

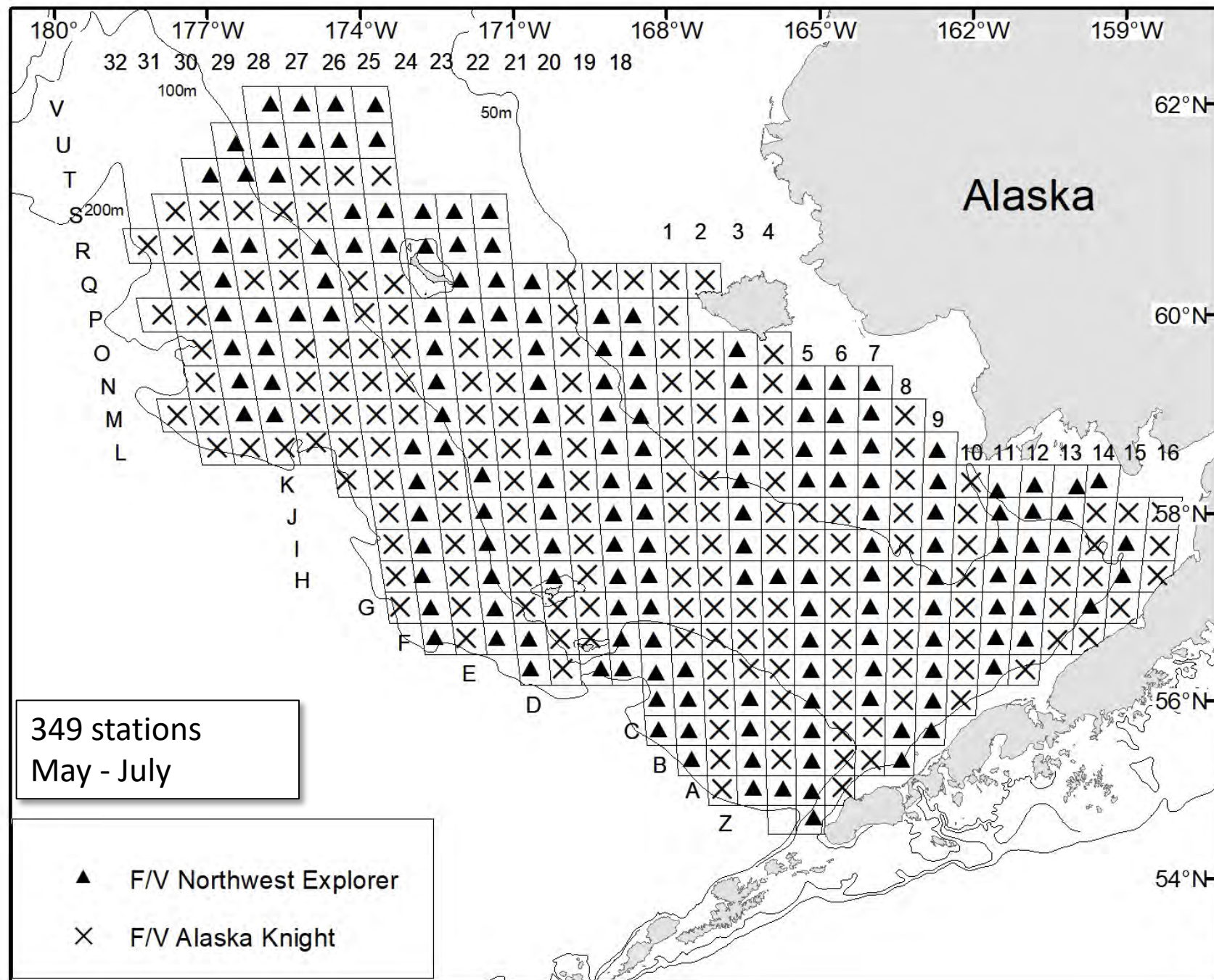
2025 Eastern Bering Sea Crab Survey Results

Leah Zacher, Shannon Hennessey, Jon Richar, Erin Fedewa,
Emily Ryznar, and Mike Litzow

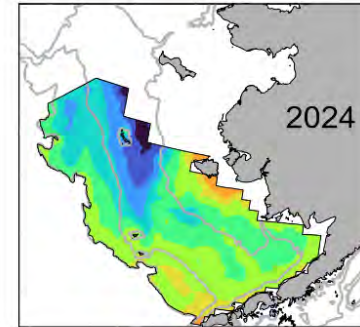
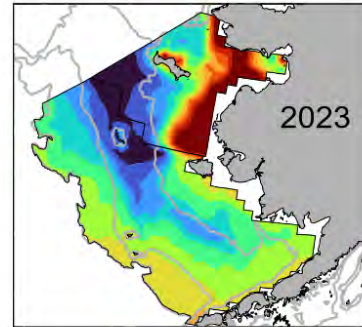
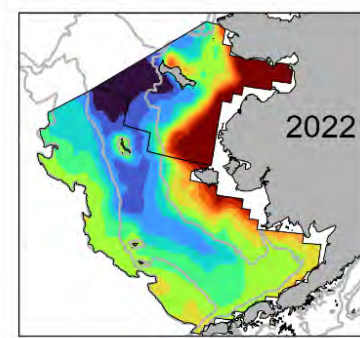
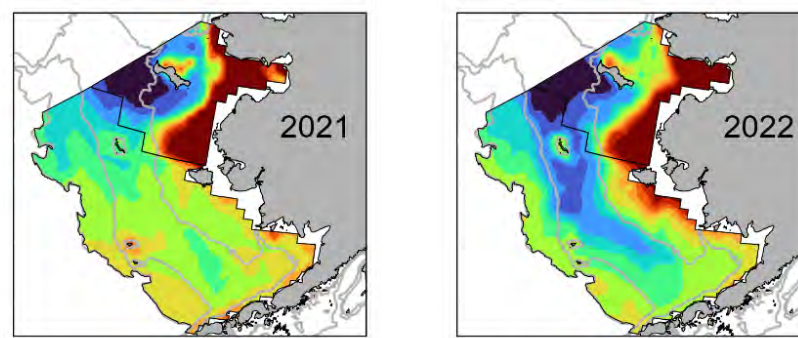
With contributions from everyone in the Shellfish Assessment Program



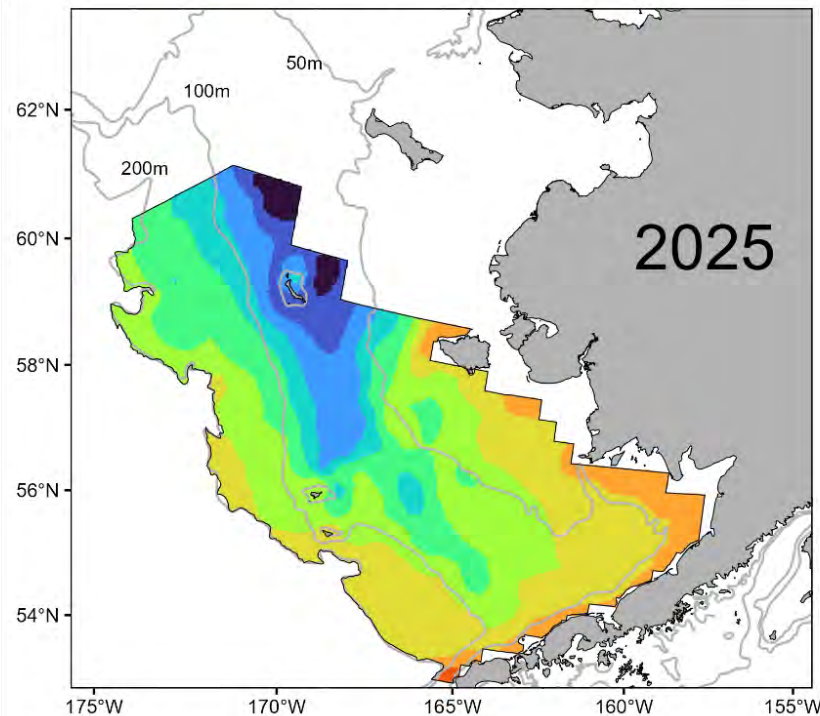
- 137 stations also sampled in Northern Bering Sea, those results not presented here



