



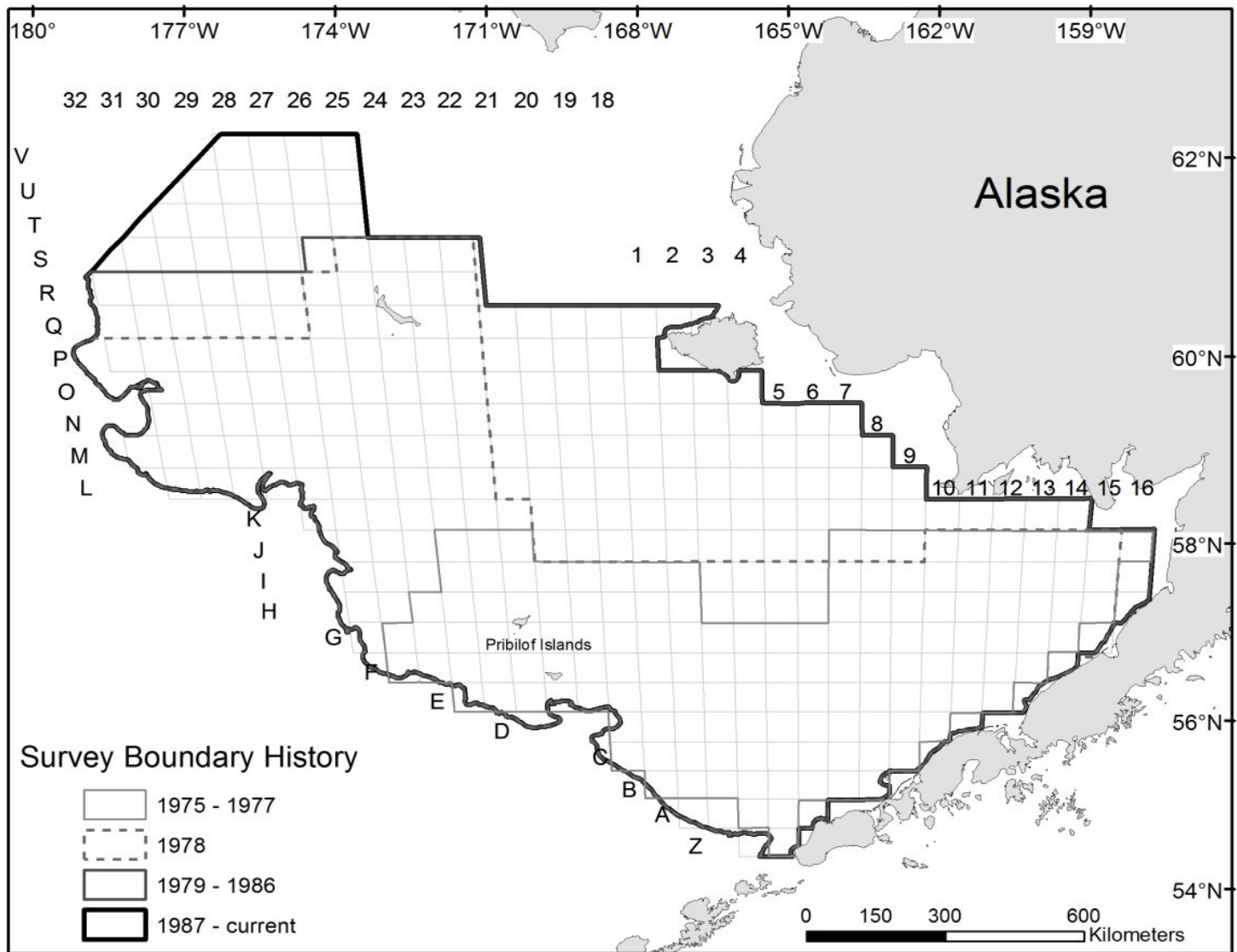
**NOAA
FISHERIES**

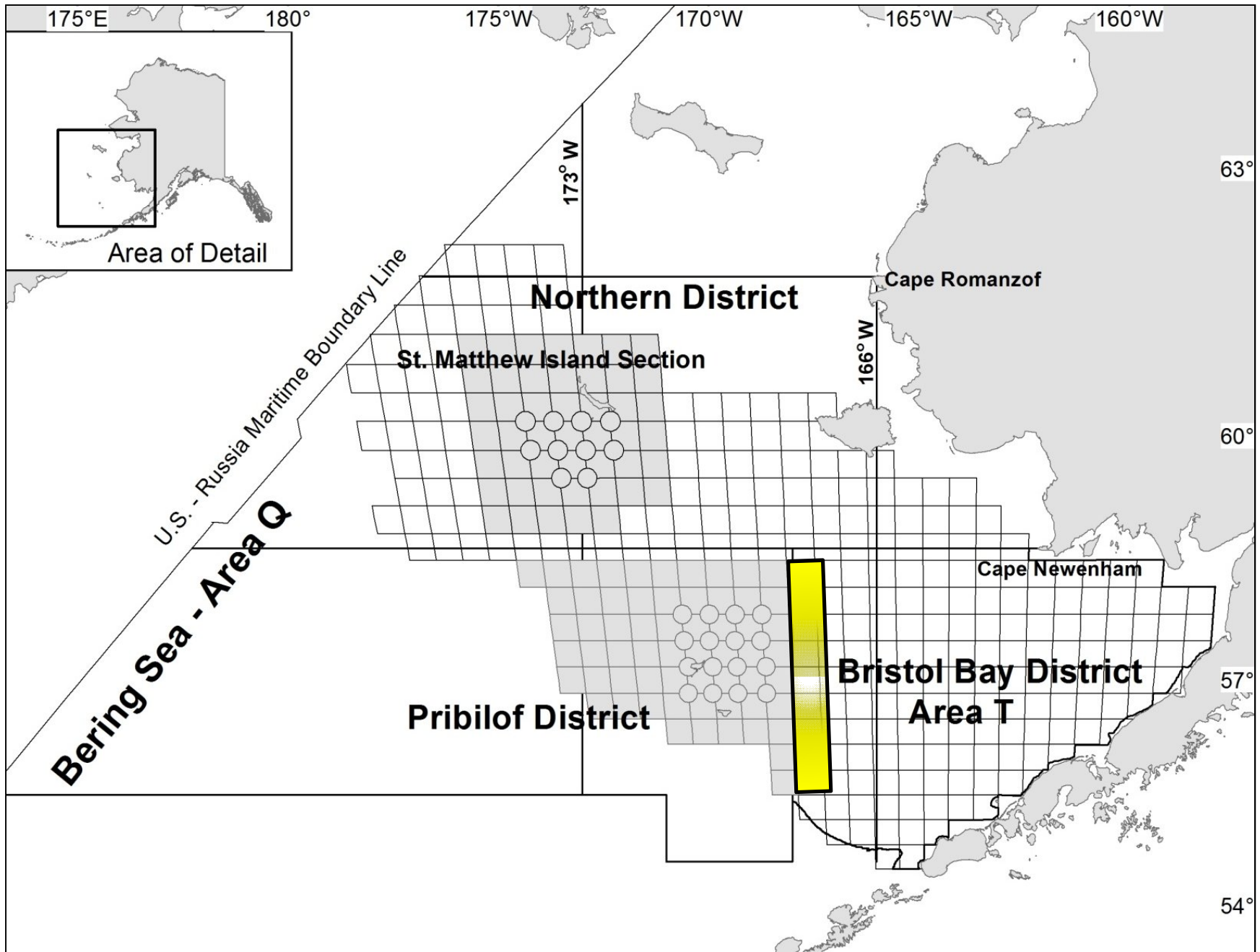
Alaska Fisheries
Science Center-
Kodiak Lab

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

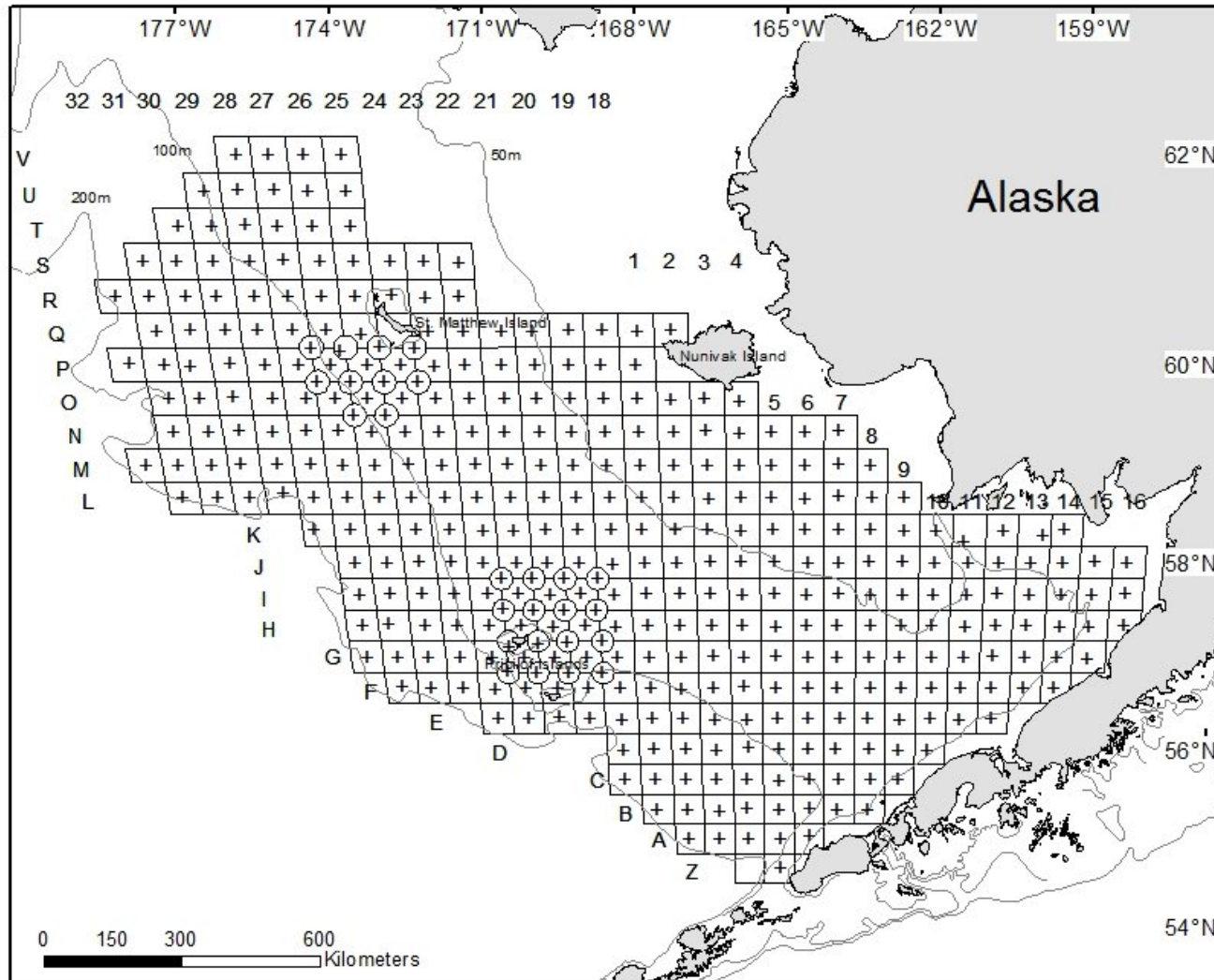
Ben Daly, Claire Armistead, Robert Foy, AFSC
SAP and GAP programs

Crab Plan Team
September 2016





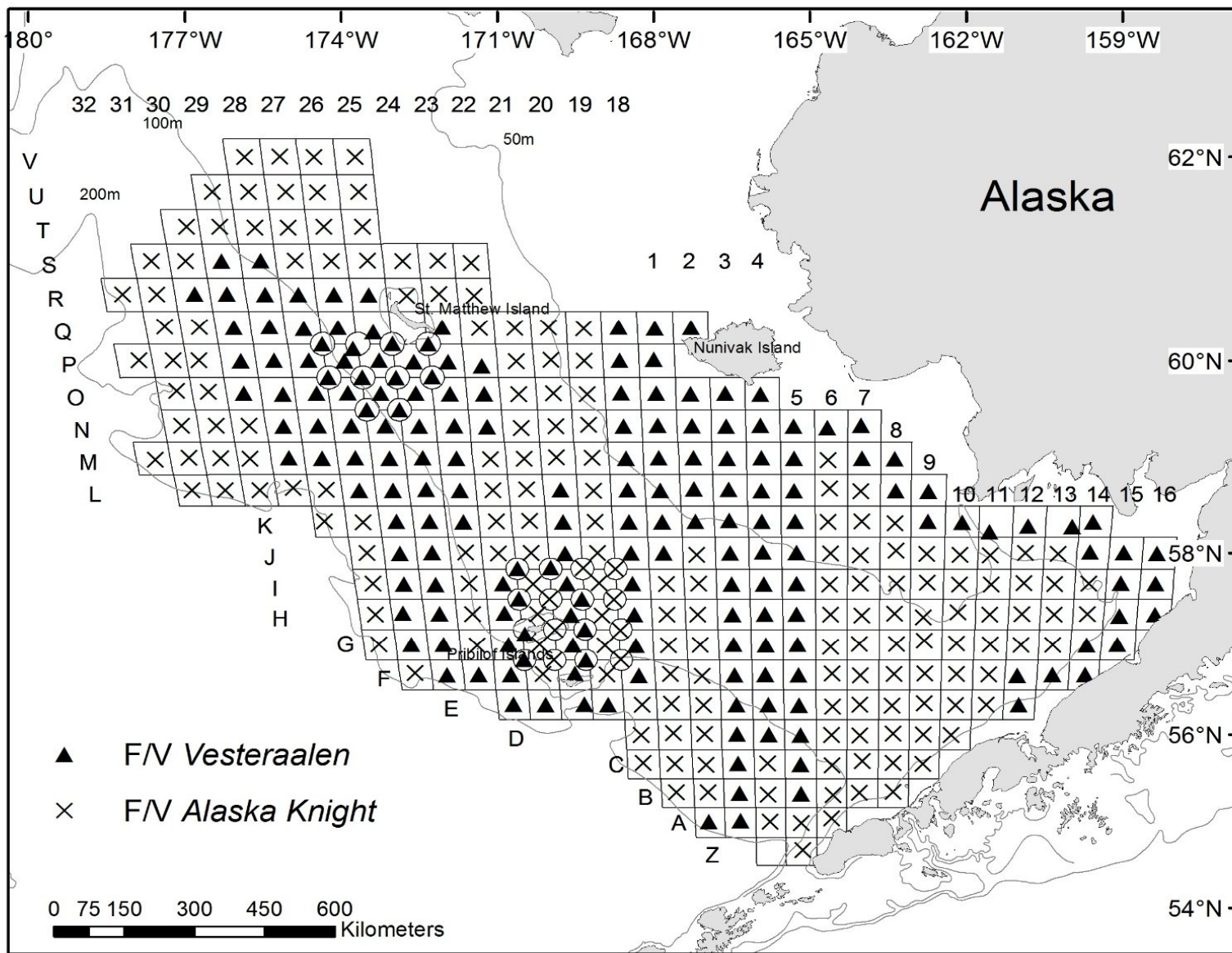
2016 standard Bering Sea survey



HIGHLIGHTS

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

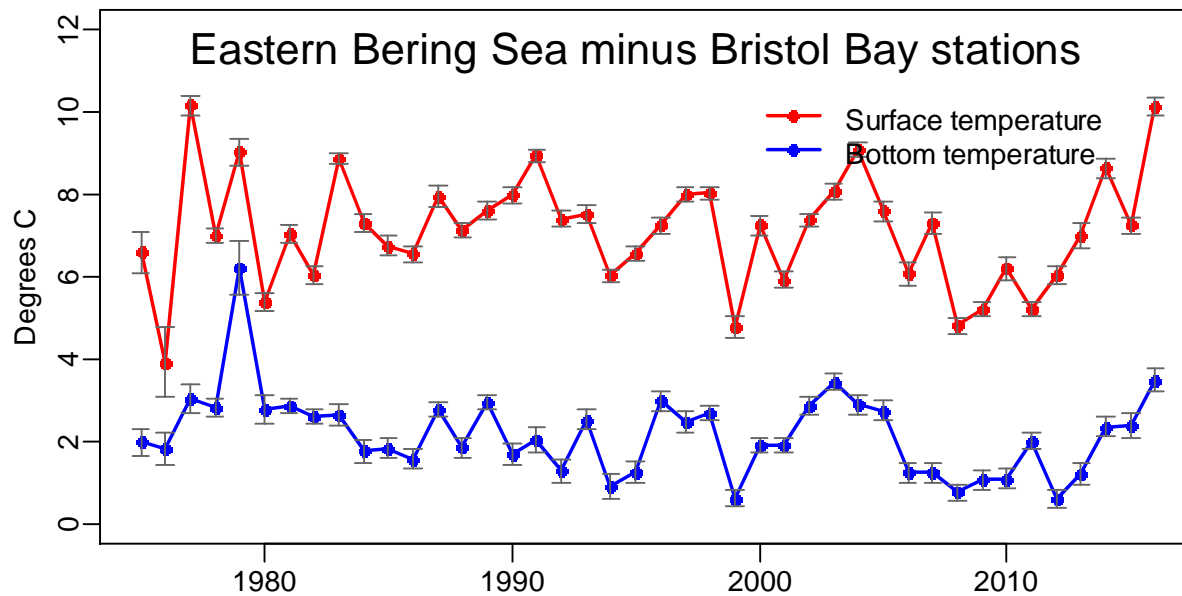
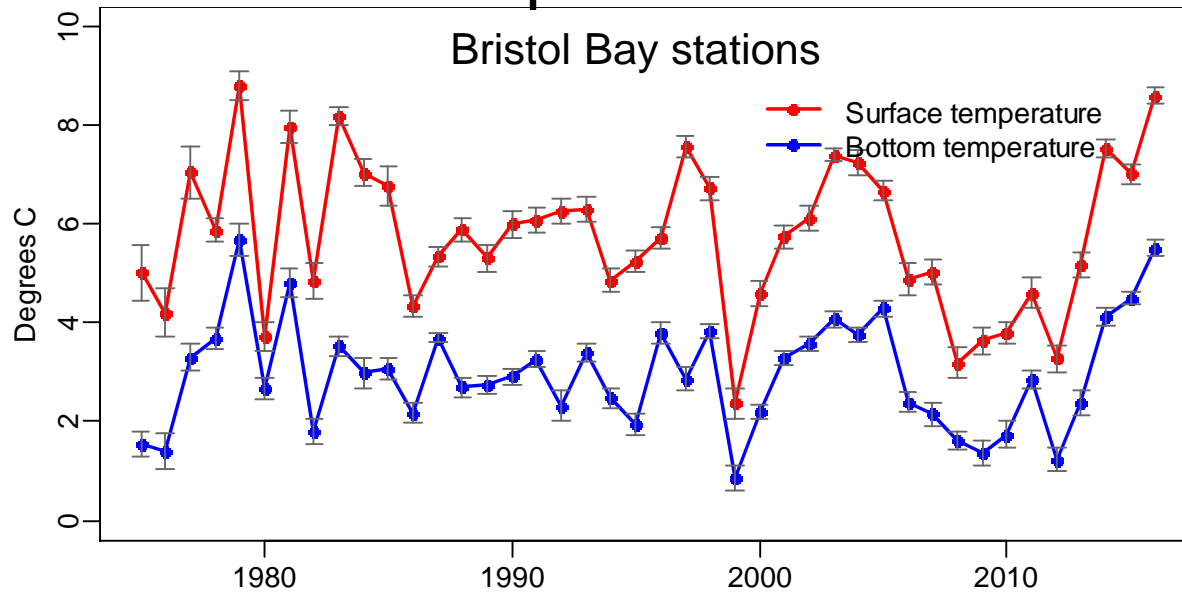
2016 standard Bering Sea survey

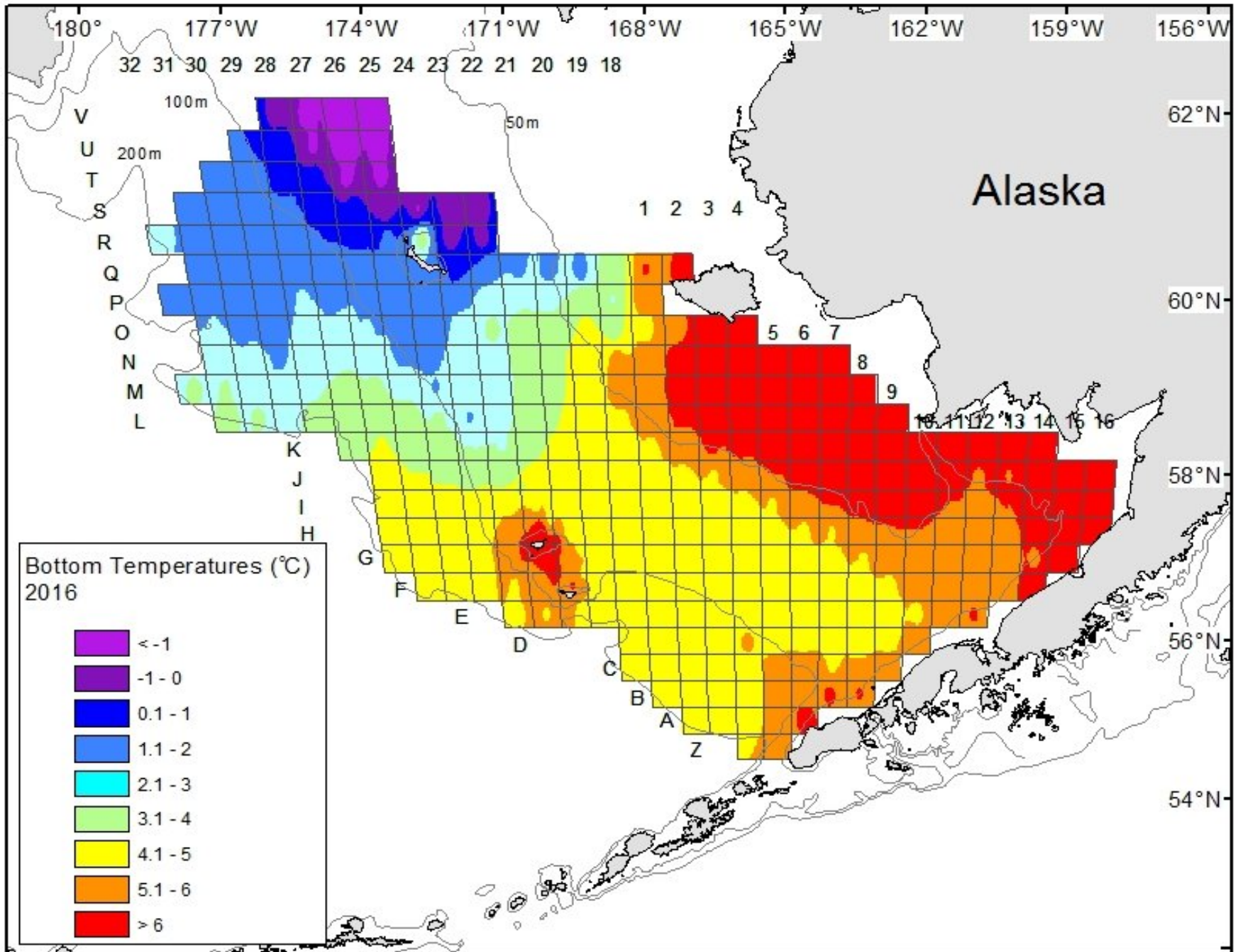


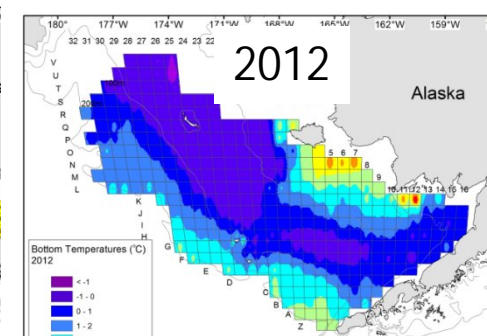
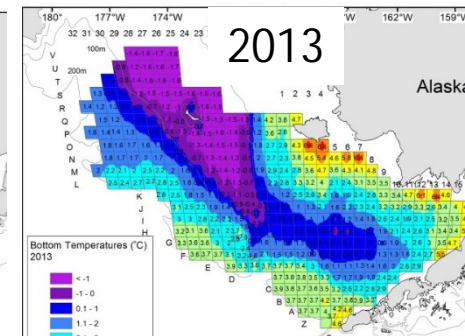
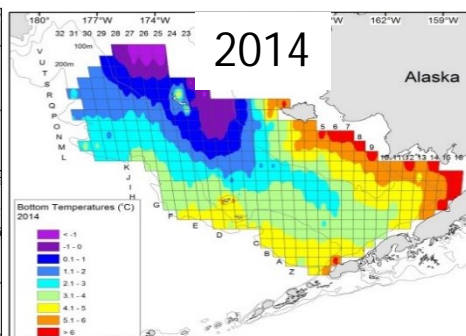
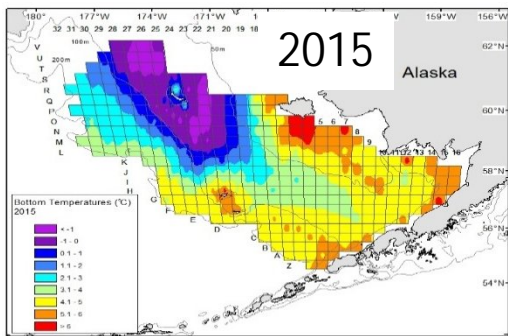
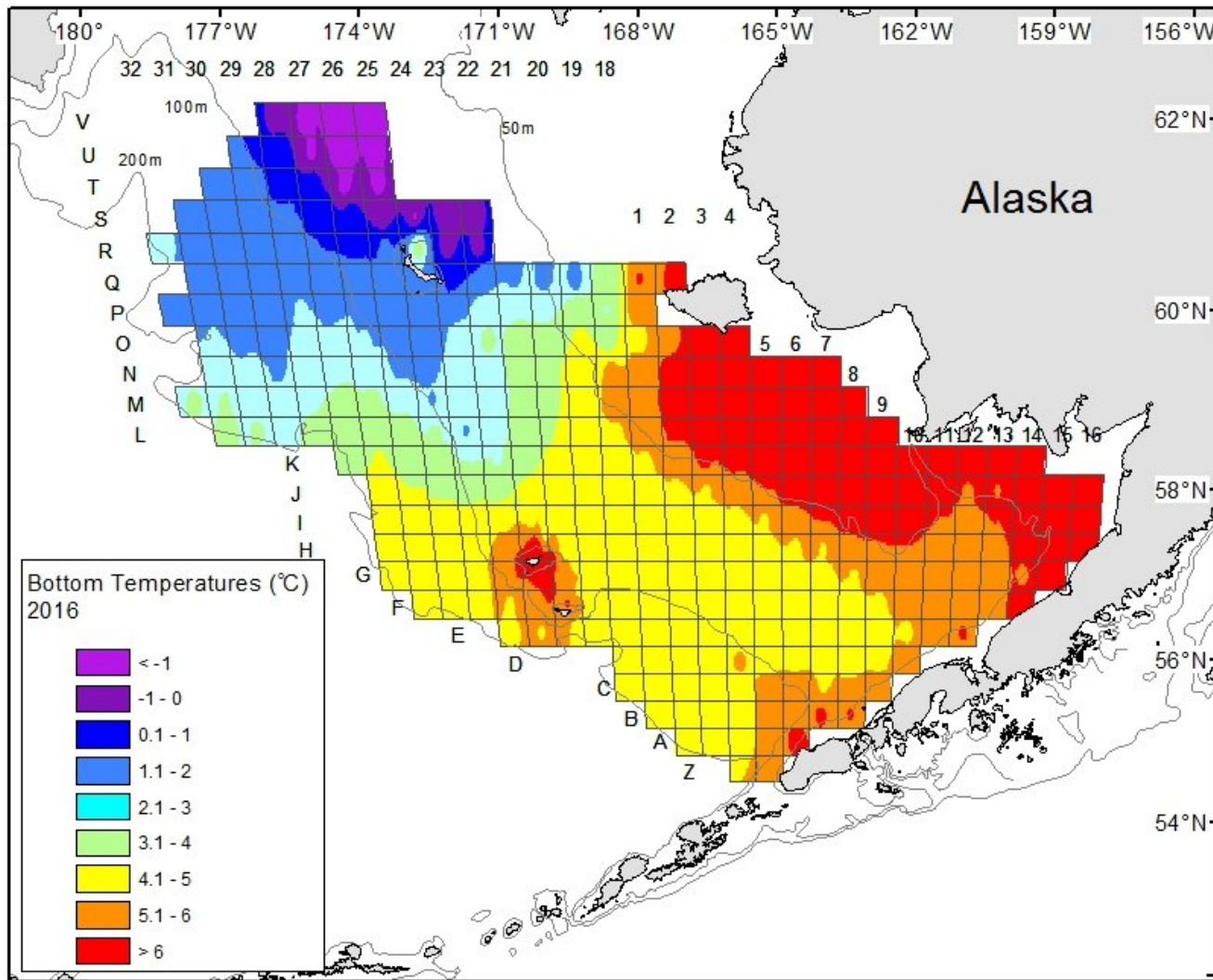
Special projects related to crab species

| 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 |

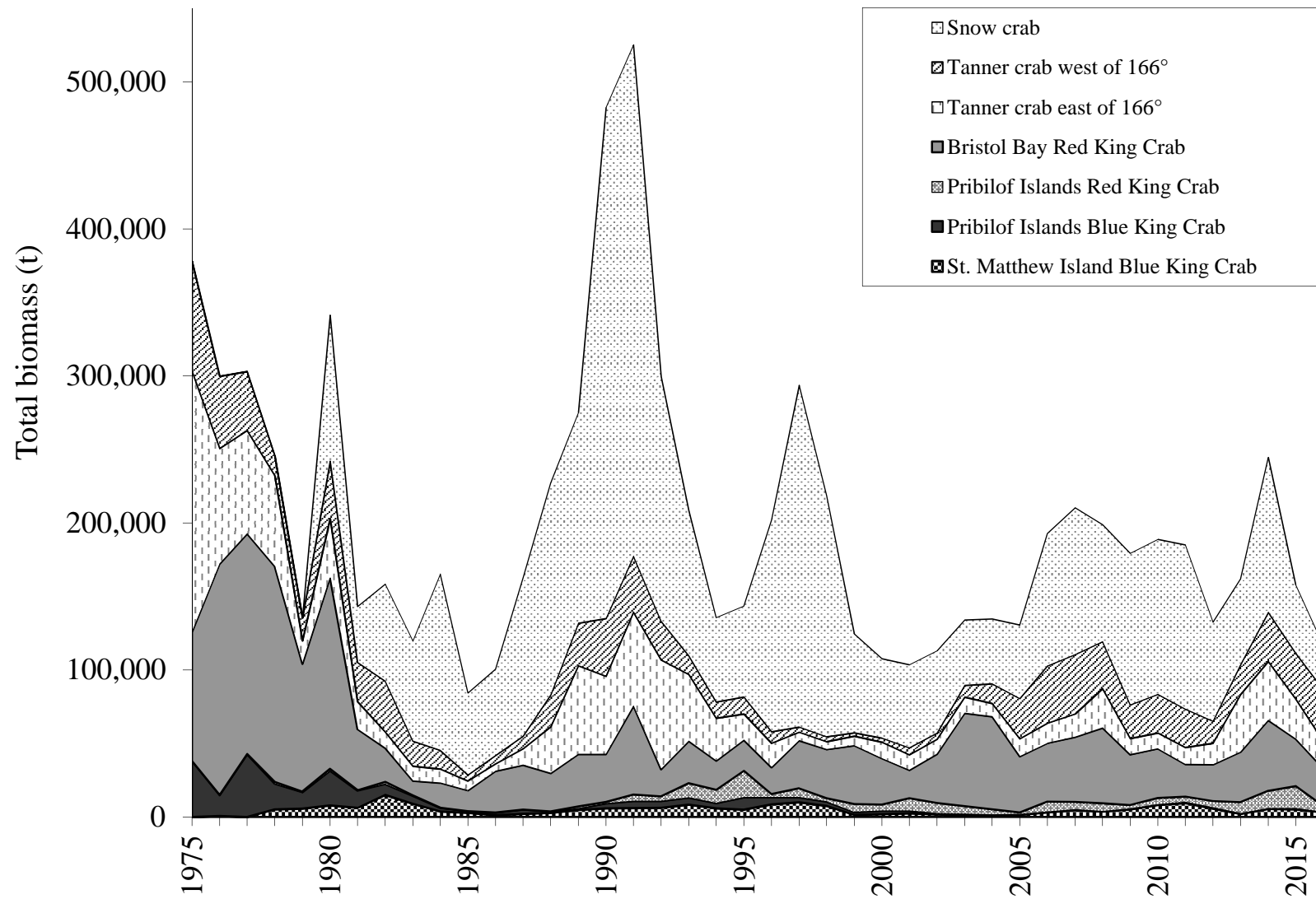
Bristol Bay Surface (red) and Bottom (blue) temperatures



