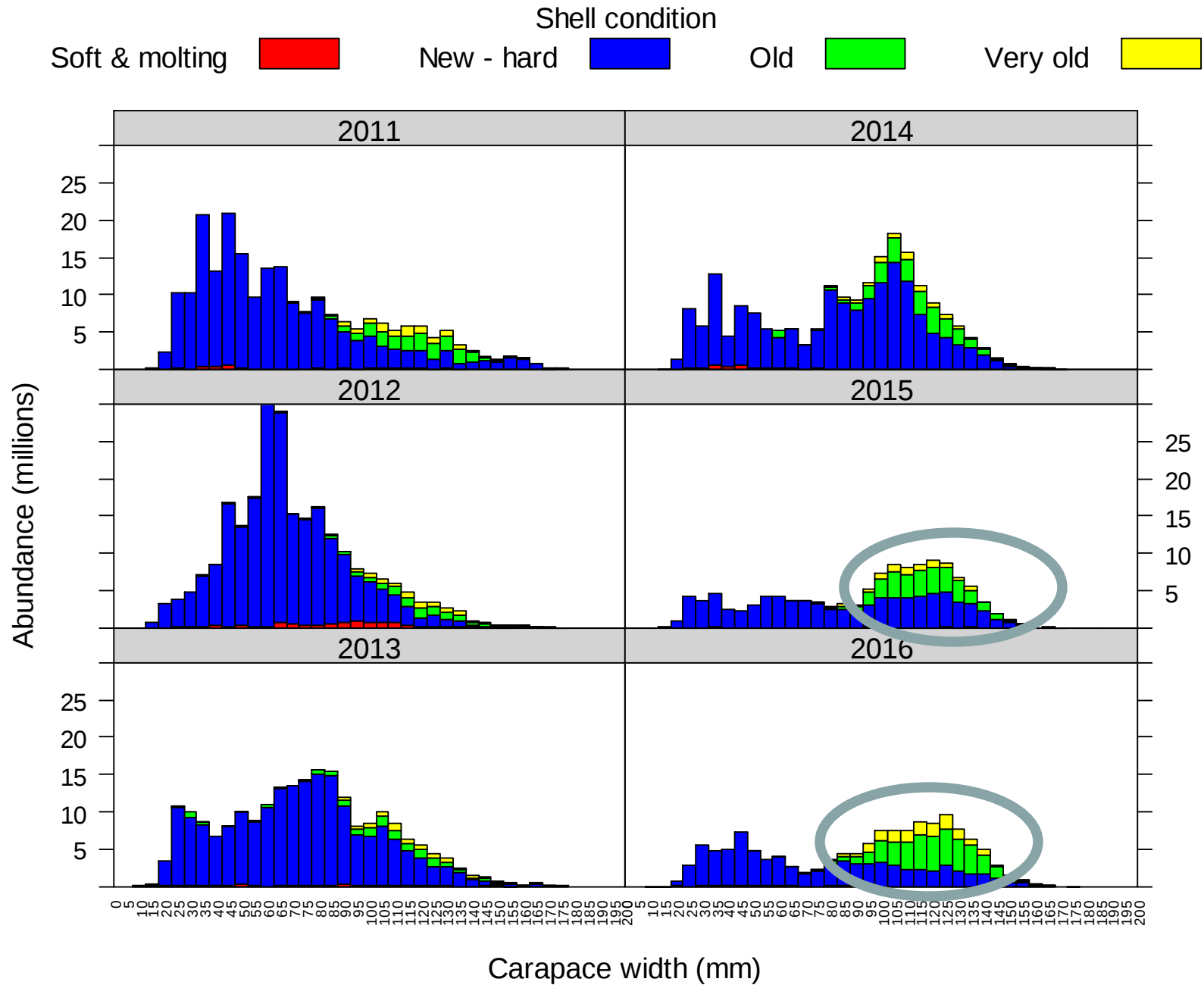
Old

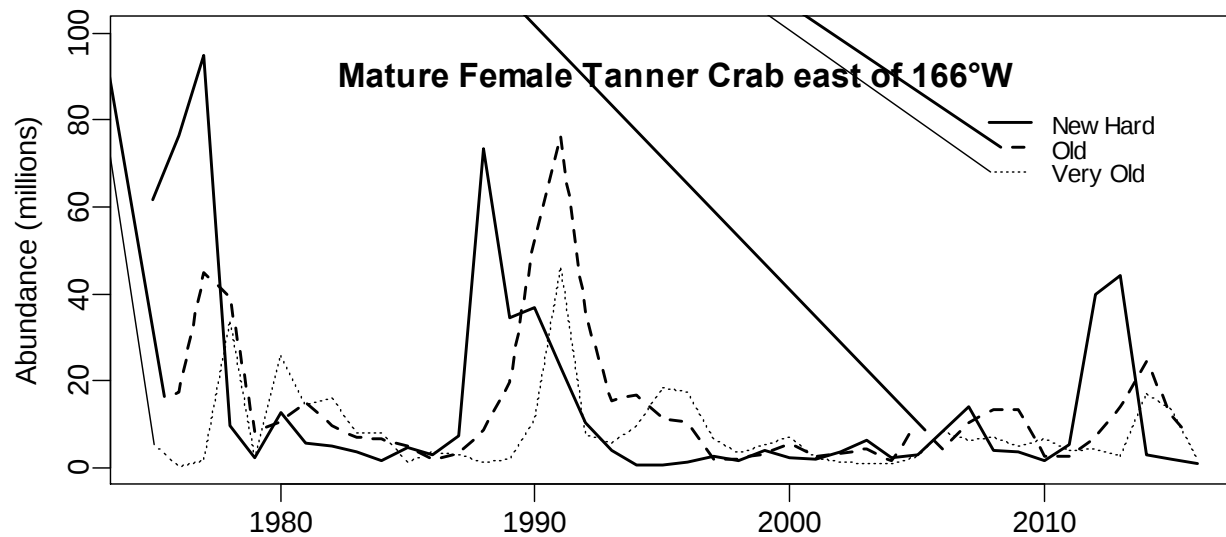
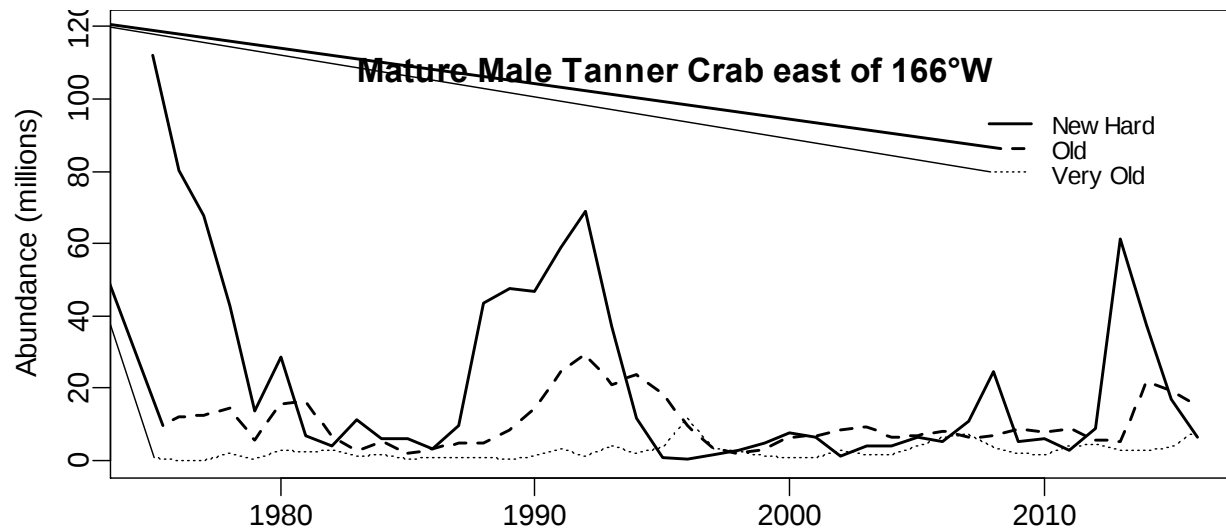


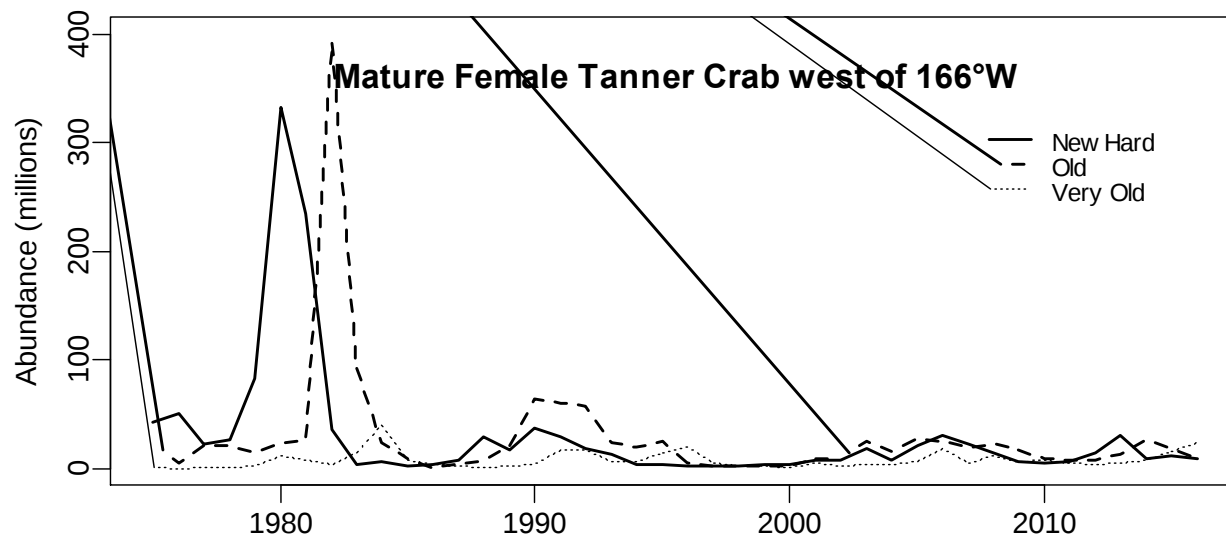
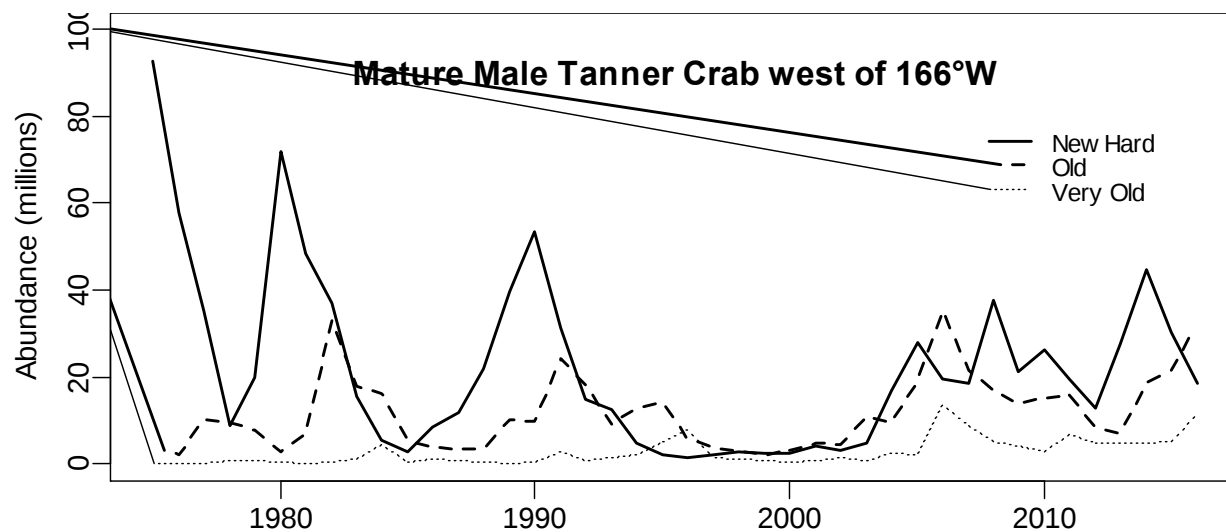
Very old