Intermediate cold pool compared to previous four surveys

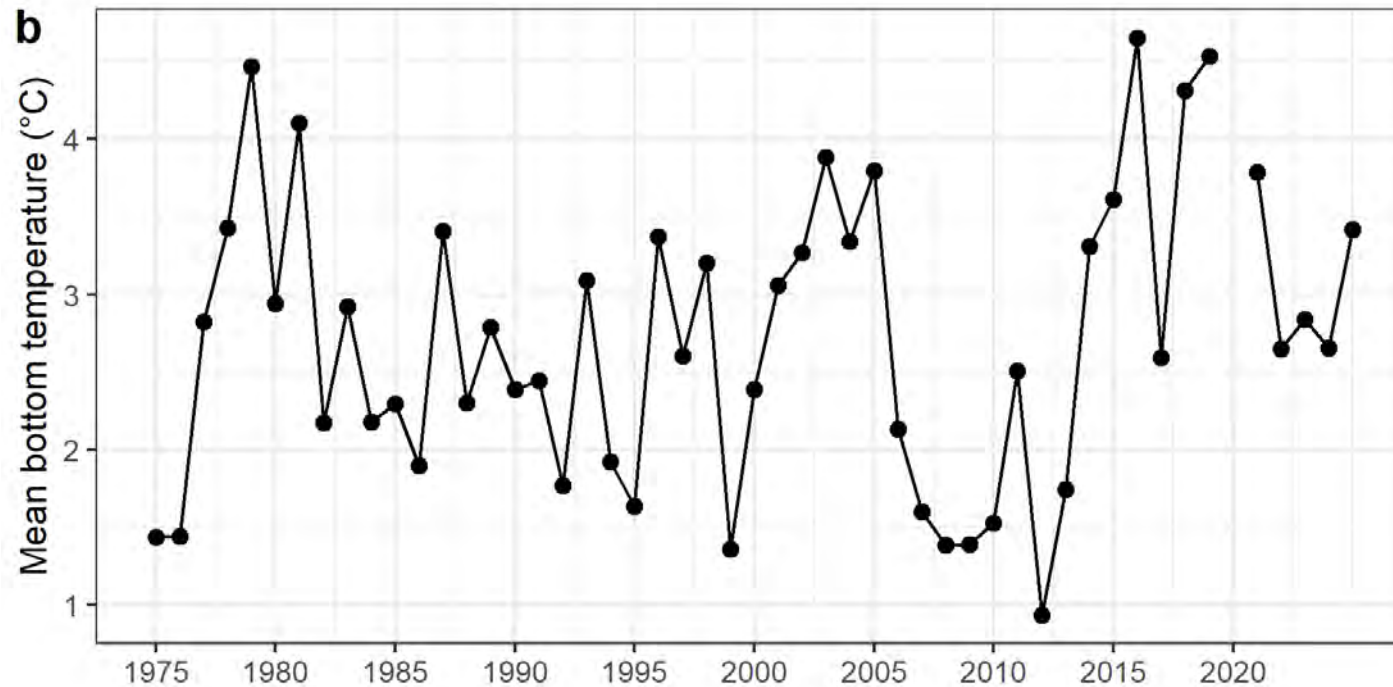
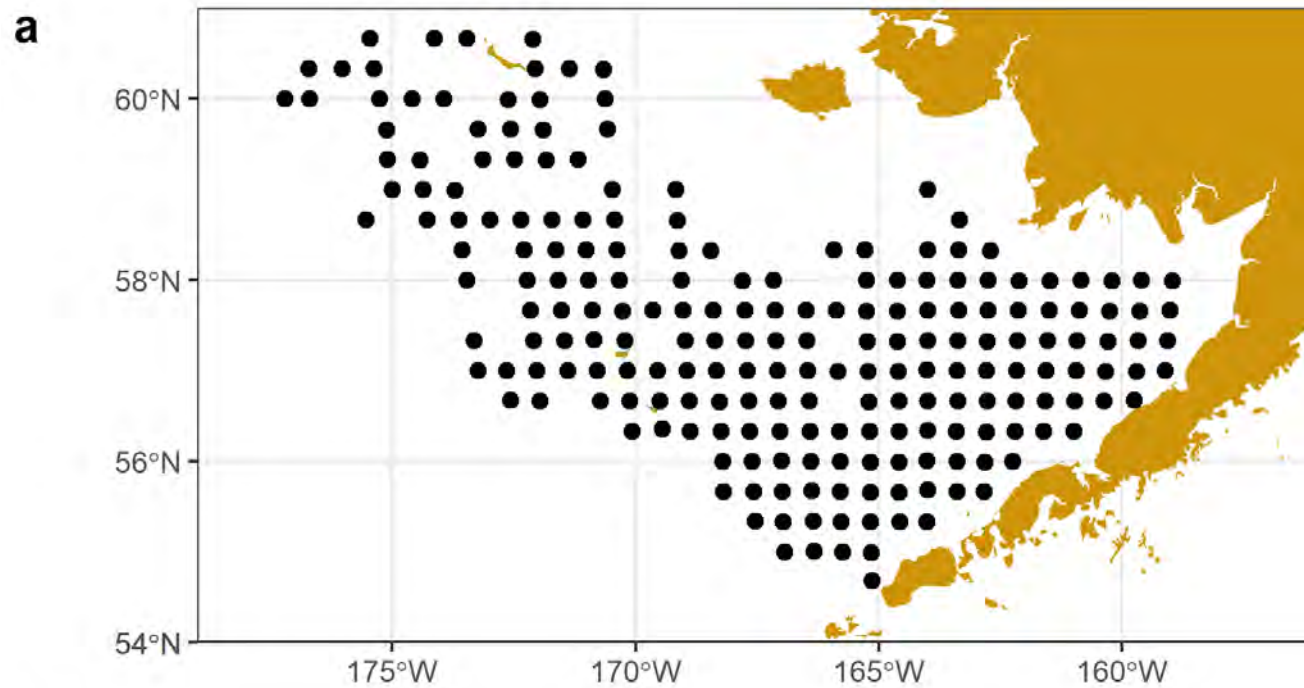


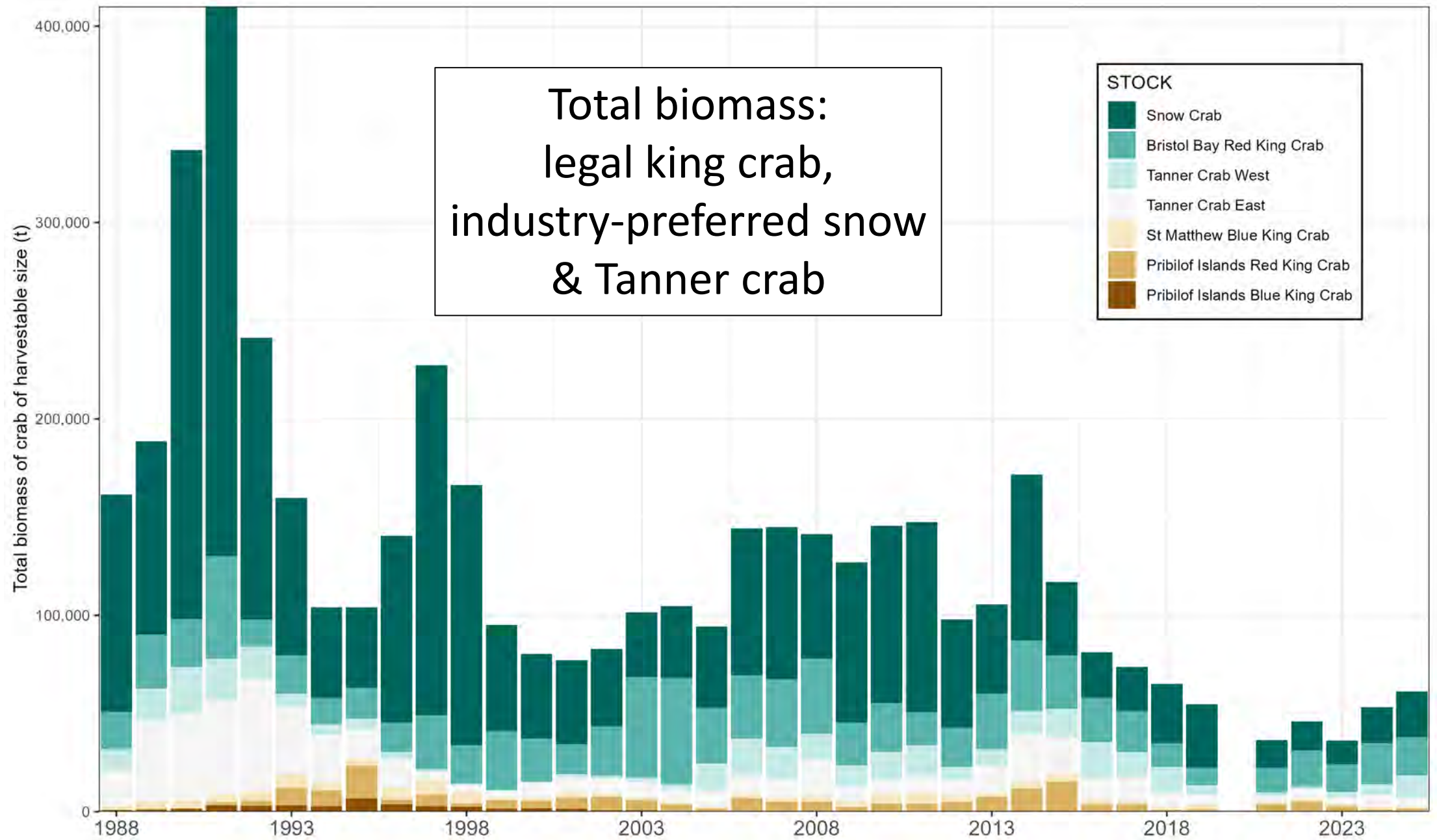
Bottom temperature (°C)



Mean bottom
temperature 0.7°C
above 1975-2025
time series average

(temperatures
controlled for
missing values
and sampling
date)