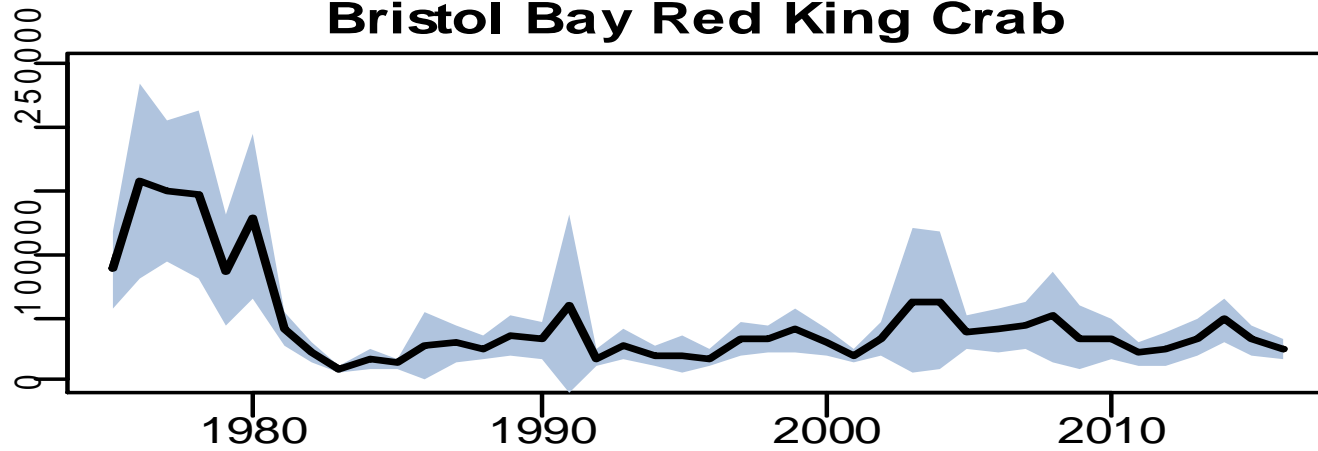




Mature male biomass



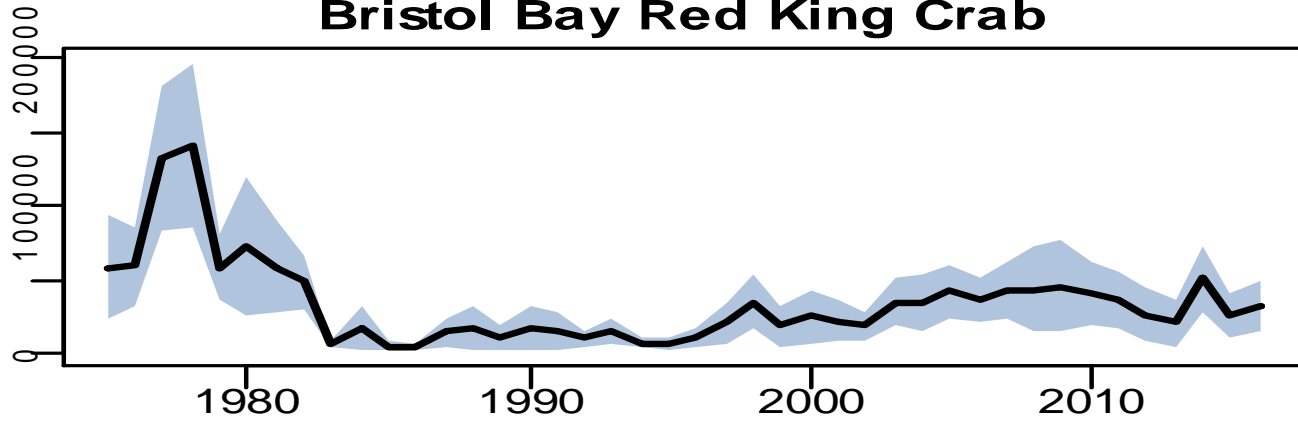
Bristol Bay Red King Crab



Mature male biomass (t)

-21%

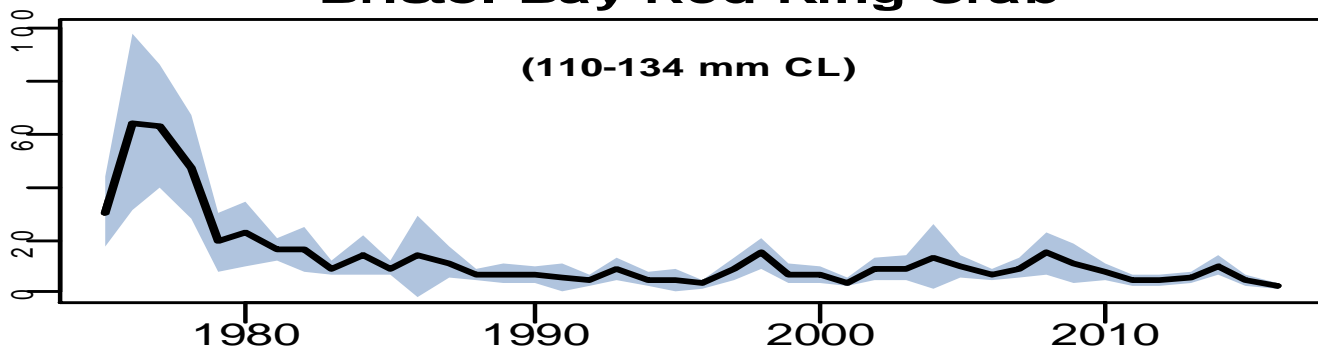
Bristol Bay Red King Crab



Mature females biomass (t)

+28%

Bristol Bay Red King Crab

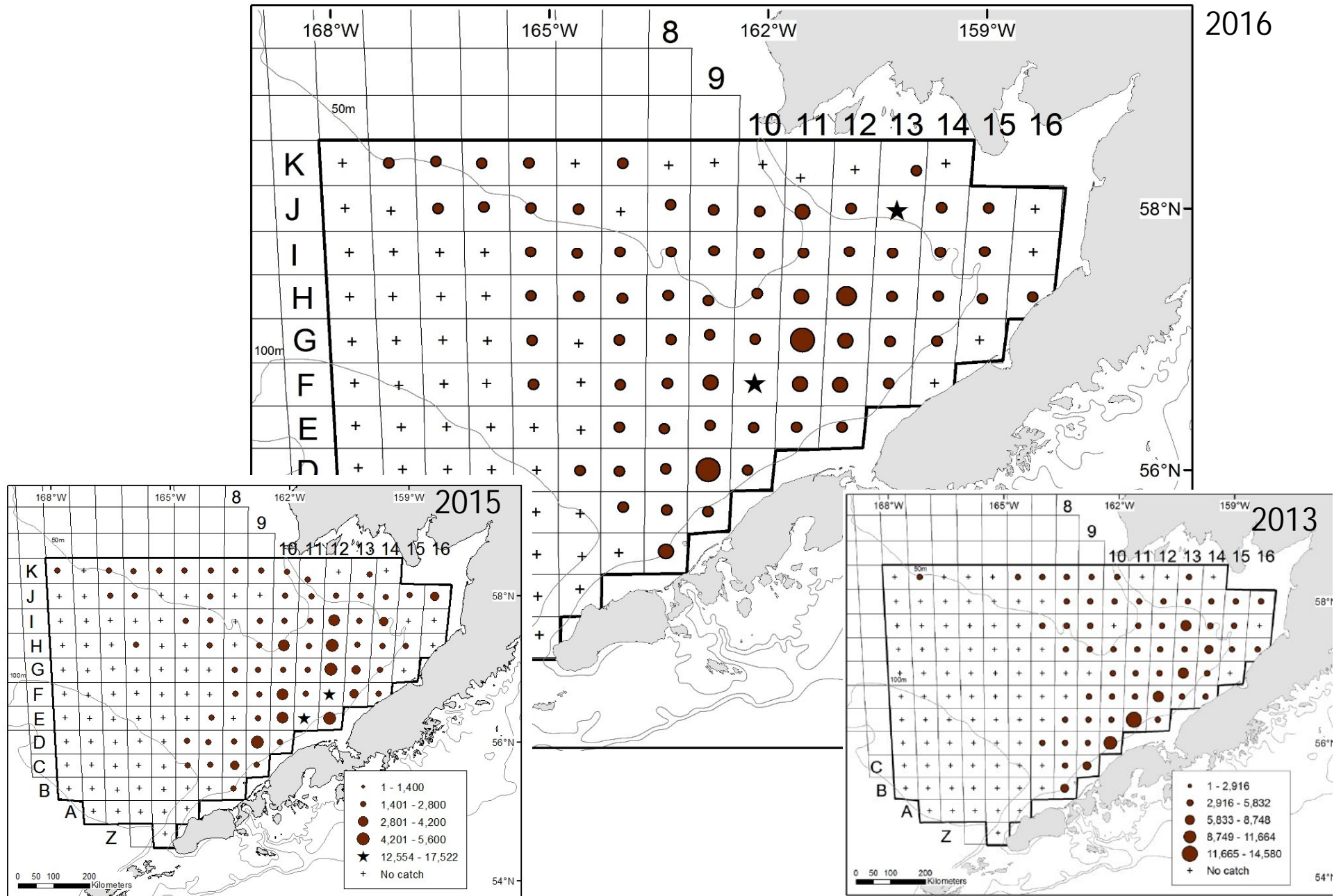


Juvenile abundance (millions)

Male -21%

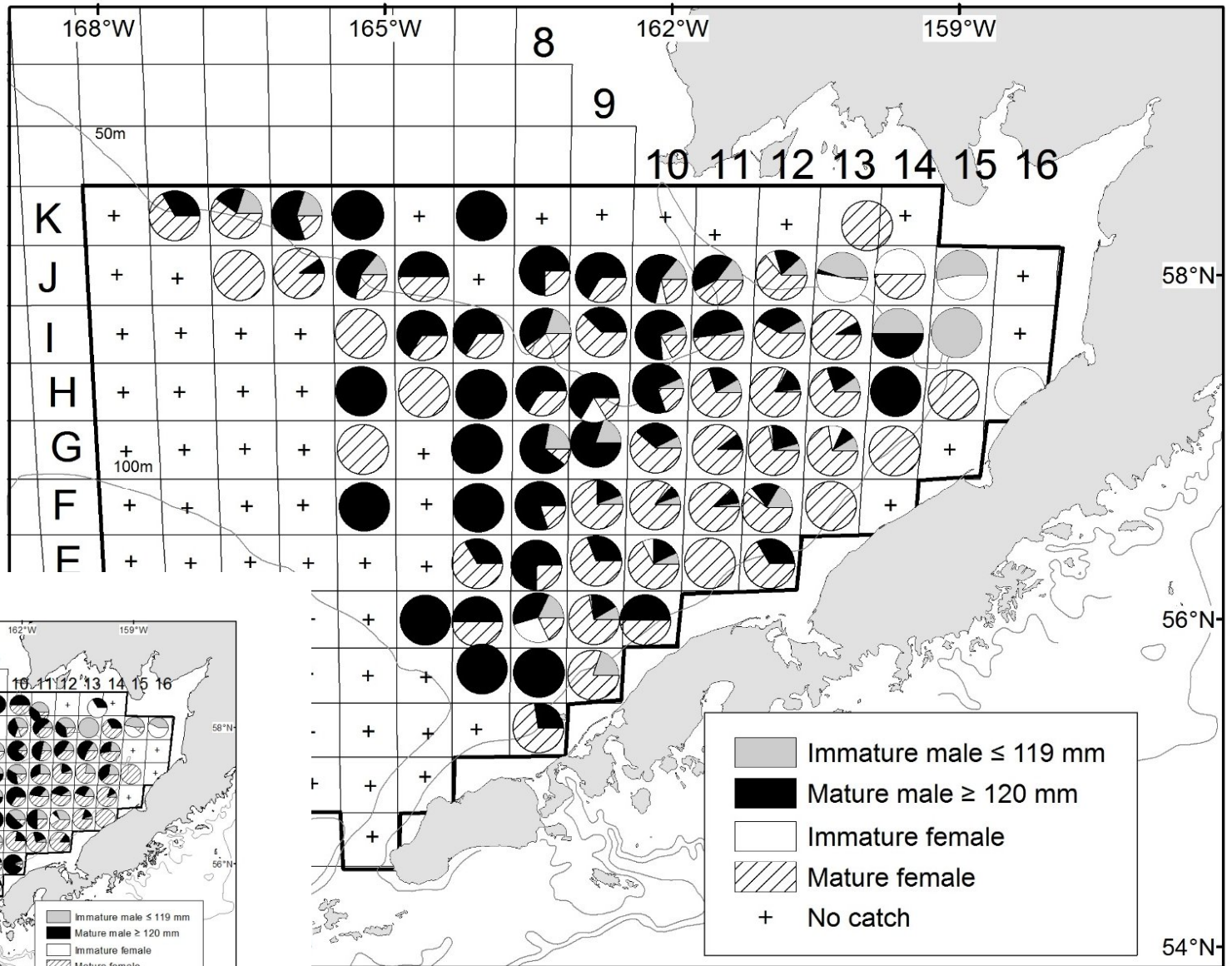
Female +47%

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

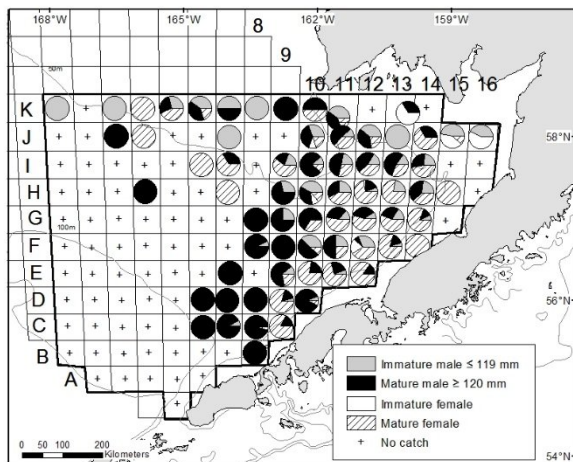


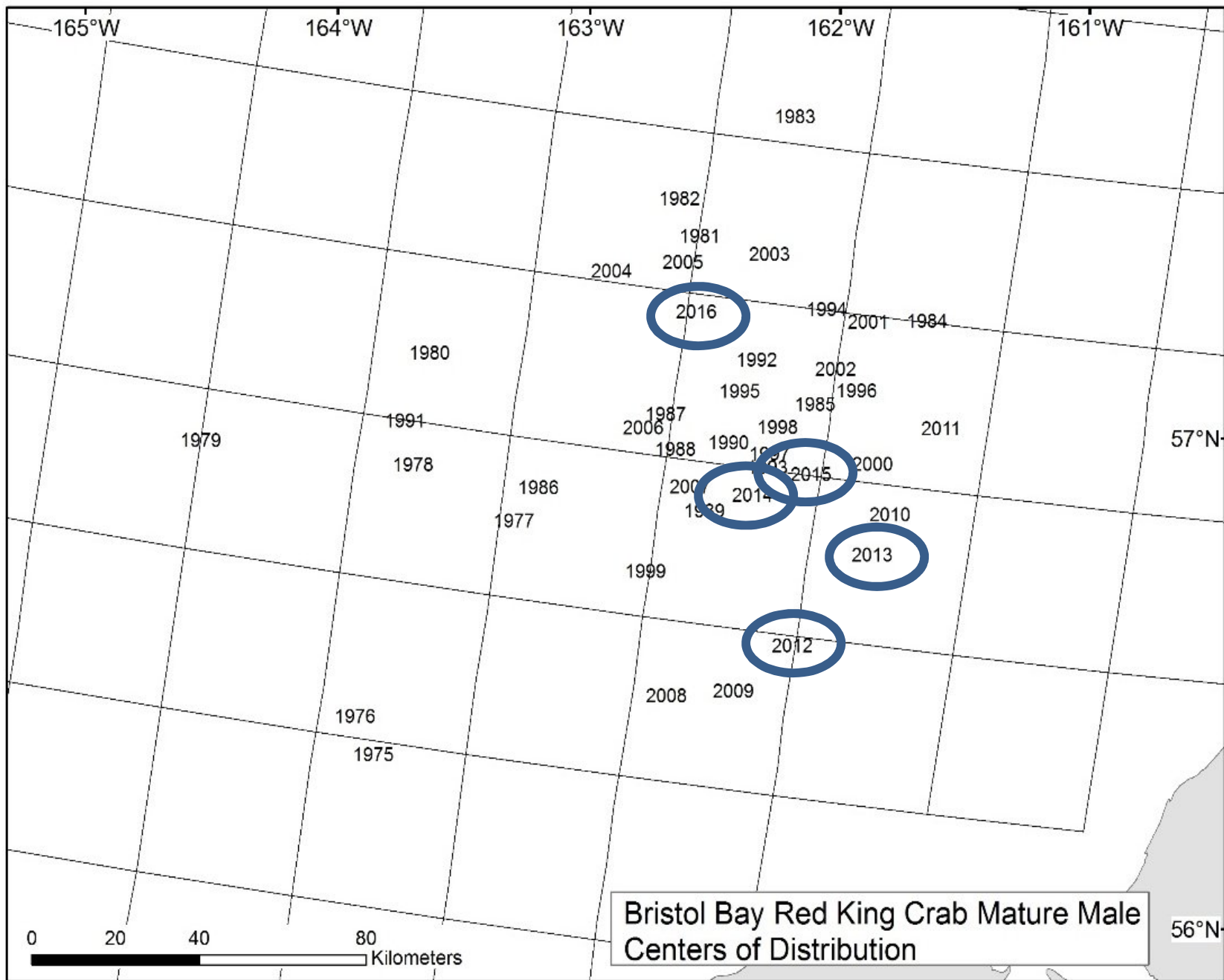
Bristol Bay red king crab (*Paralithodes camtschaticus*)

2016

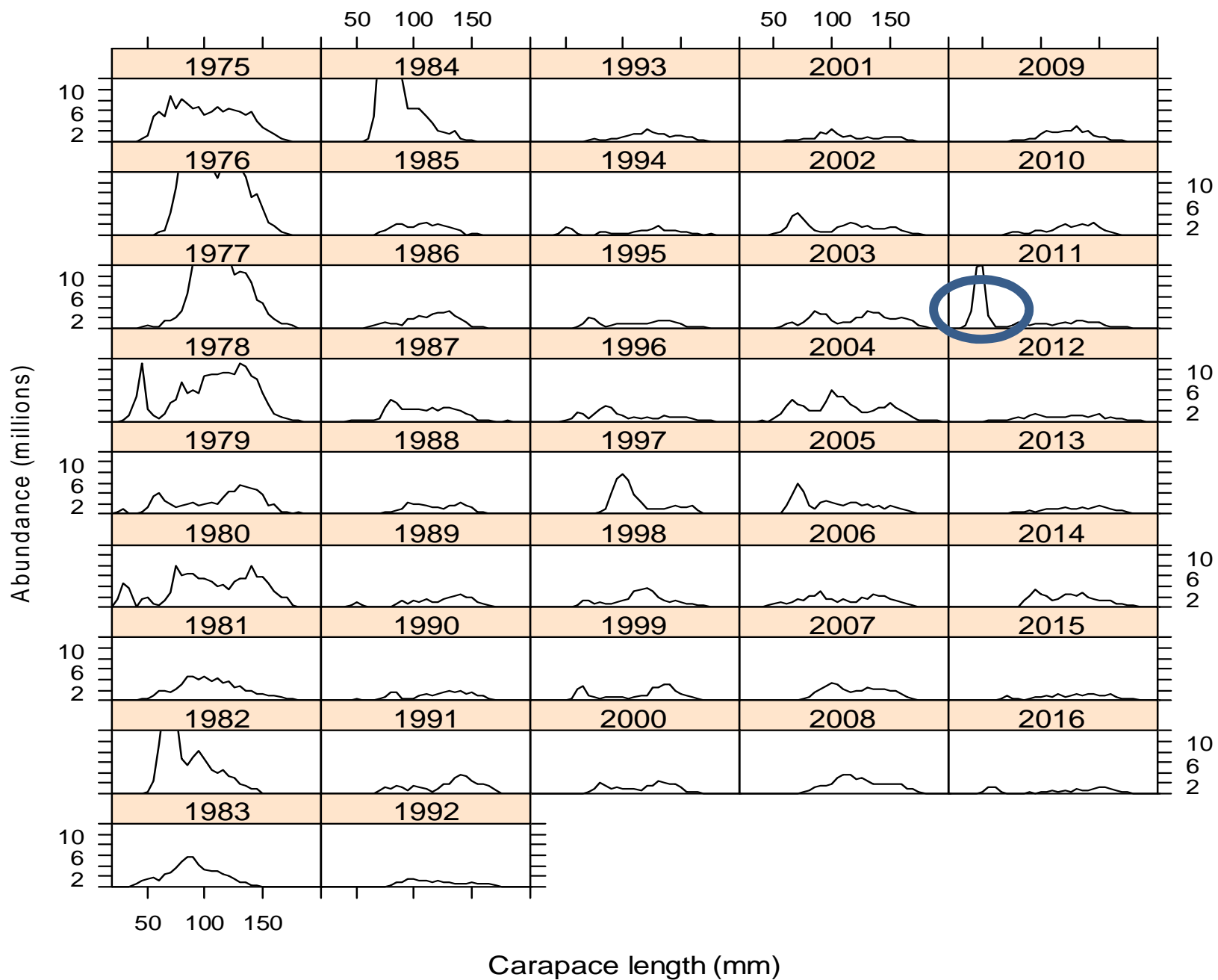


2015

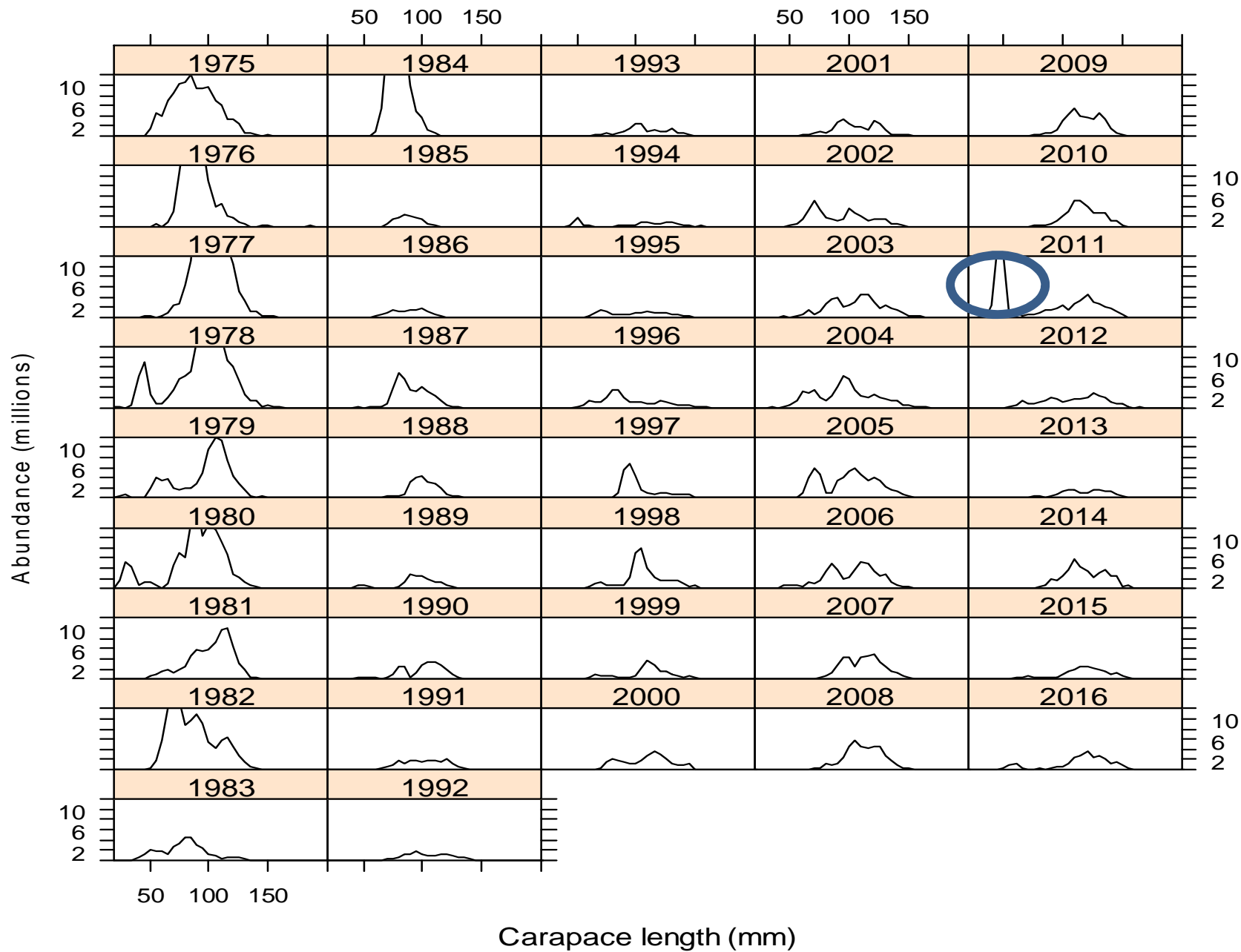




Bristol Bay Red King Crab (male)



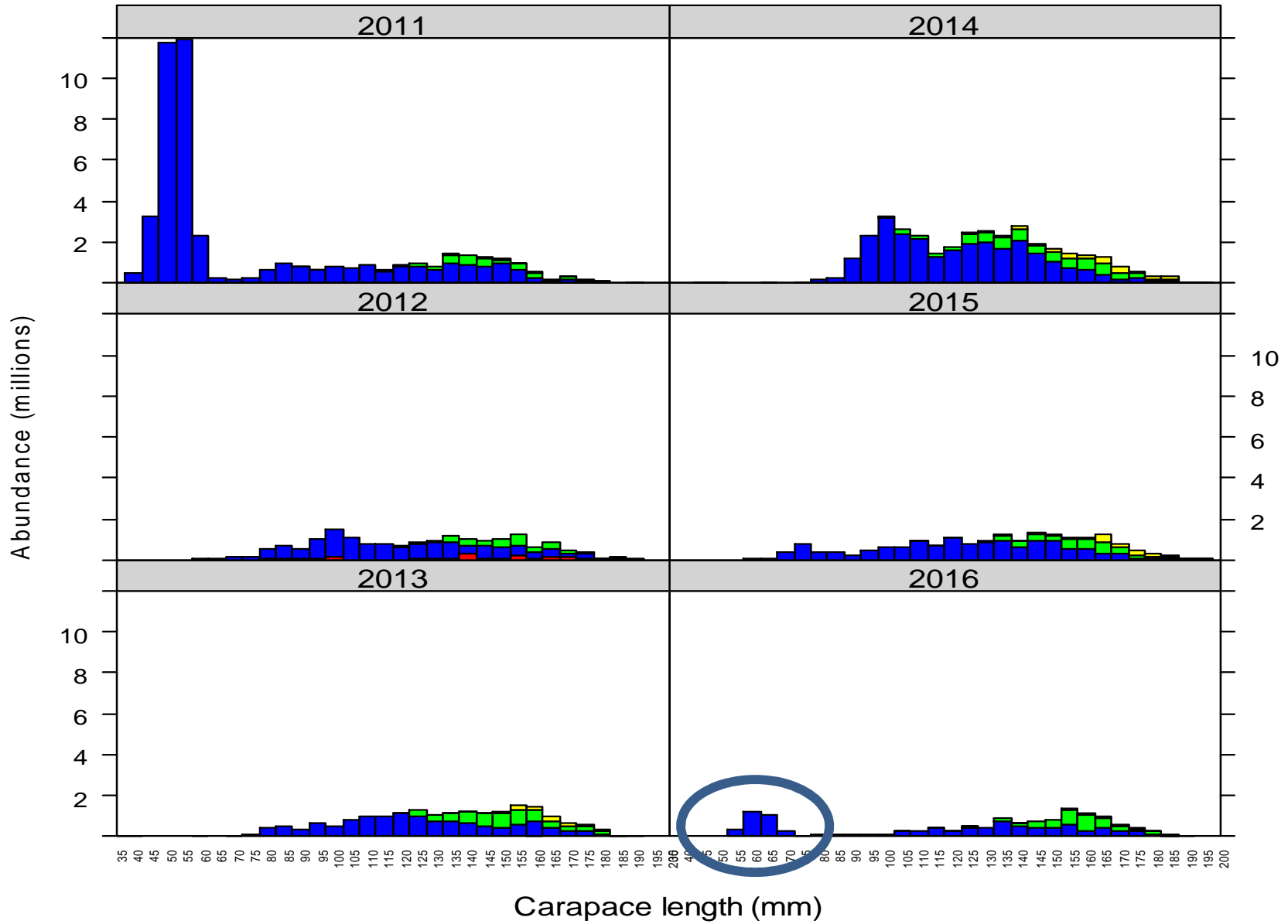
Bristol Bay Red King Crab (female)



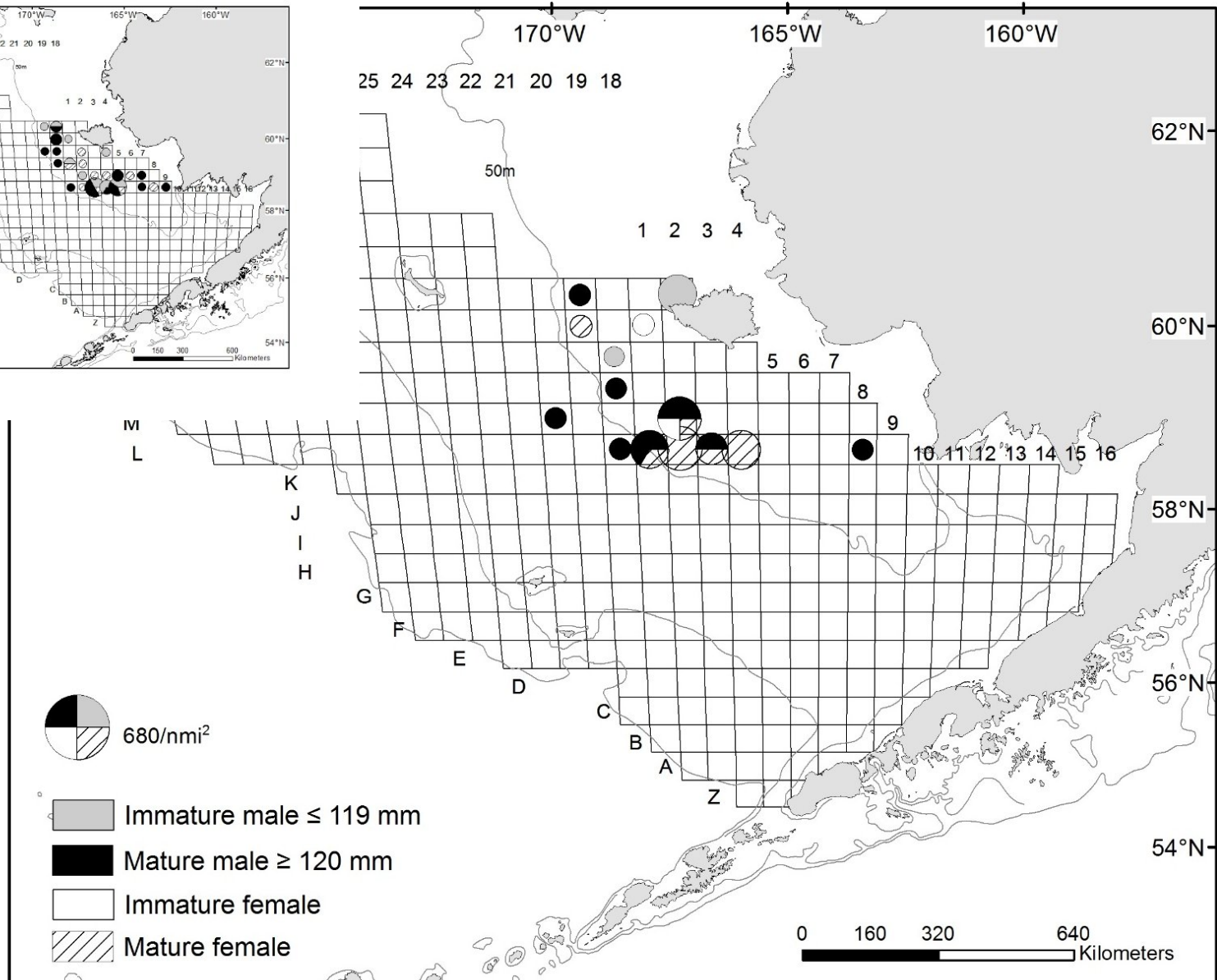
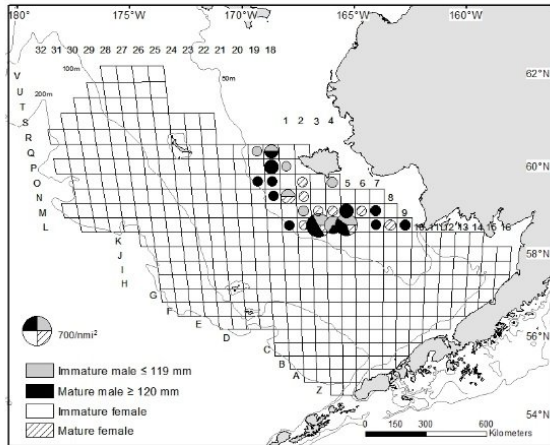
Bristol Bay Red King Crab (male)