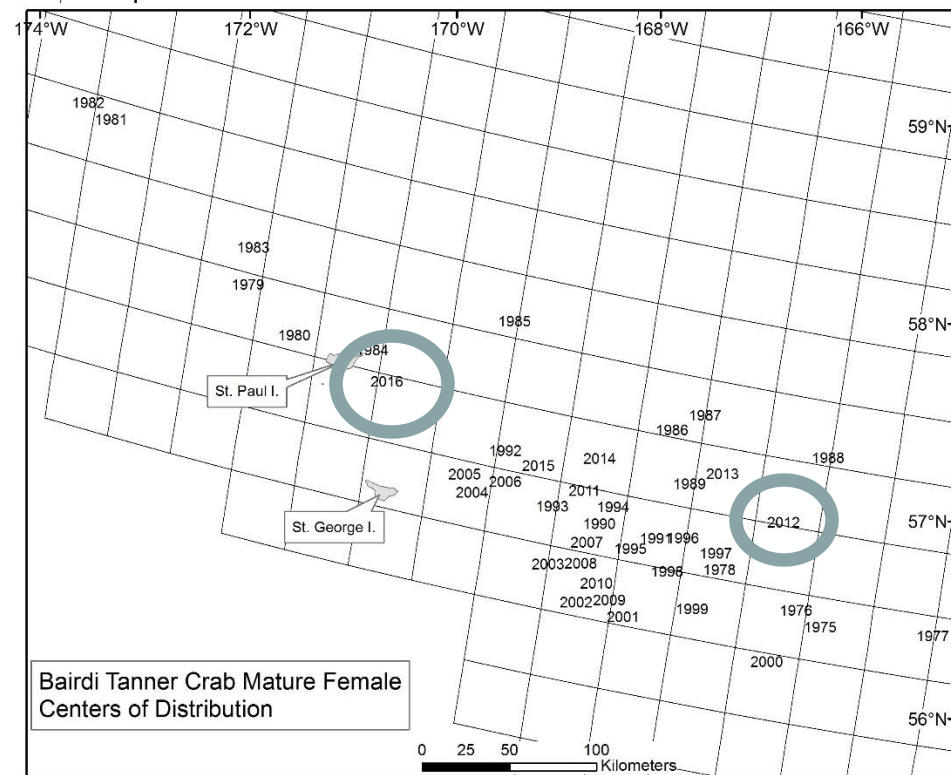
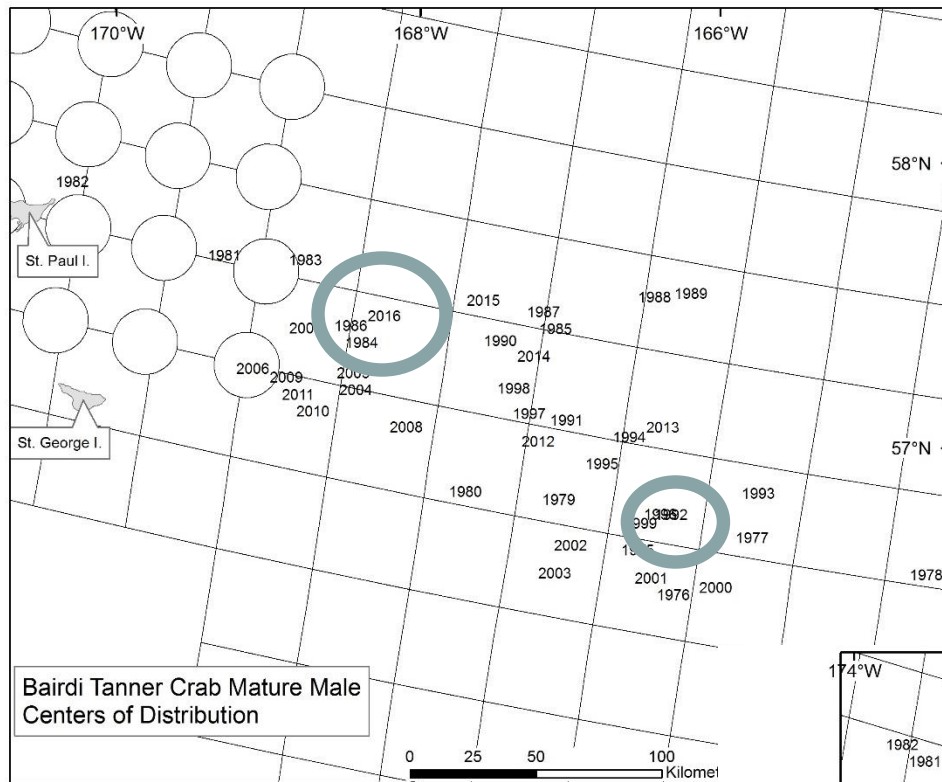


Tanner Crab west of 166°W (male)