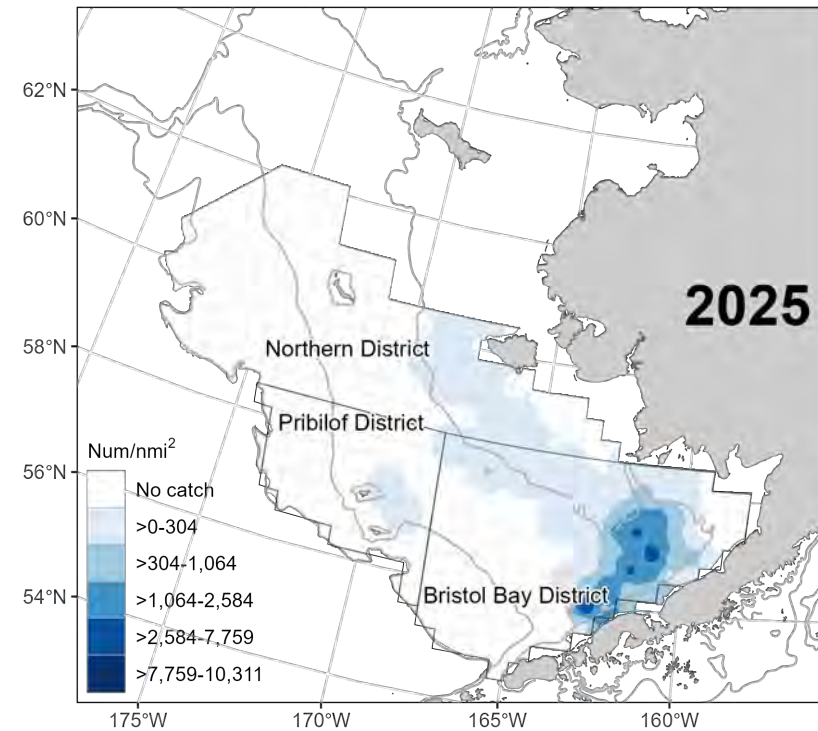
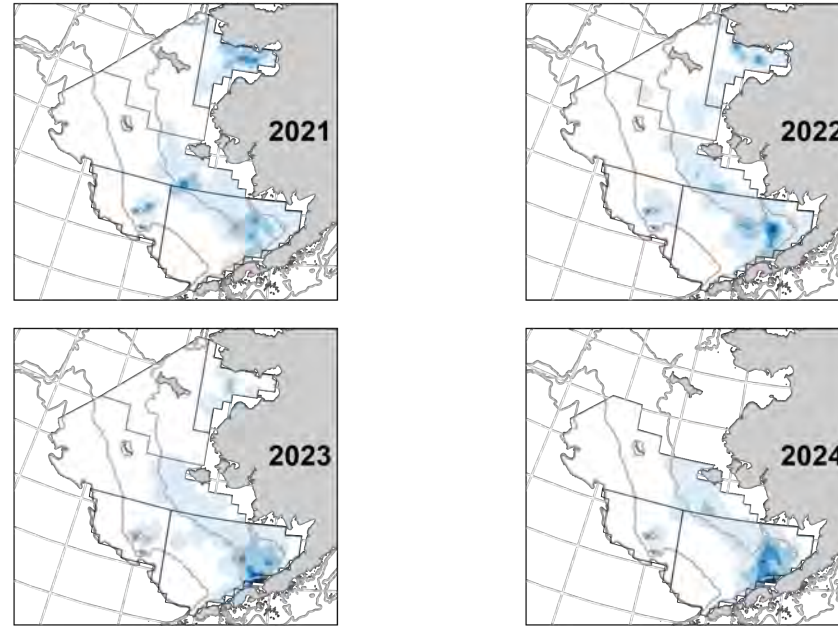