Shell condition

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



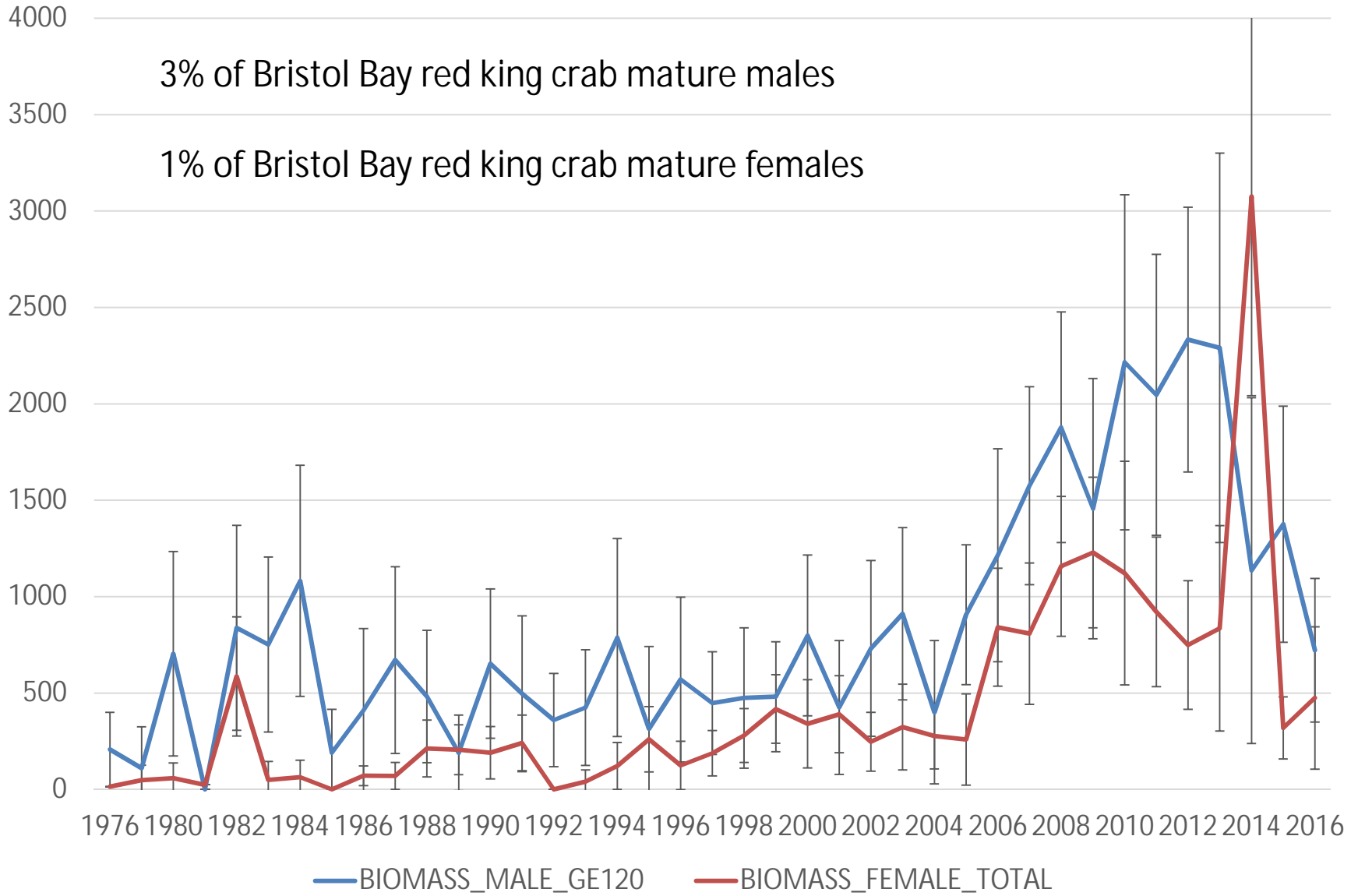
Unstratified red king crab (*Paralithodes camtschaticus*)



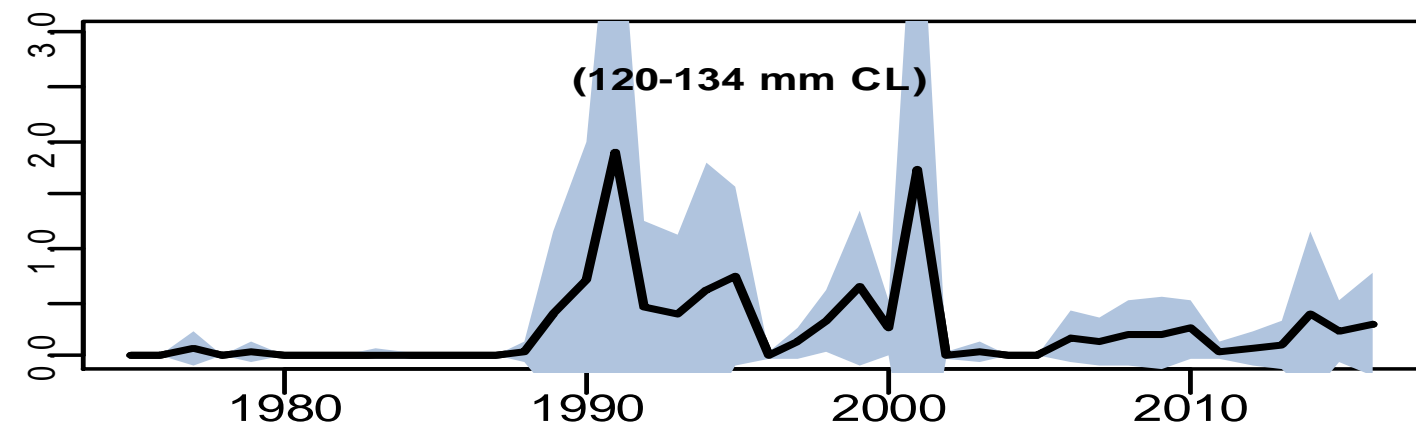
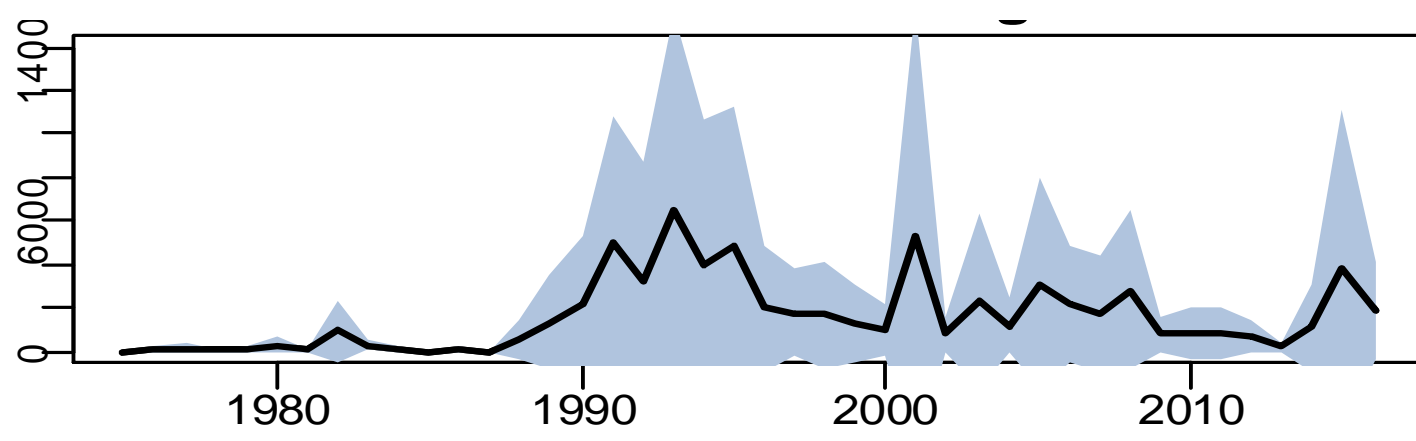
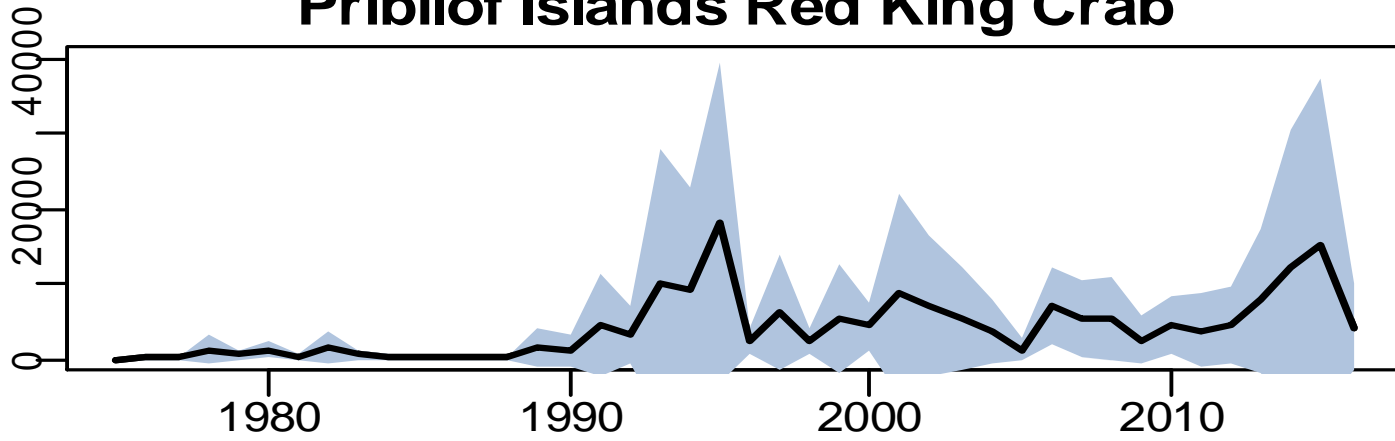
Unstratified red king crab (*Paralithodes camtschaticus*)

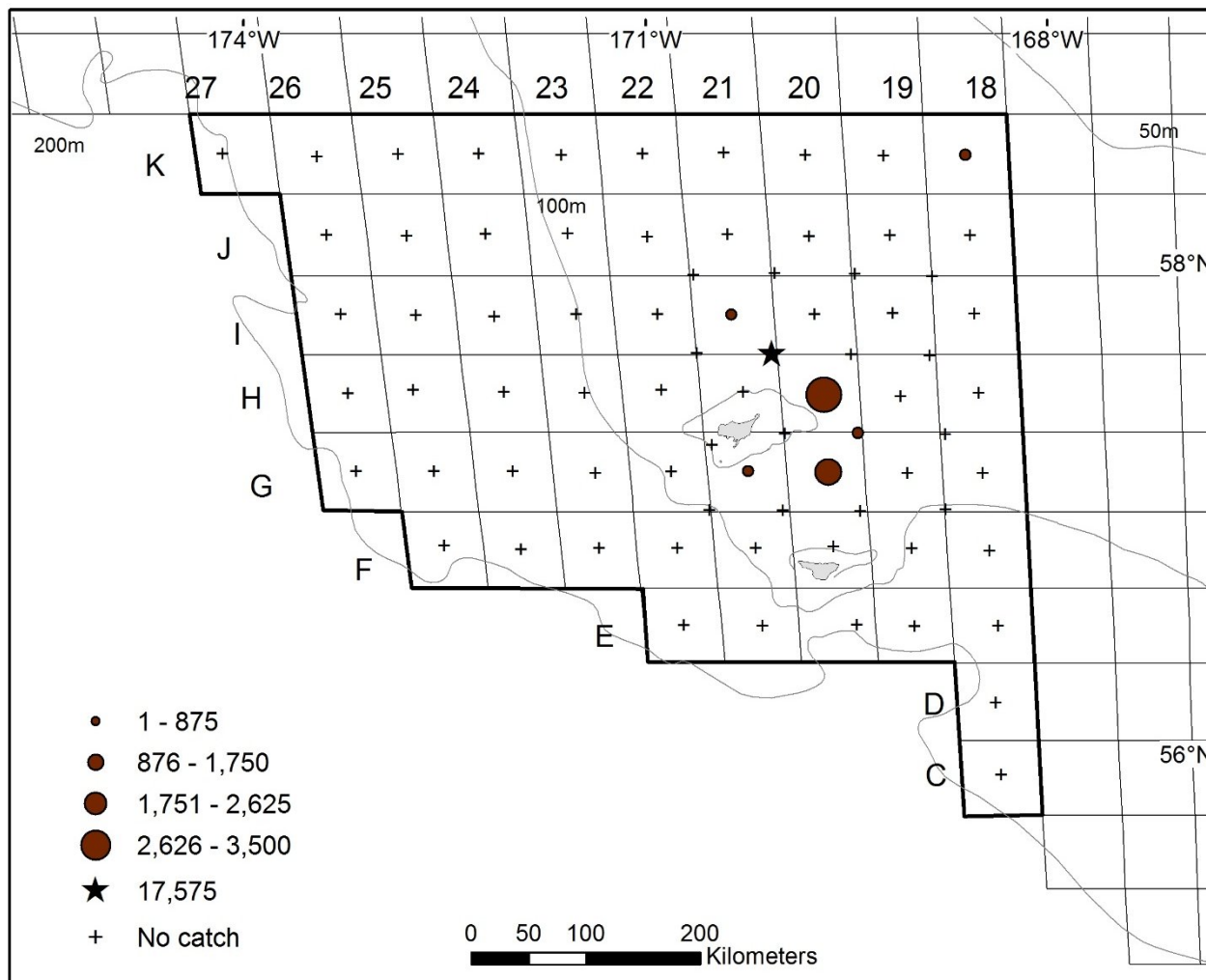
3% of Bristol Bay red king crab mature males

1% of Bristol Bay red king crab mature females

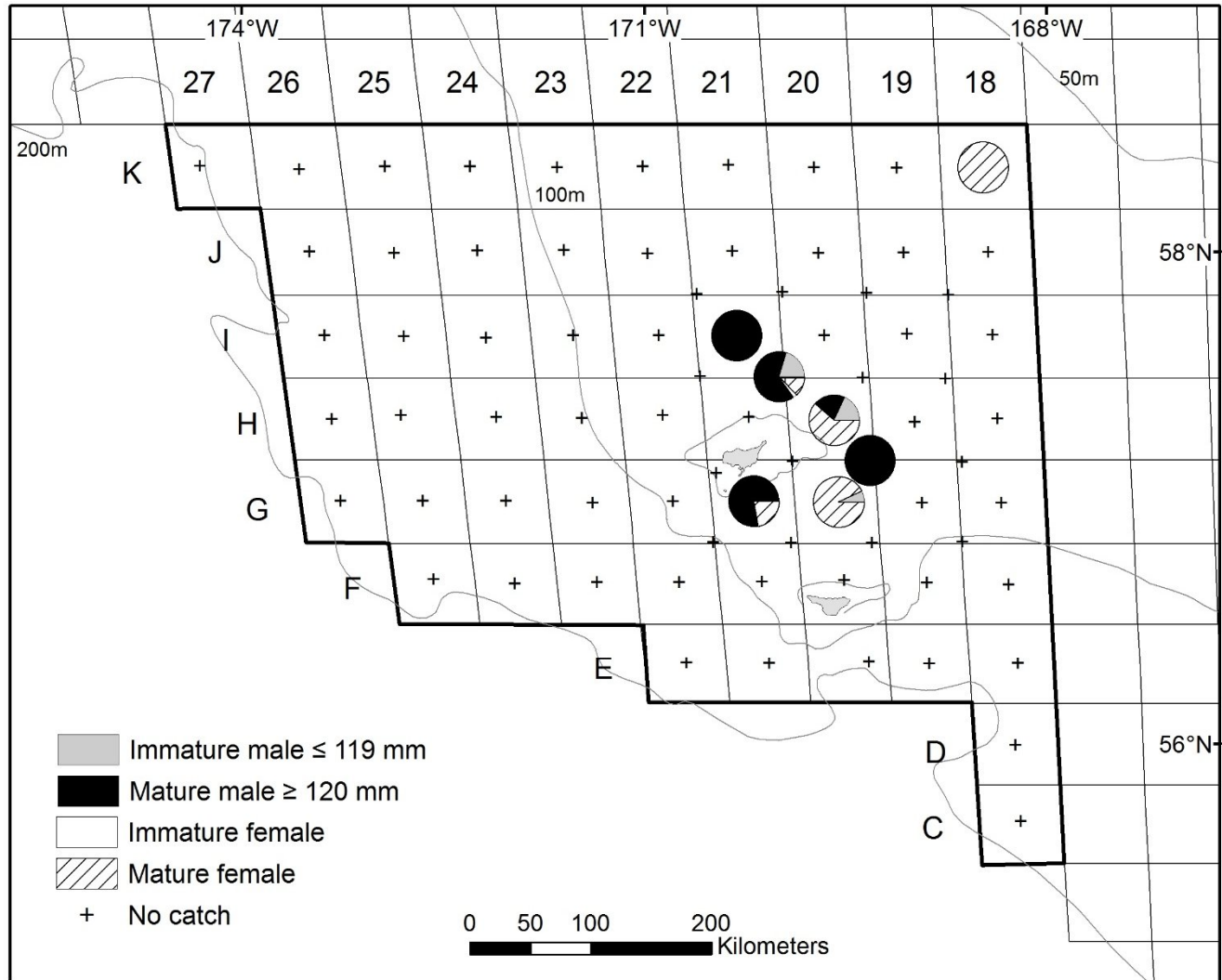


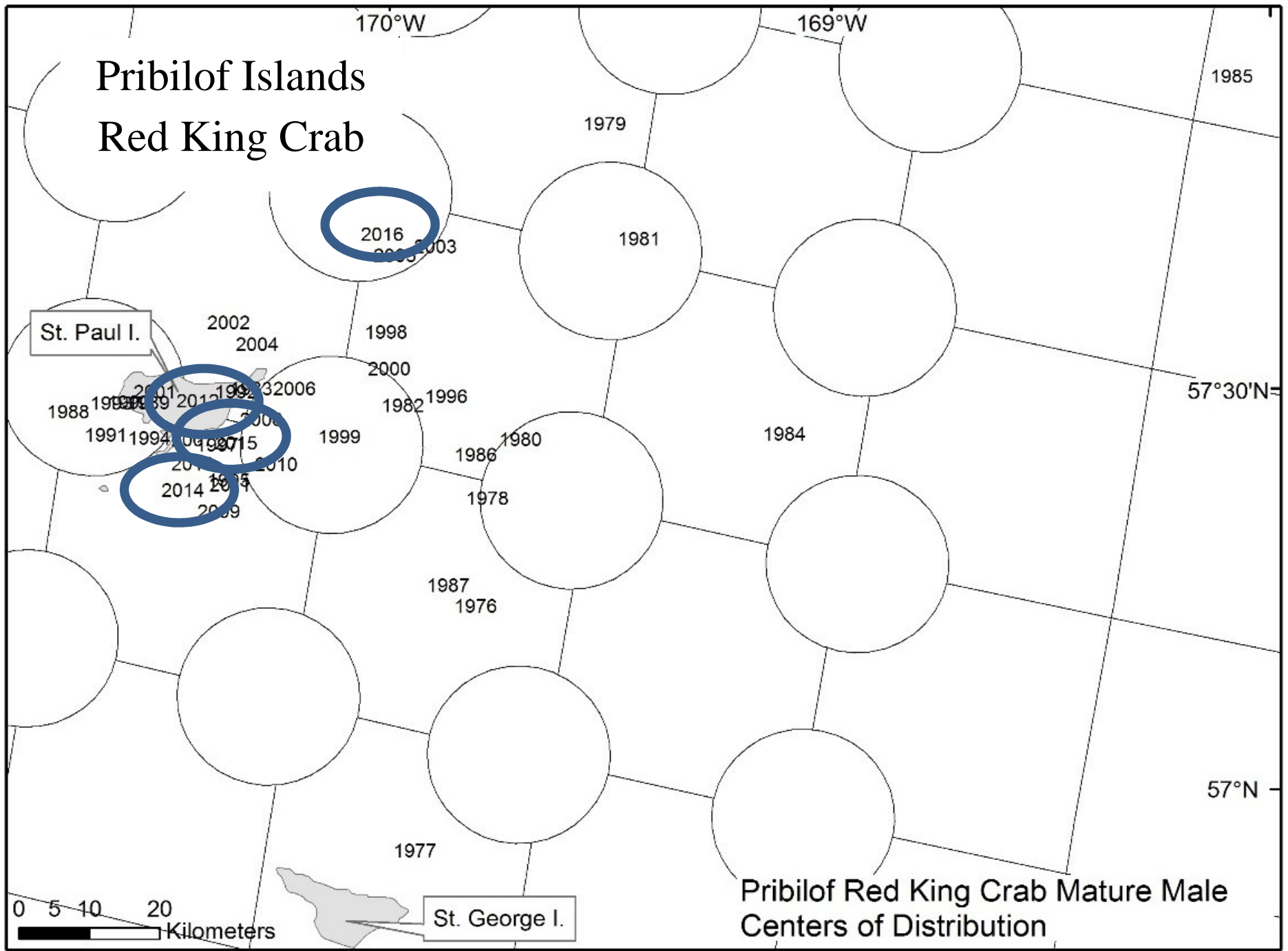
Pribilof Islands Red King Crab





73% of mature males at star

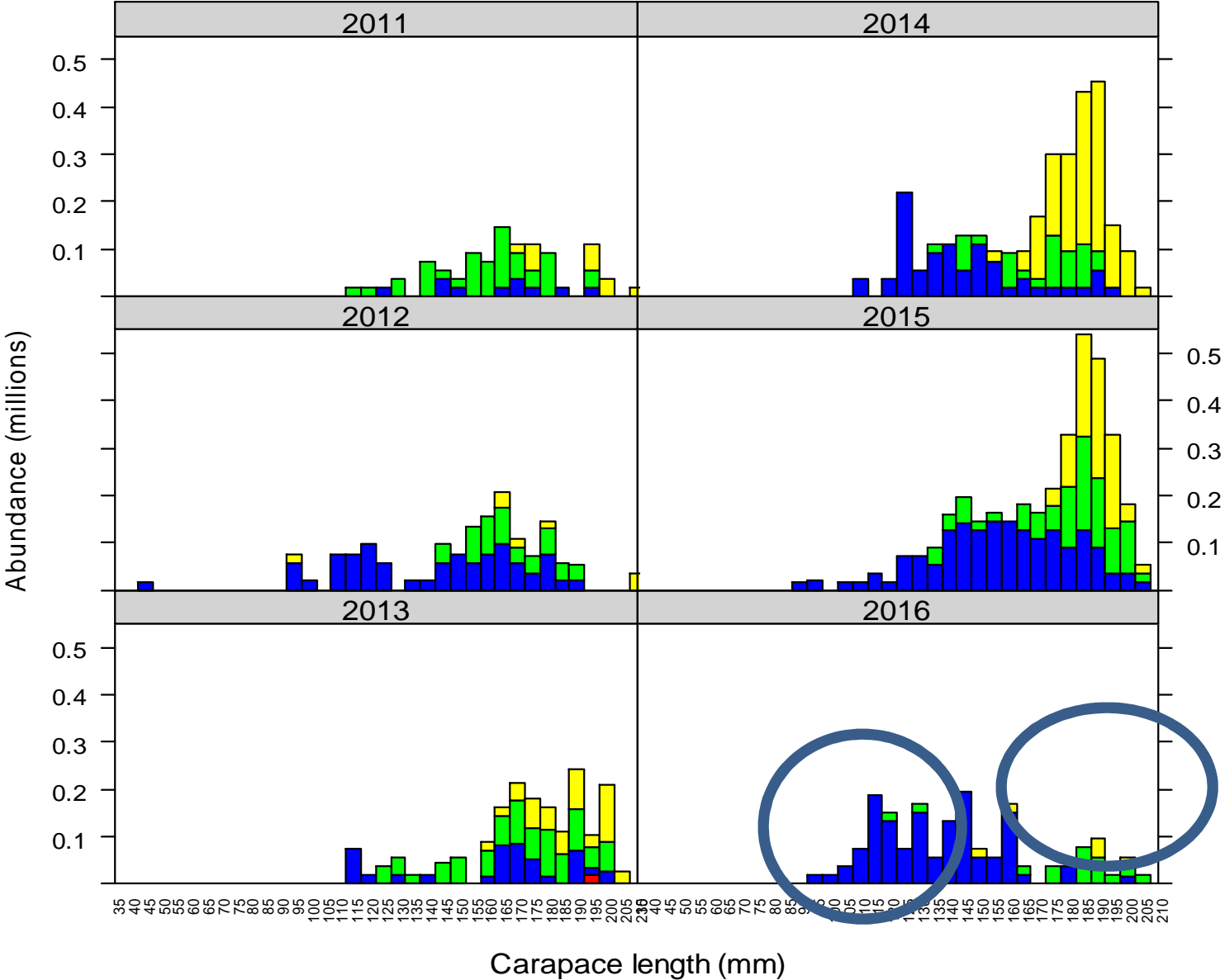




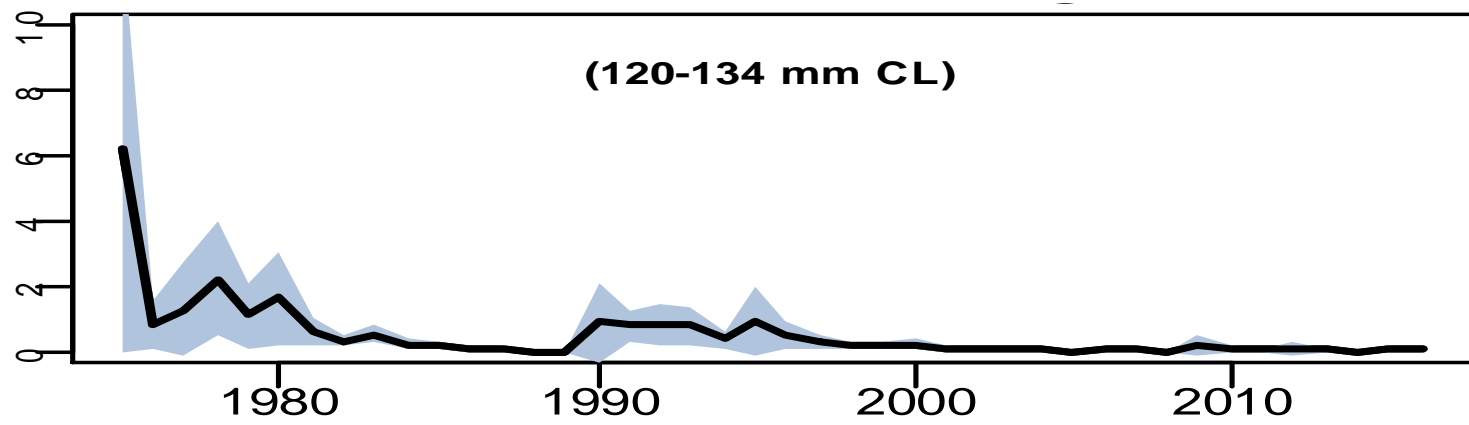
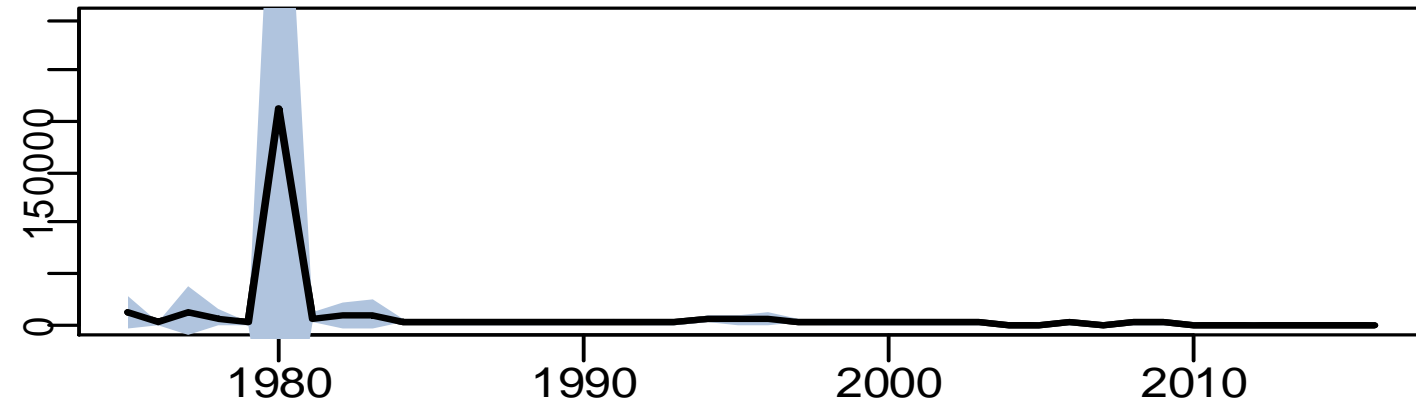
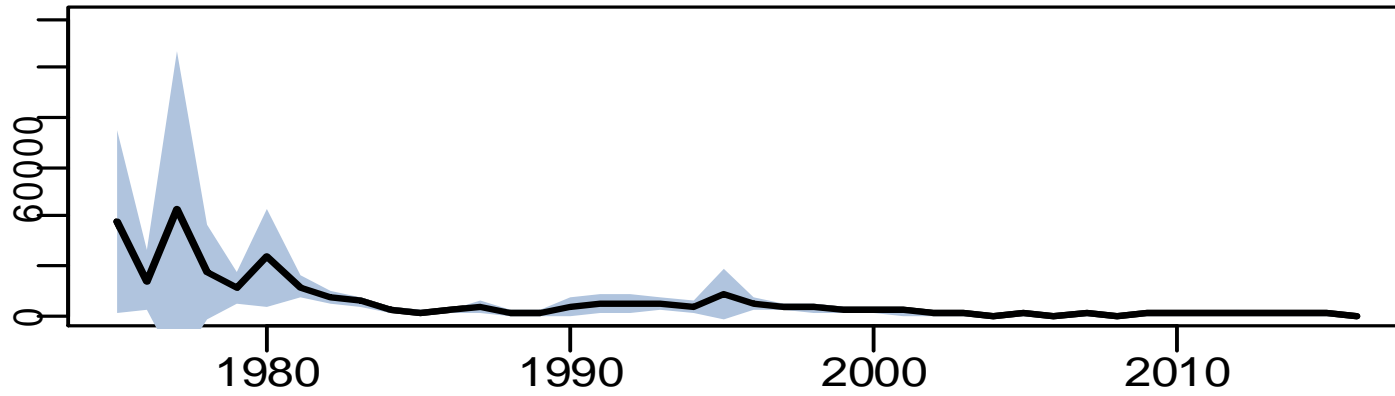
Pribilof Islands Red King Crab (male)