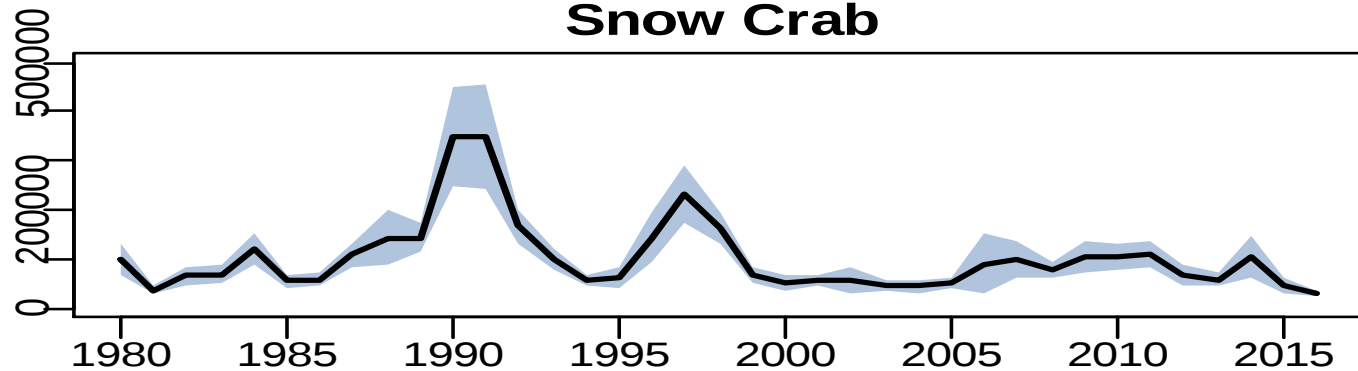




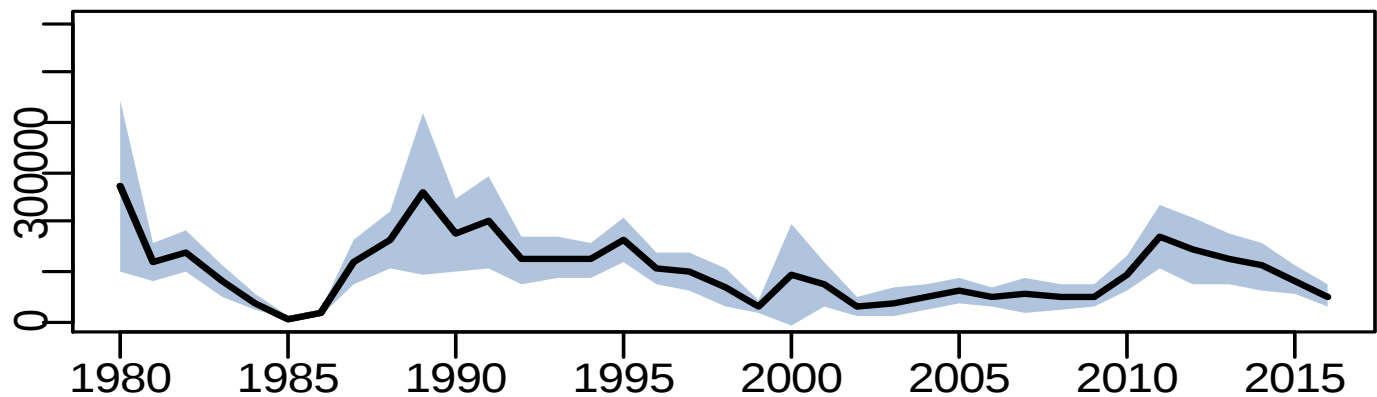




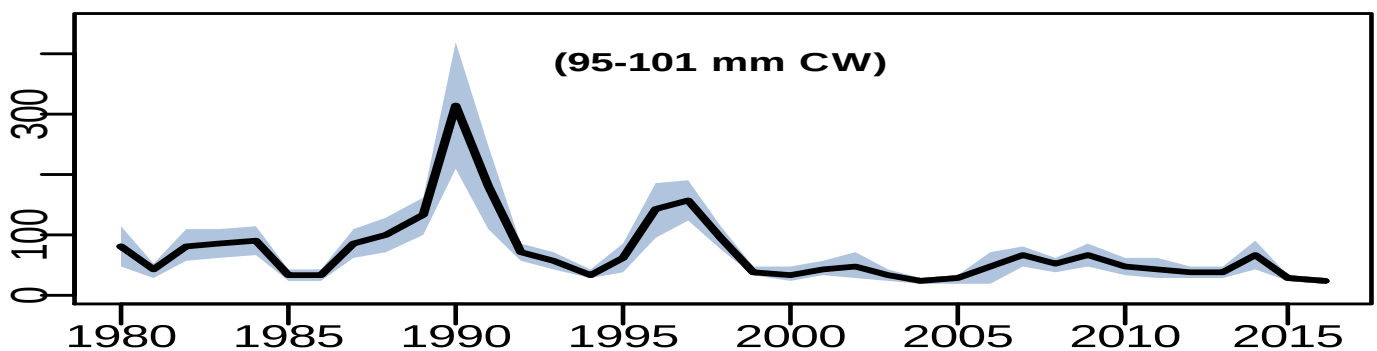
Snow Crab



Mature
male
biomass (t)
-35%



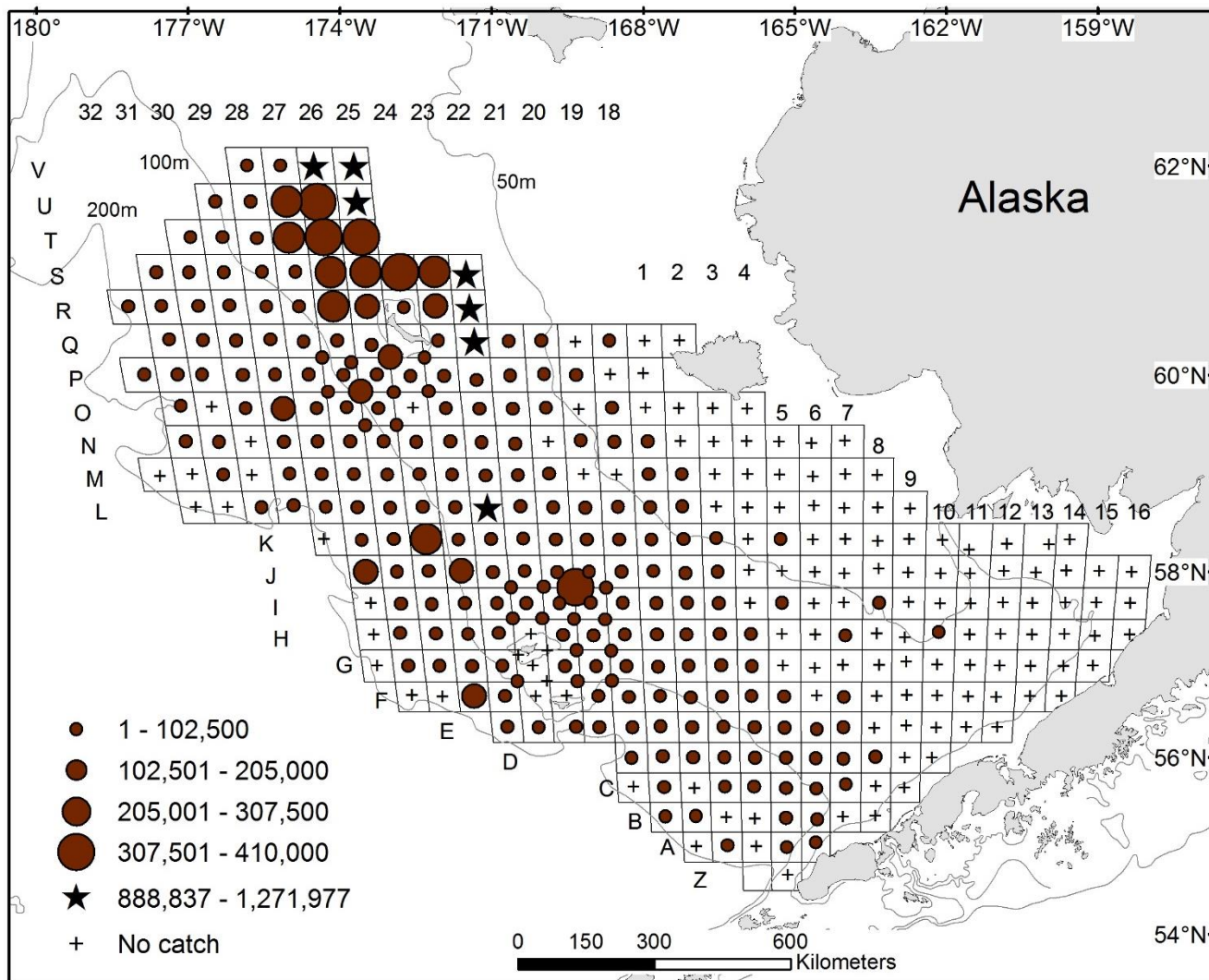
Mature
female
biomass (t)
-60%

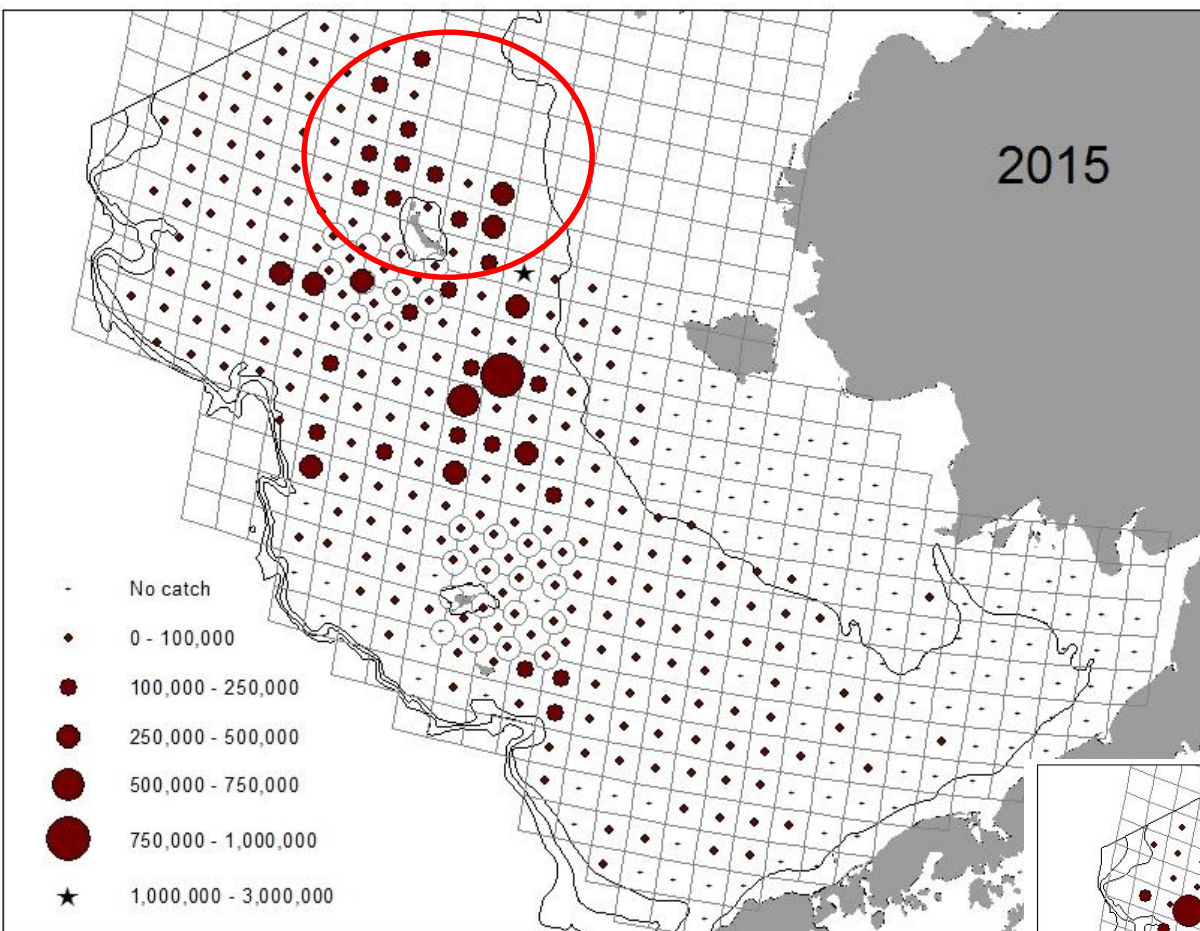


(95-101 mm CW)

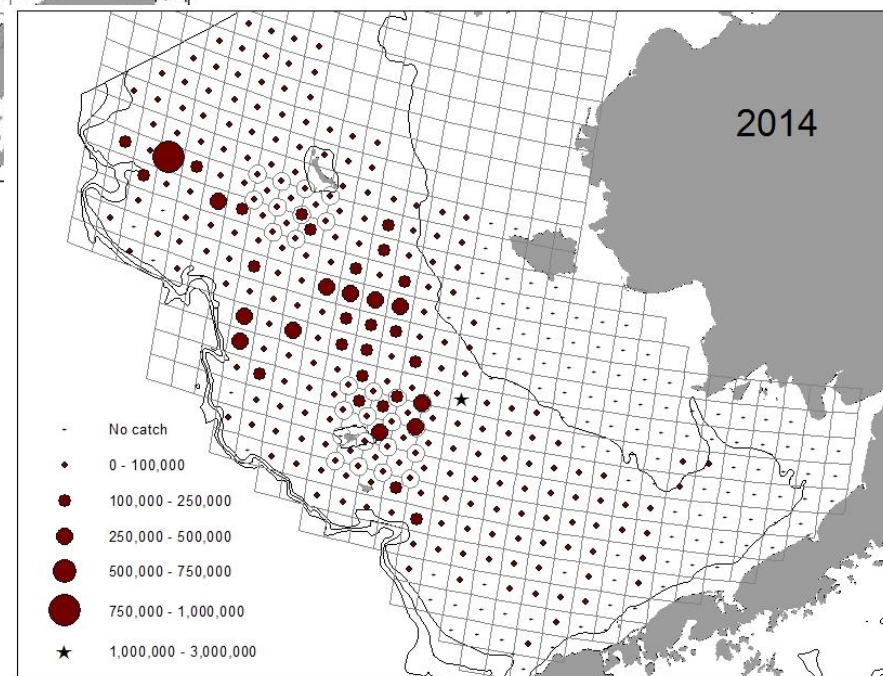
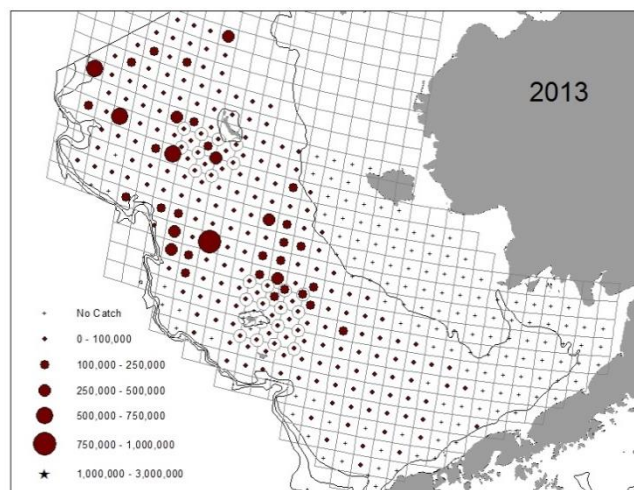
Juvenile
abundance
(millions)
Male +57%
Female +46%

snow crab (*Chionoecetes opilio*) total density

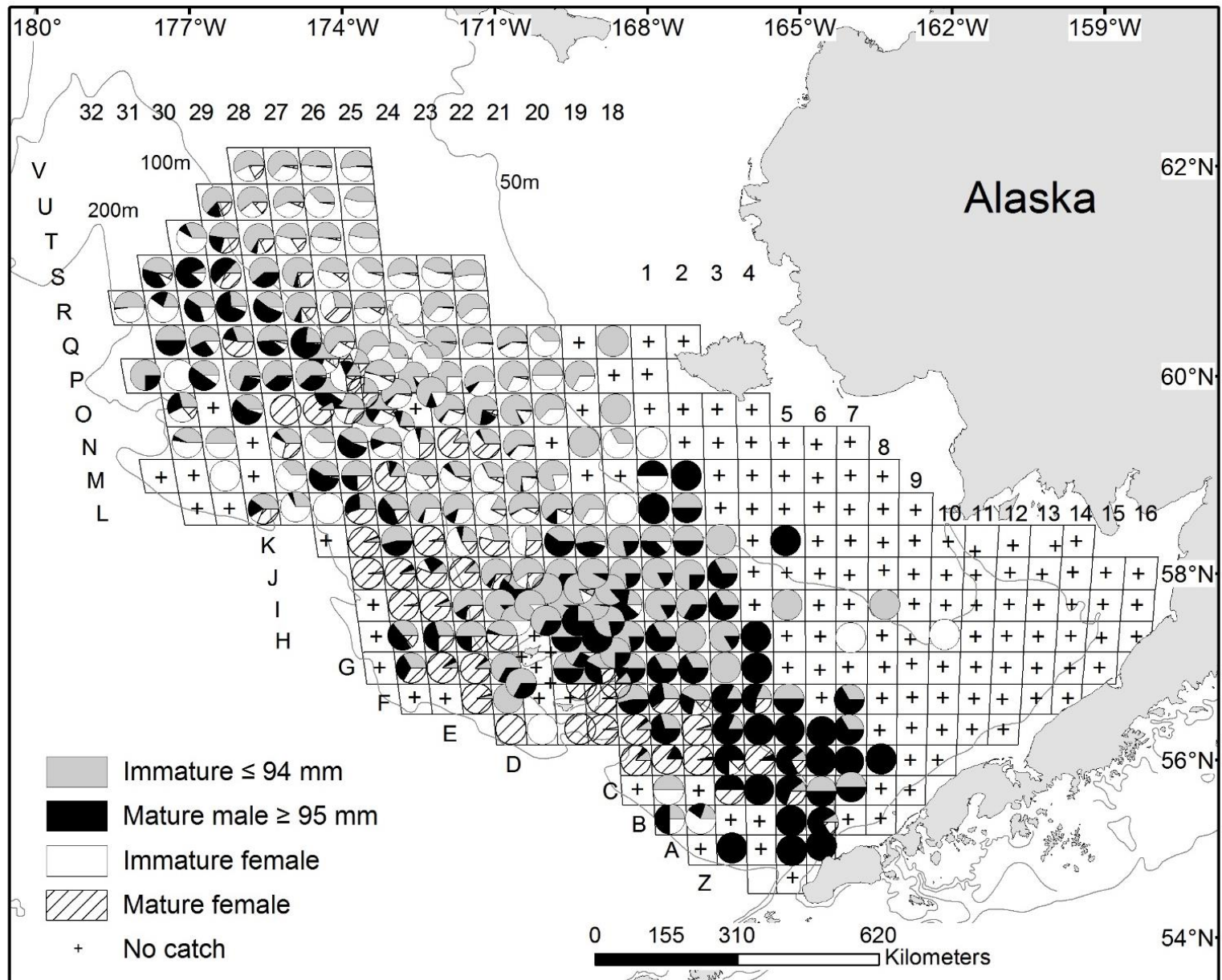




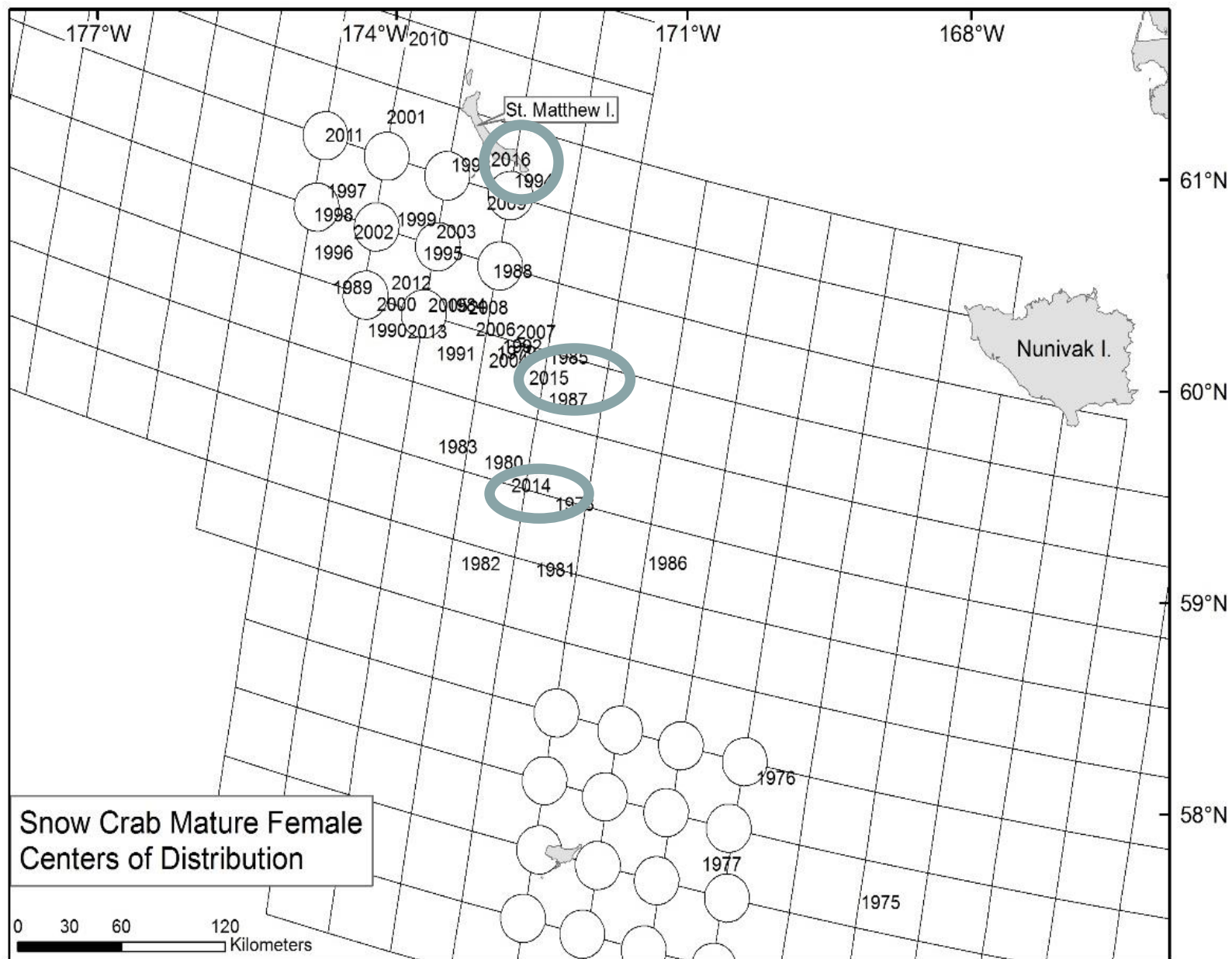
snow crab (*Chionoecetes opilio*)
total density