Red king crab

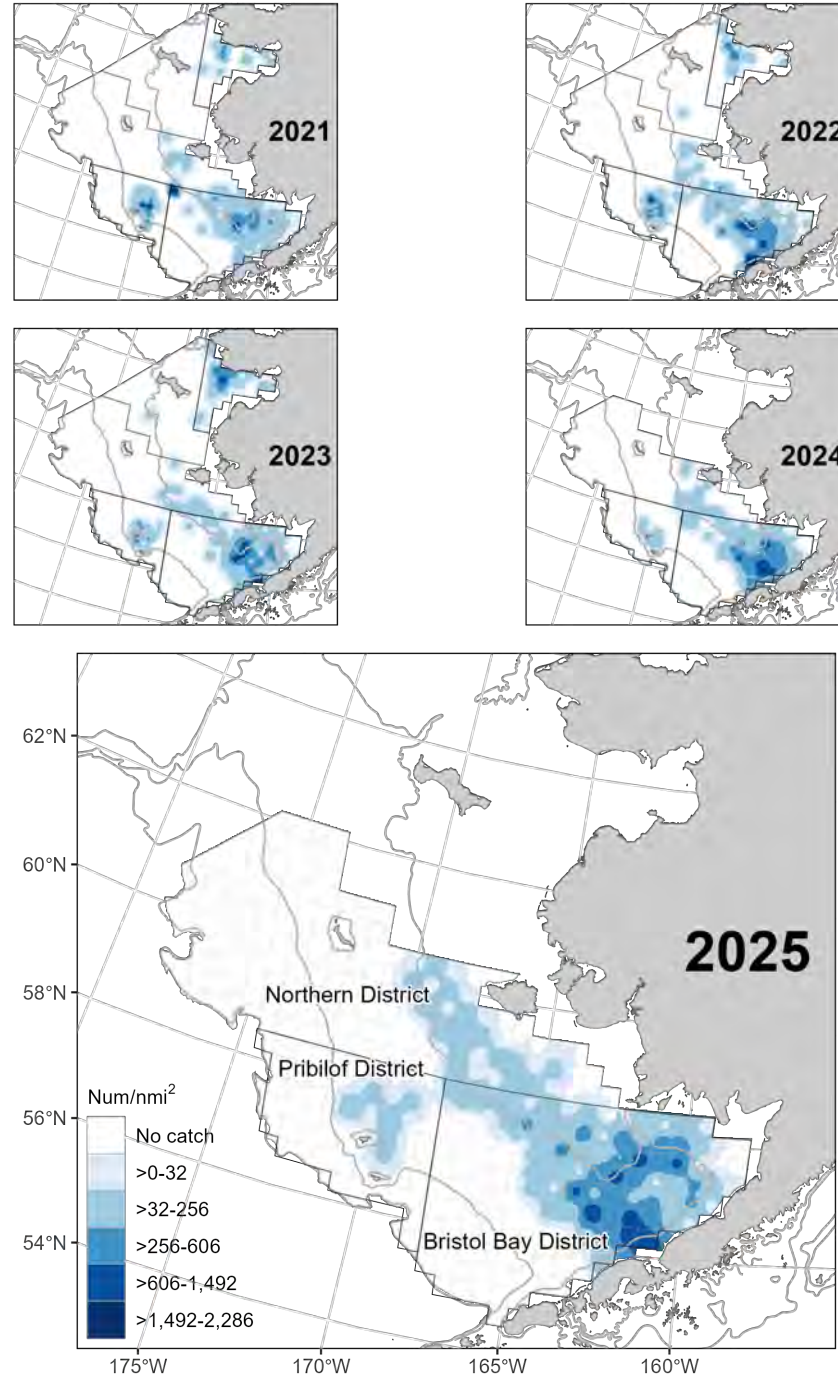
Distribution by year

Red King Crab Mature Female



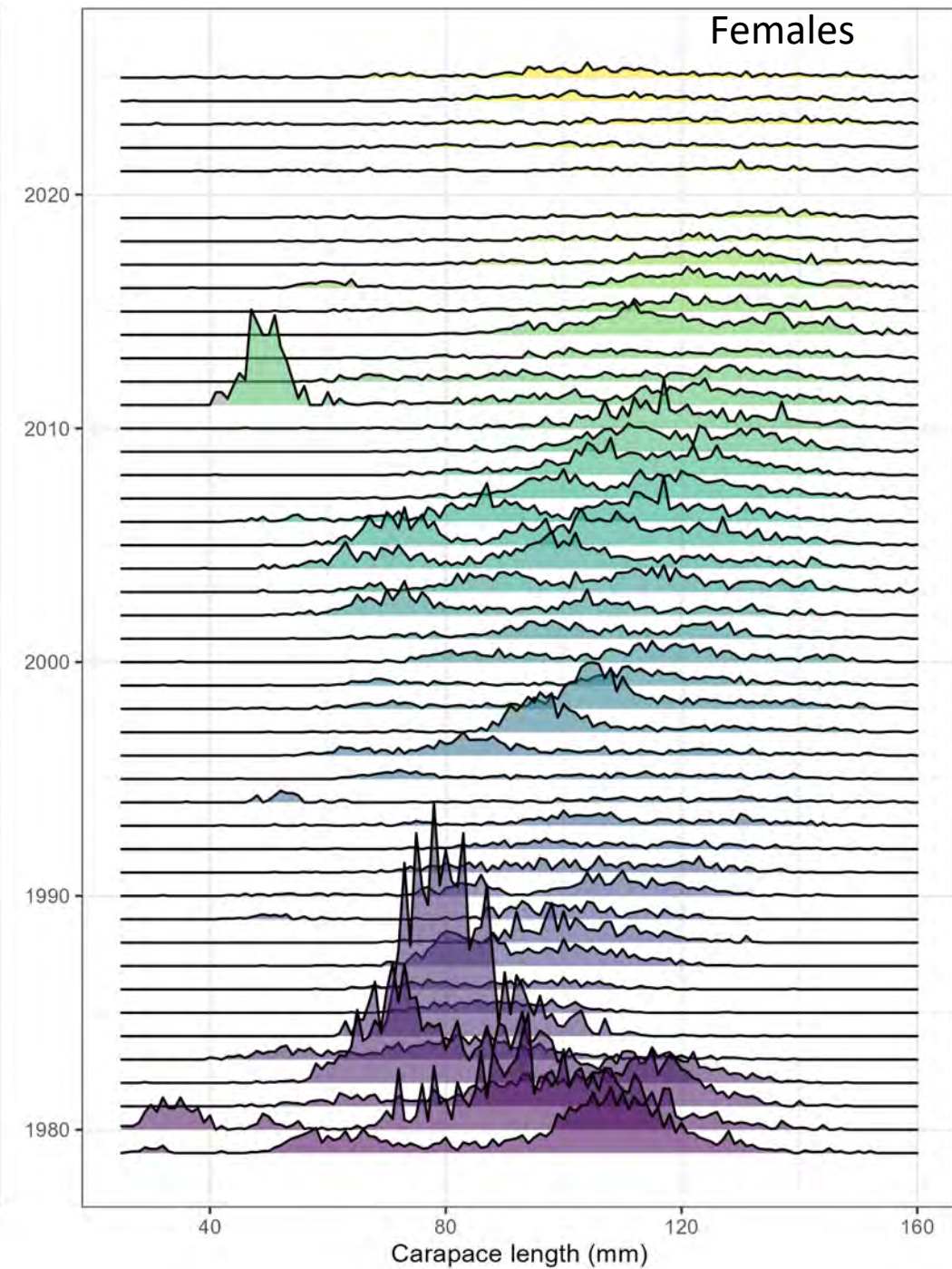
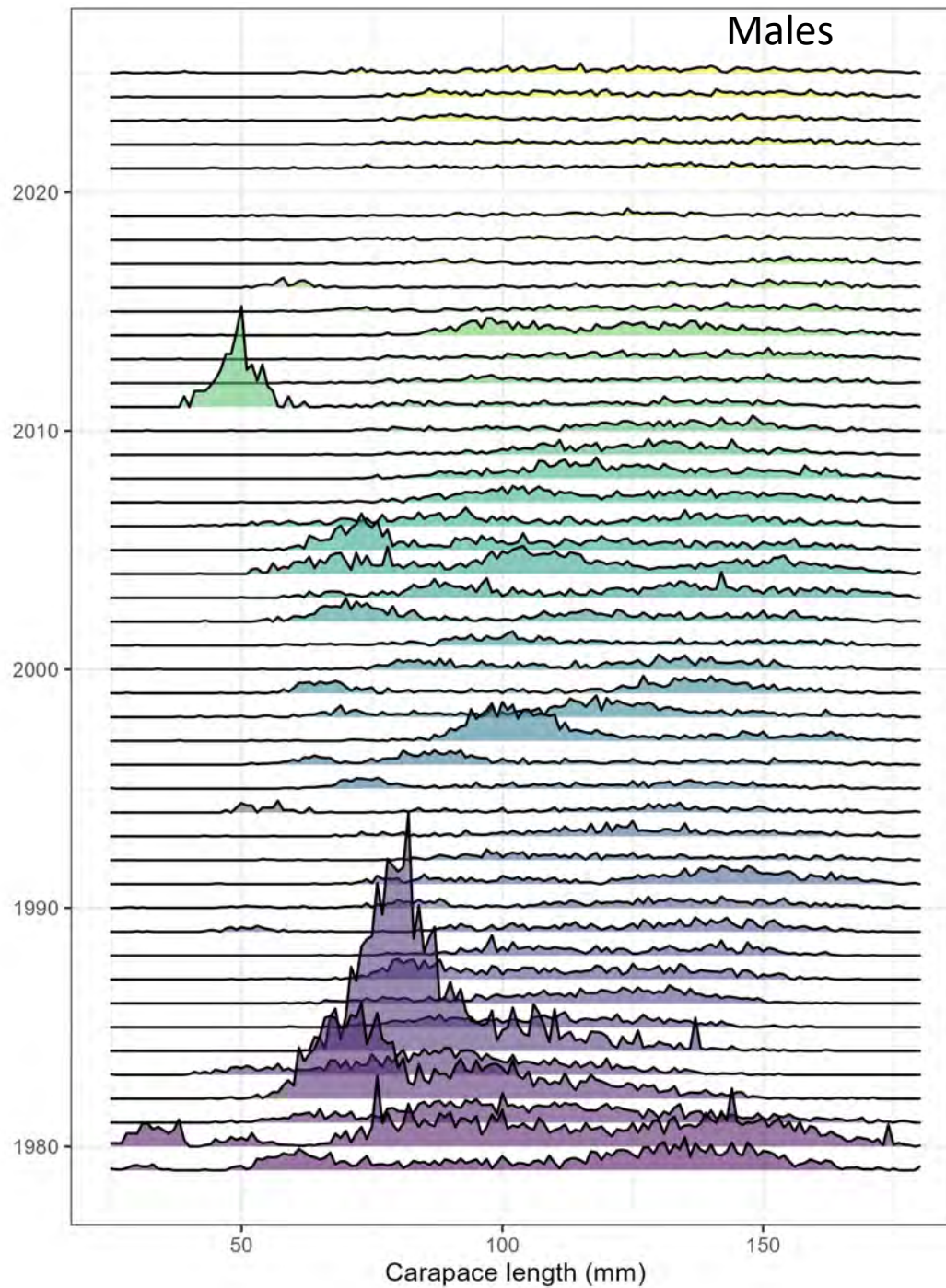
Distribution by year