Shell condition

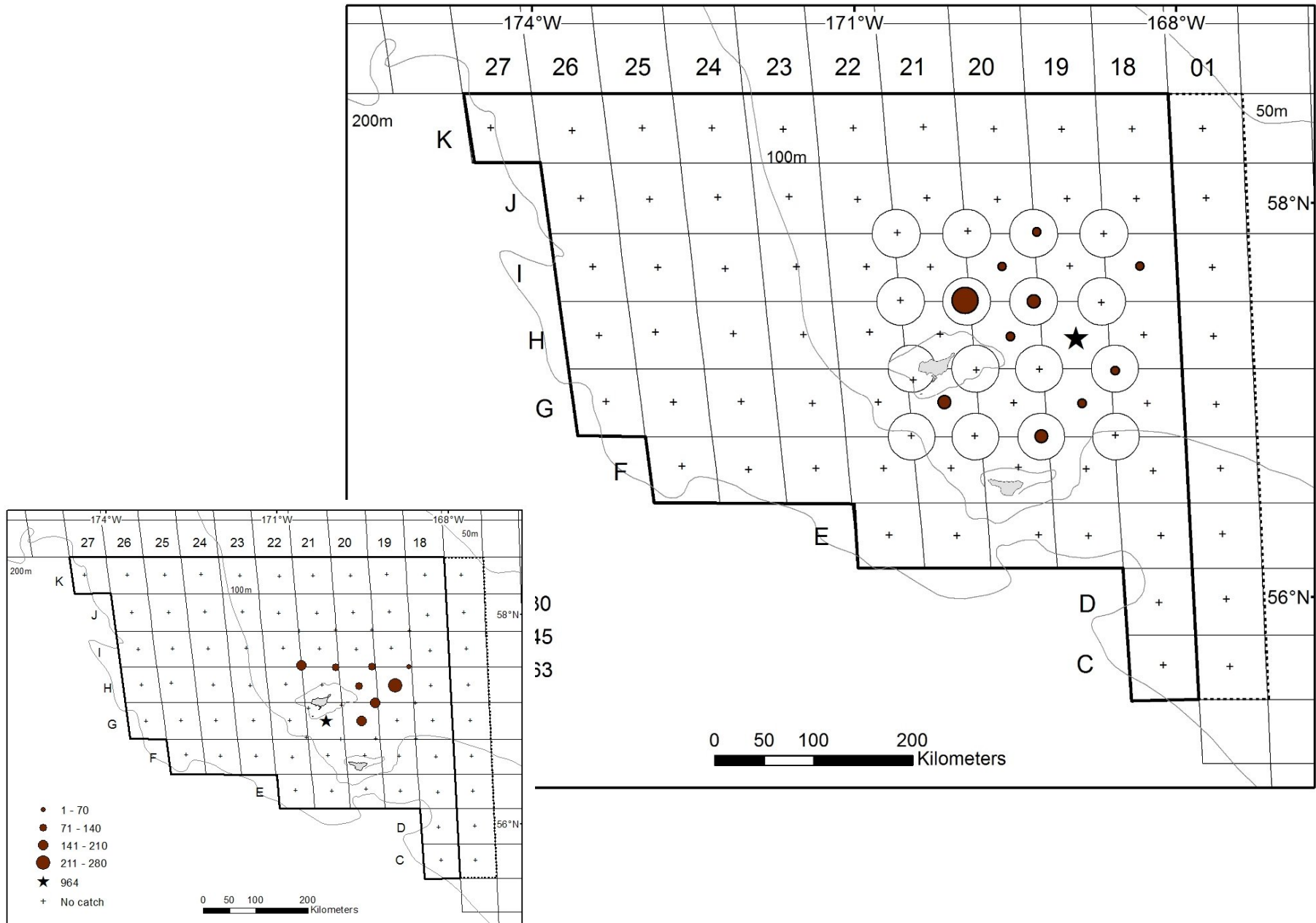
- Soft & molting ■
- New - hard ■
- Old ■
- Very old ■



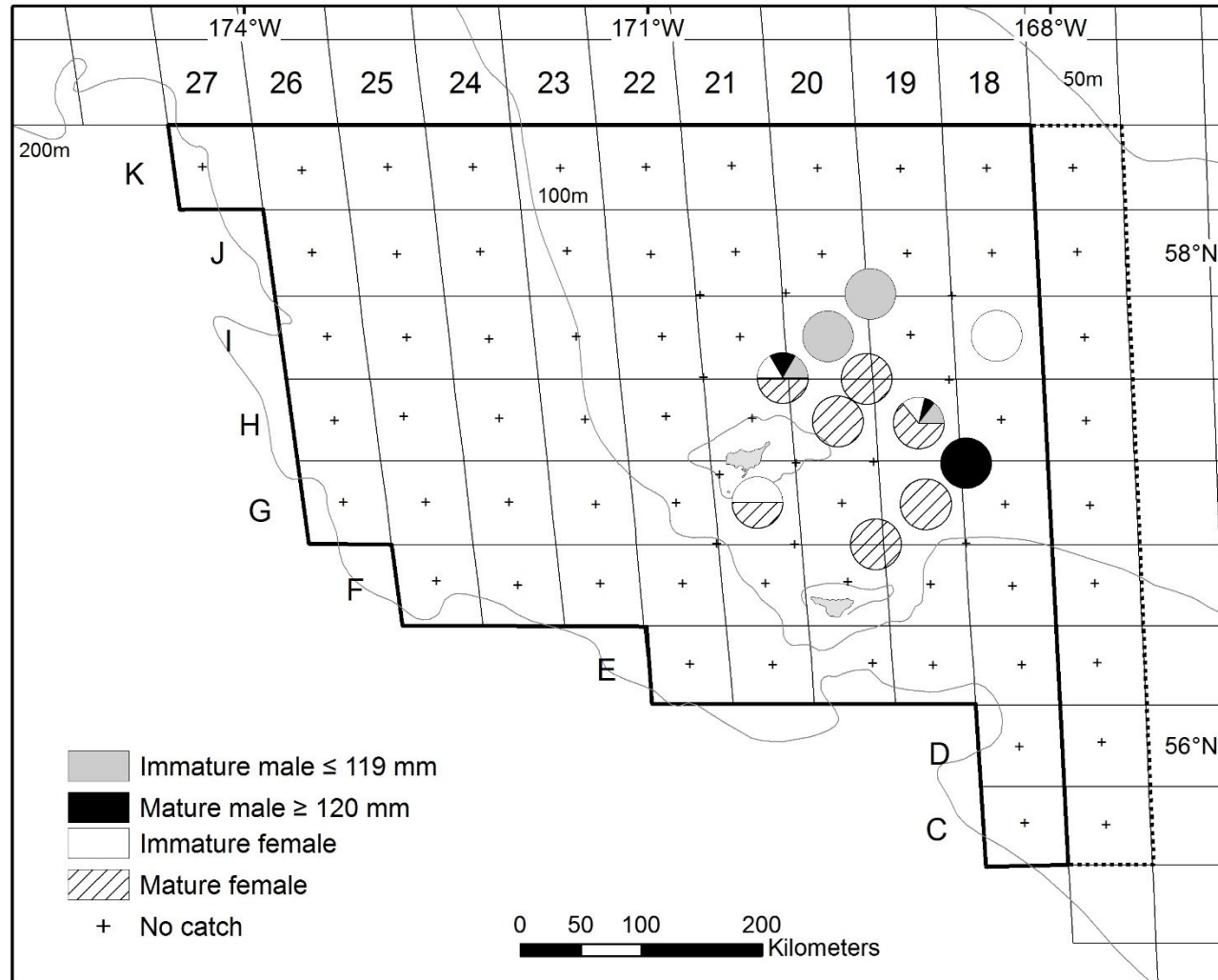
Pribilof Islands Blue King Crab



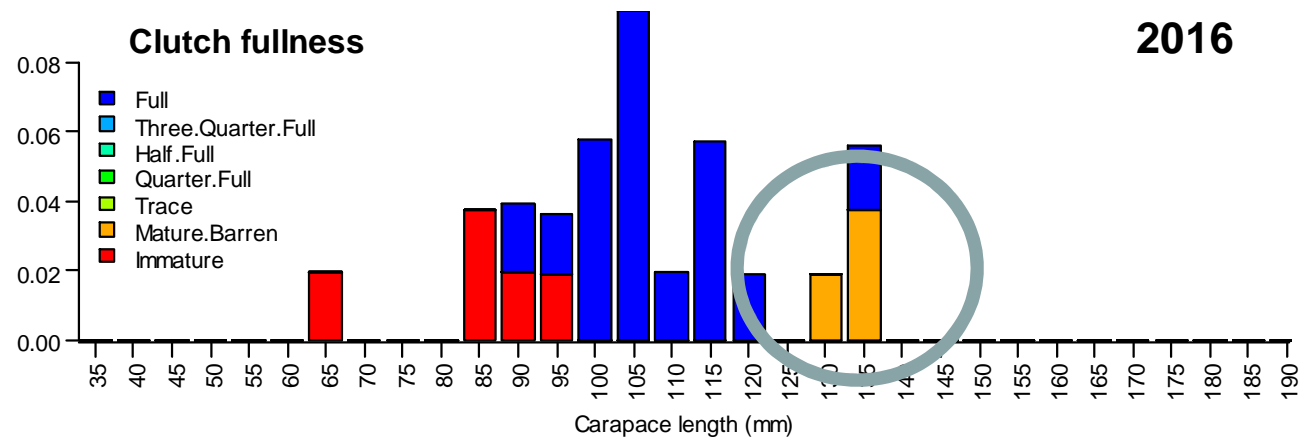
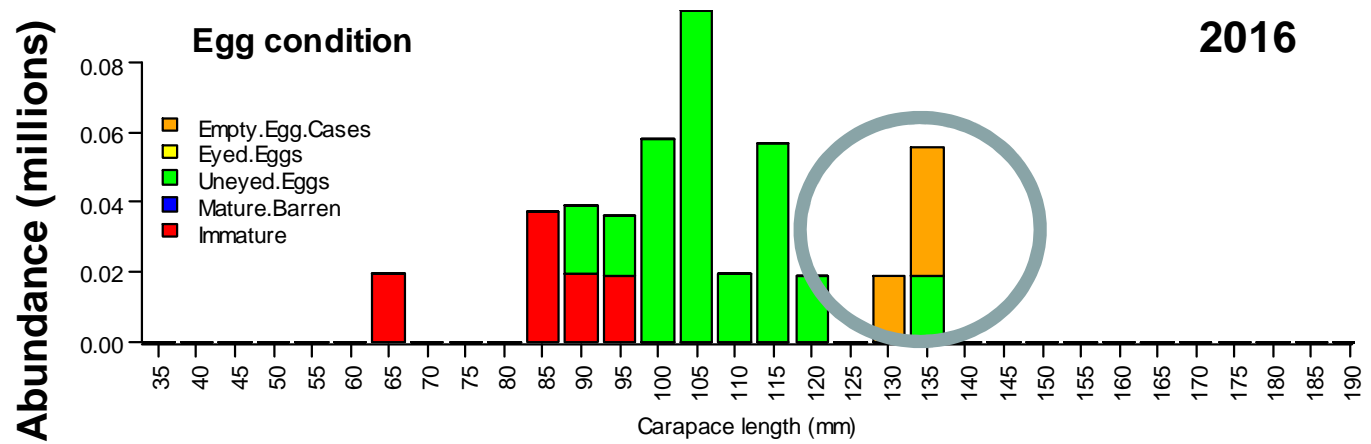
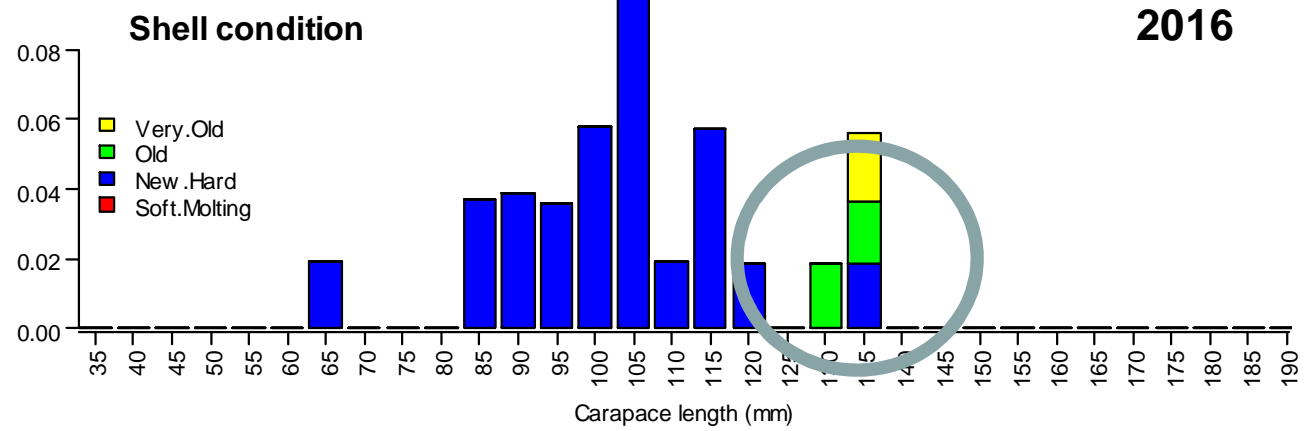
Pribilof Islands Blue King Crab



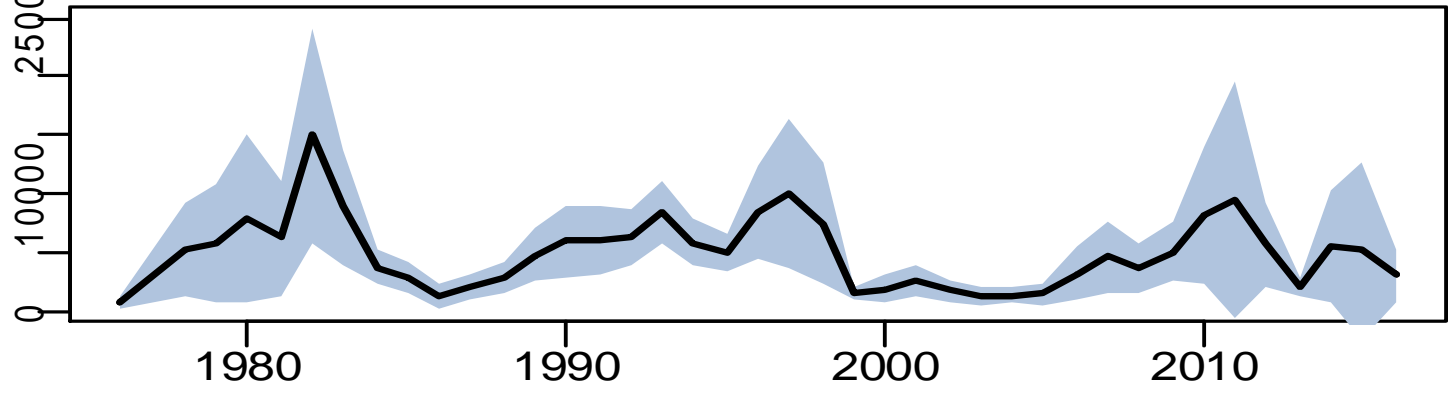
Pribilof Islands Blue King Crab



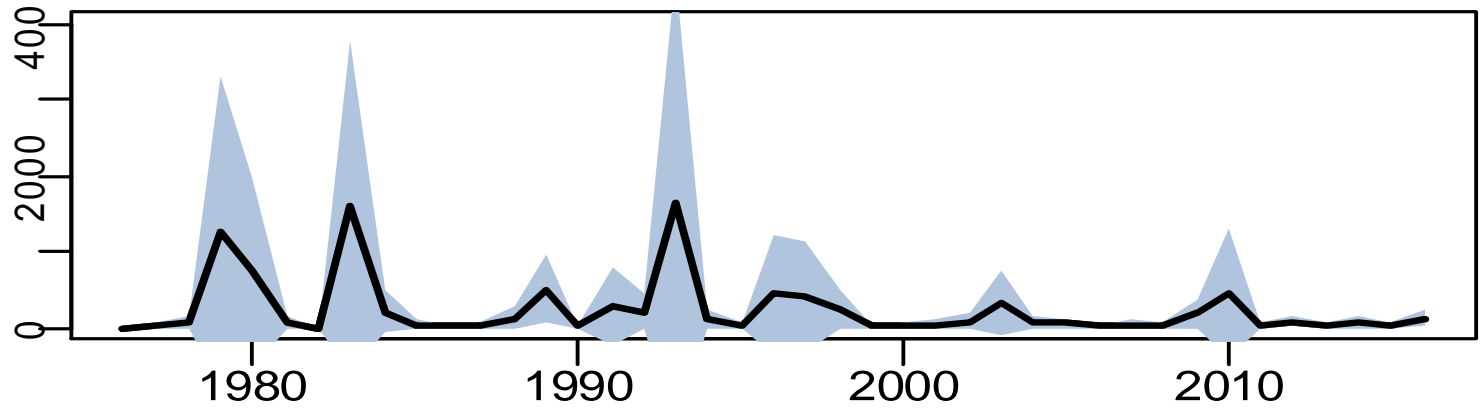
Pribilof Islands Blue King Crab



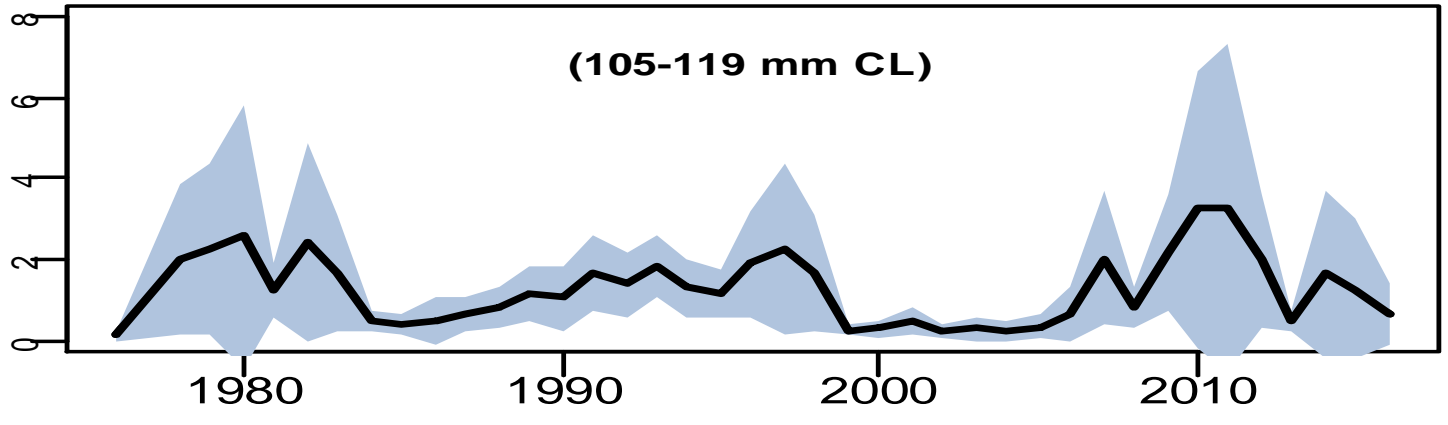
St. Matthew Is. Blue King Crab



Mature male biomass (t)
-40%

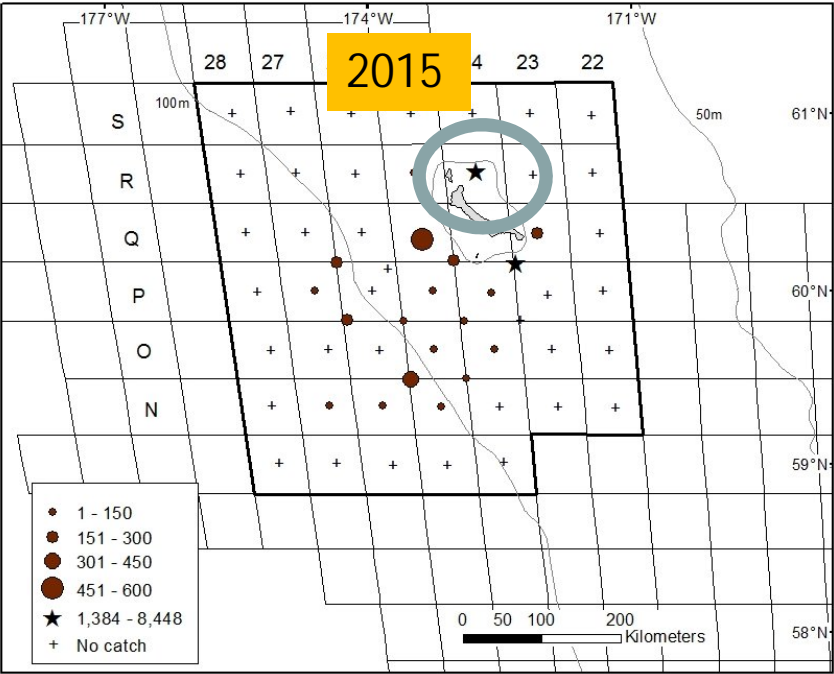
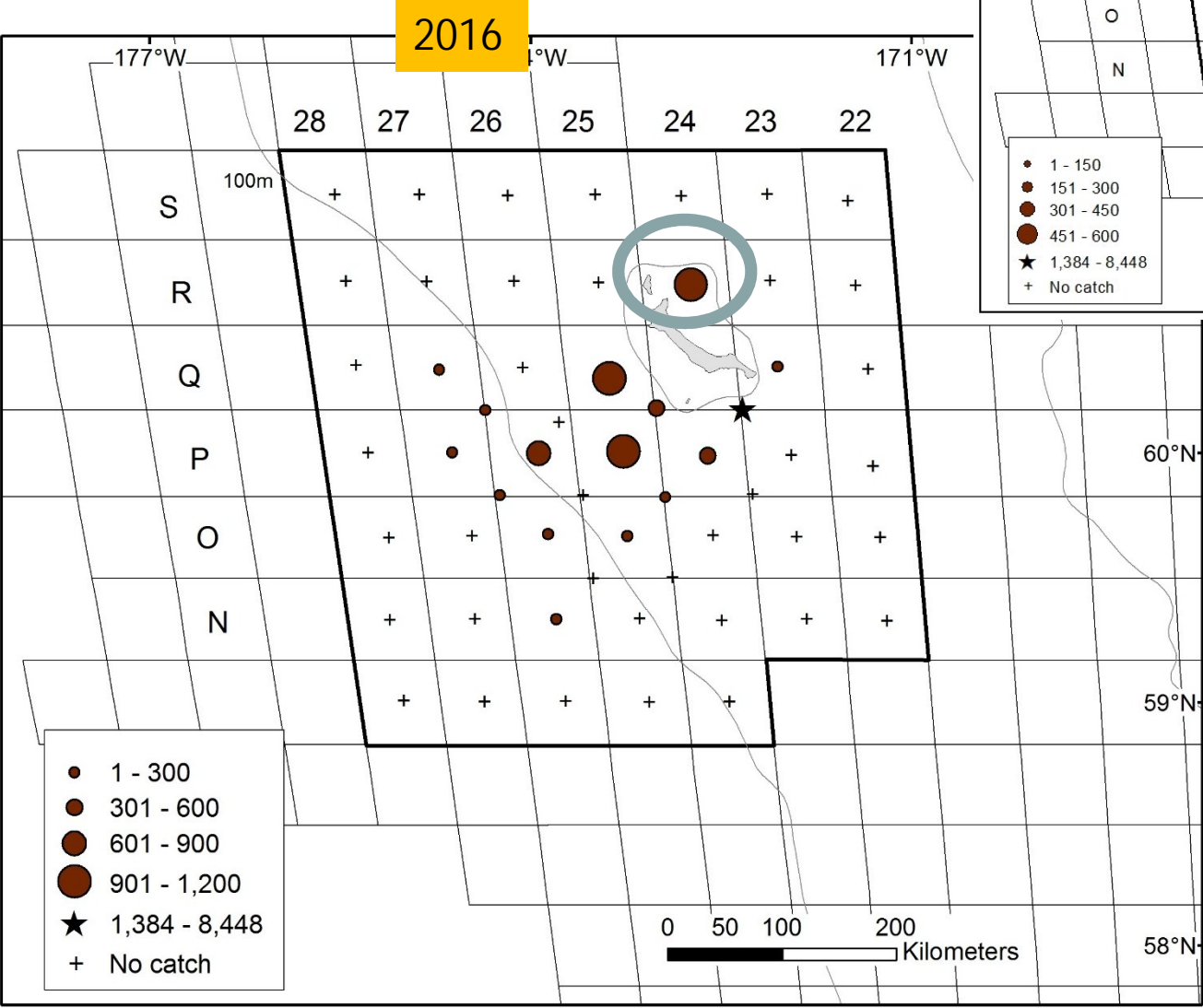


Mature female biomass (t)

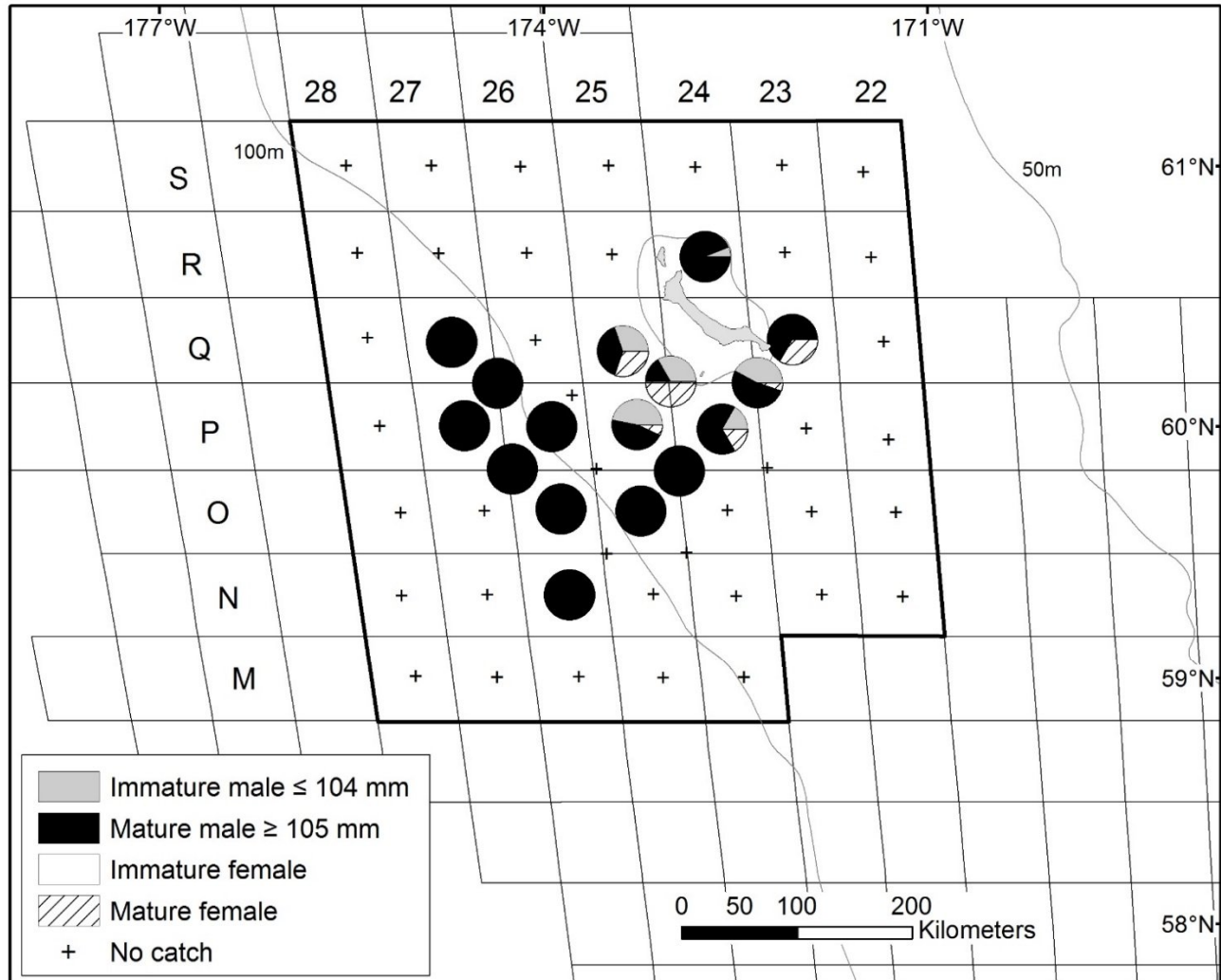


Juvenile abundance (millions)