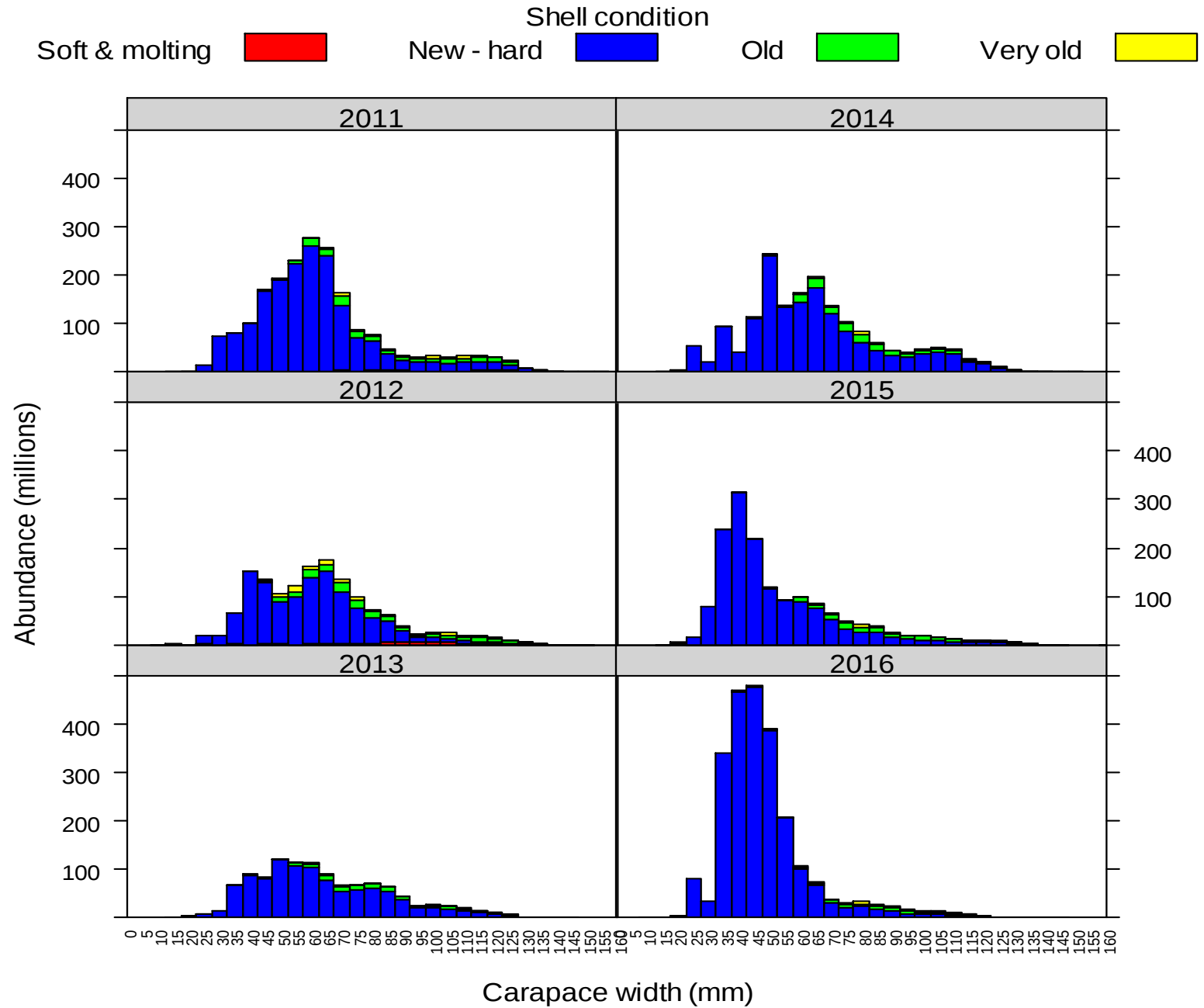
snow crab



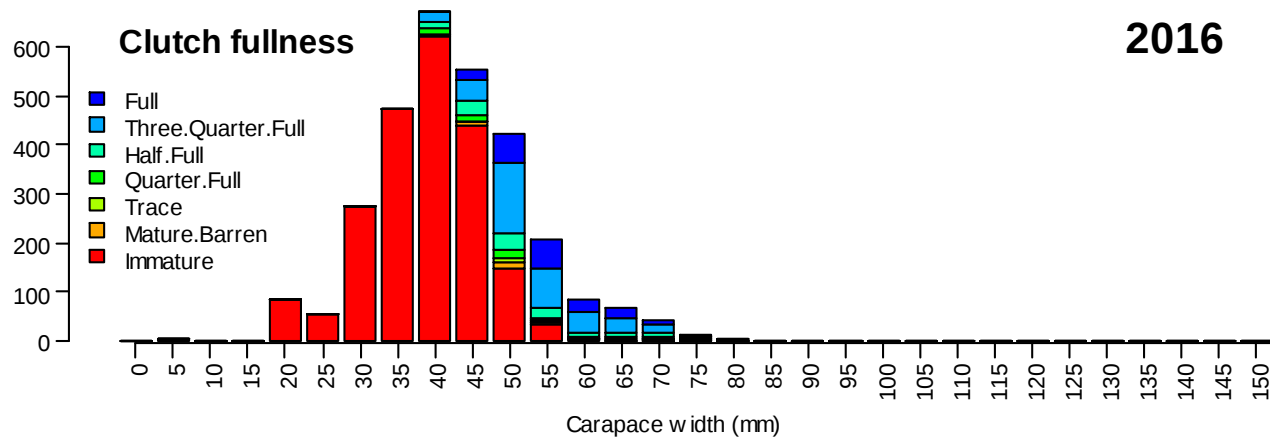
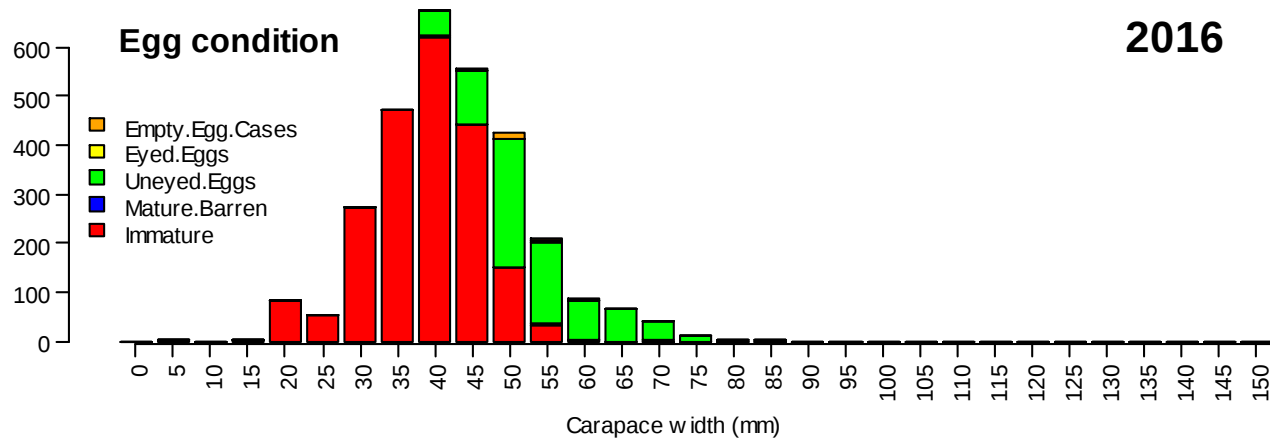
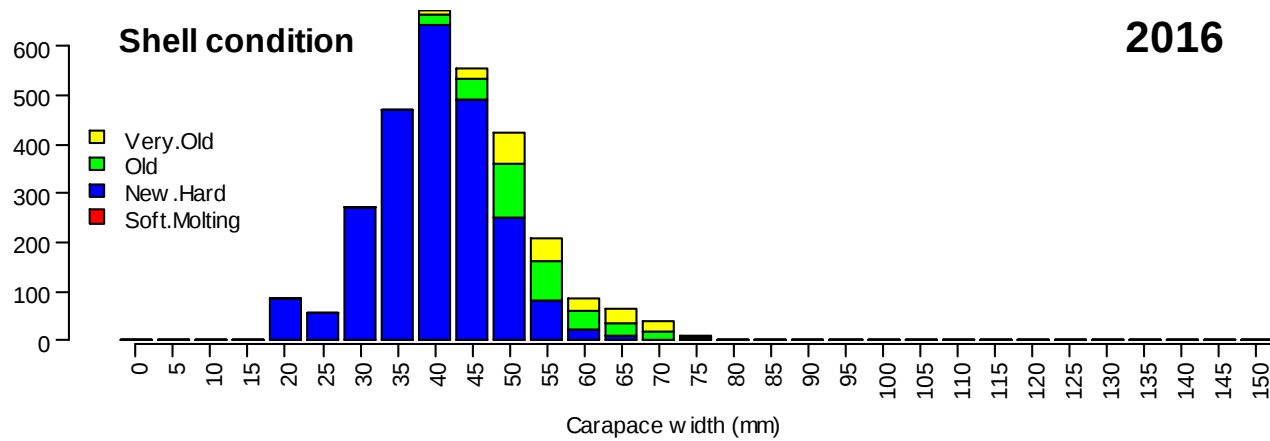
snow crab (*Chionoecetes opilio*)