Red King Crab Legal Male



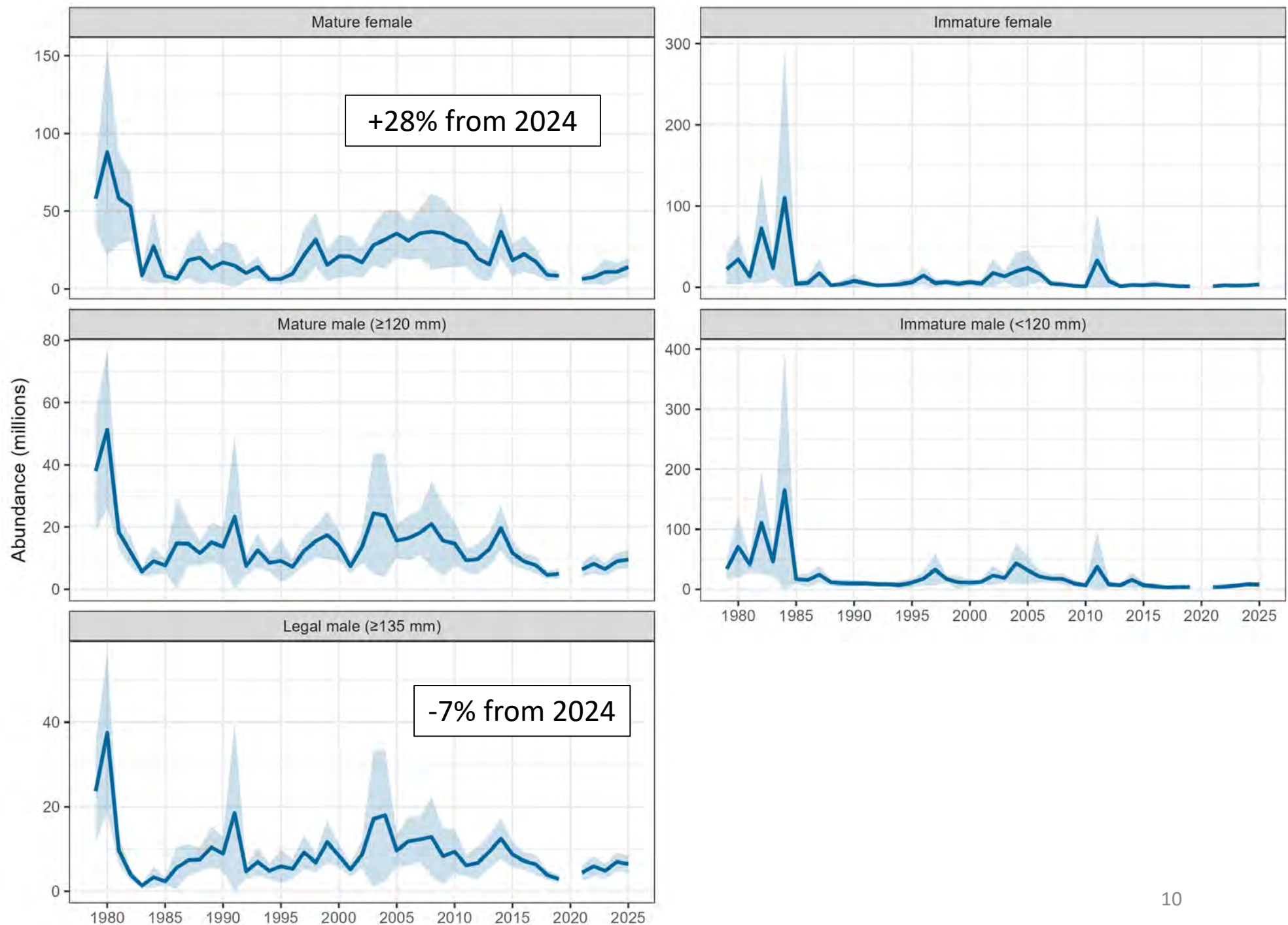
Bristol Bay red king crab

- Male & female abundance remain near historic lows

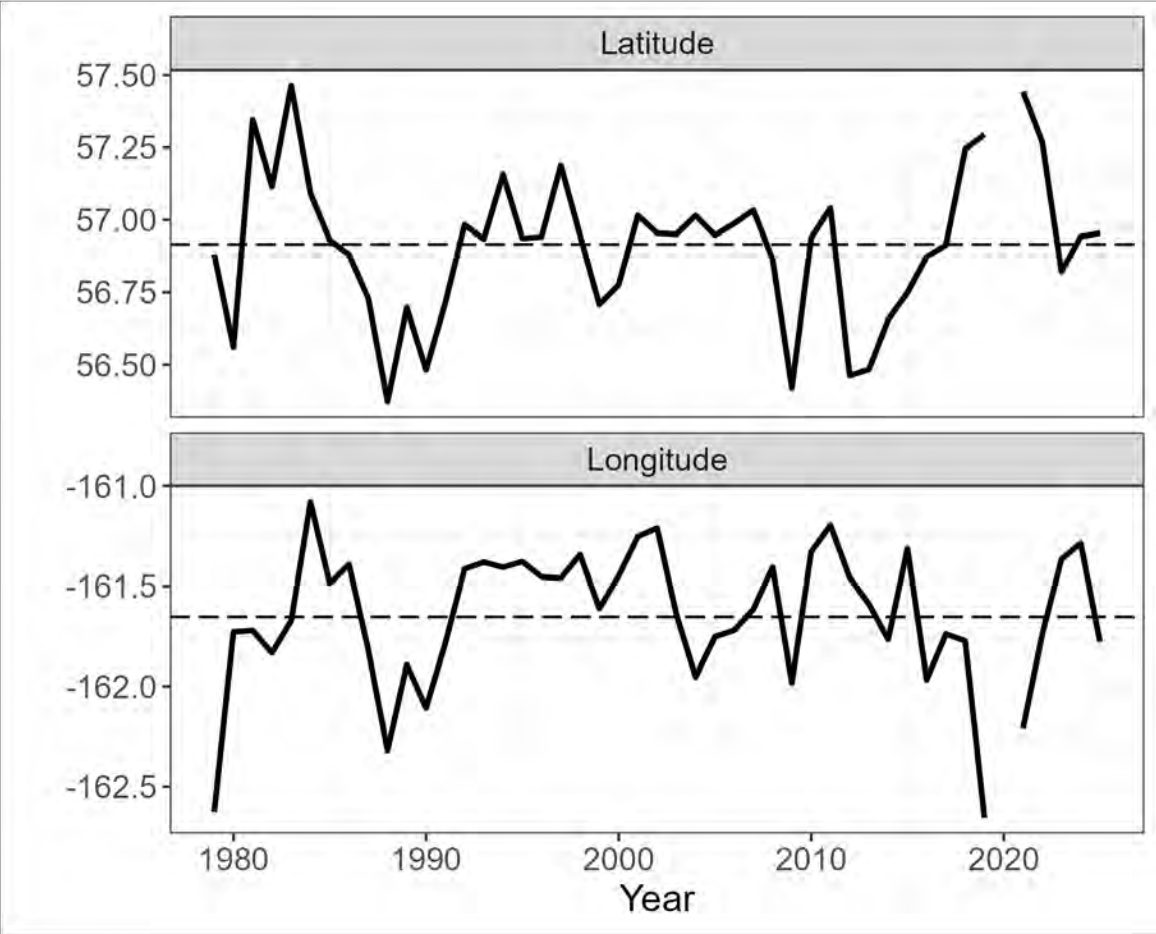
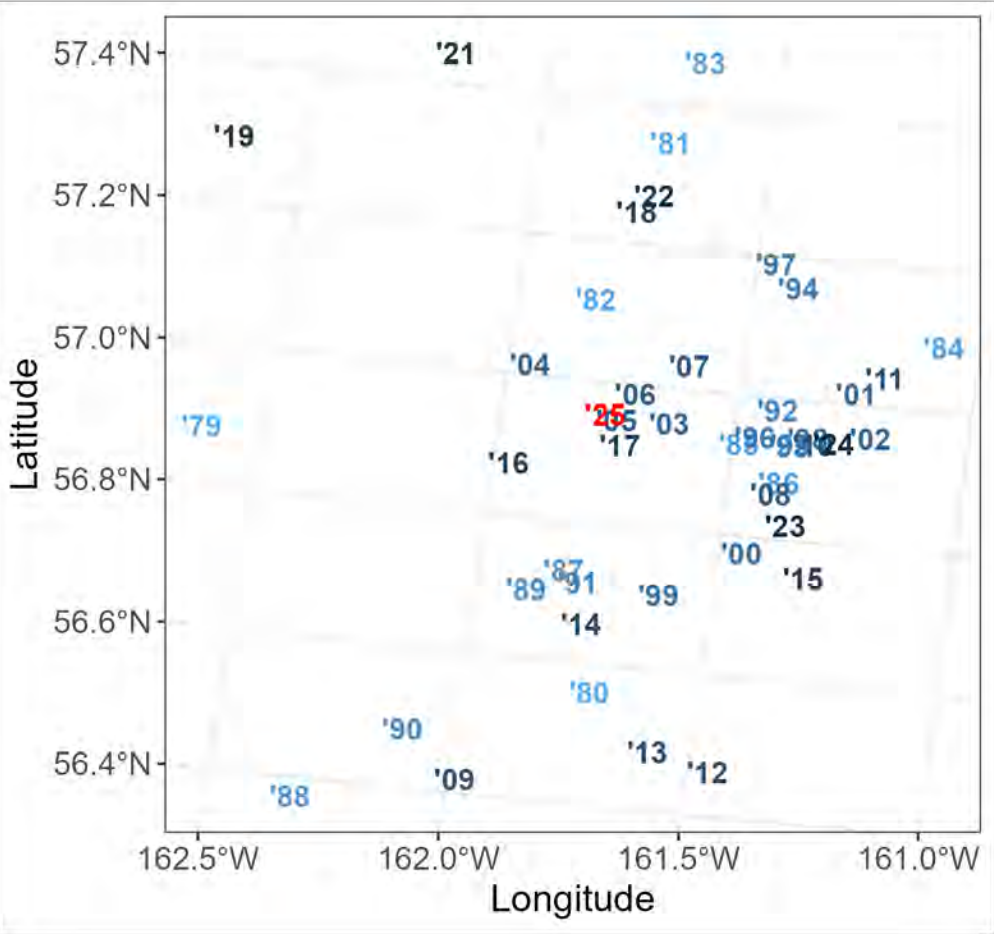