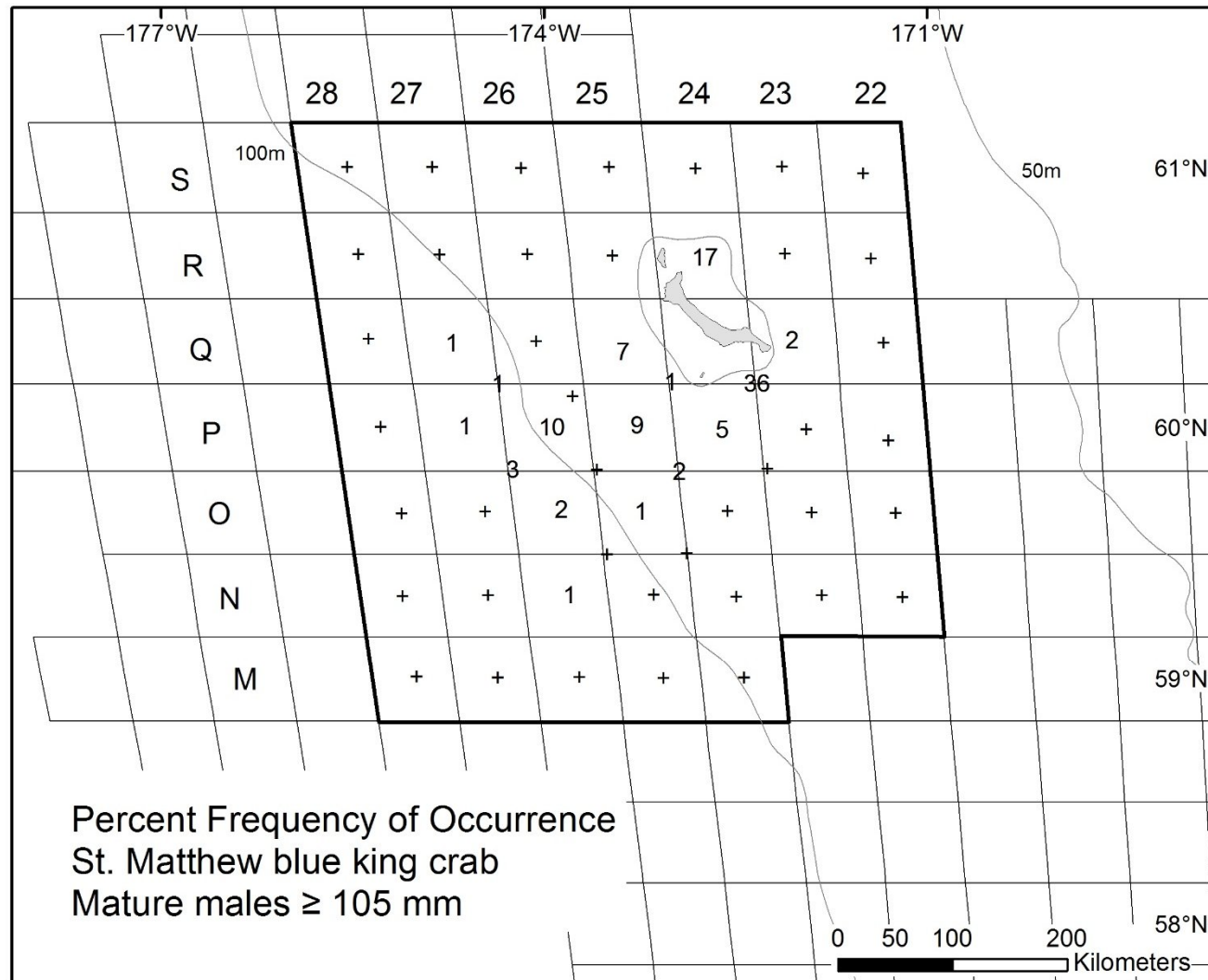
St Matthew Island blue king crab



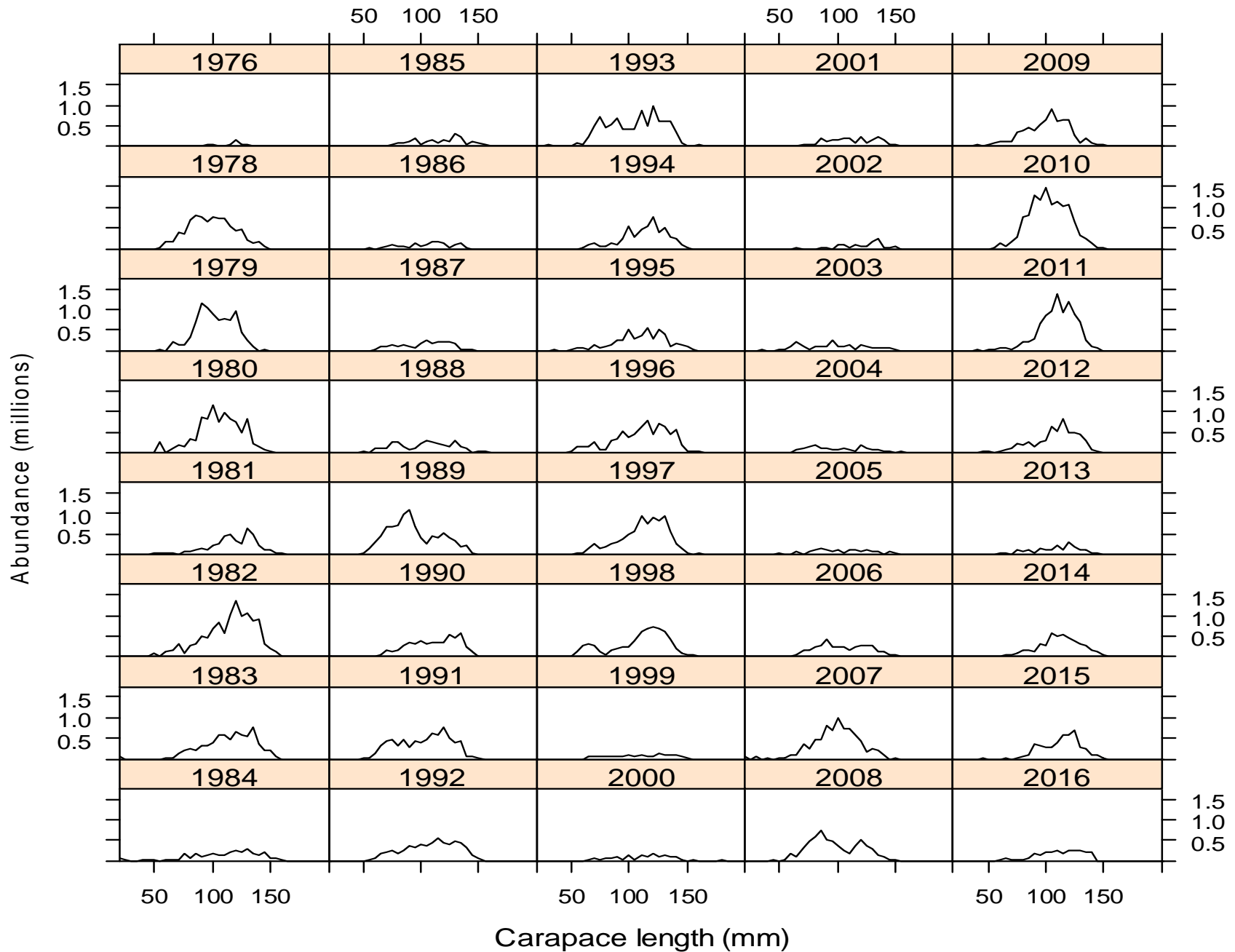
St Matthew Island blue king crab



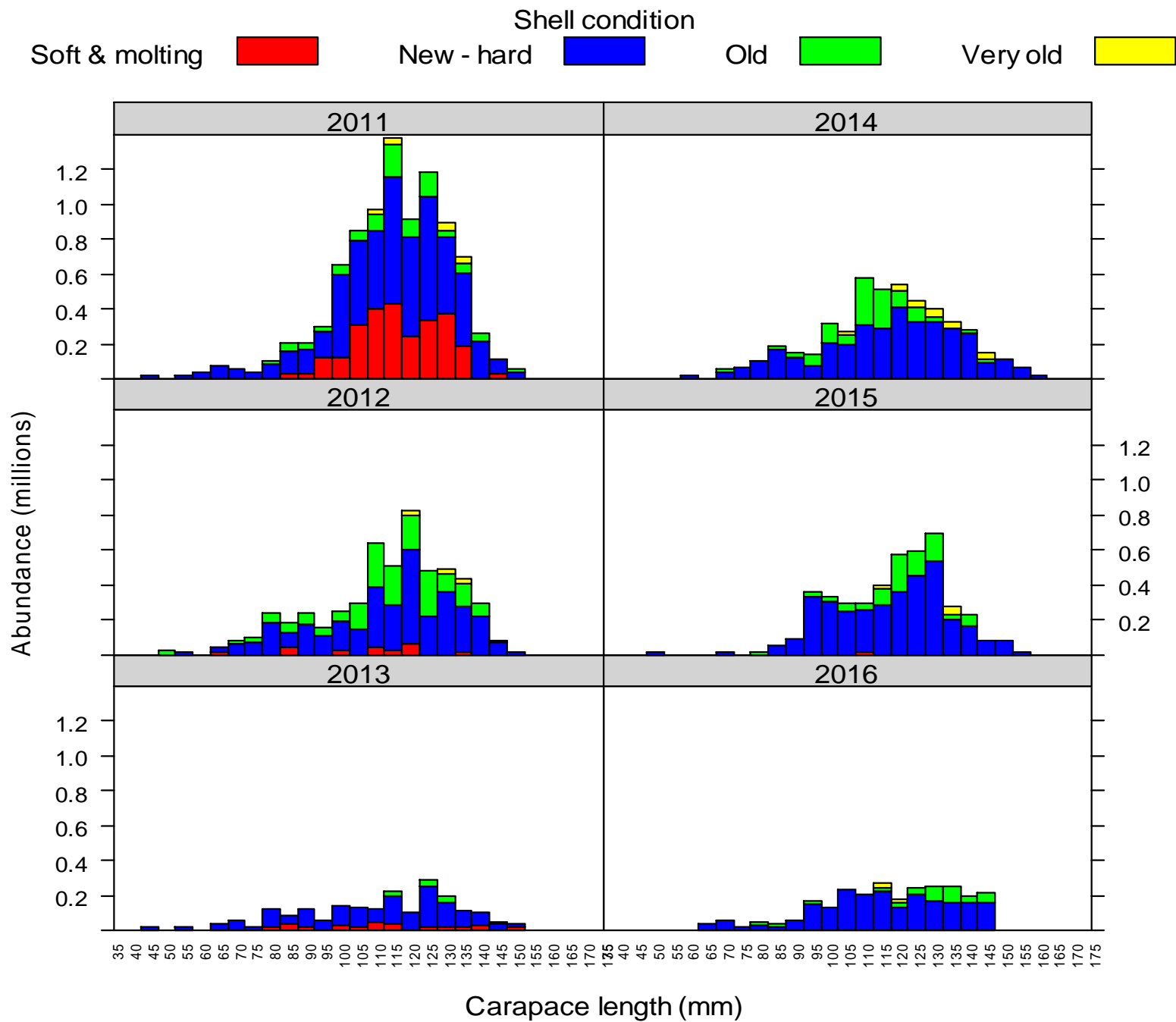
St Matthew Island blue king crab



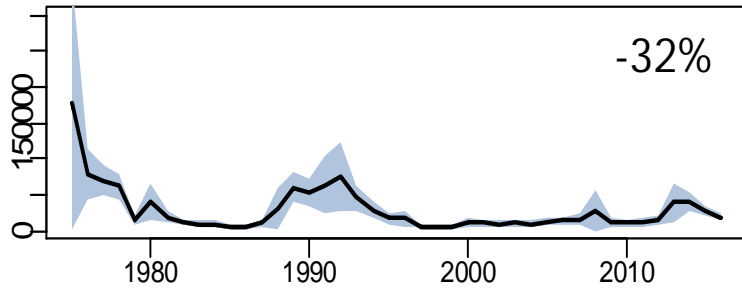
St. Matthew Island Blue King Crab (male)



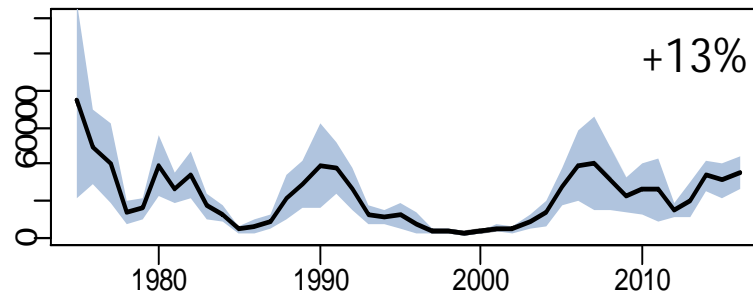
St. Matthew Island Blue King Crab (male)



Tanner Crab east of 166° W

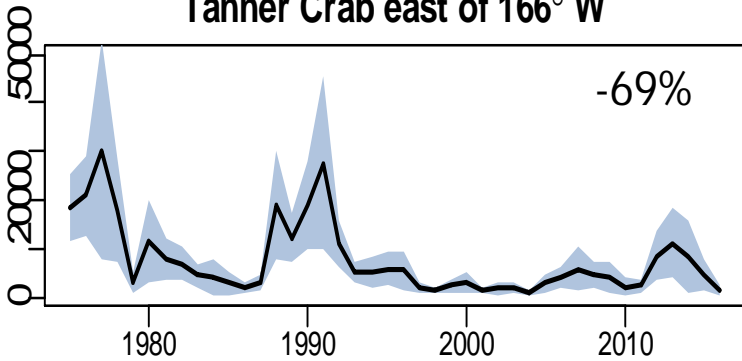


Tanner Crab west of 166° W

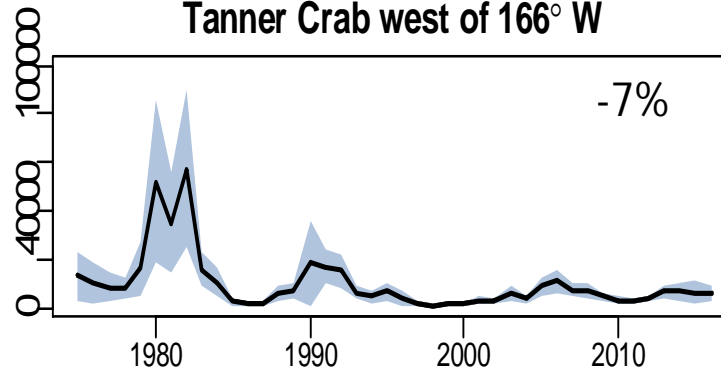


Mature male biomass (t)

Tanner Crab east of 166° W

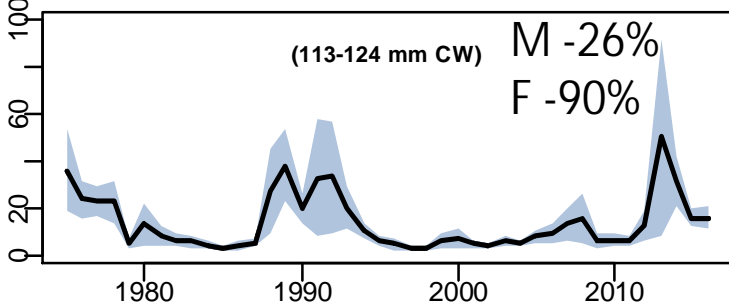


Tanner Crab west of 166° W

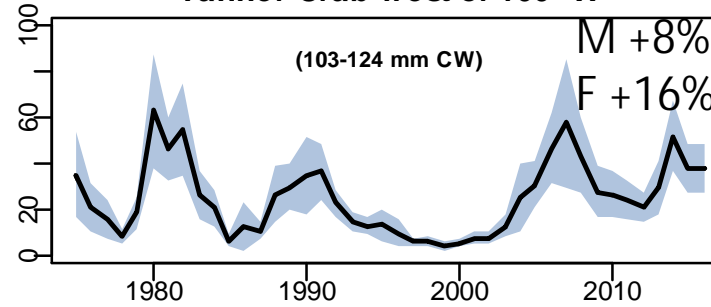


Mature females biomass (t)

Tanner Crab east of 166° W

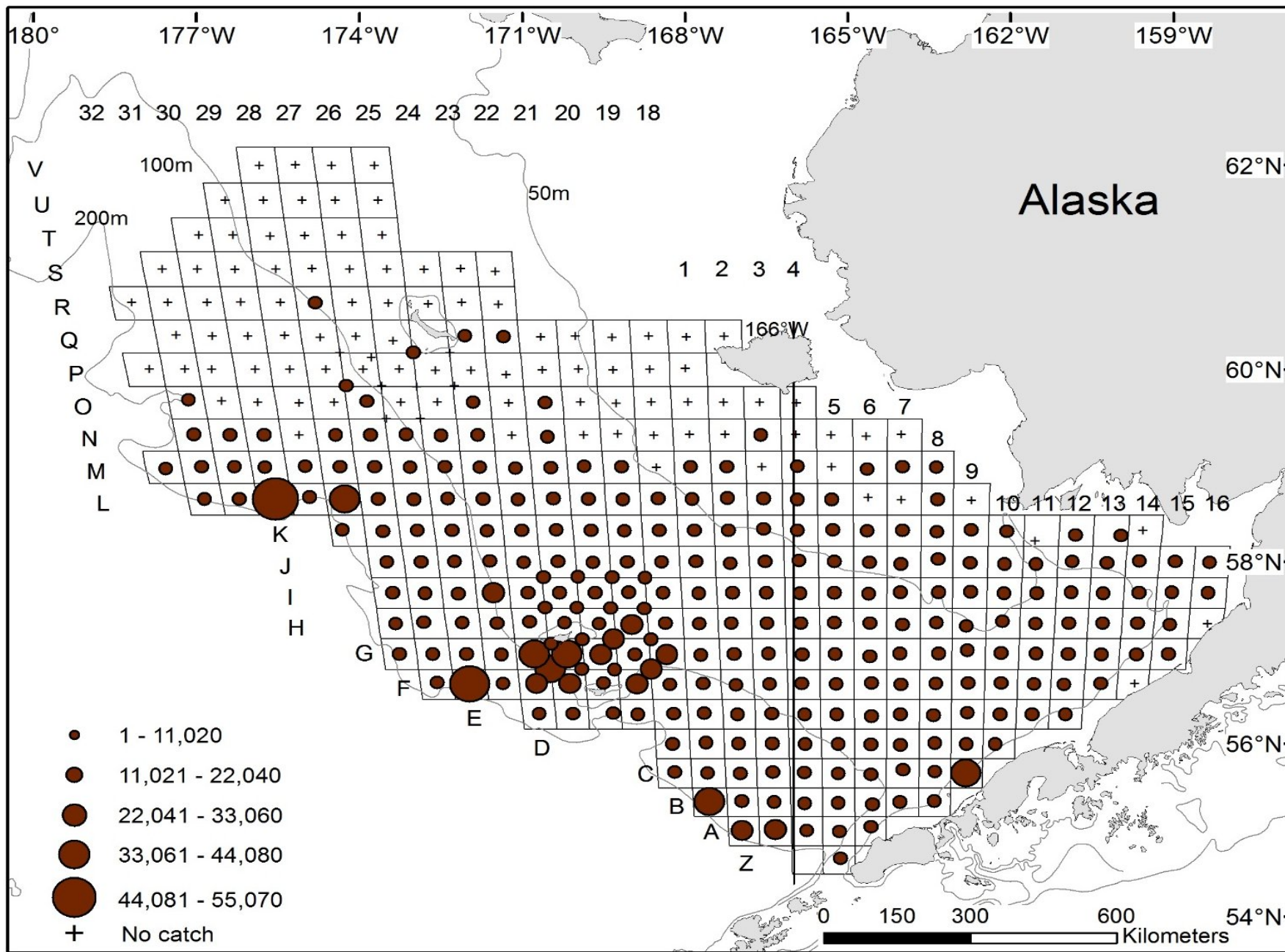


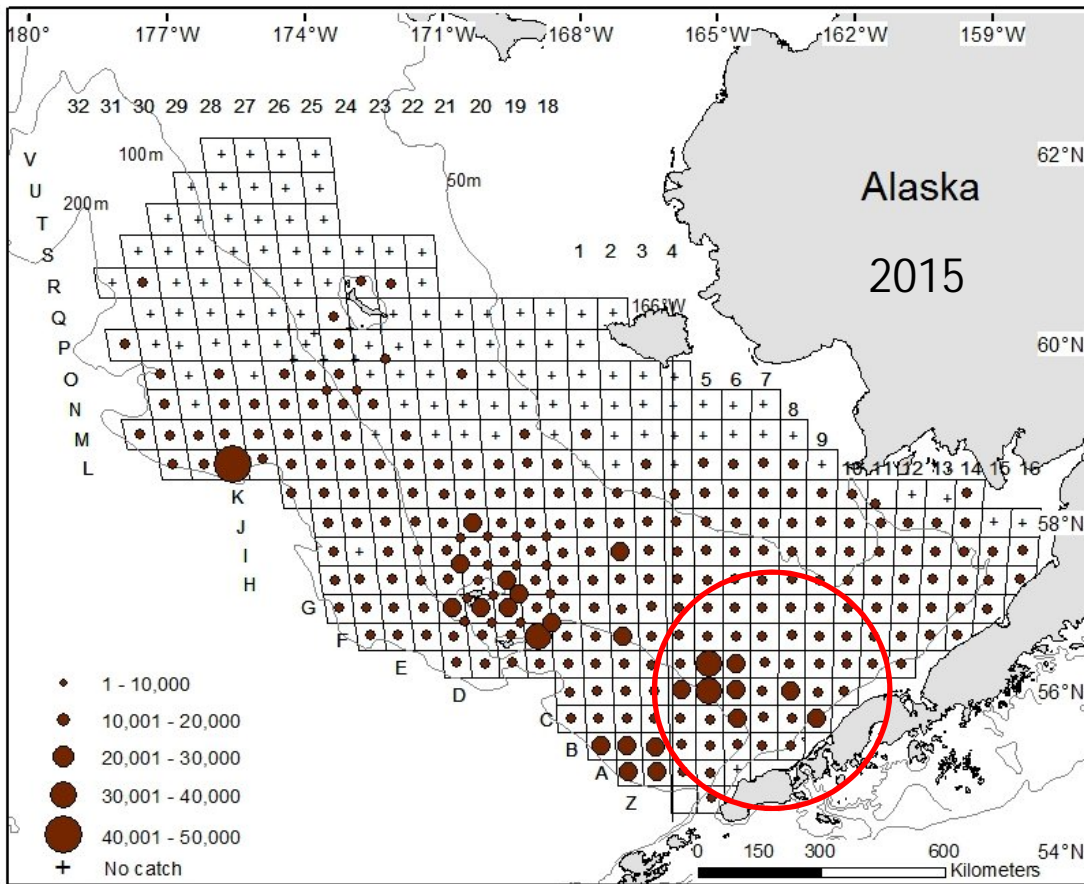
Tanner Crab west of 166° W



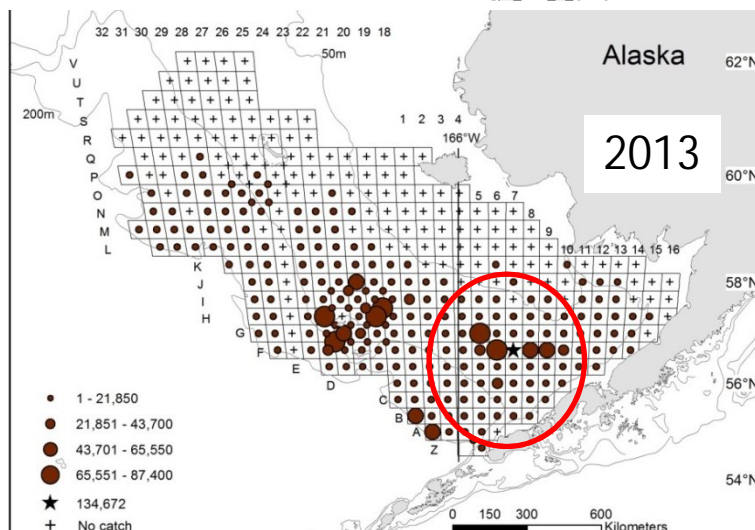
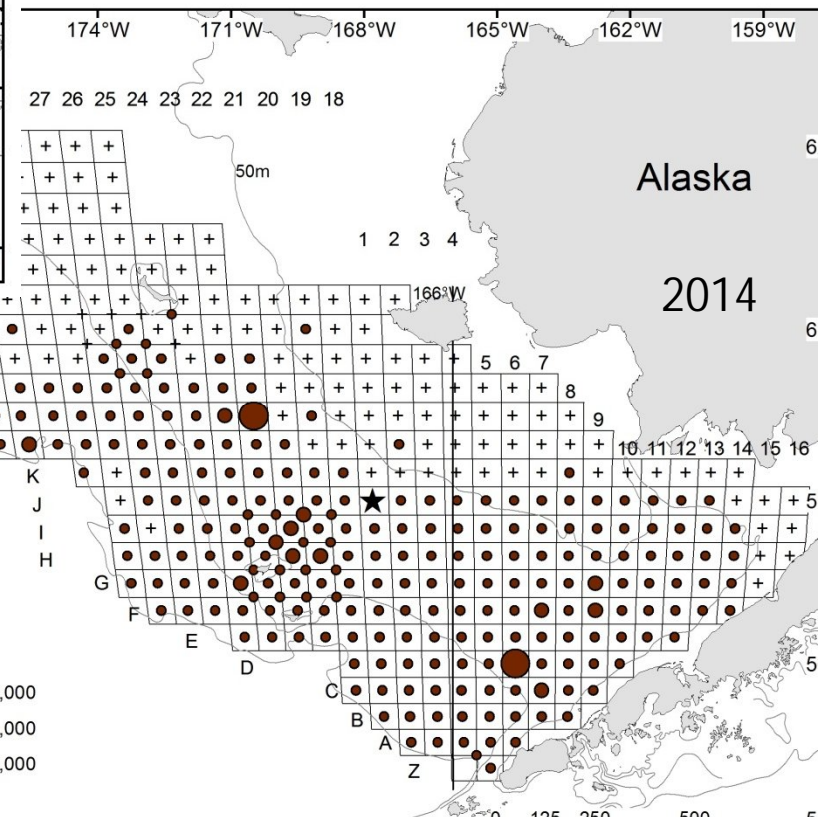
Juvenile abundance (millions)

Tanner crab (*Chionoecetes bairdi*) total density

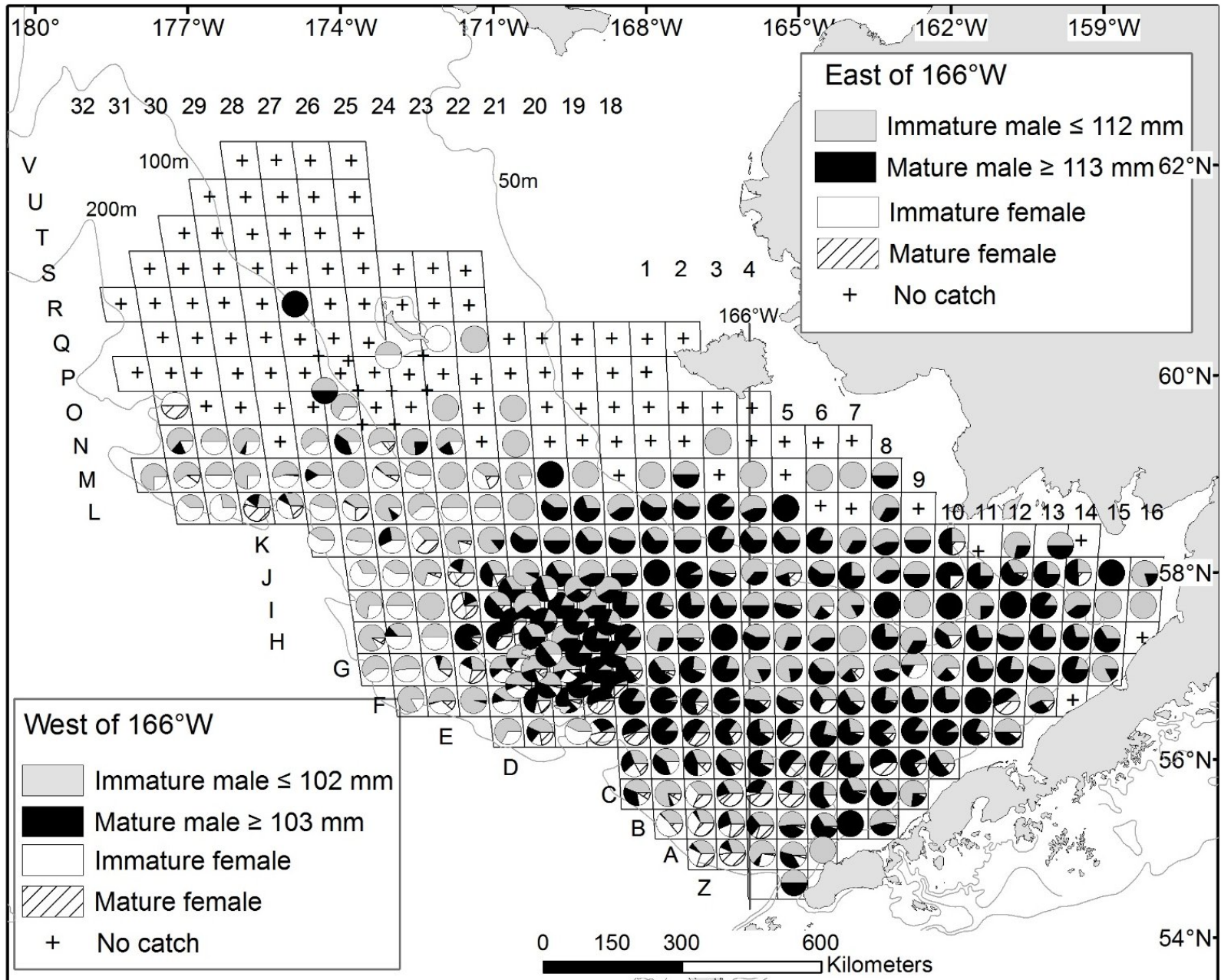




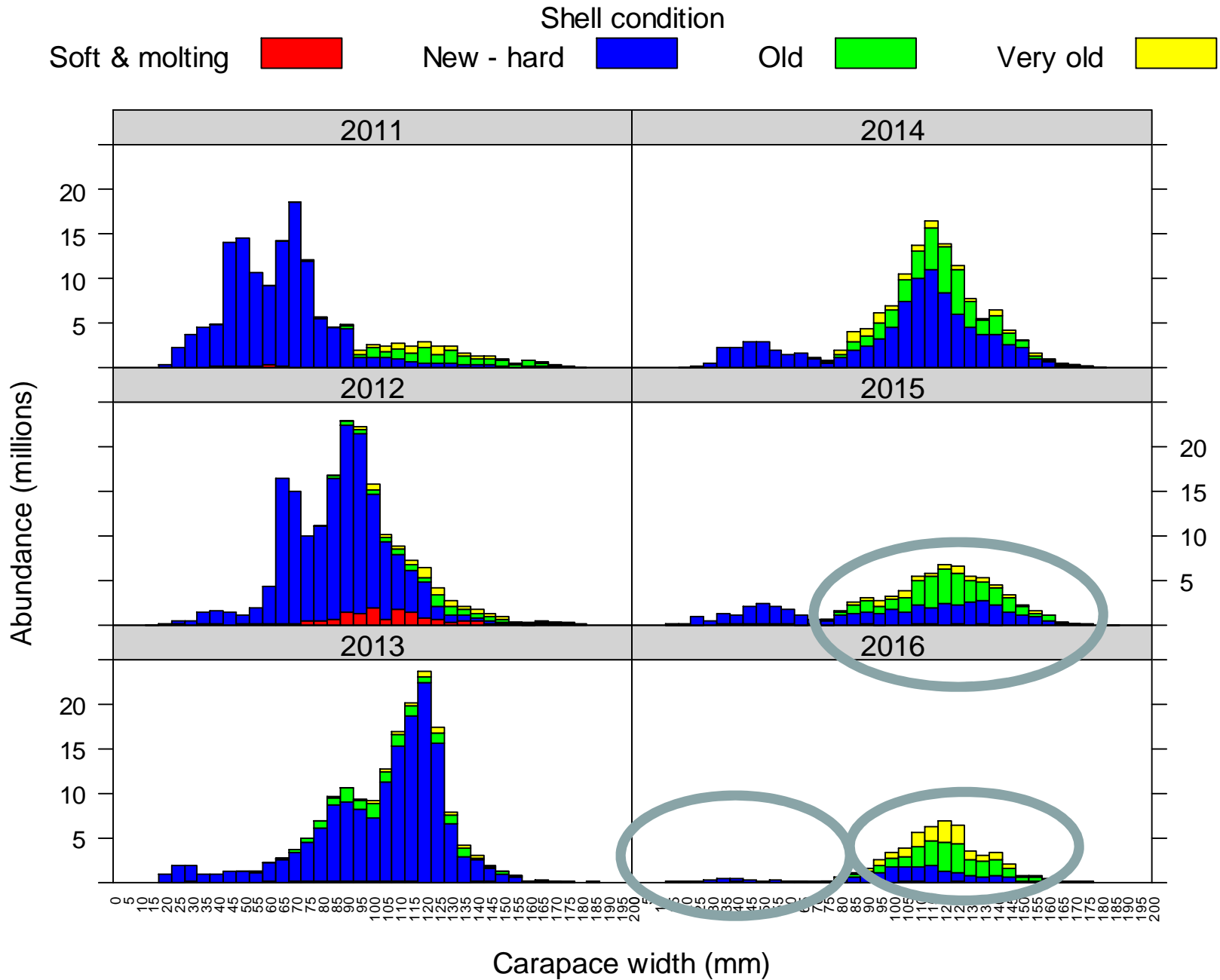
Tanner crab (*Chionoecetes bairdi*)
total density