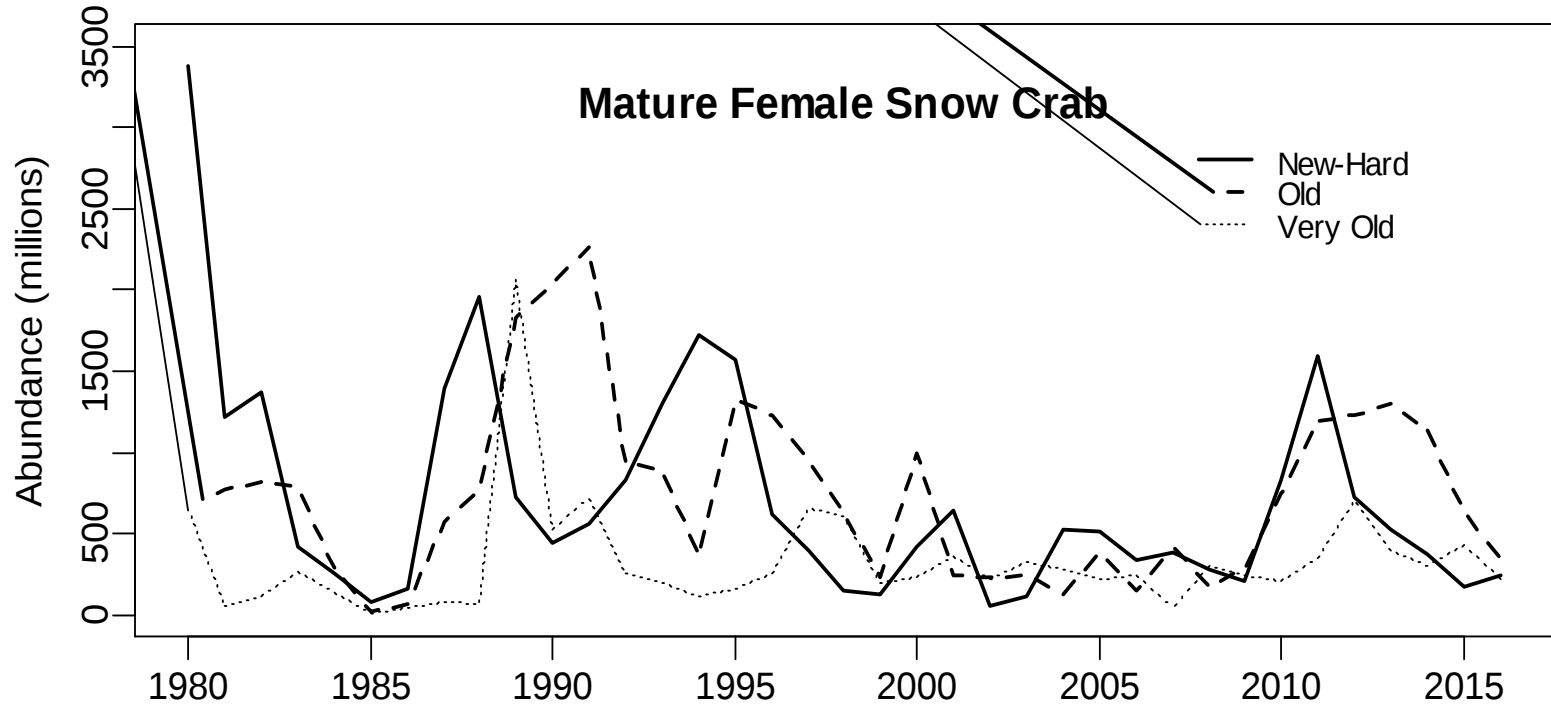
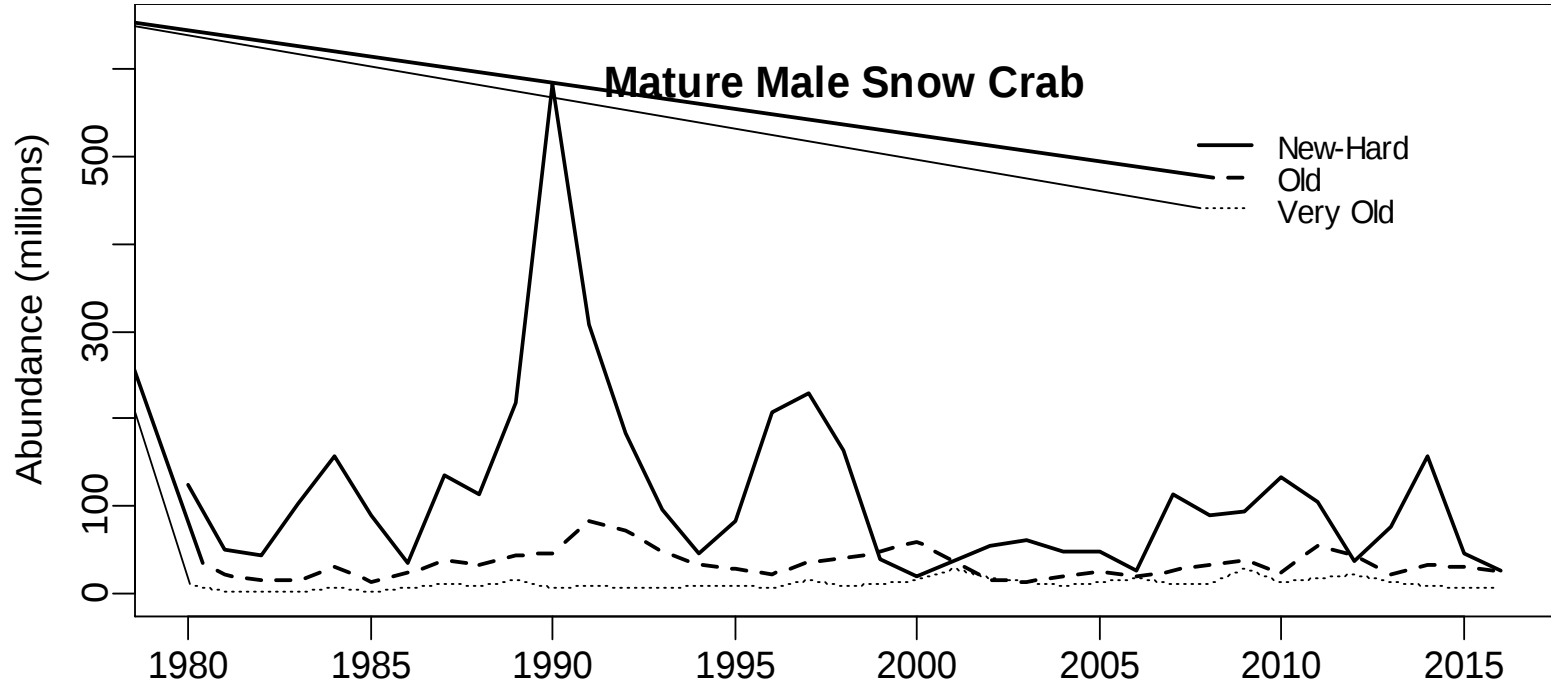


Snow Crab (male)



Abundance (millions)

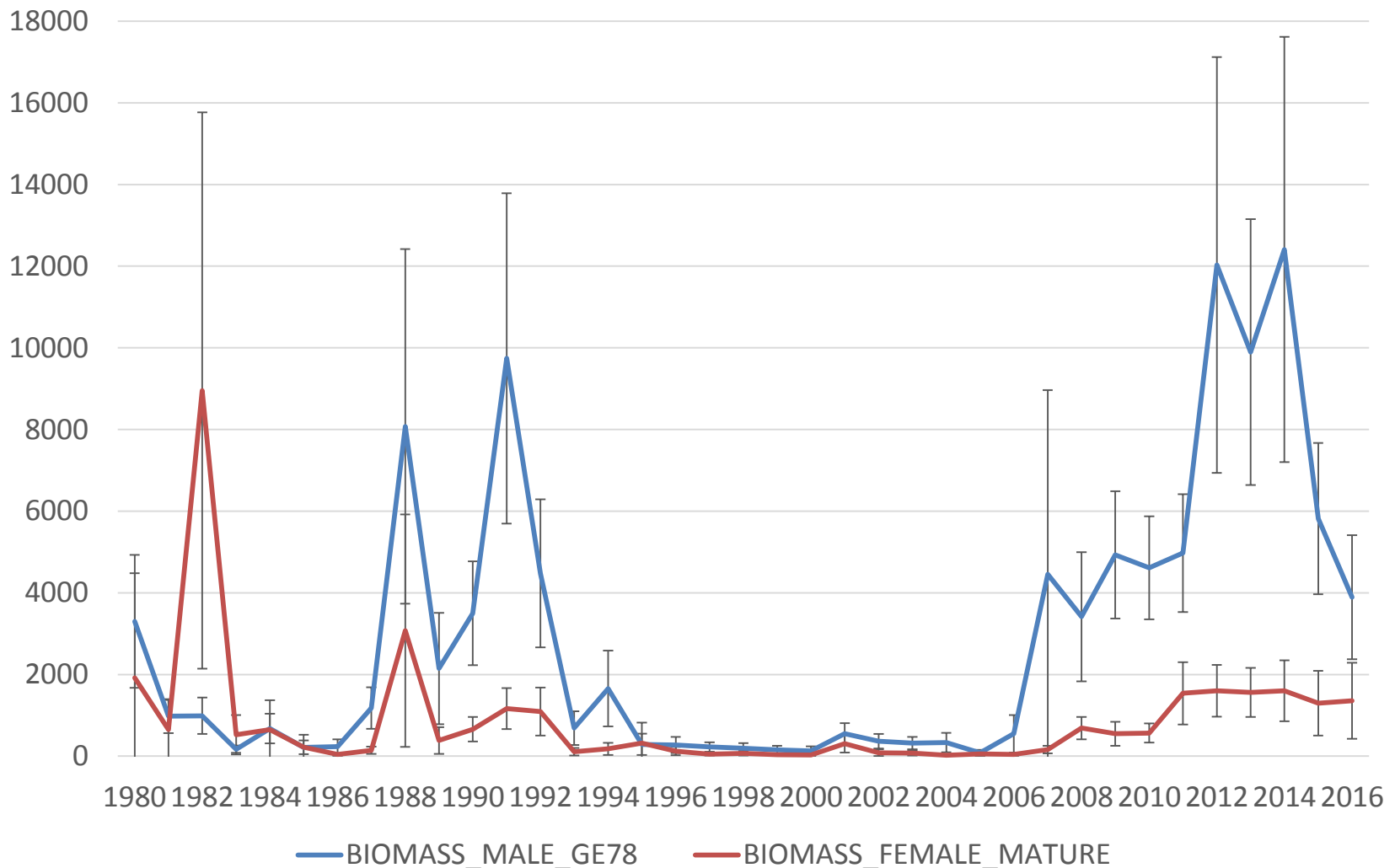




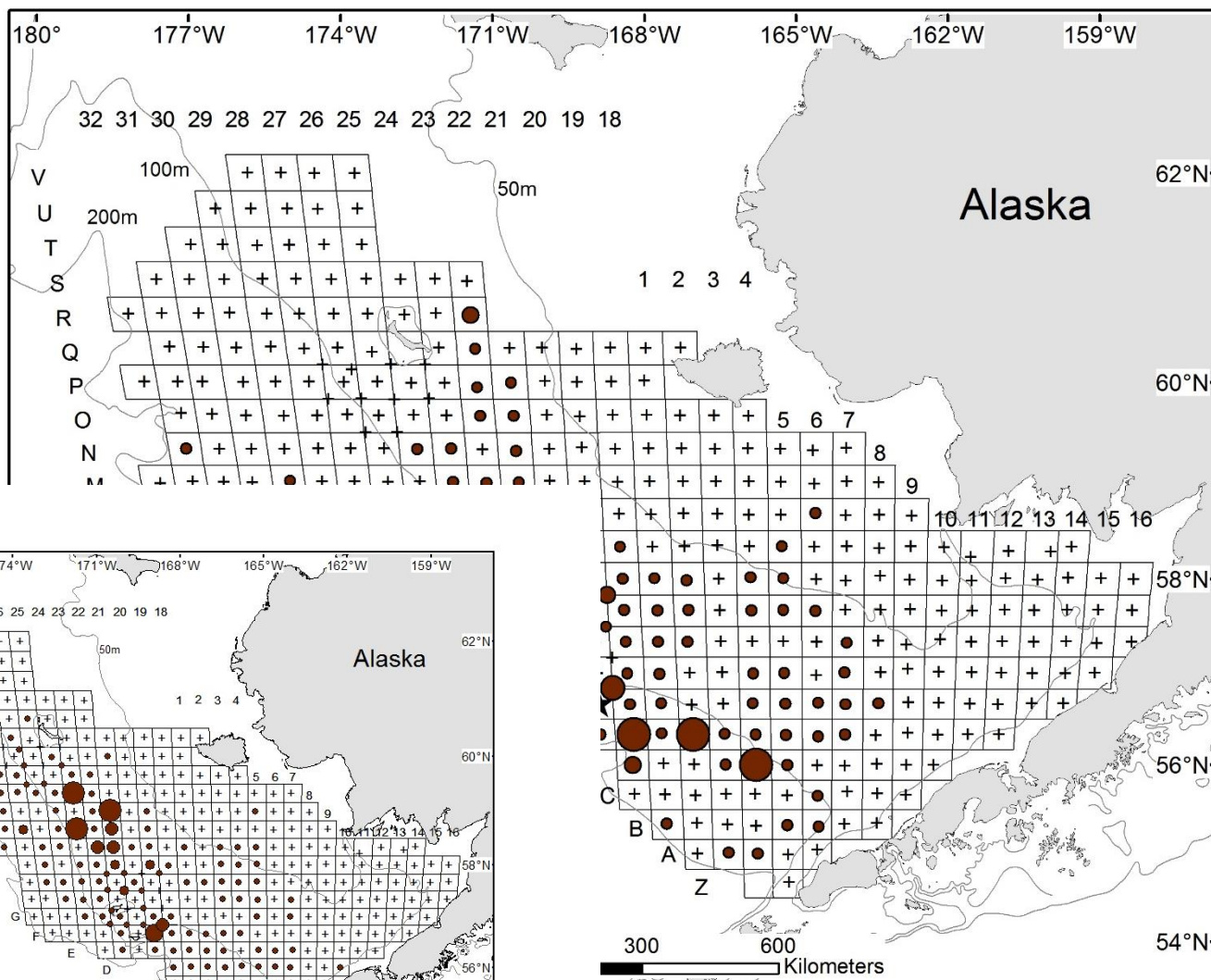
Chionoecetes bairdi/opilio hybrid crab biomass (t)