Bristol Bay red king crab

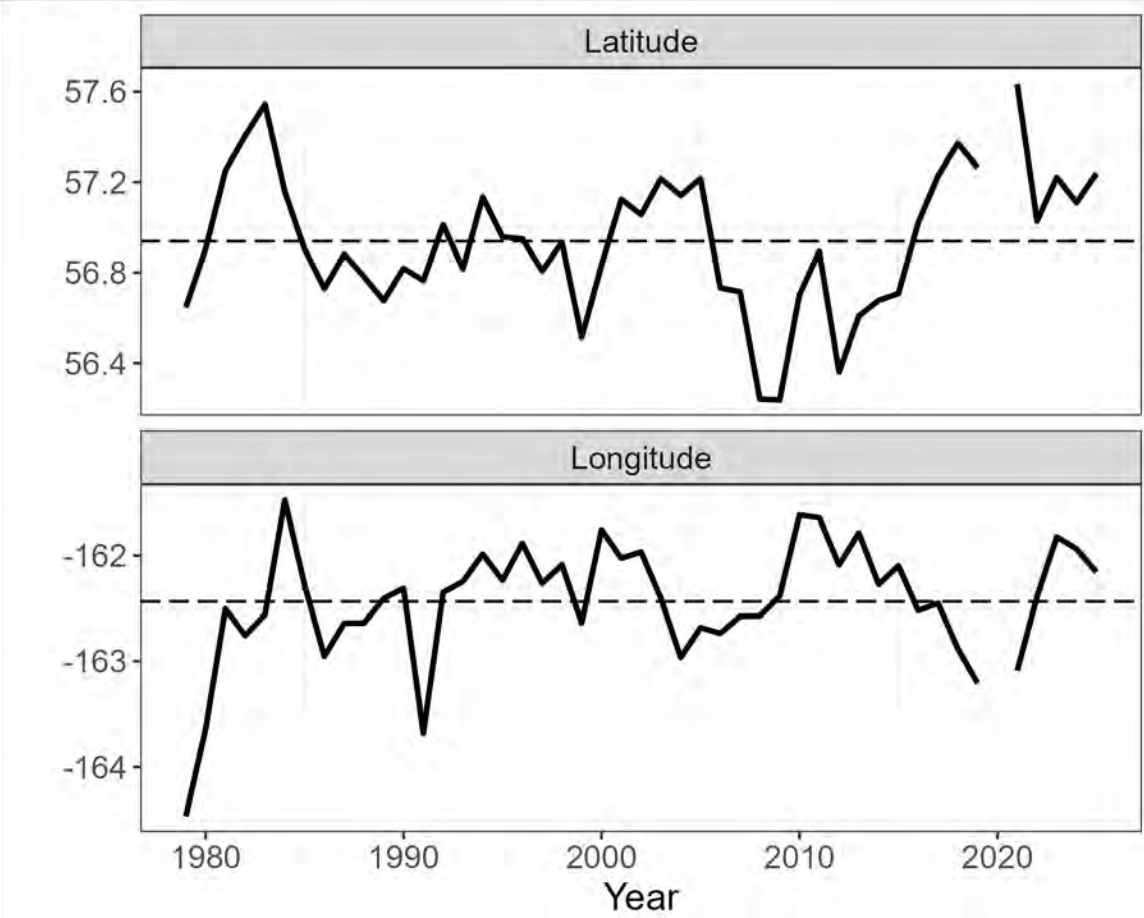
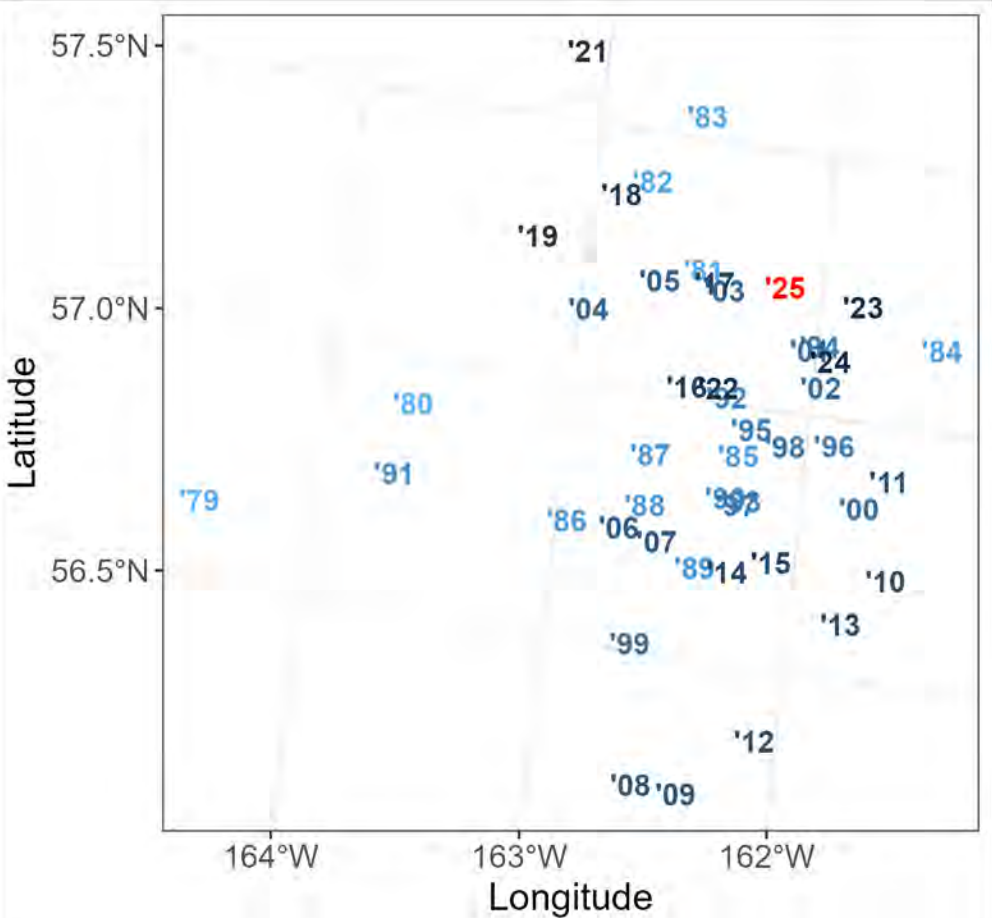
- Mature female & male abundance / legal abundance showing positive trend since 2021
- Immature abundance still extremely low