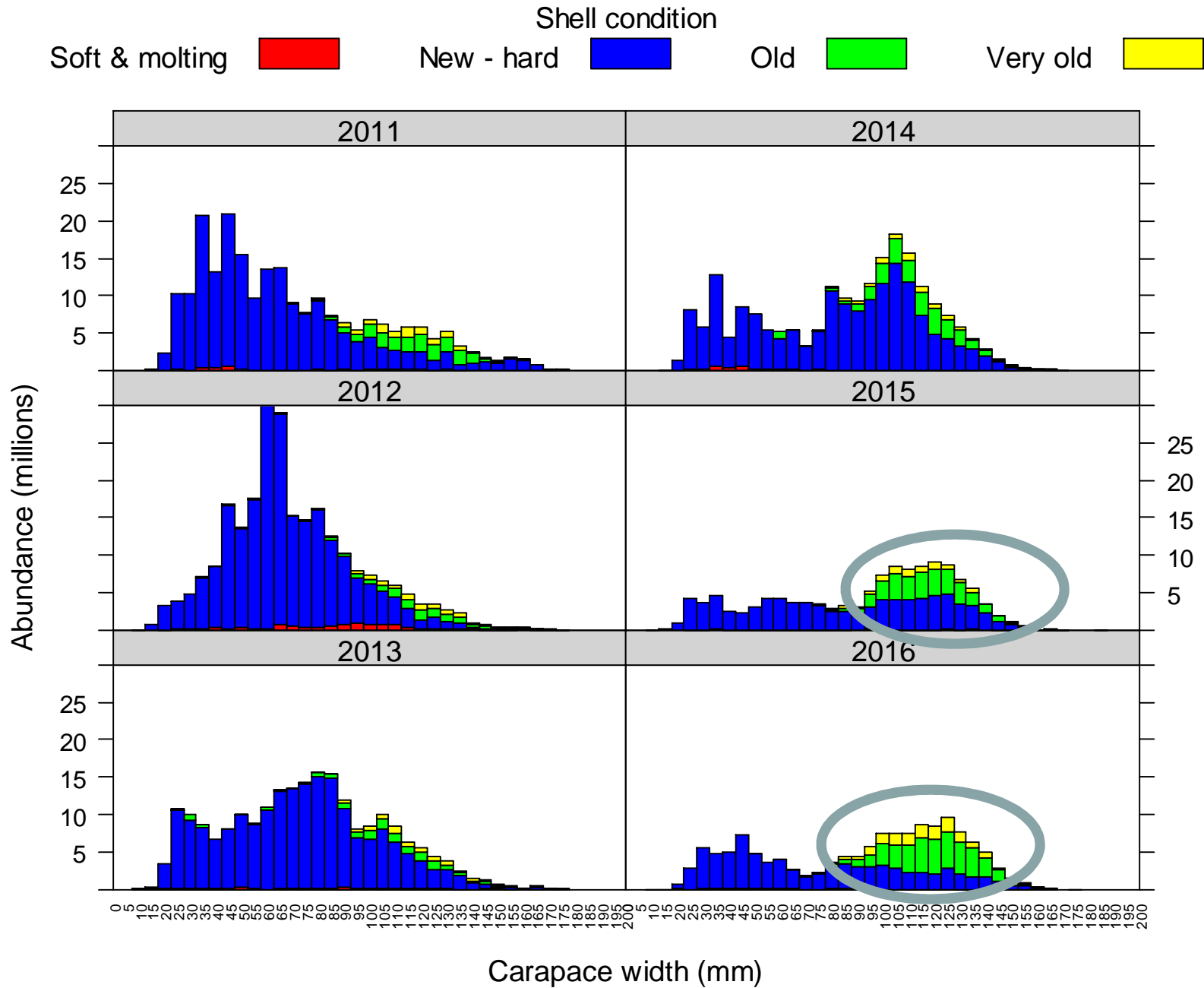
Tanner crab

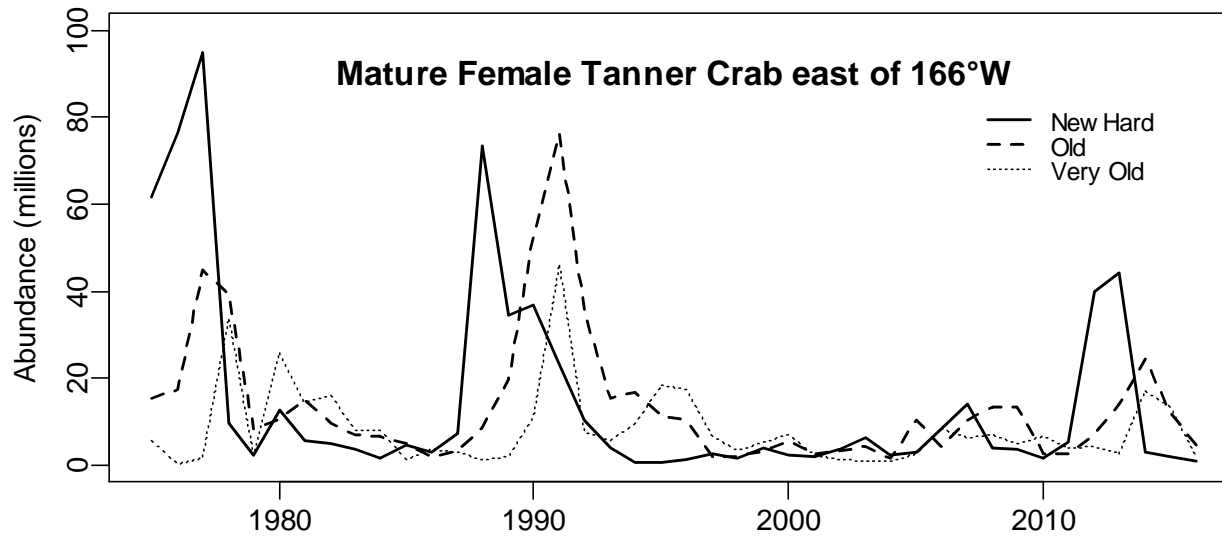
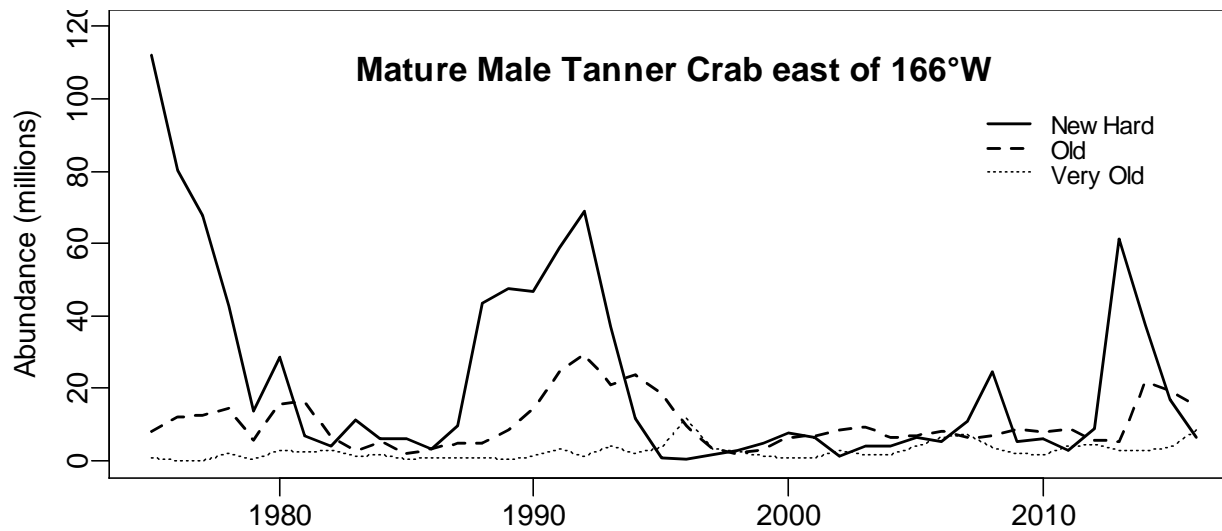


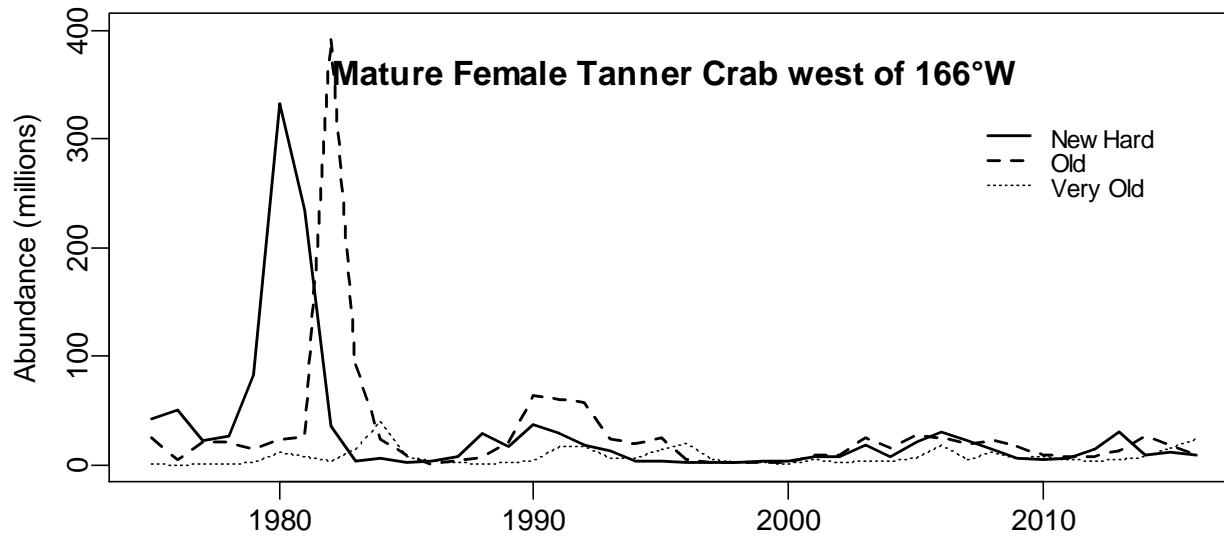
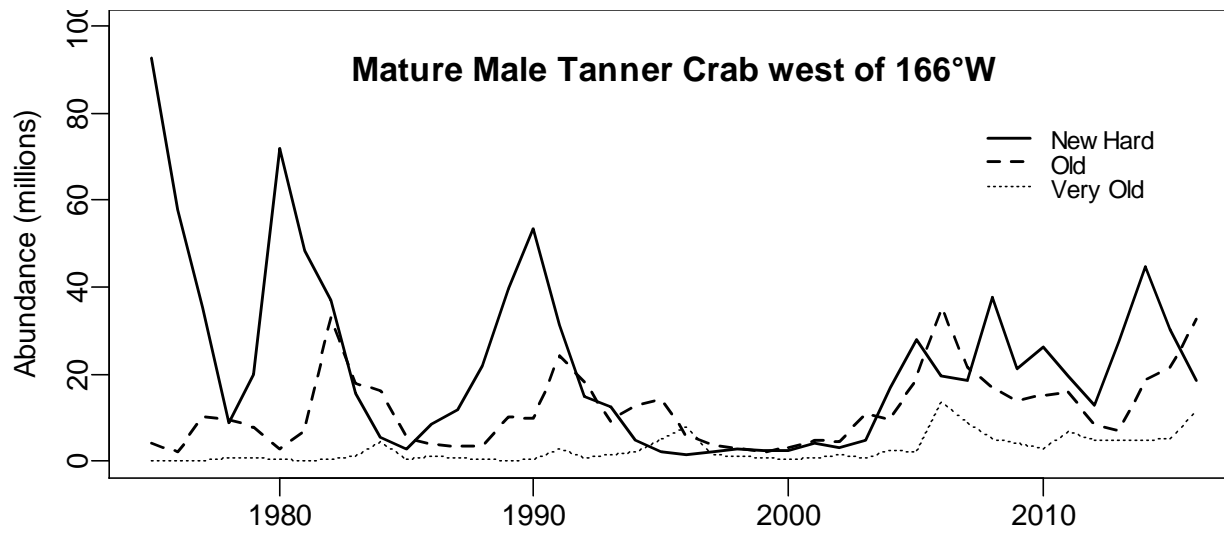
Tanner Crab east of 166°W (male)

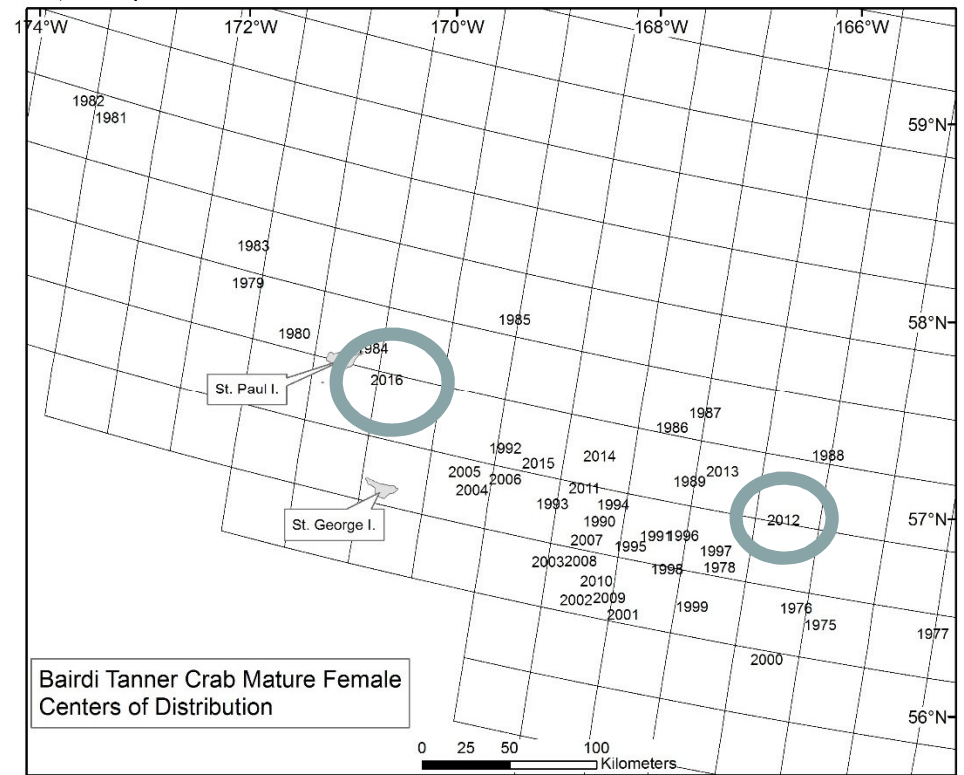
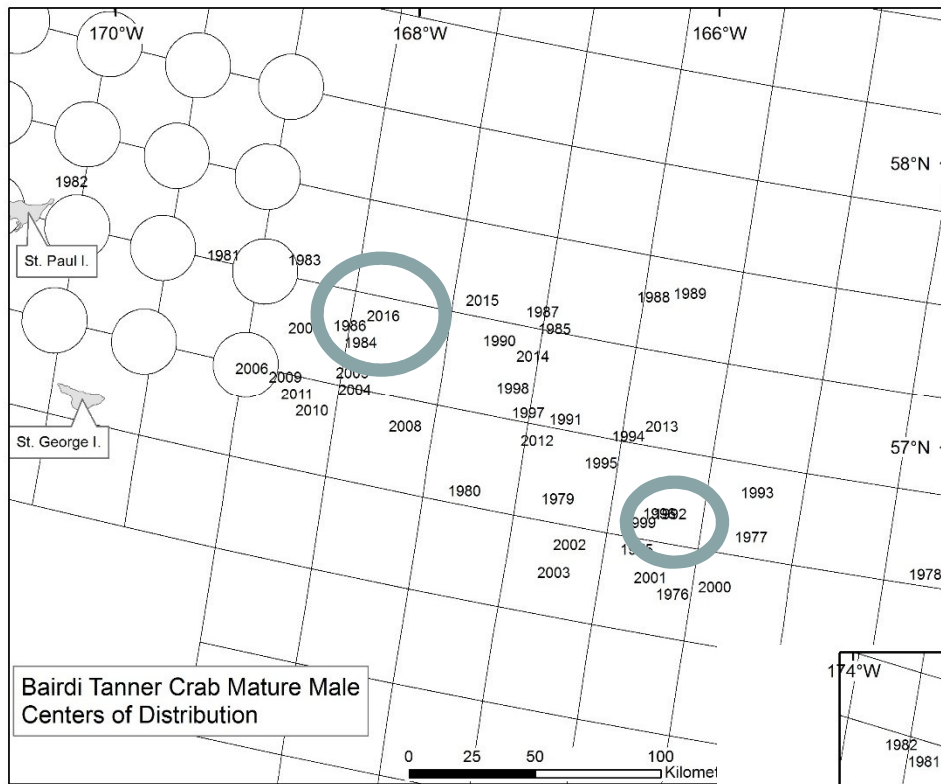


Tanner Crab west of 166°W (male)

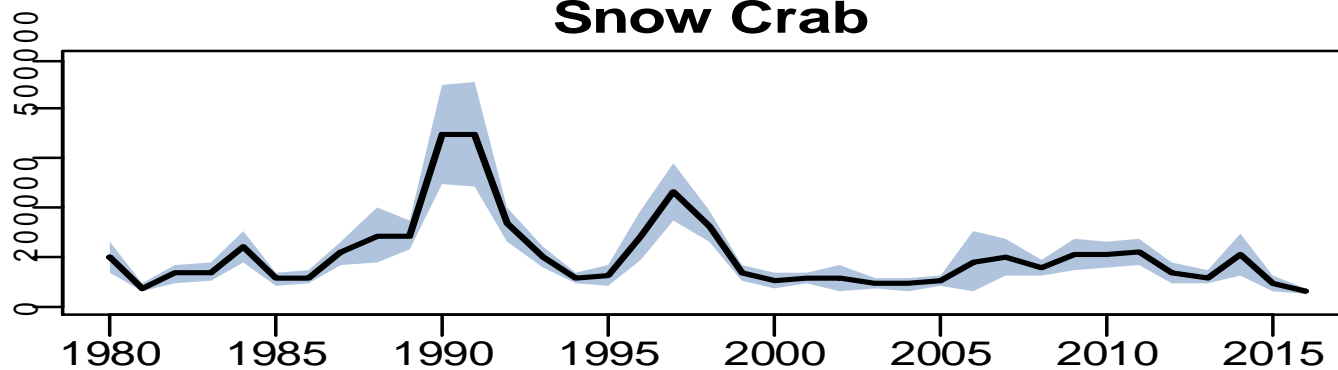




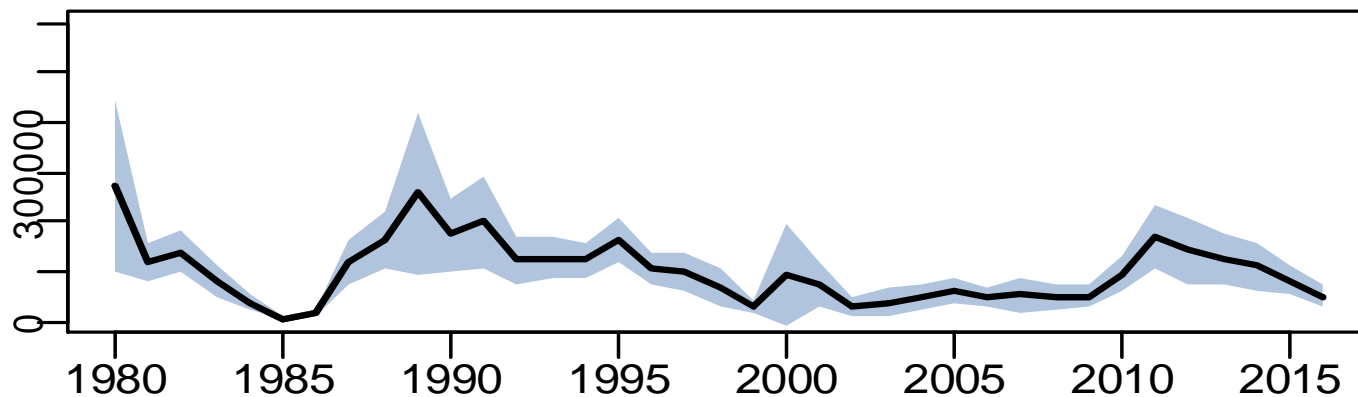




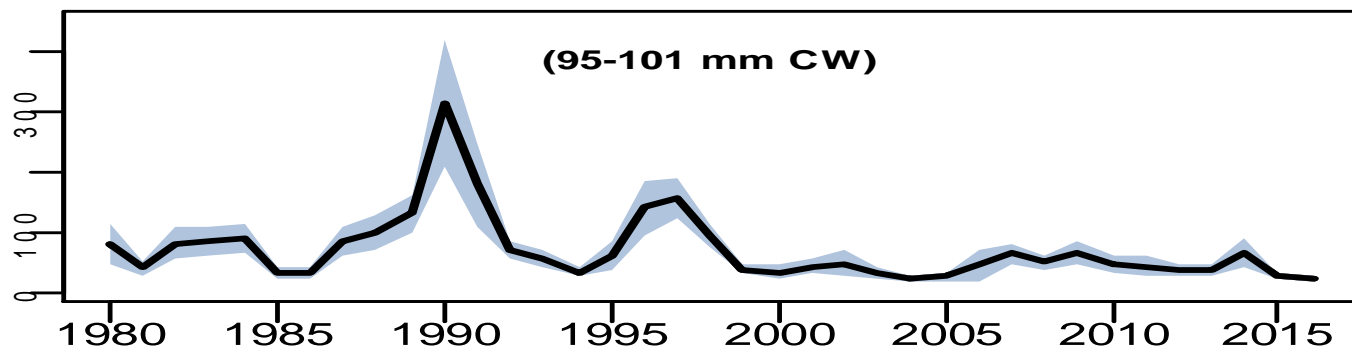
Snow Crab



Mature male biomass (t)
-35%

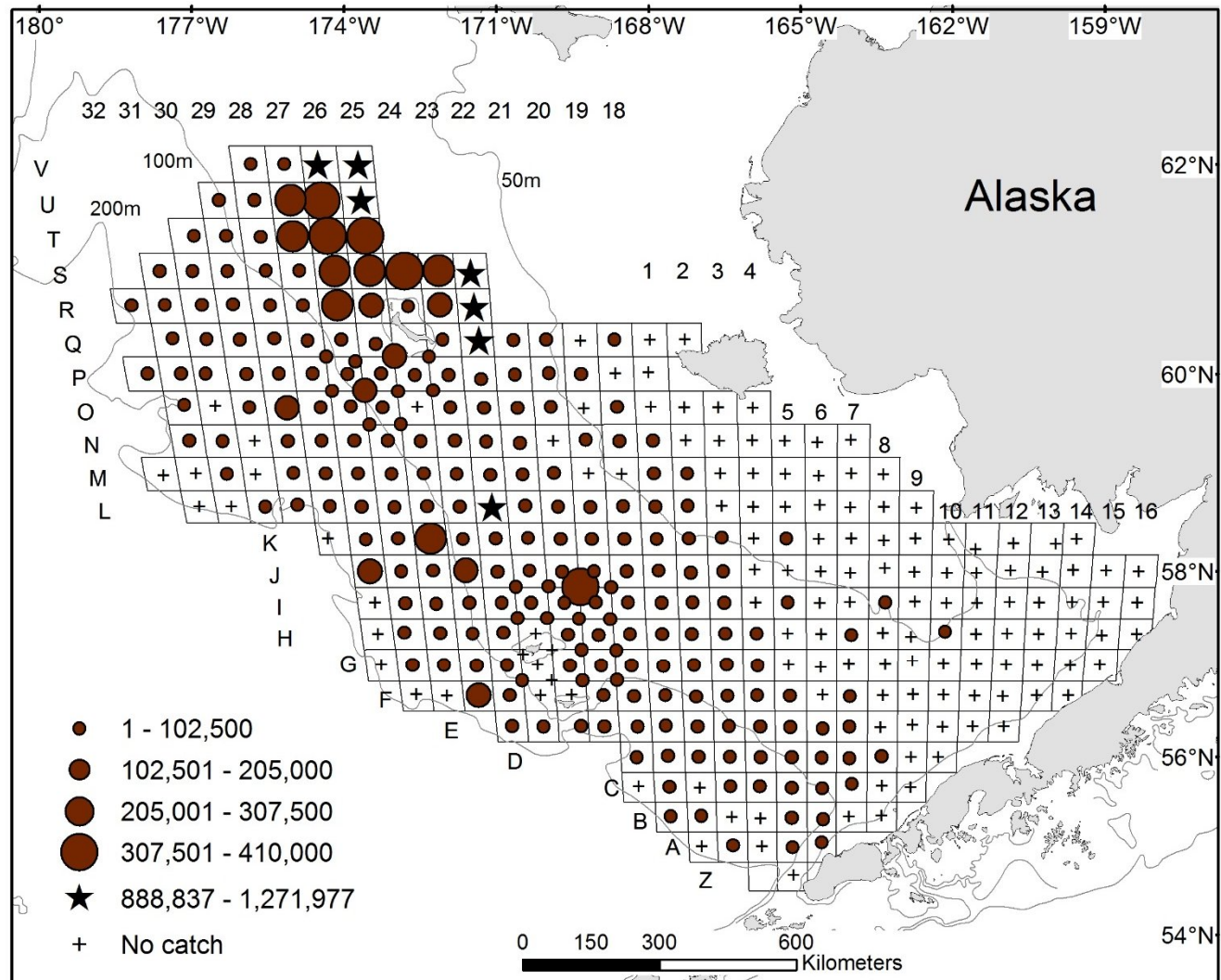


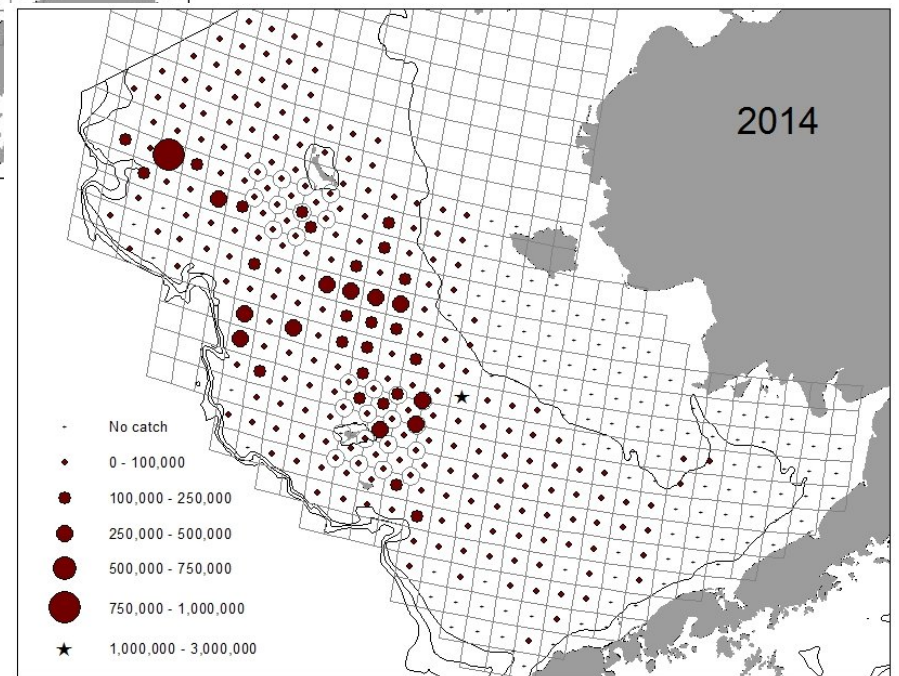
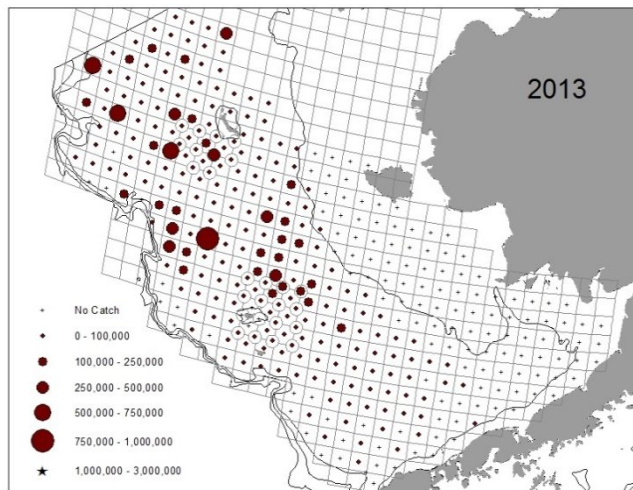
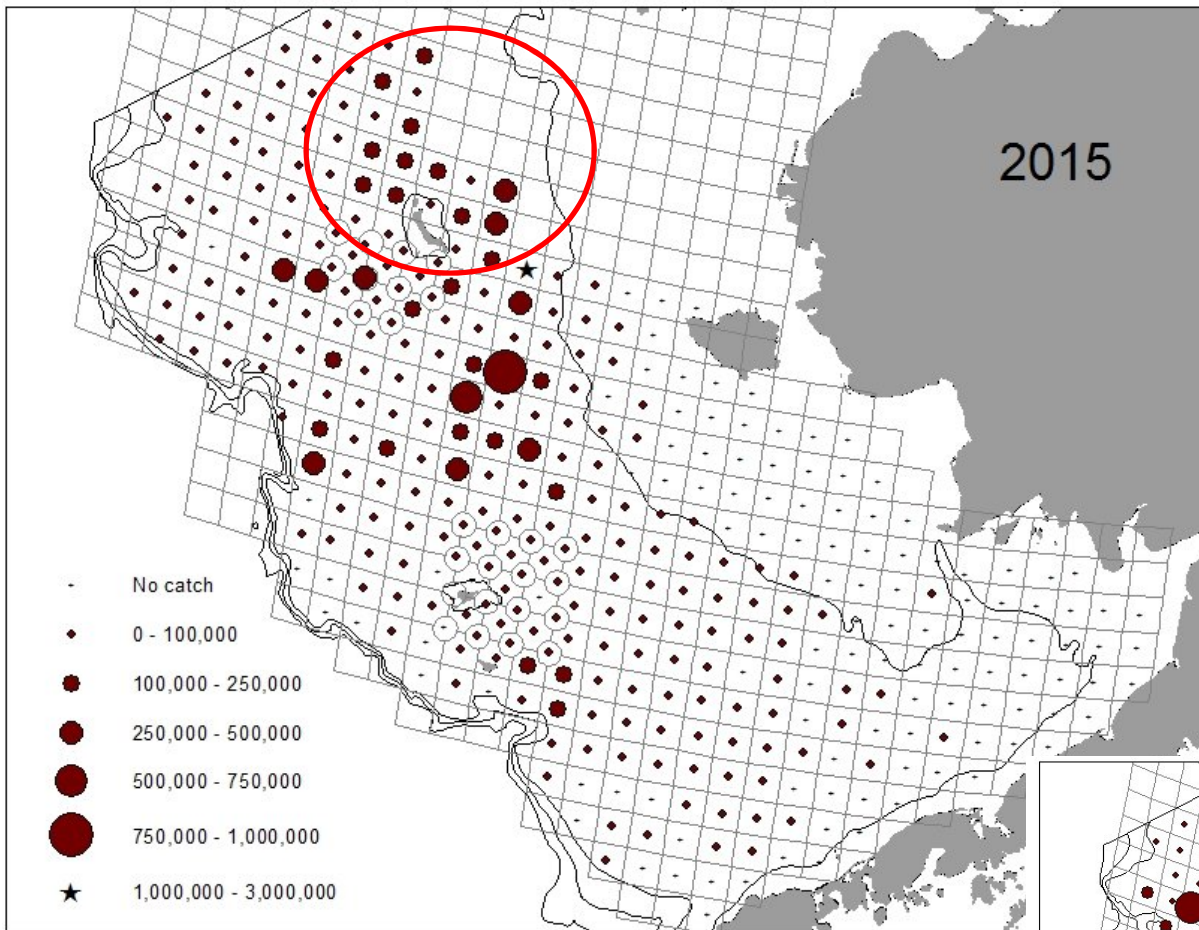
Mature female biomass (t)
-60%