8% of legal male snow crab
3% of mature female snow crab

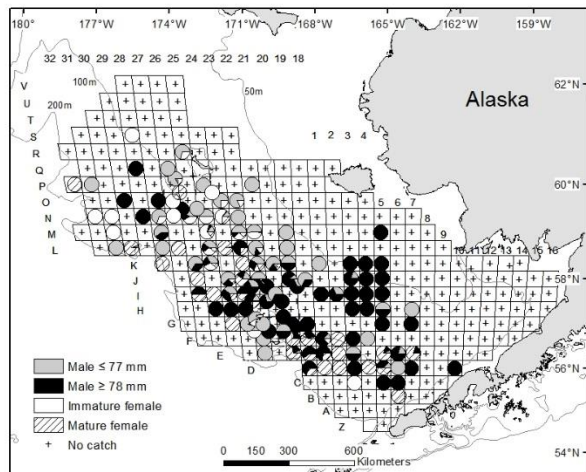
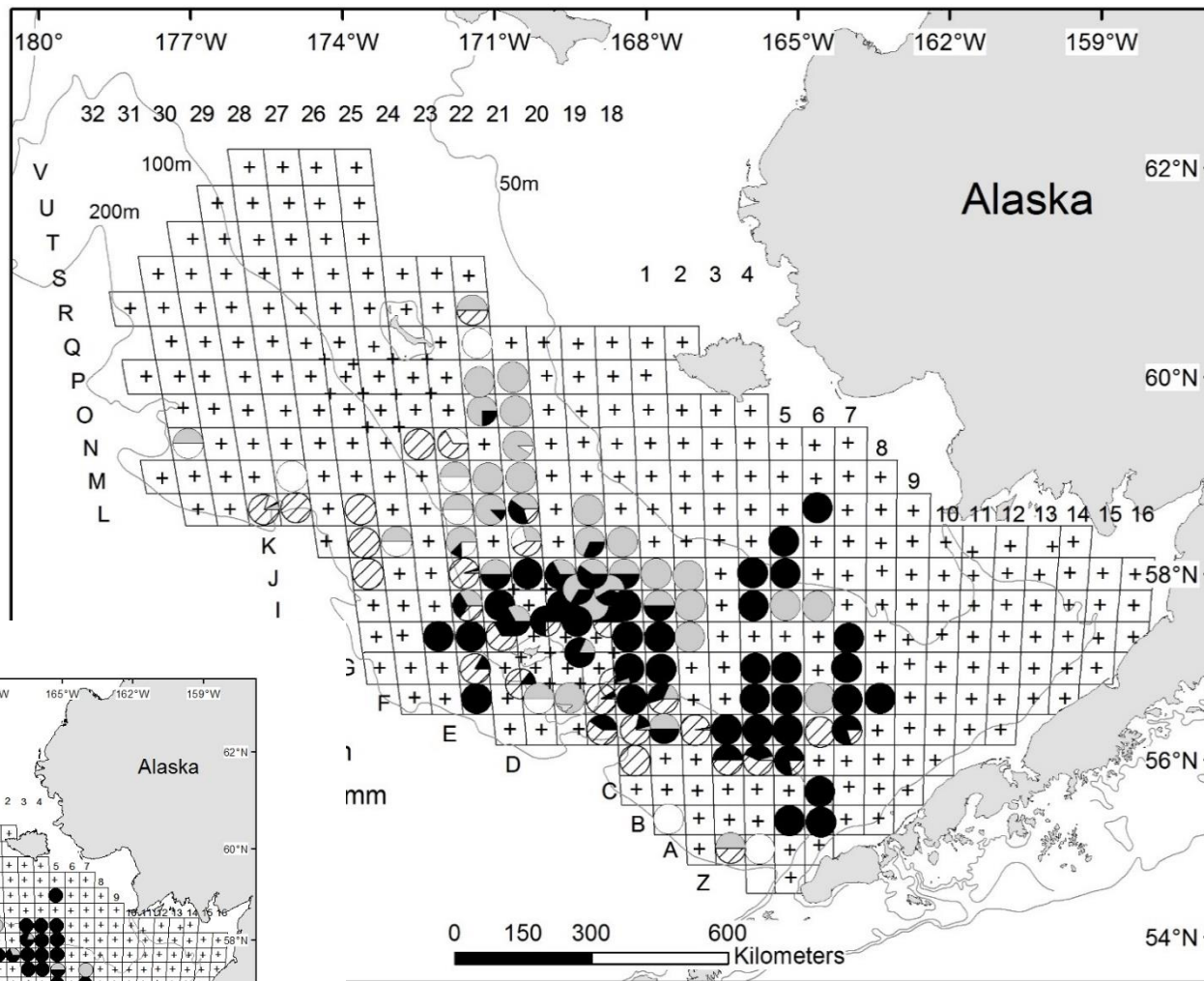
10% of legal male Tanner crab (west)
22% of mature female Tanner crab (west)