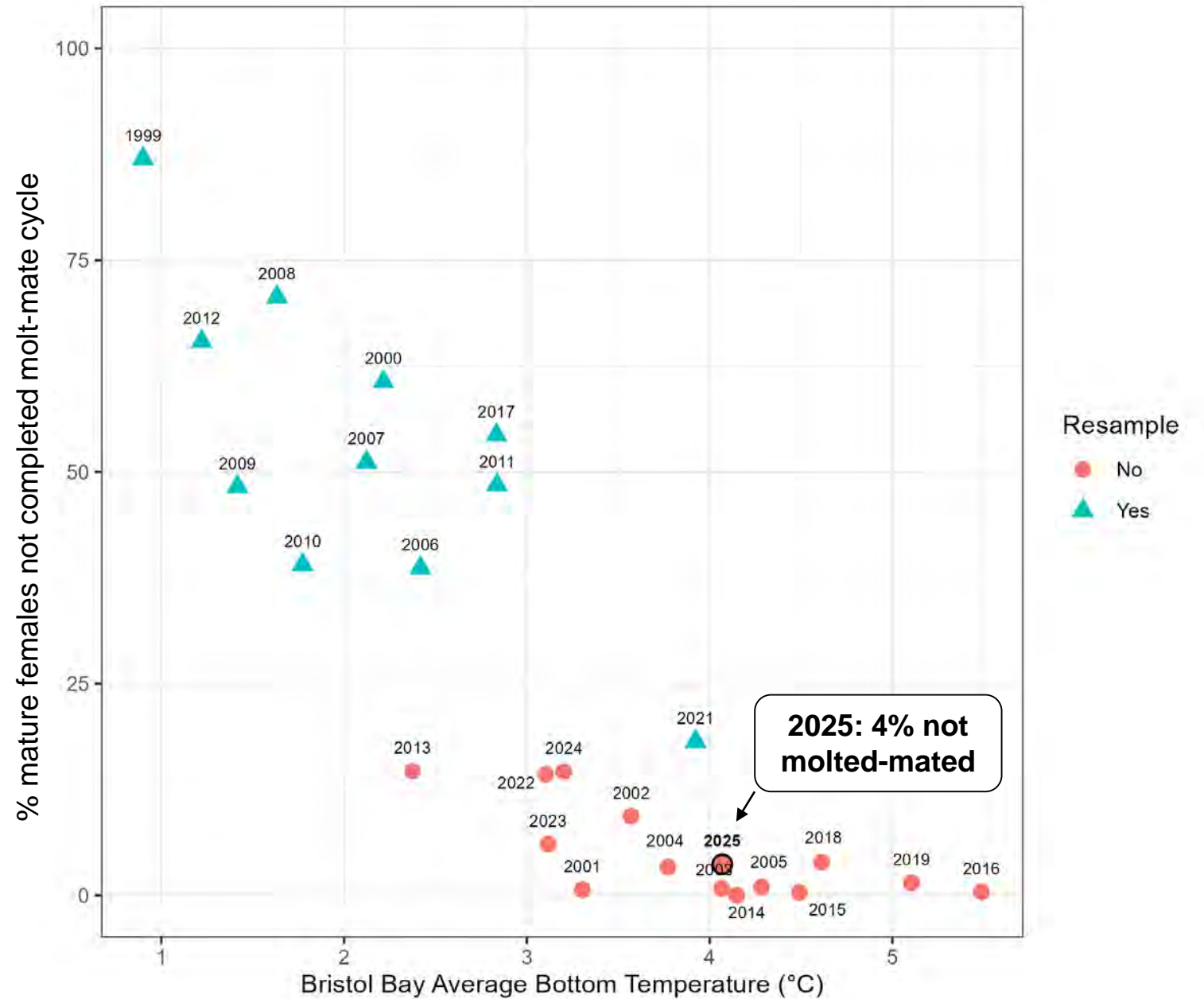
Bristol Bay Red King Crab Mature Female



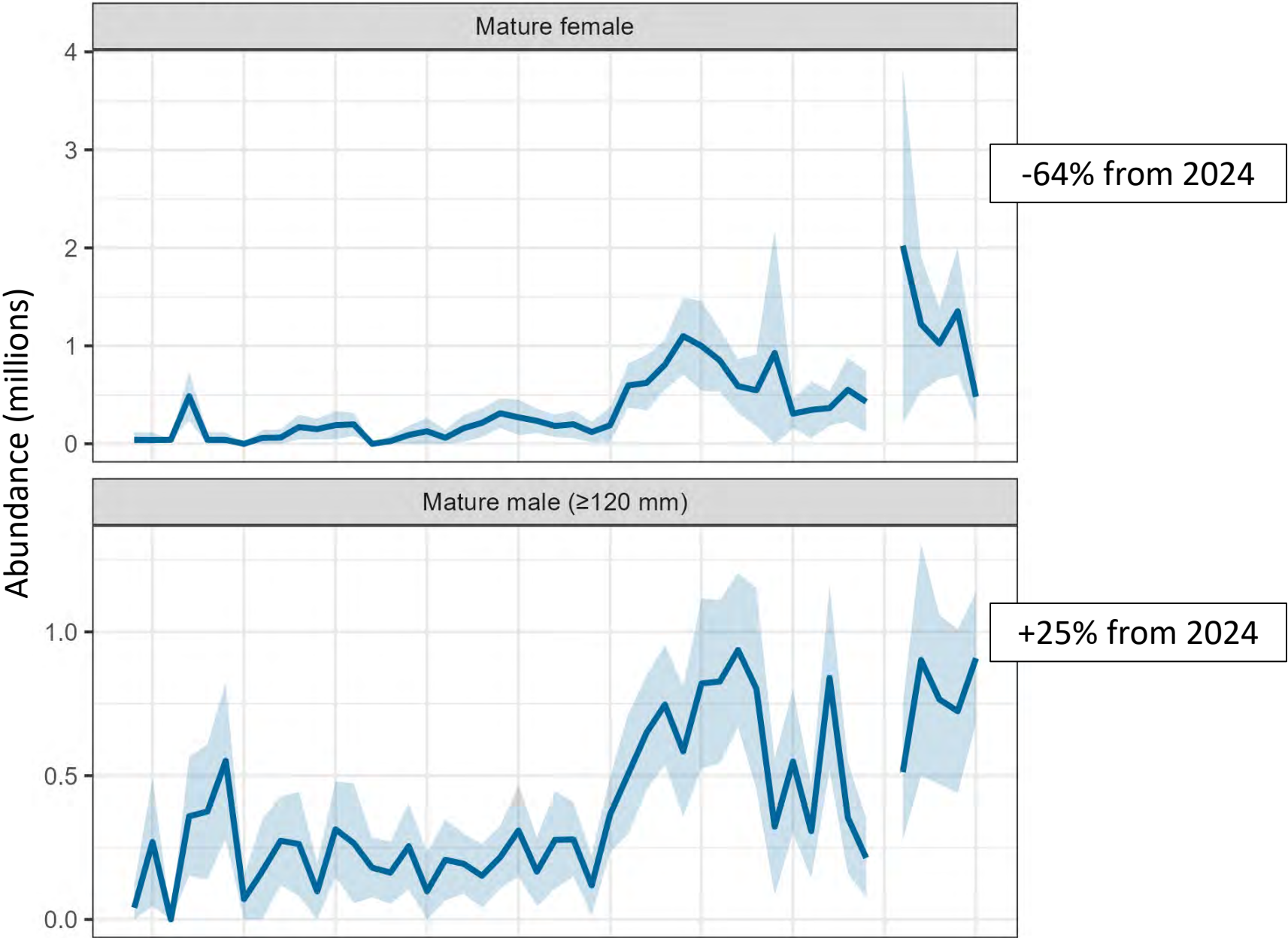
Bristol Bay Red King Crab Legal Male



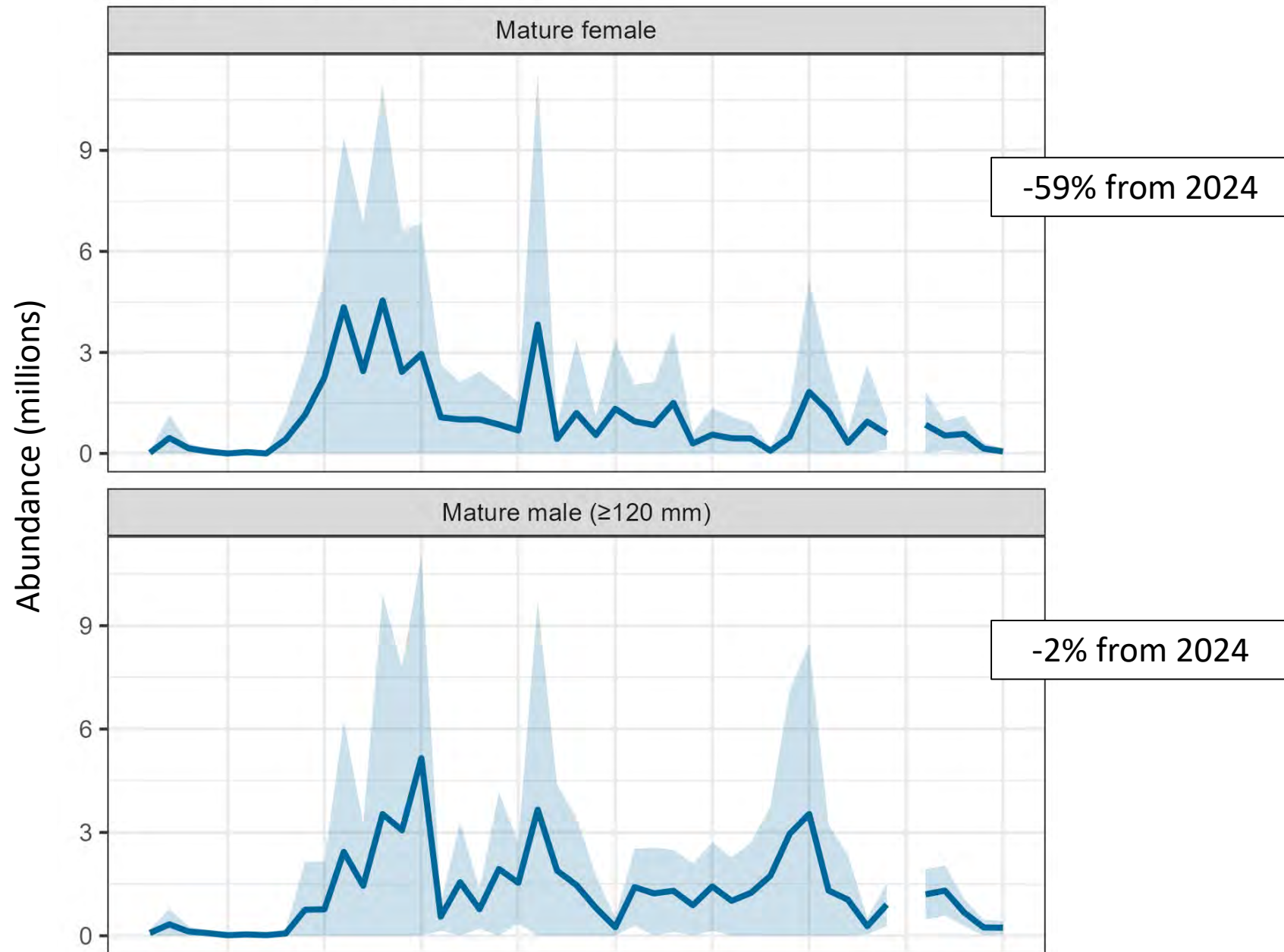
Retow history:
% not molt-mated vs
bottom temperature