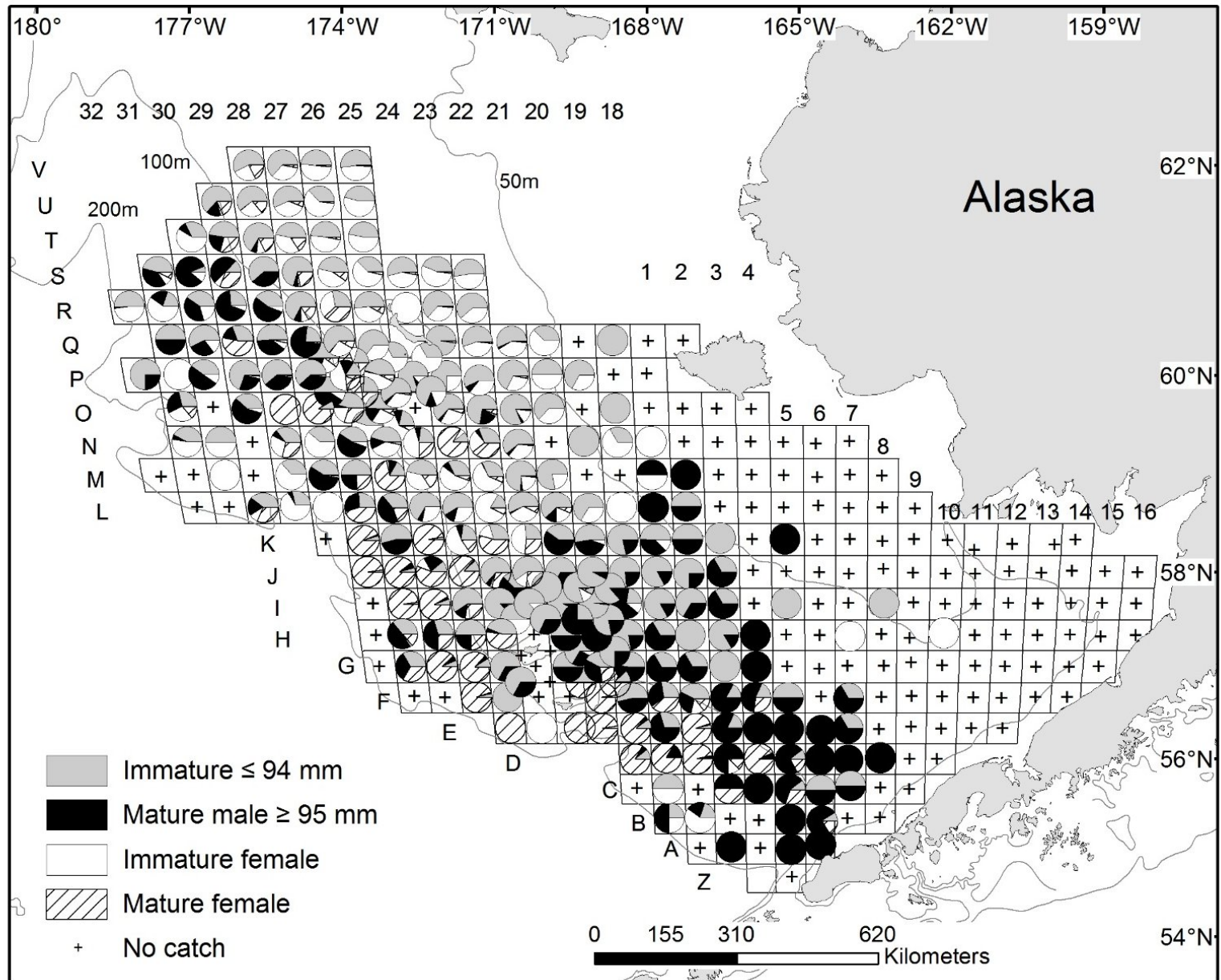
Juvenile abundance (millions)
Male +57%
Female +46%

snow crab (*Chionoecetes opilio*) total density

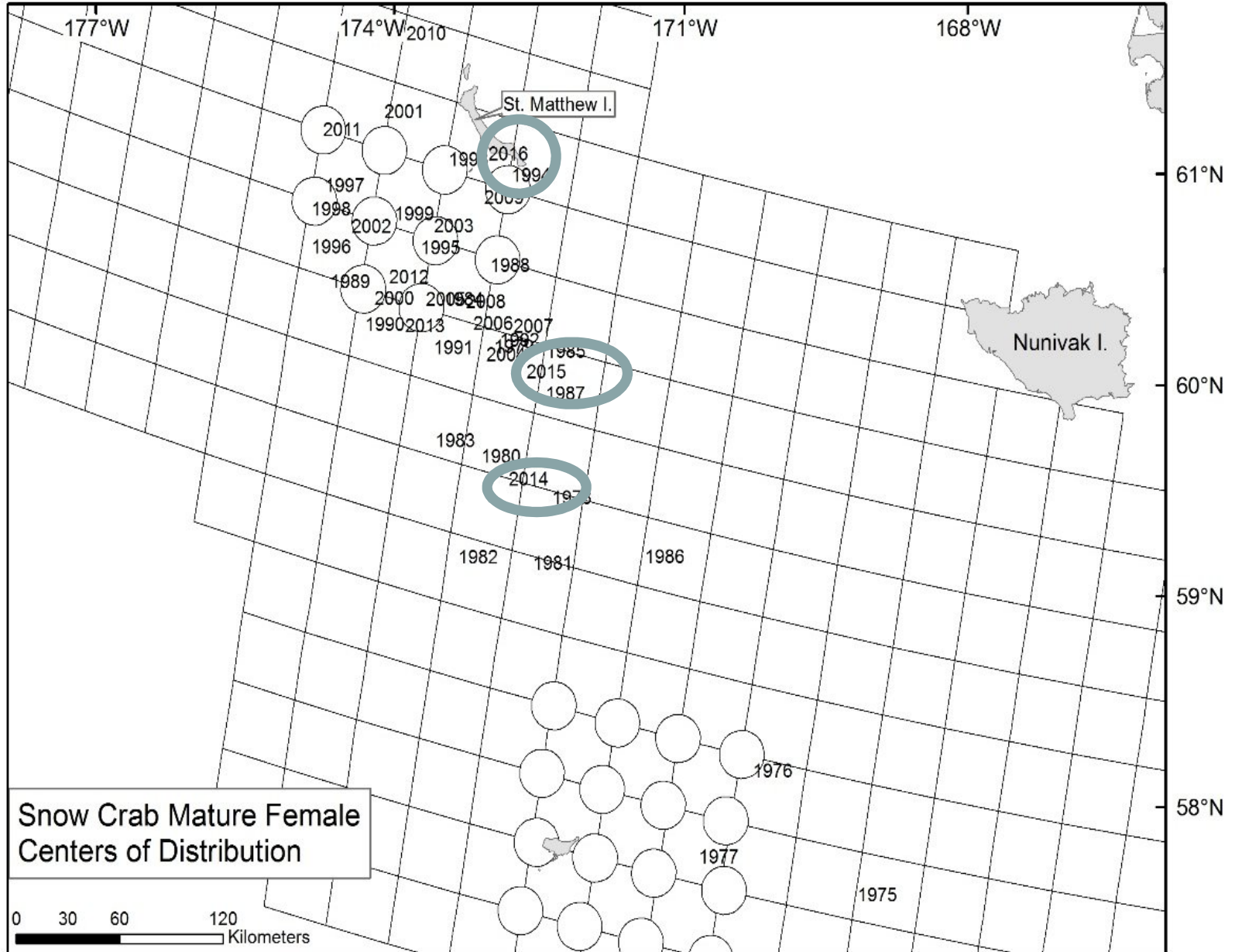




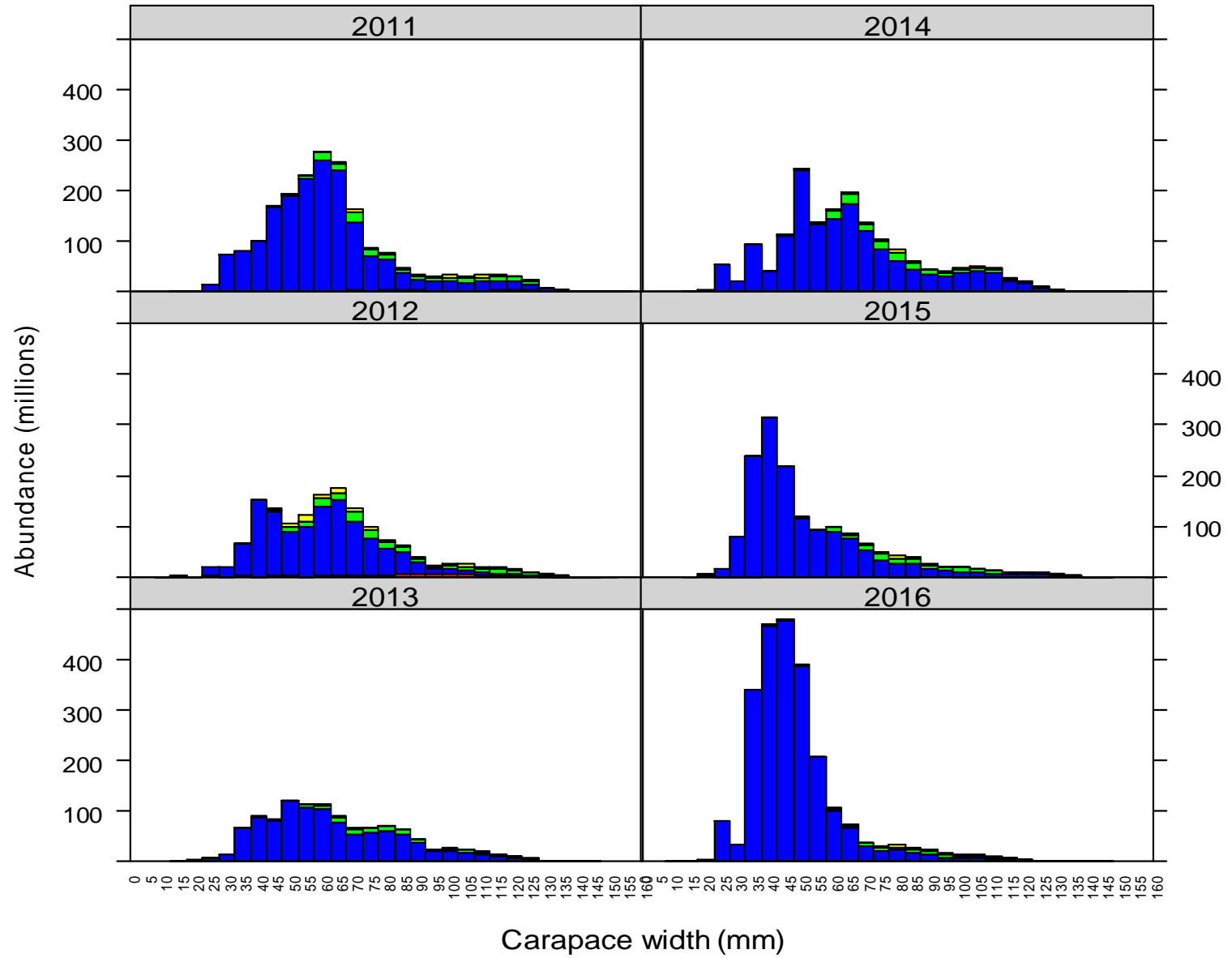
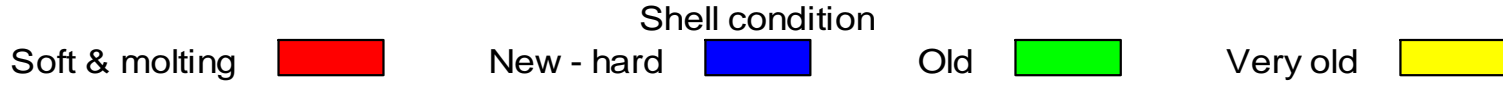
snow crab



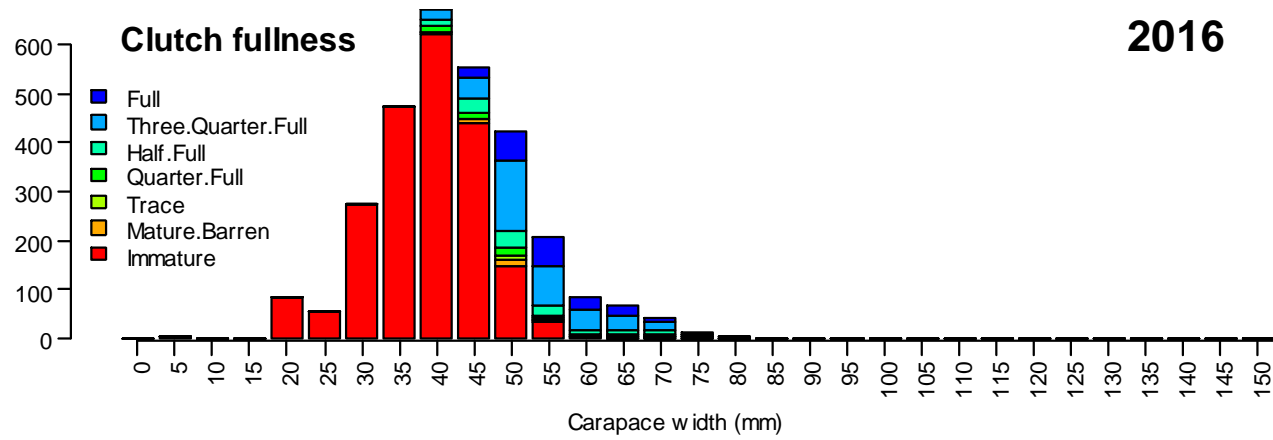
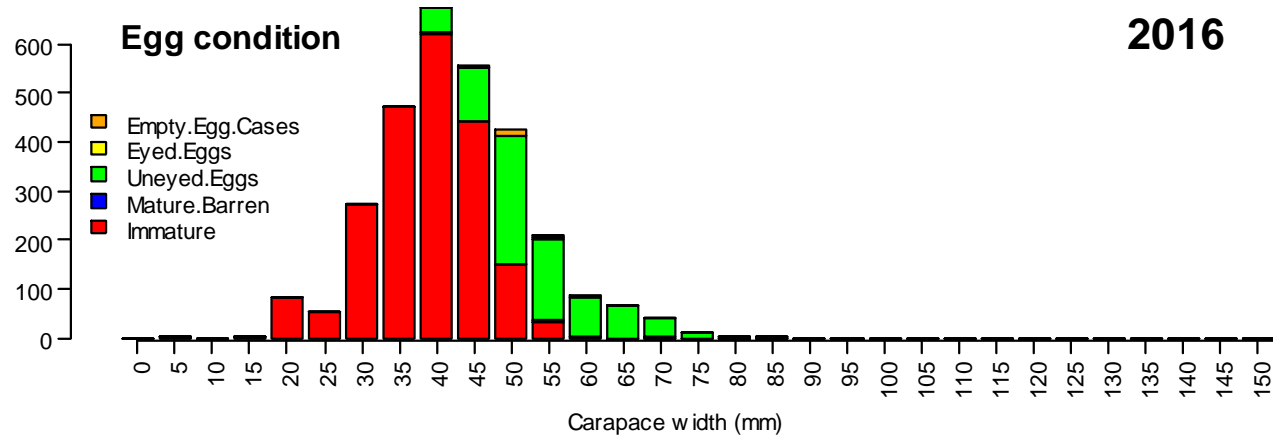
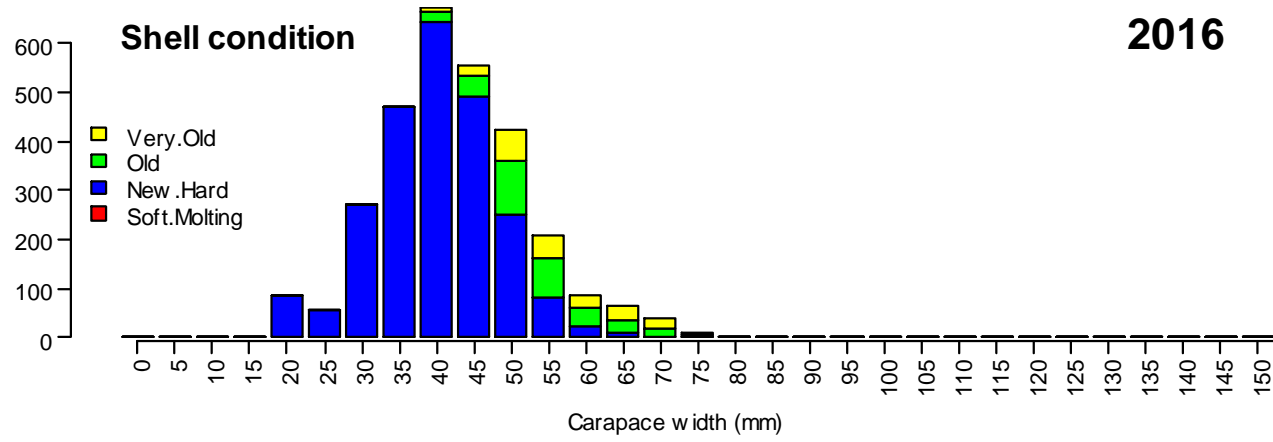
snow crab (*Chionoecetes opilio*)

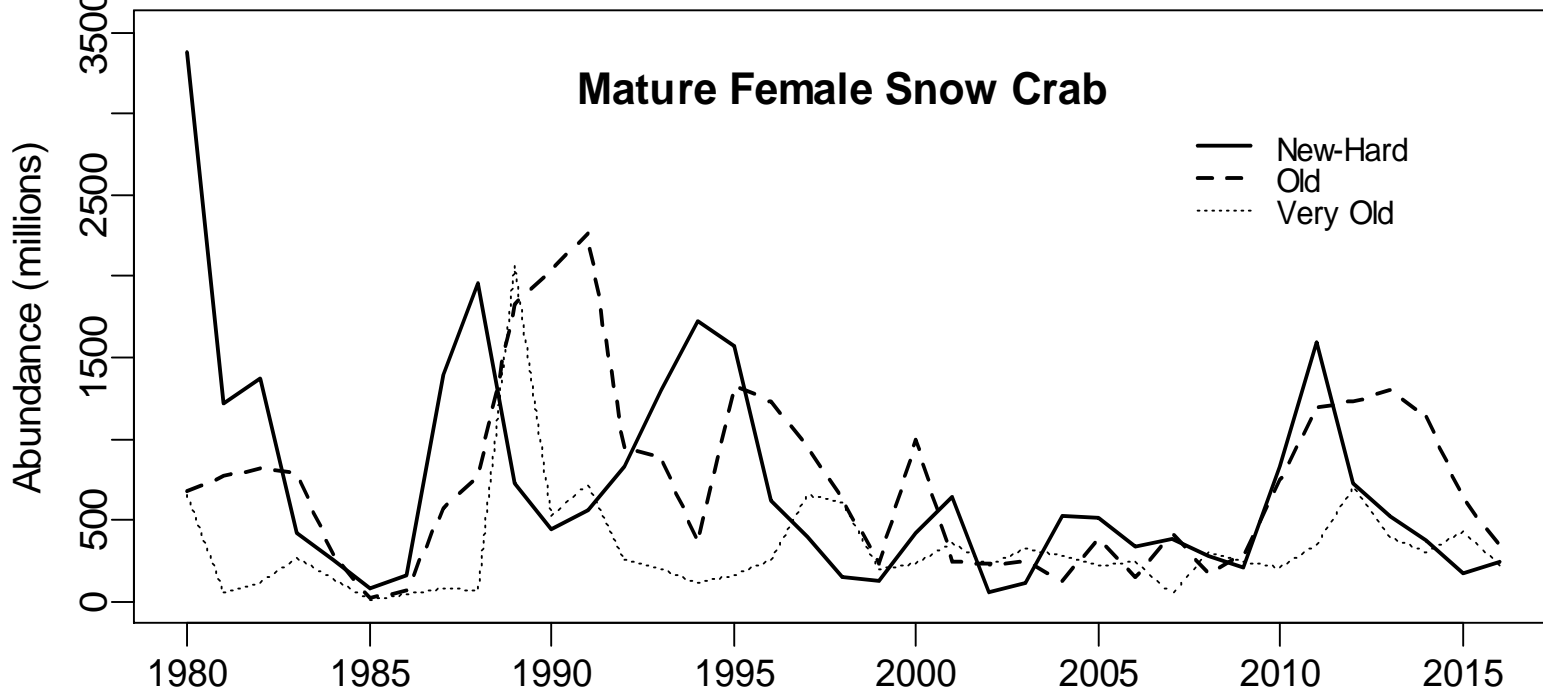
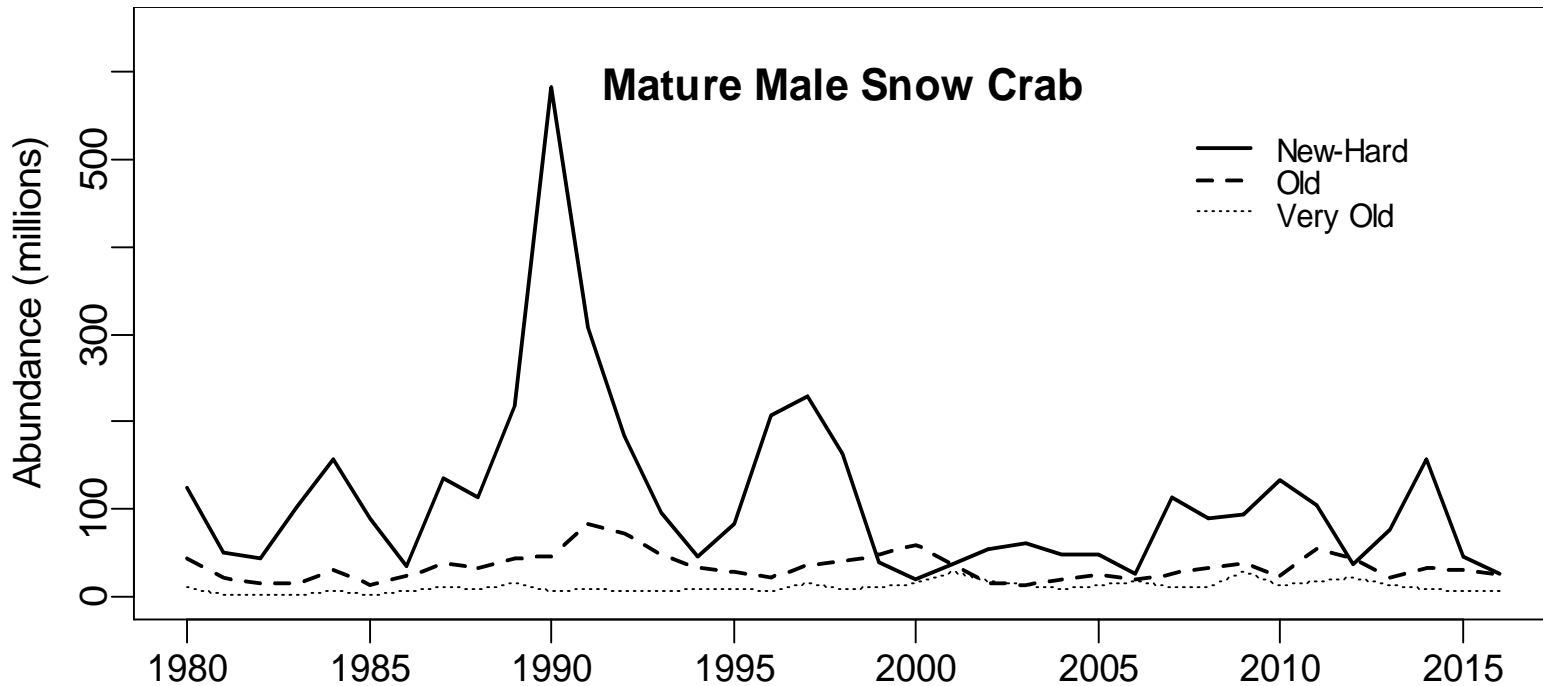


Snow Crab (male)



Abundance (millions)

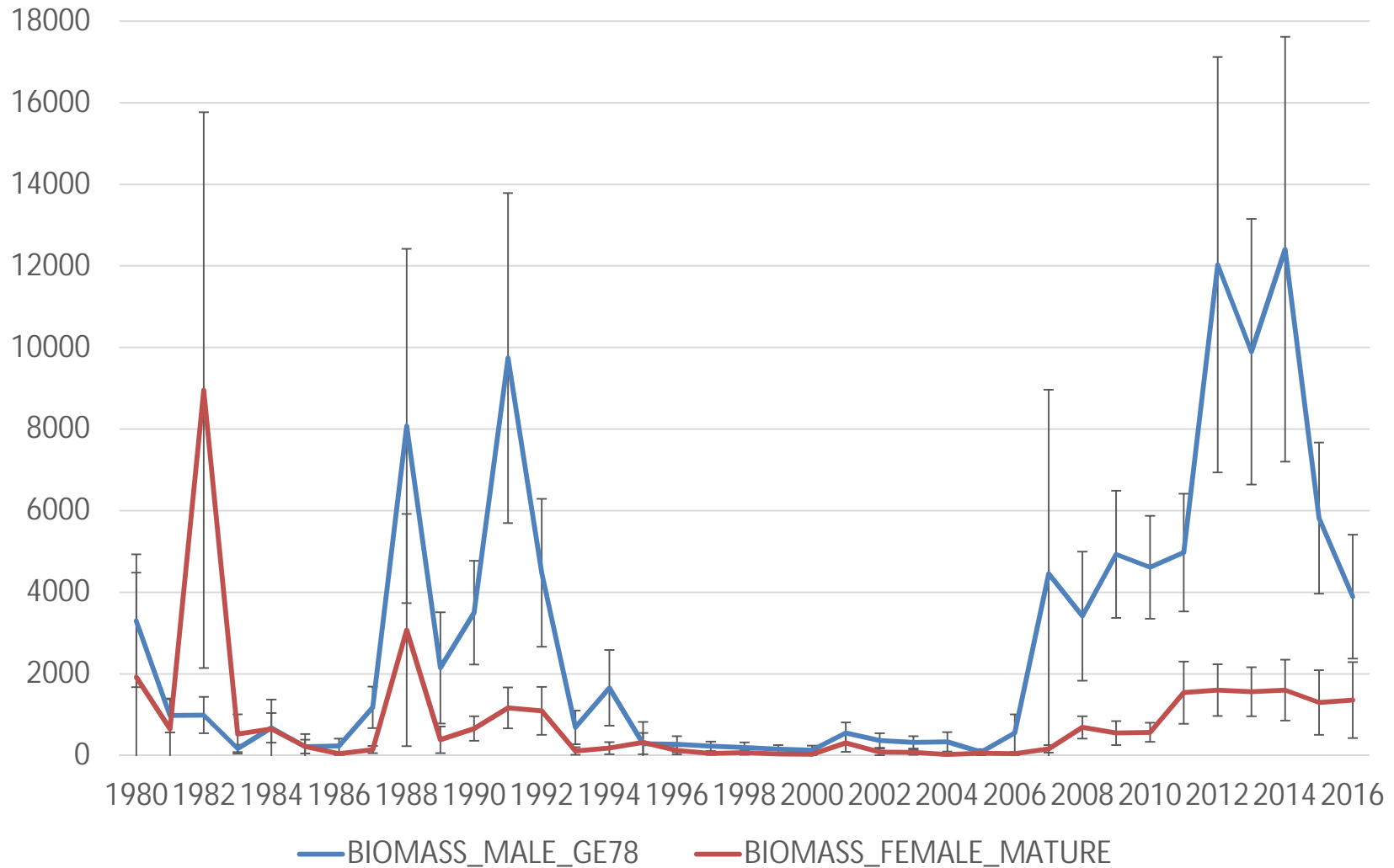




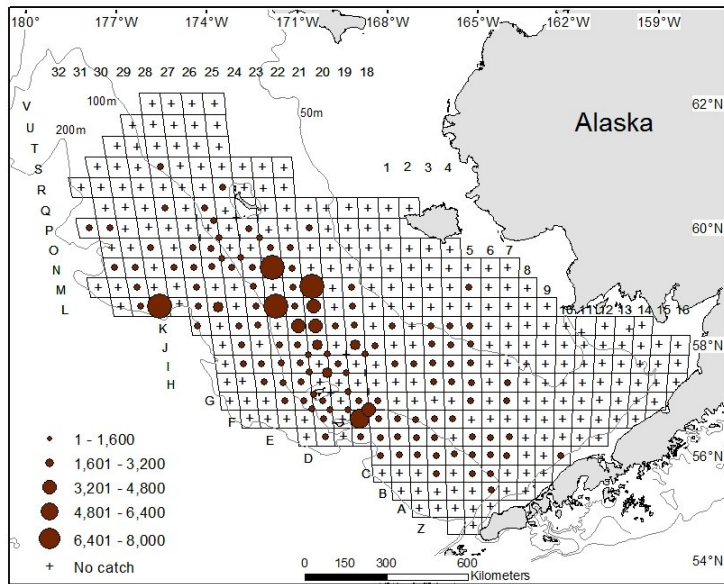
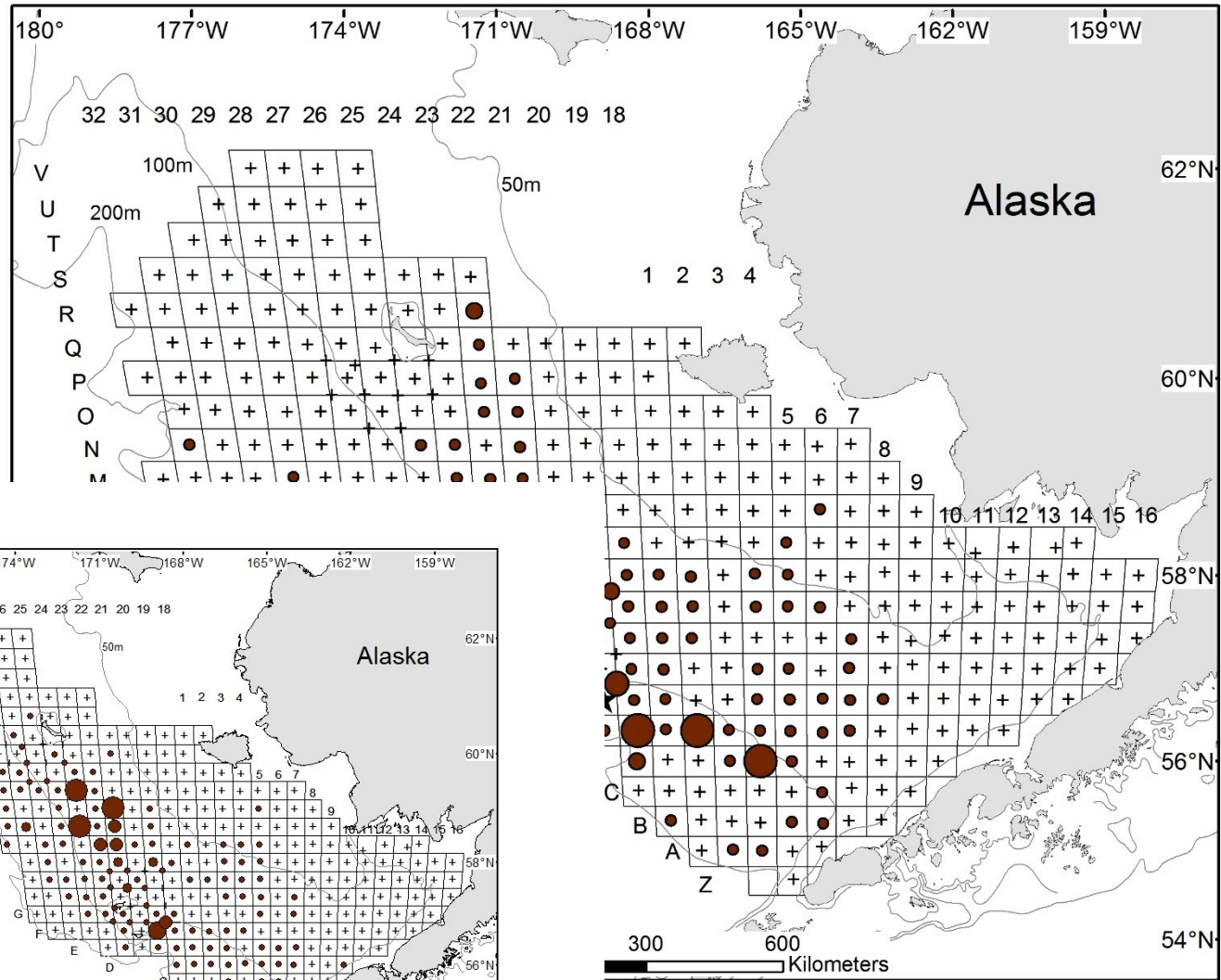
Chionoecetes bairdi/opilio hybrid crab biomass (t)

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

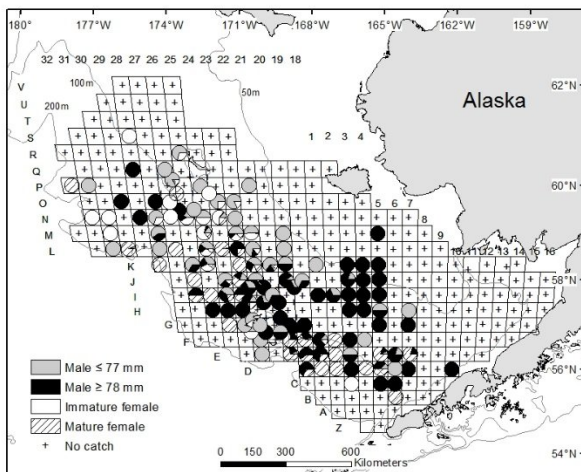
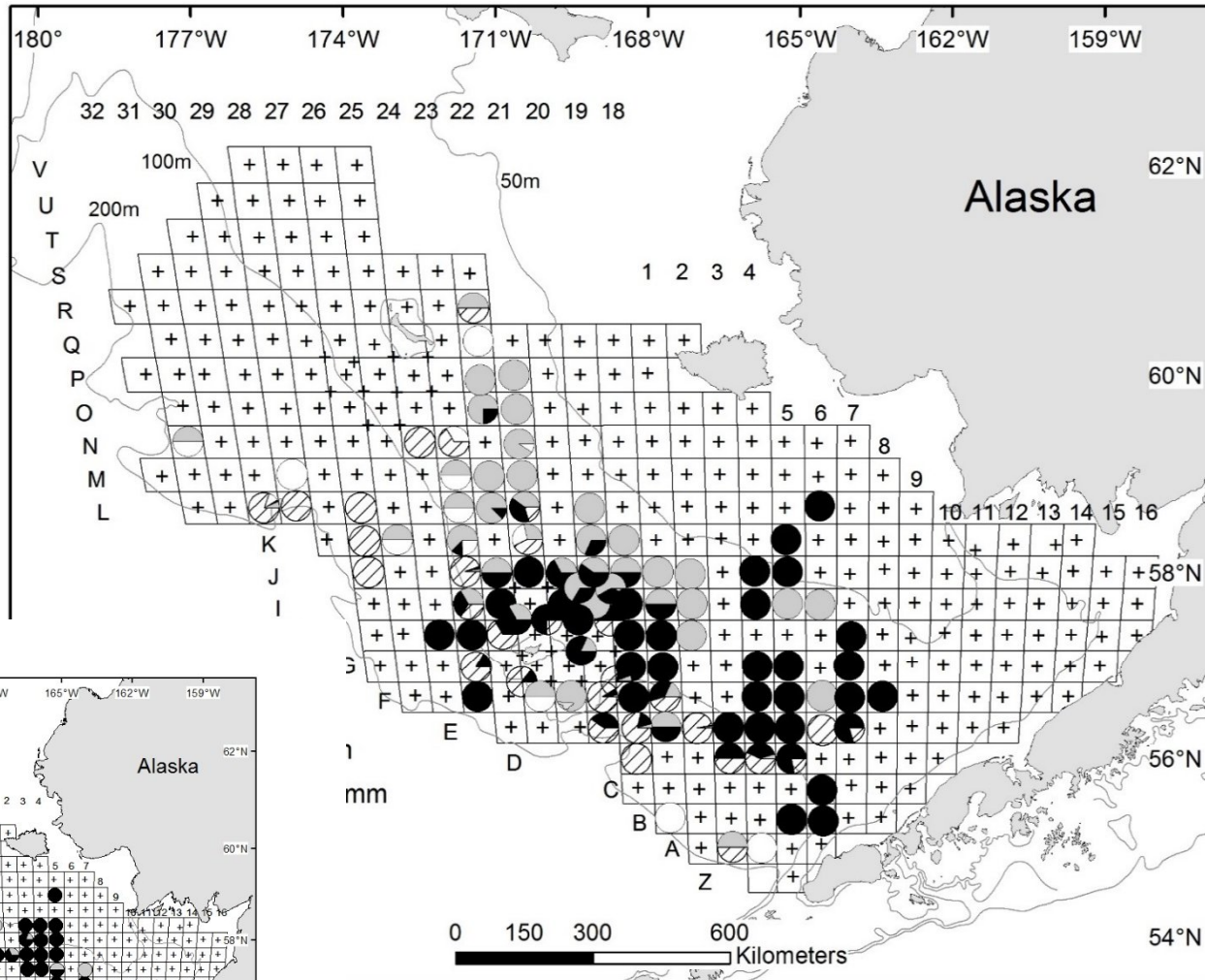
10% of legal male Tanner crab (west)
22% of mature female Tanner crab (west)