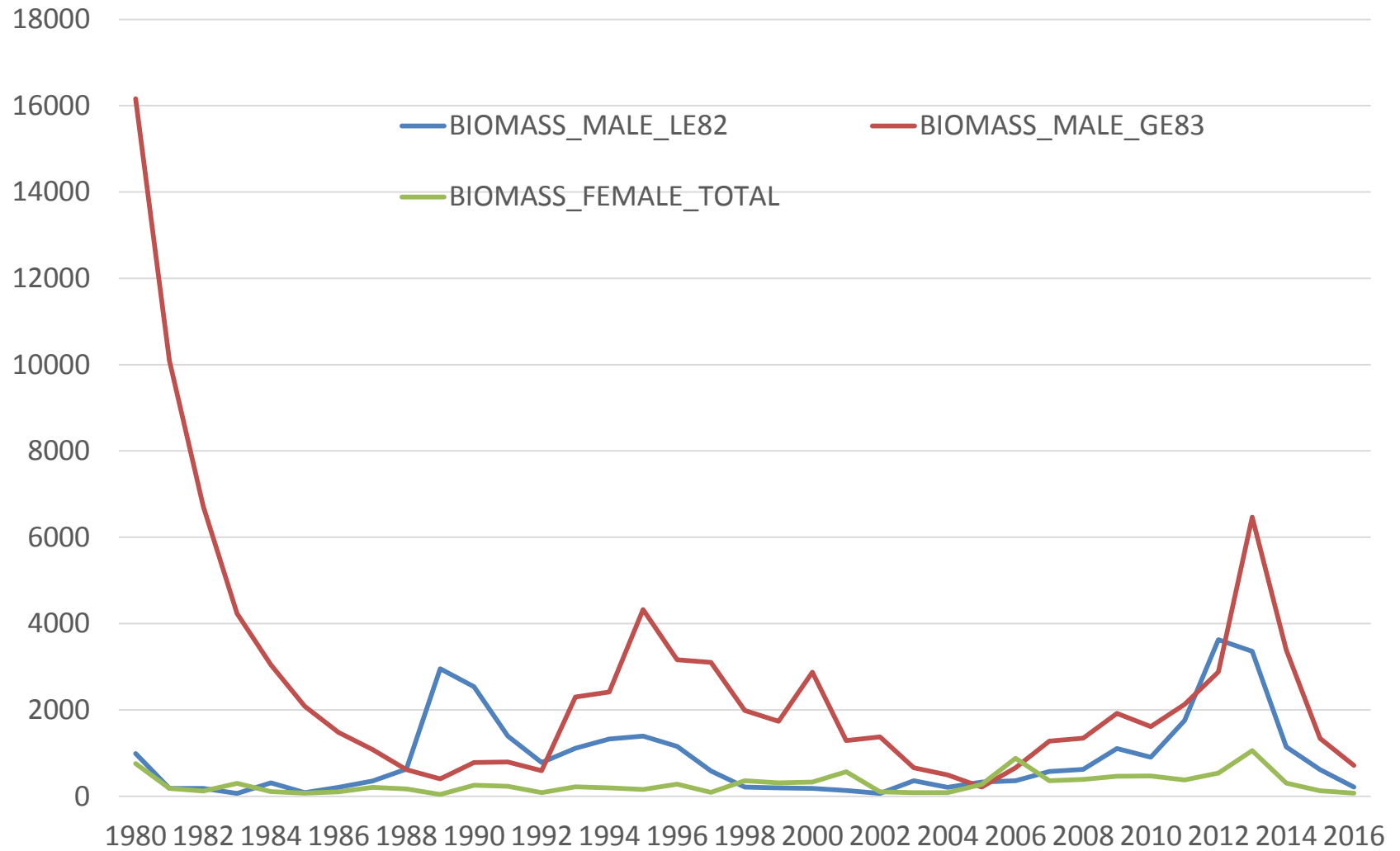
Chionoecetes bairdi/opilio hybrid crab



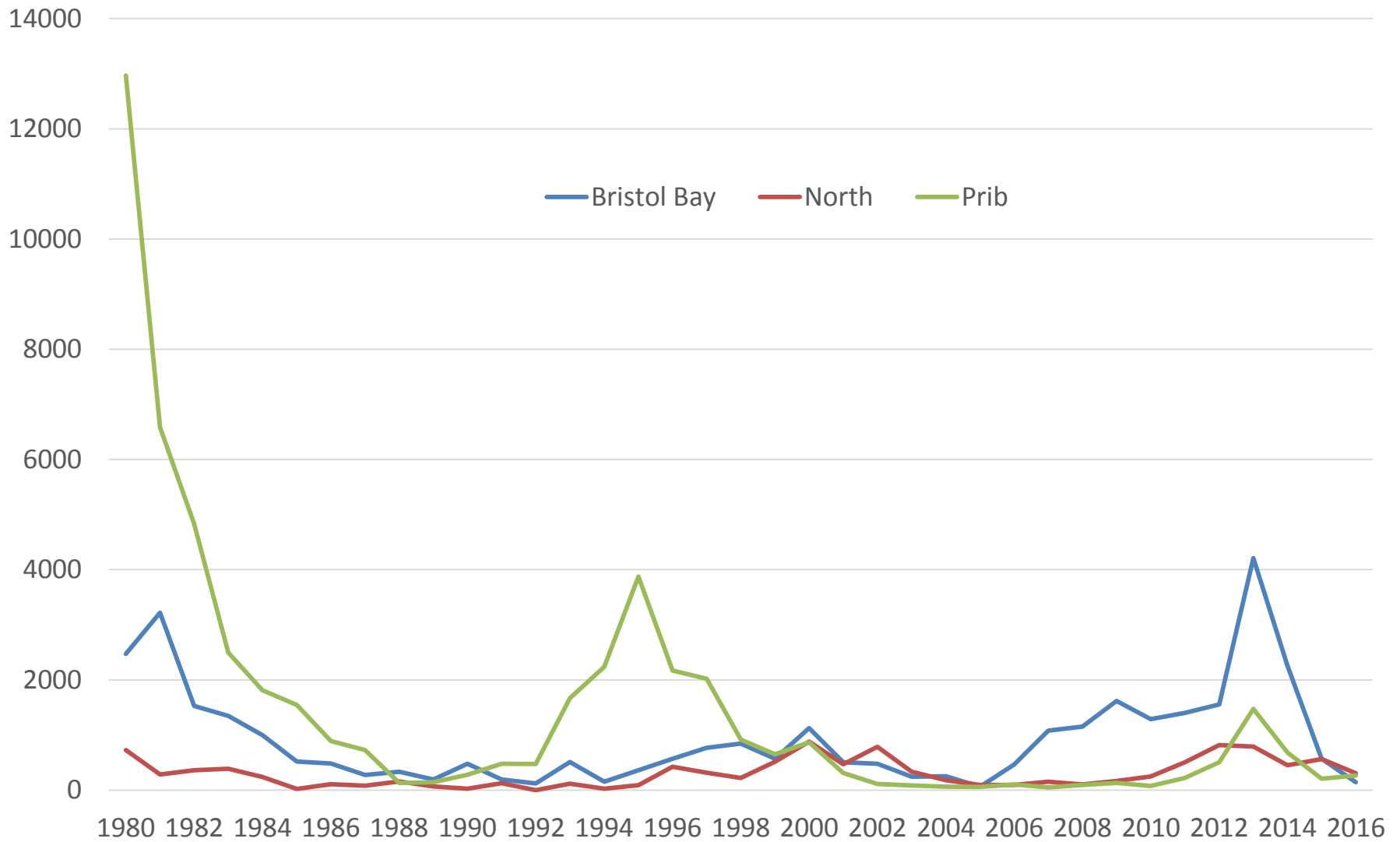
Chionoecetes bairdi/opilio hybrid crab



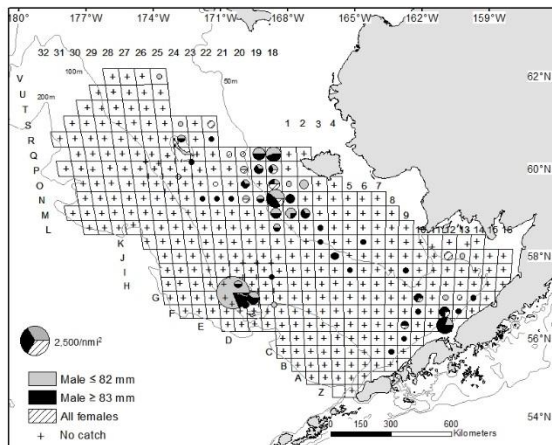
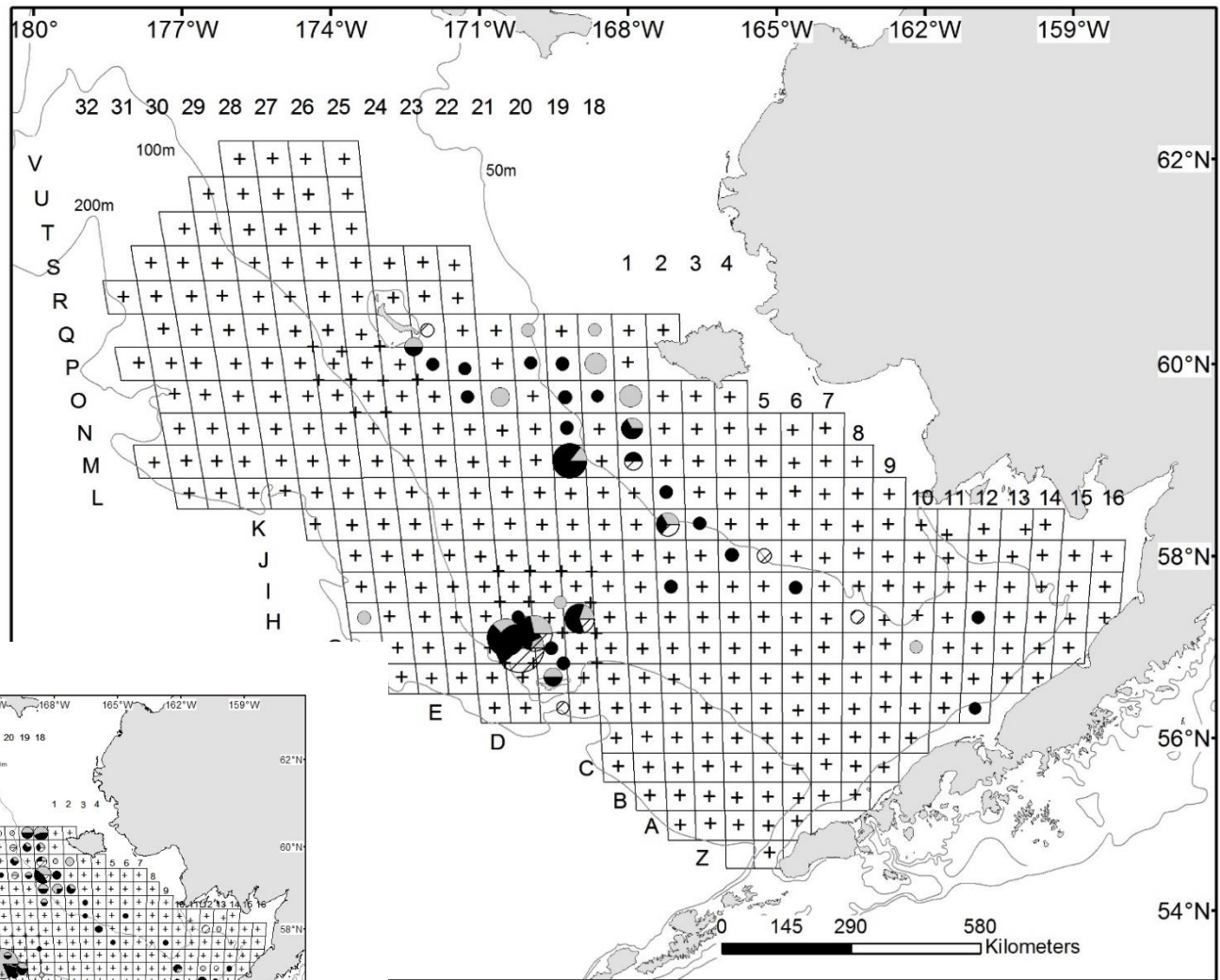
Hair crab biomass (t)



Hair crab biomass (t)



Hair crab



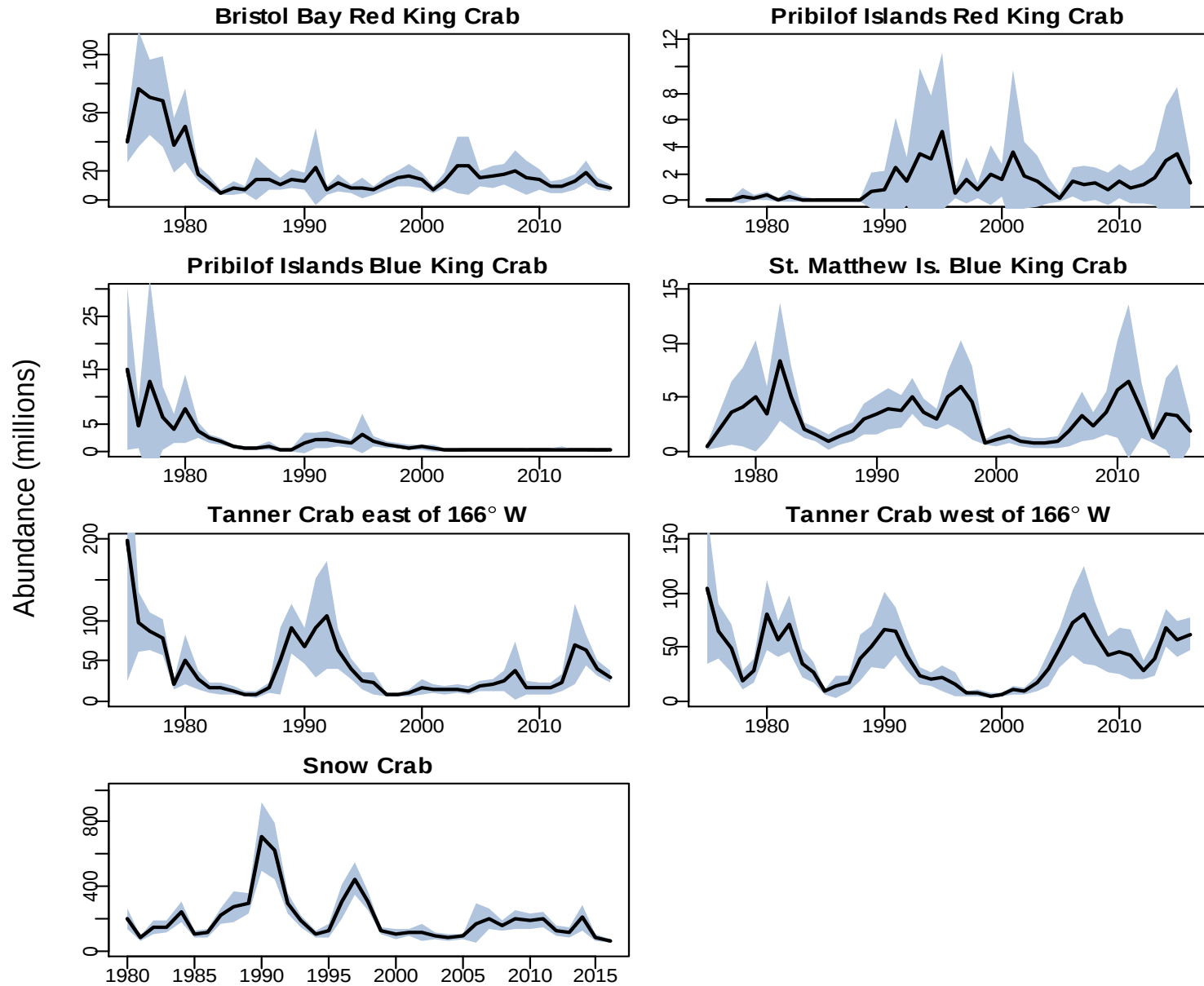
2016 Mature Males (2015 value in parentheses)

	# tows	#tows with crab	# caught	% measured	Biomass (t)
BB RKC	136	59 (53)	302 (387)	100%	25,481 (32,121)
PI RKC	77	5 (9)	69 (195)	100%	4,150 (15,173)
PI BKC	86	3 (8)	3 (13)	100%	129 (622)
SM BKC	56	16 (19)	83 (119)	100%	3,072 (5,134)
TC east	120	99 (94)	1,011 (1,287)	100%	18,523 (27,241)
TC west	255	112 (108)	2,797 (2,624)	91%	35,119 (31,122)
SC	375	190 (180)	2,191 (3,128)	86% (97%)	29,961 (46,410)

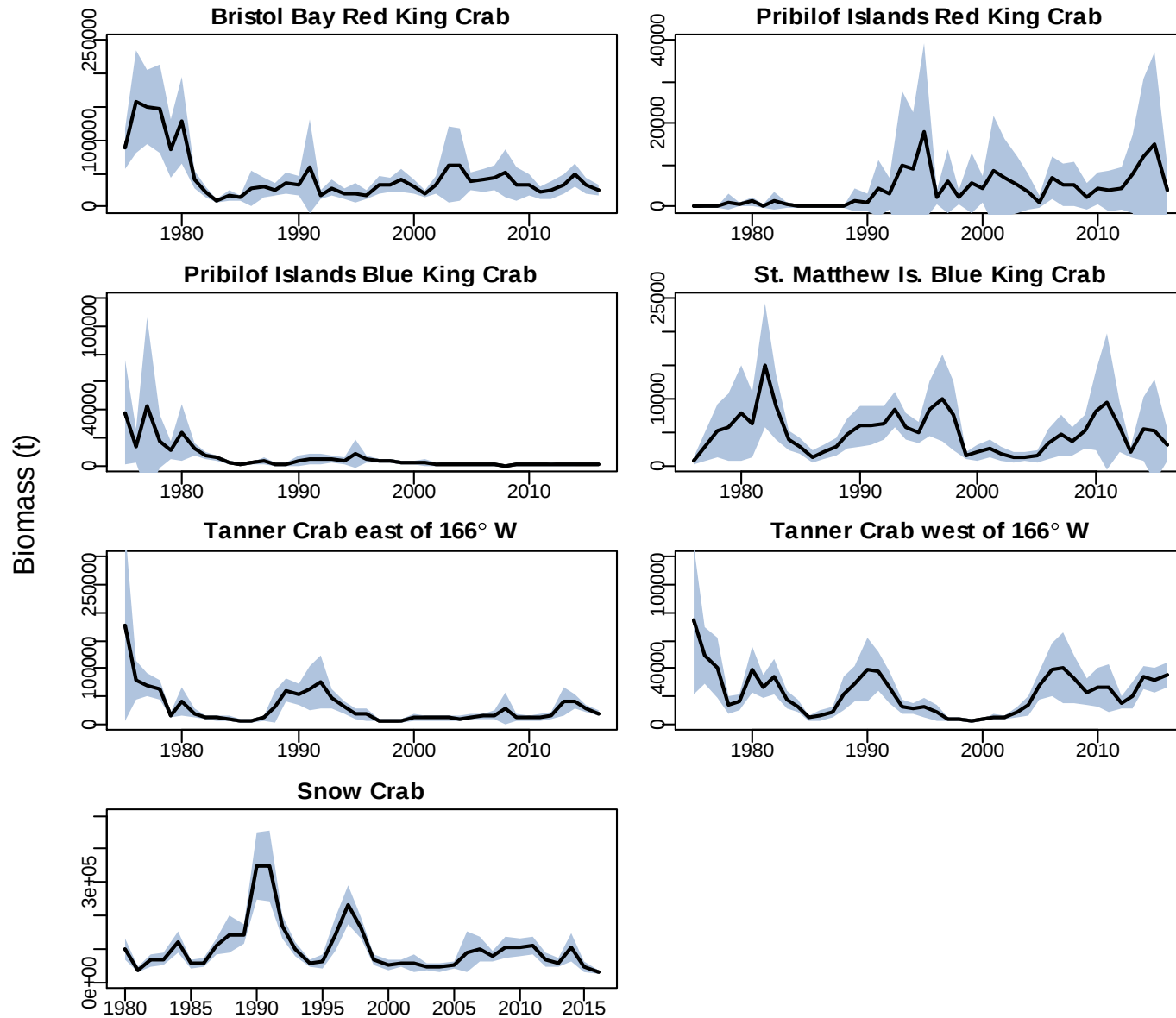
Crab Management Process

Survey ended data sent to Kodiak	July 26
Trawl area swept data	August 10
Final abundance and biomass to SOA	August 15
Draft Survey Result Document to public	August 30
Crab Plan Team	Sept 20-23
SSC Meeting	Oct 3
TAC setting	Oct 3-10
TACs set	Oct 10
Fishery Start	Oct 15

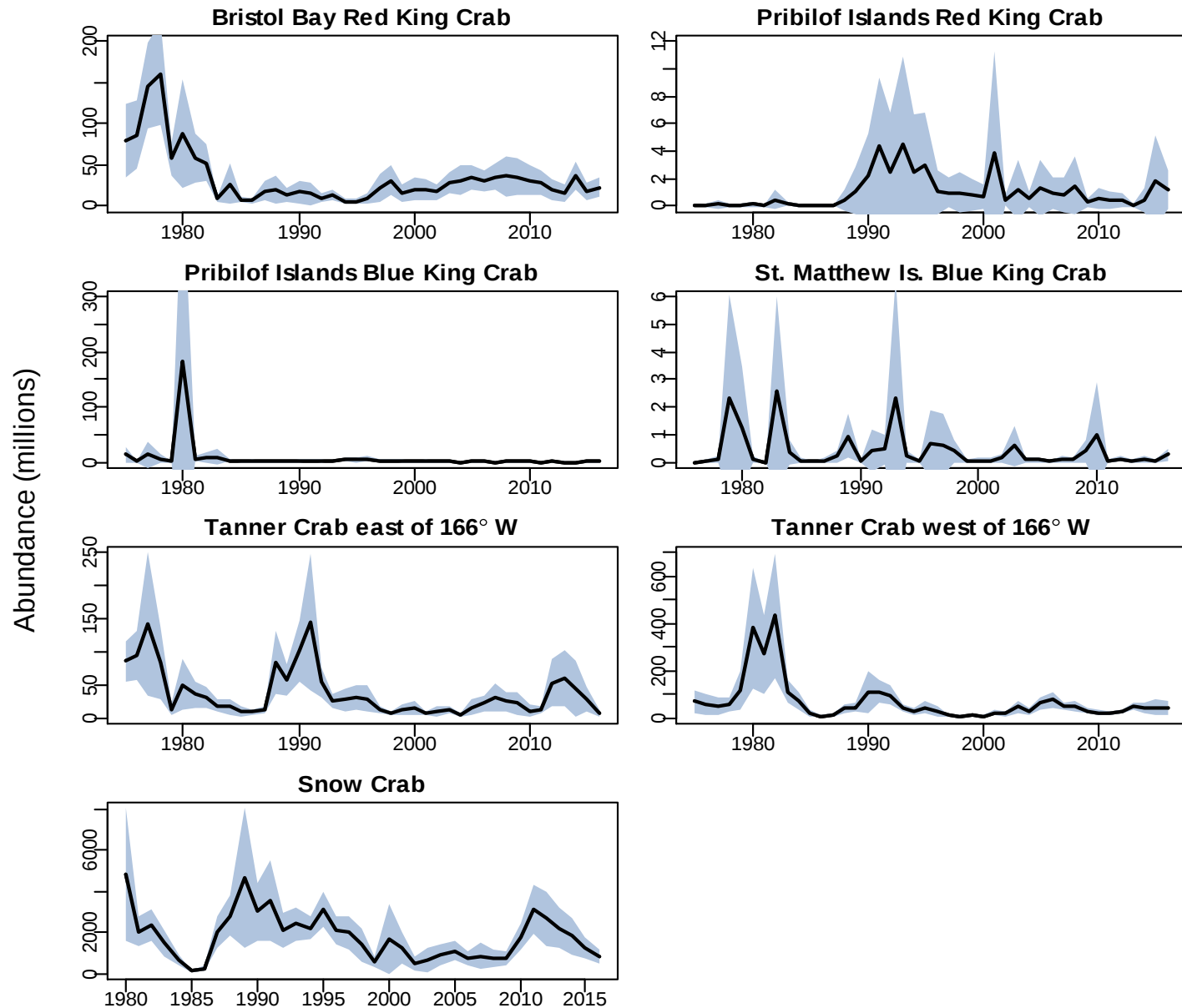
Mature Males



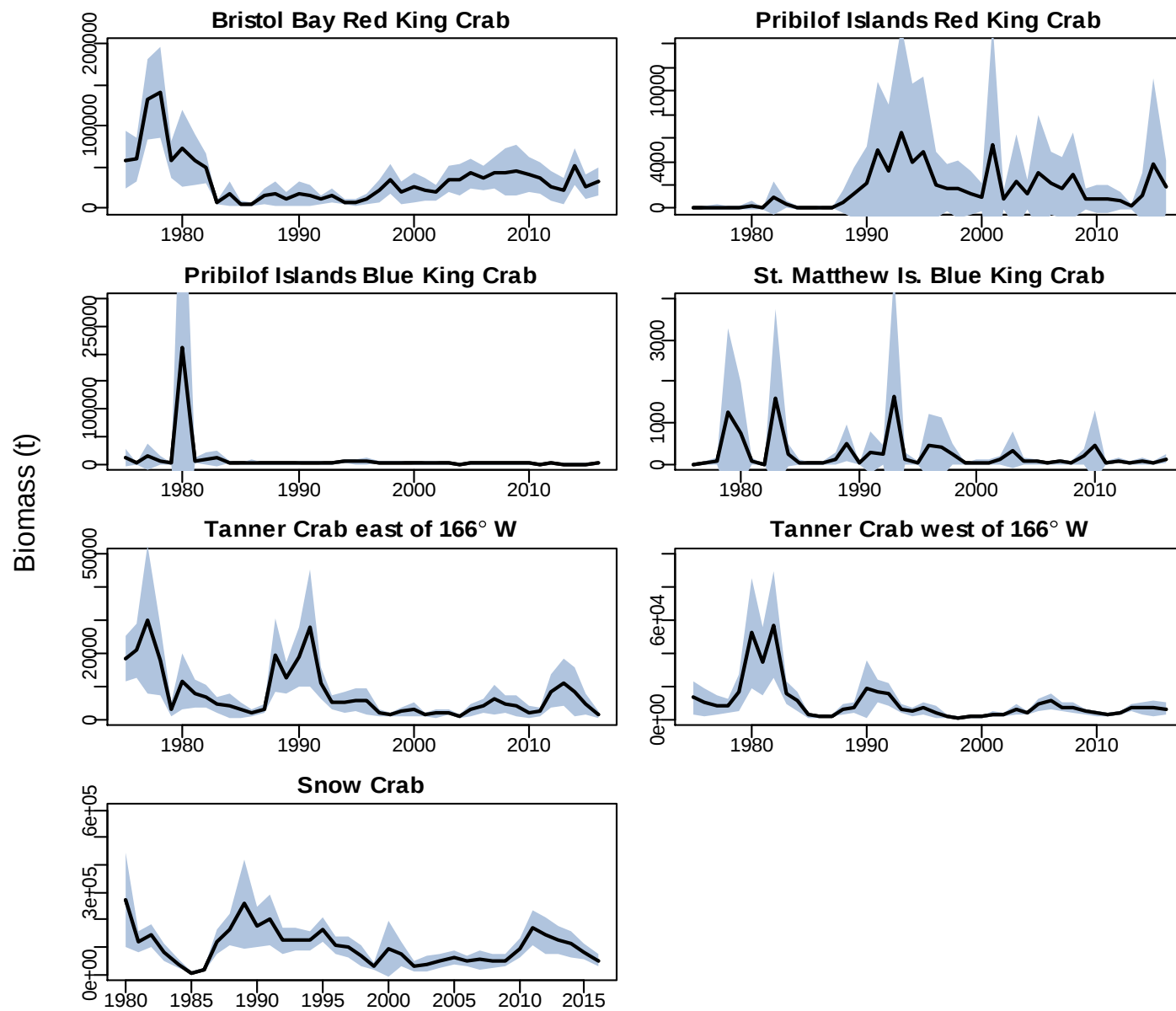
Mature Males

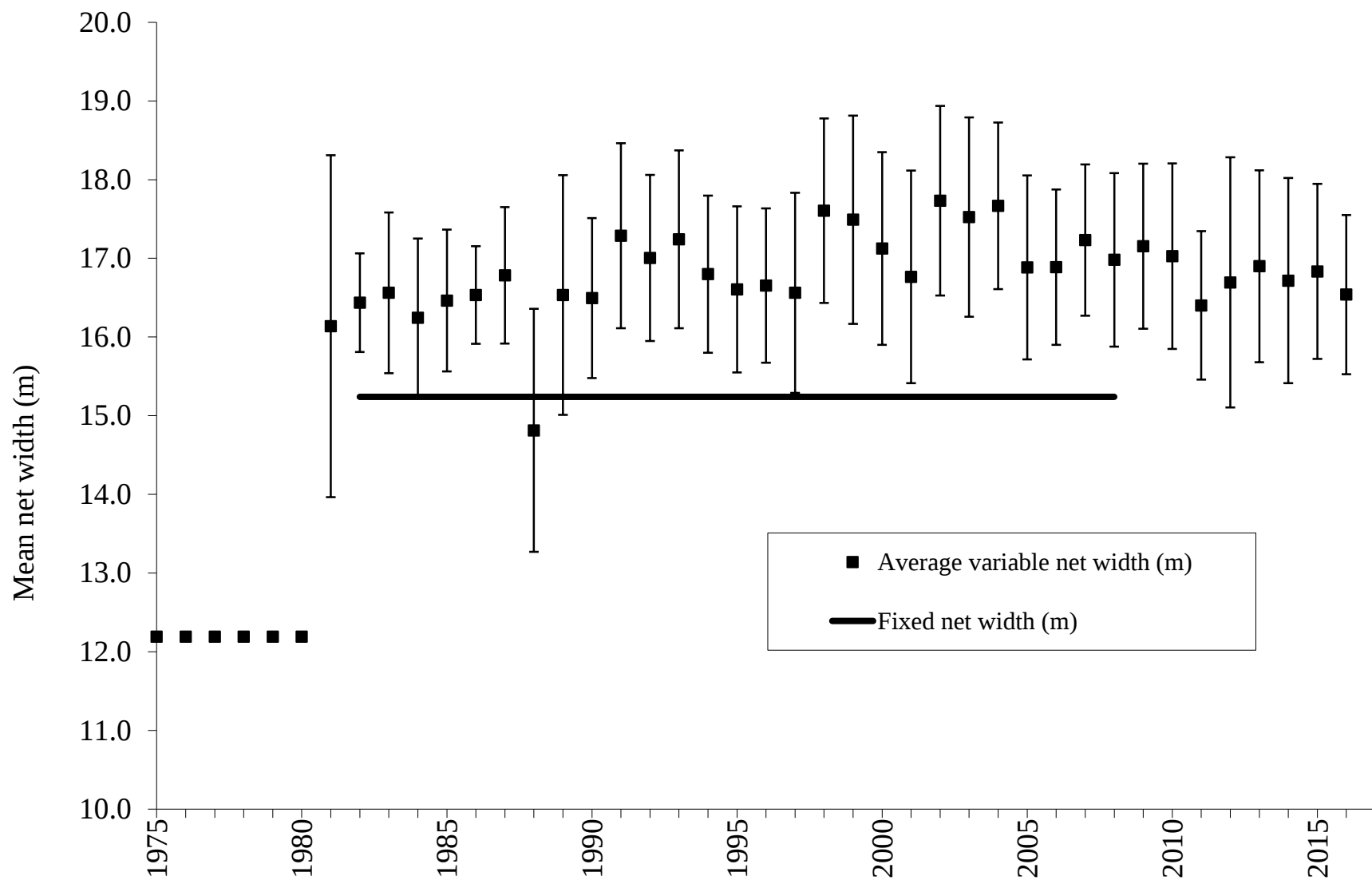


Mature Females



Mature Females





Stock	2015-16 B _{MSY}	2015/16 MODEL MMB	2015 survey MMB	2016 survey MBB	% change	2015/16 OFL	2015/16 ABC	Overfishing?	Overfished ?	ADFG TAC
EBS snow crab	157.8	147.2	46.4	30.0	-35%	83.1	62.3	No	No	Maybe CLOSED
BB red king crab	26.1	24.69	32.1	25.5	-21%	6.73	6.06	No	No	OPEN (OFL may constrain TAC)
EBS Tanner crab	26.8	53.7	58.4	53.6	-8%	27.19	21.75	No	No	Likely CLOSED
Pribilof Islands red king crab	5.65	13.7	15.2	4.2	-73%	2.12	1.59	No	No	CLOSED
Pribilof Islands blue king crab	4.1	0.455	0.6	0.1	-57%	0.00116	0.00087	Yes (catch > OFL)	Yes	CLOSED
St. Matthew Island blue king crab	3.72	2.45	5.1	3.1	-40%	0.28	0.22	No	Not likely	CLOSED