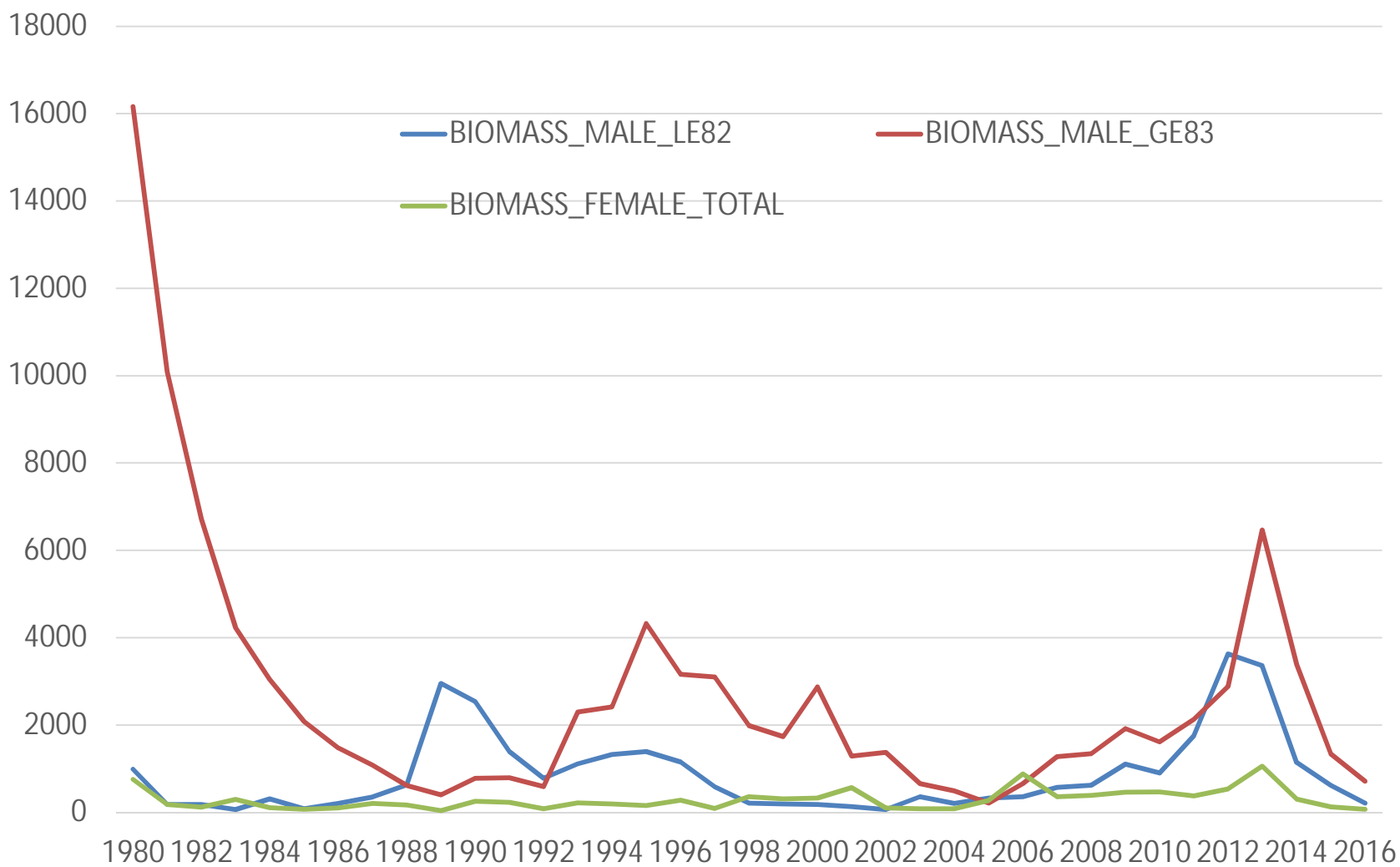
Chionoecetes bairdi/opilio hybrid crab



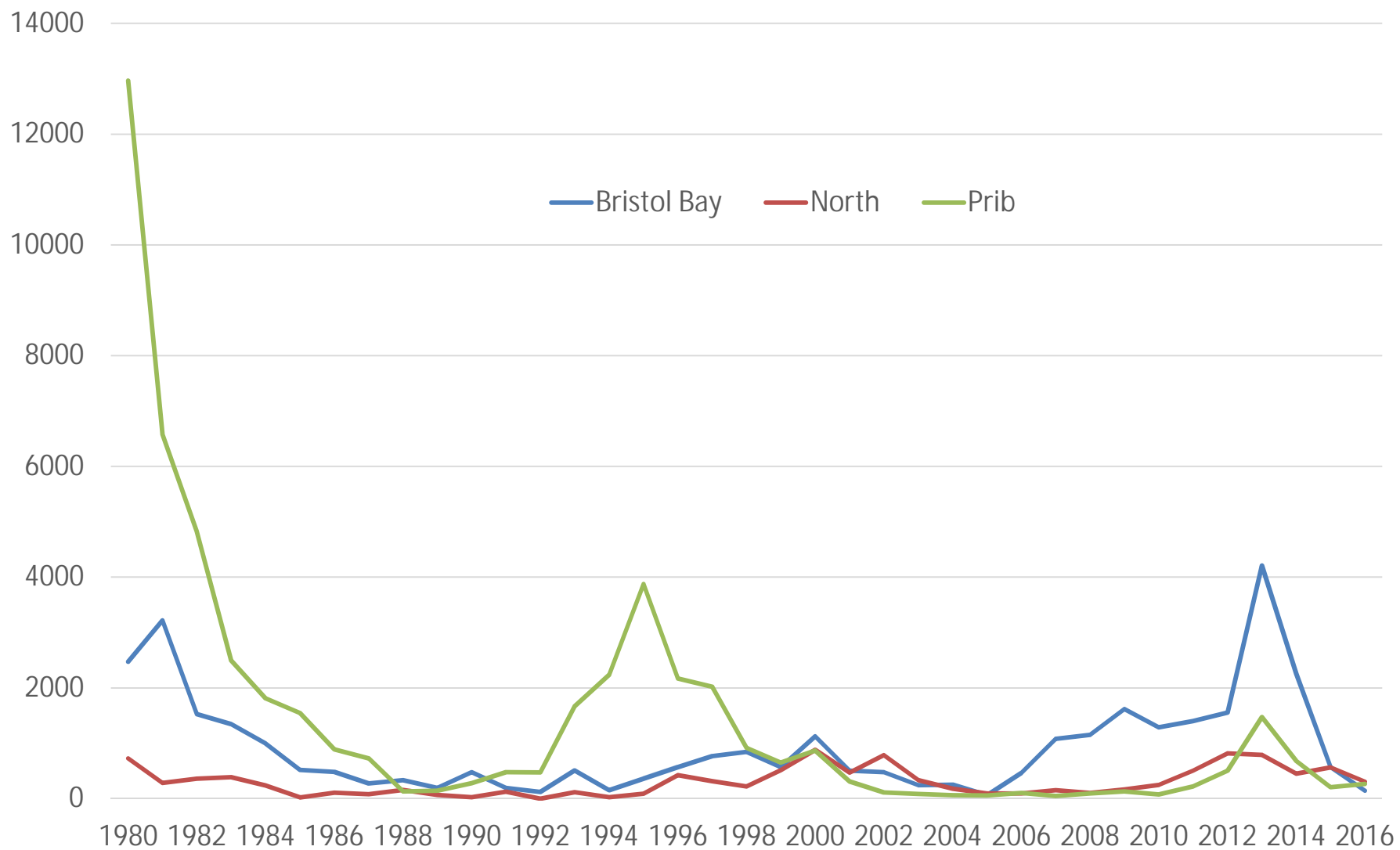
Chionoecetes bairdi/opilio hybrid crab



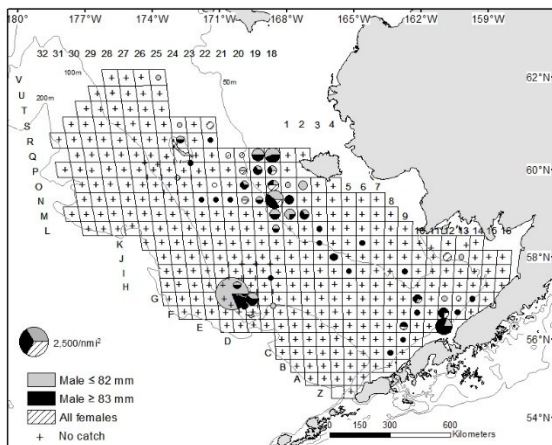
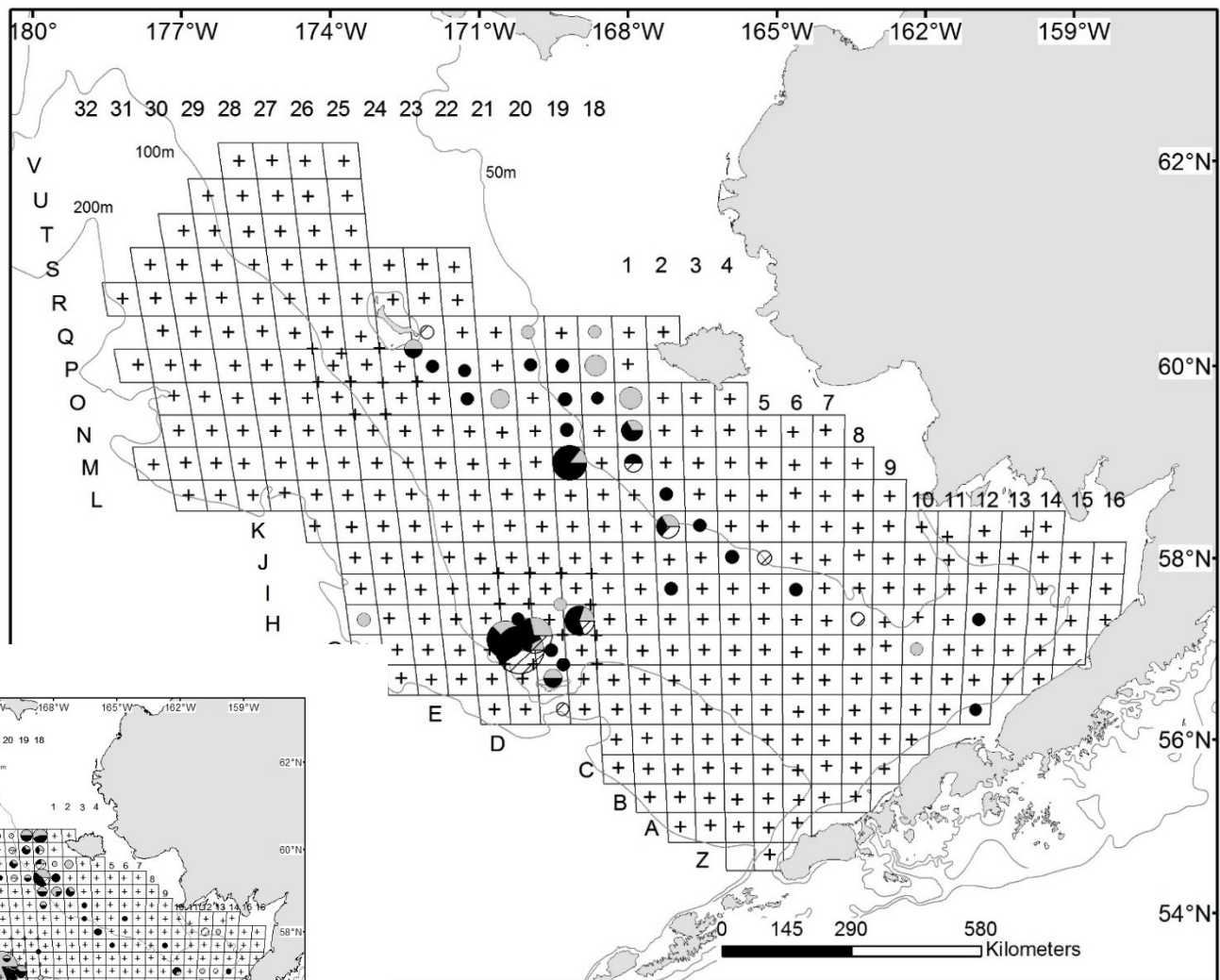
Hair crab biomass (t)



Hair crab biomass (t)



Hair crab



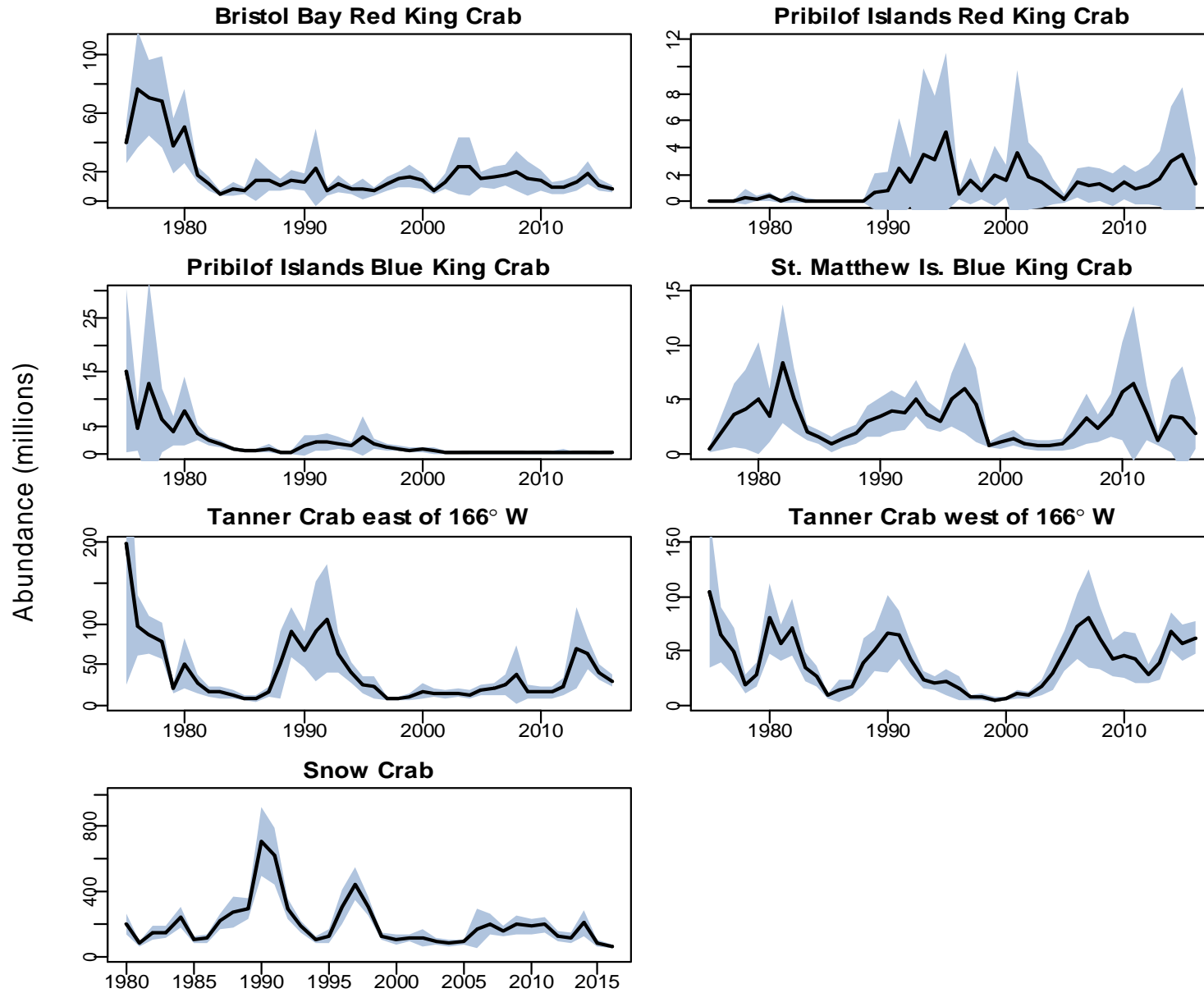
2016 Mature Males (2015 value in parentheses)

| | # 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) |

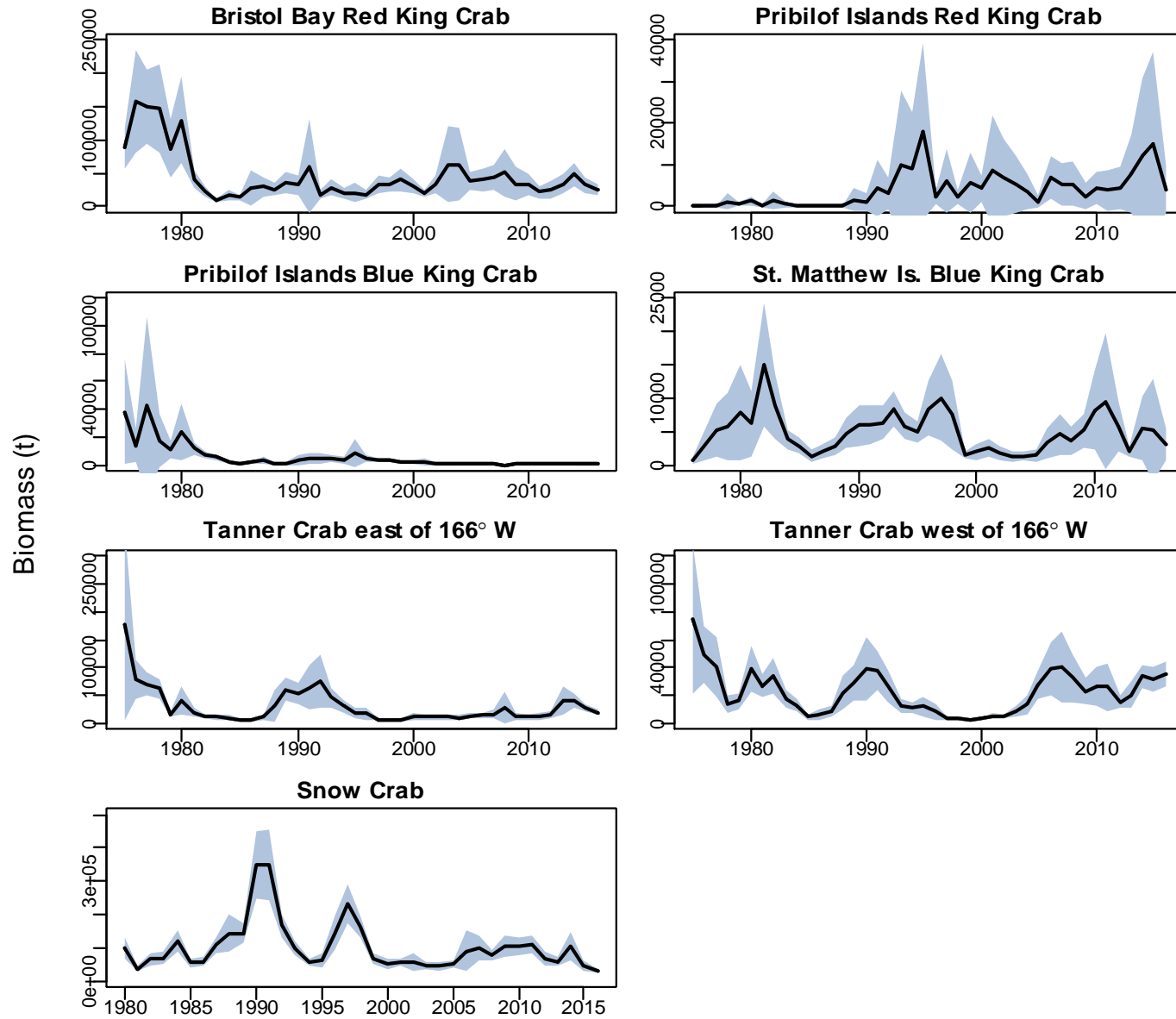
Crab Management Process

| | |
|--|------------|
| 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 |

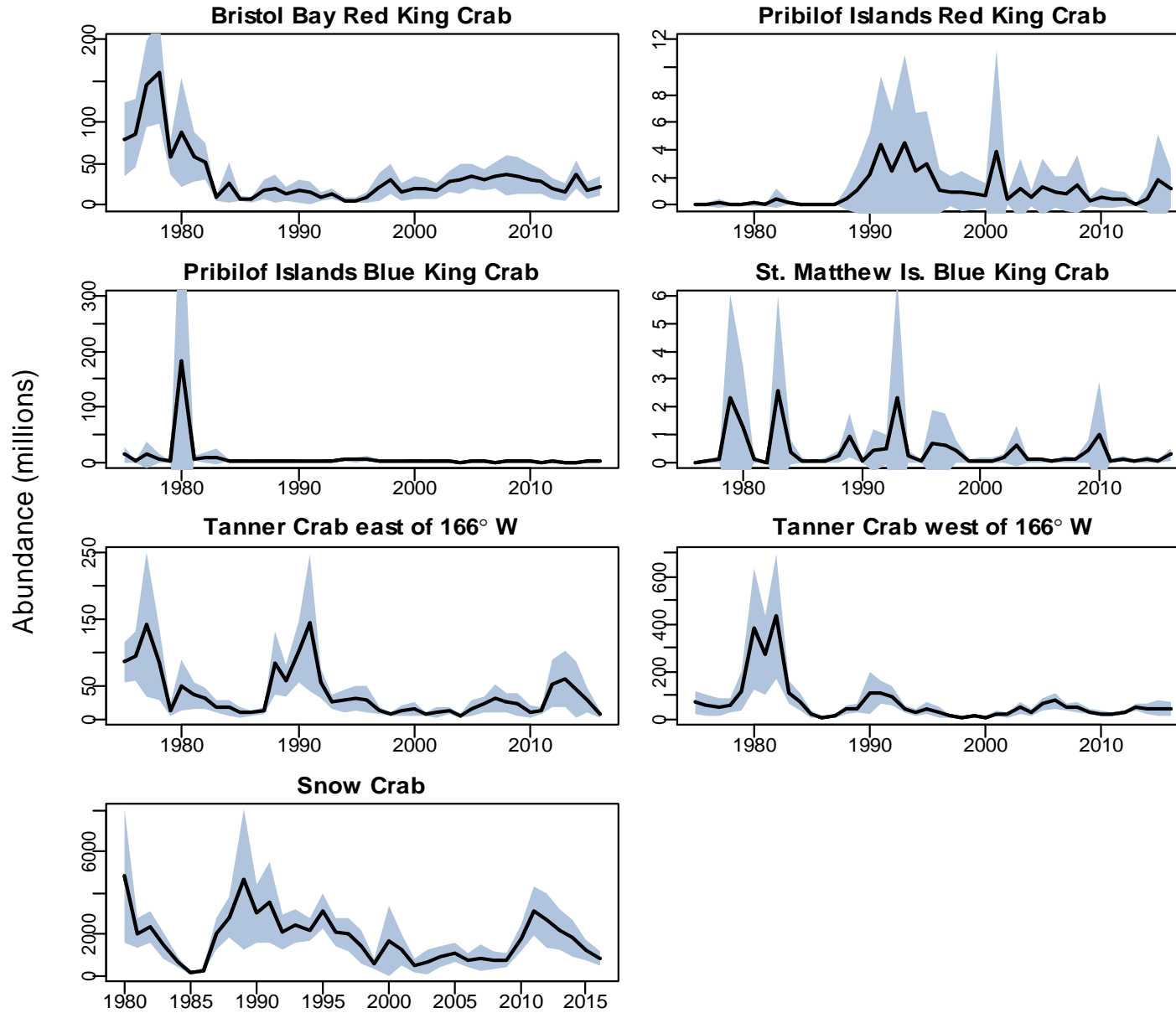
Mature Males



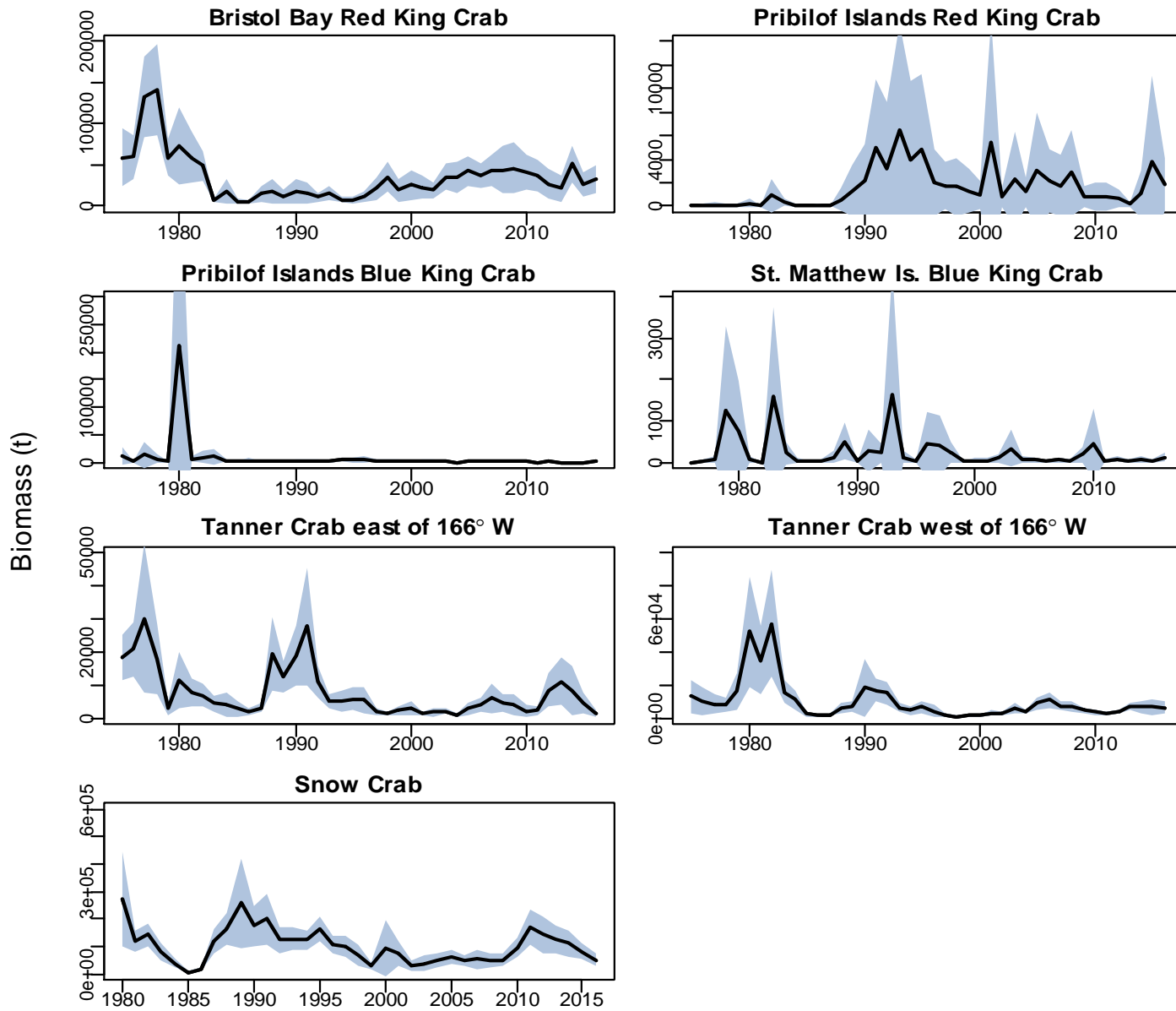
Mature Males

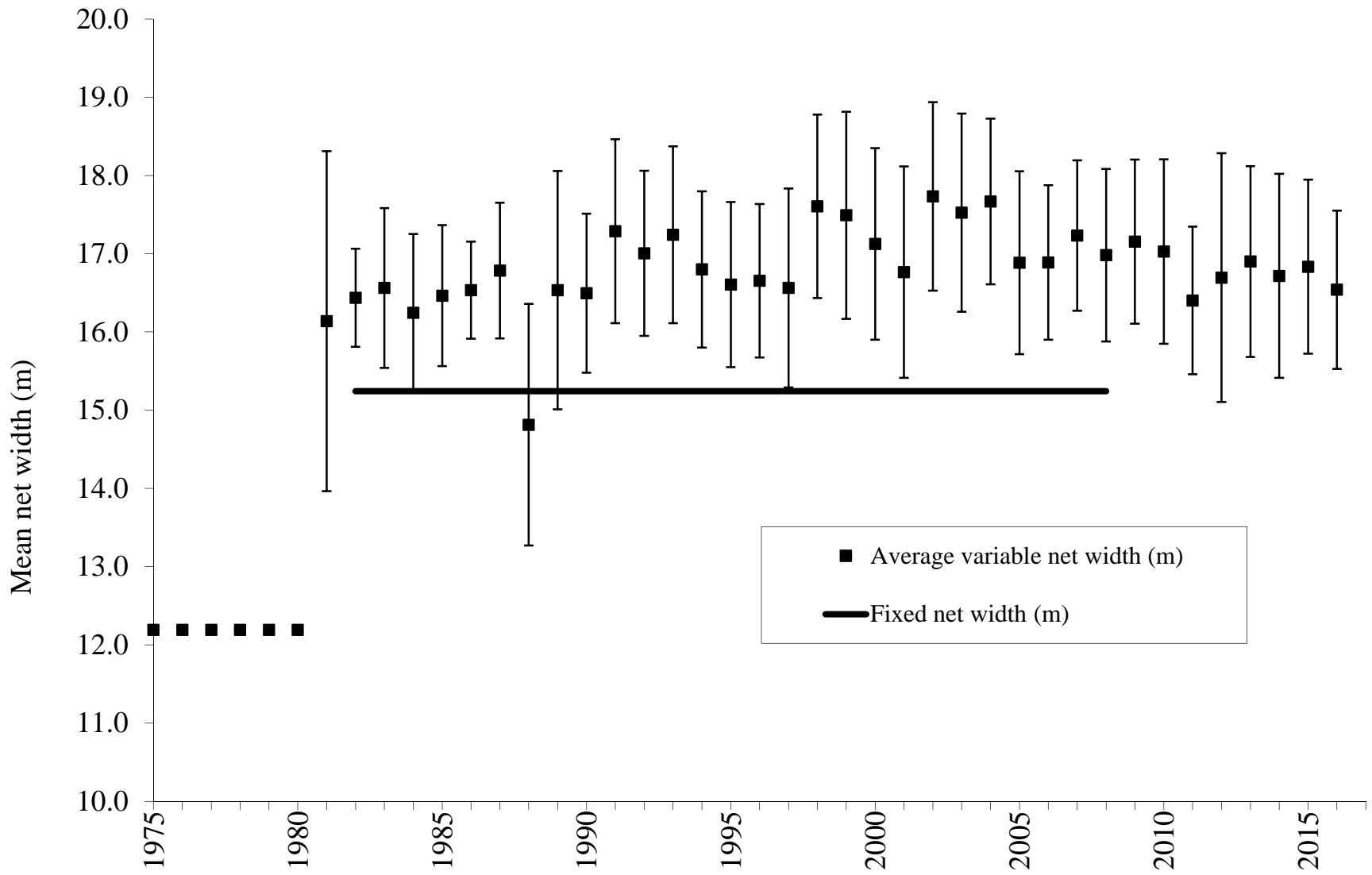


Mature Females



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 |