Northern District Red King Crab



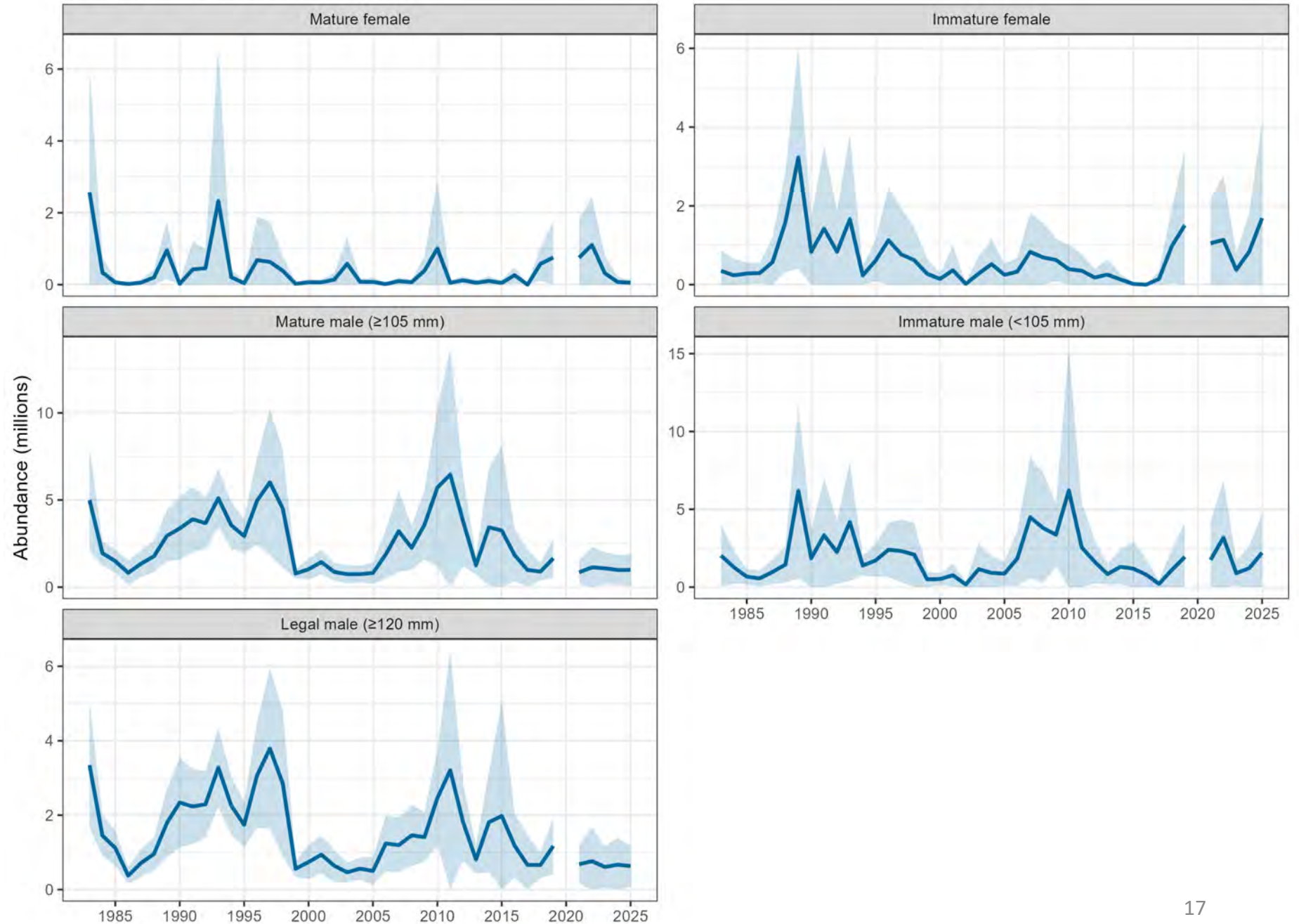
Pribilof Islands Red King Crab



Blue king crab

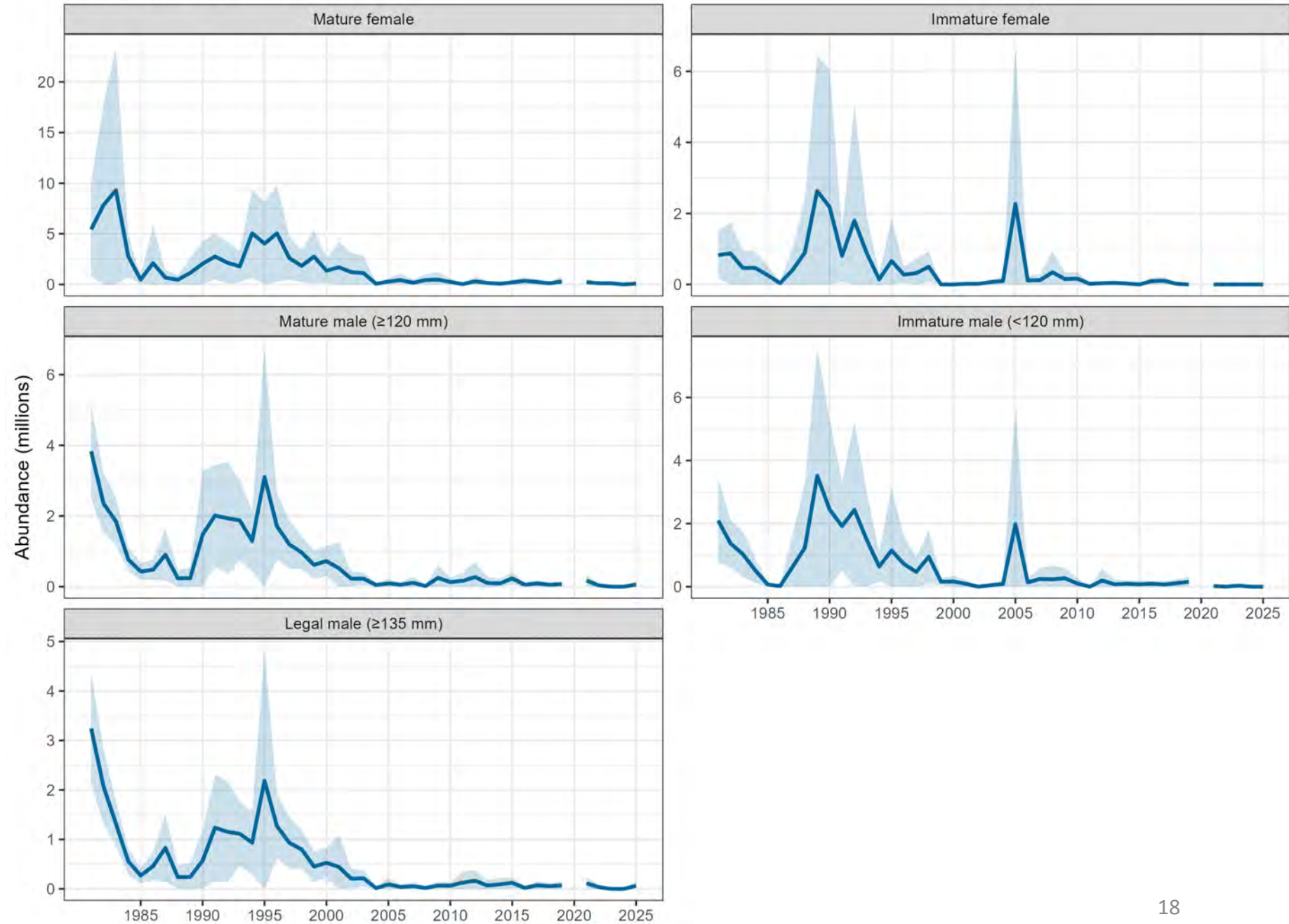
St. Matthew Island Blue King Crab

- Stable low abundance of mature/legal males
- Relatively high abundance of immatures (immature female highest since 1990s)
- 74% of immature females caught at one station



- Only 2 legal males / 3 mature females caught
- No immature females caught

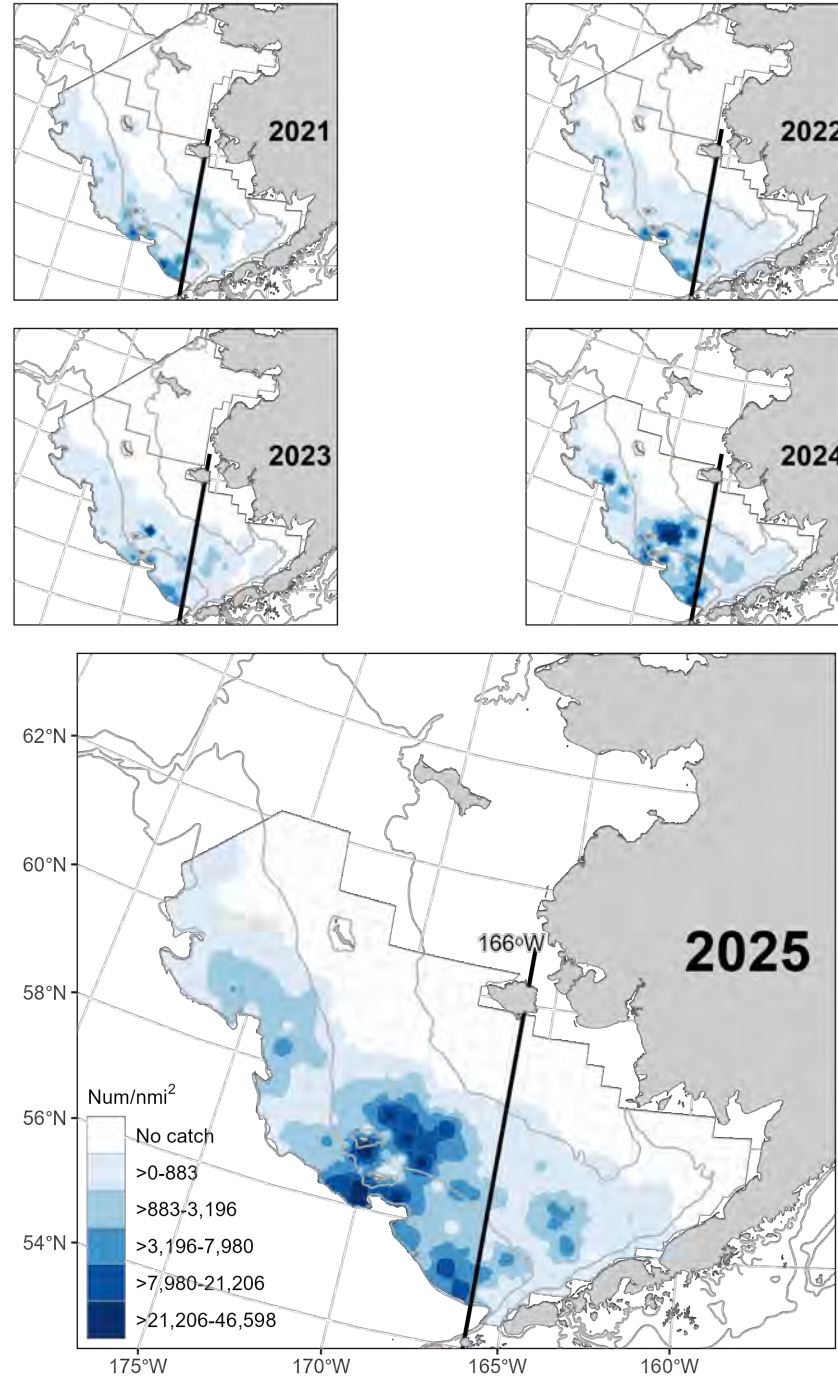
Pribilof Islands Blue King Crab



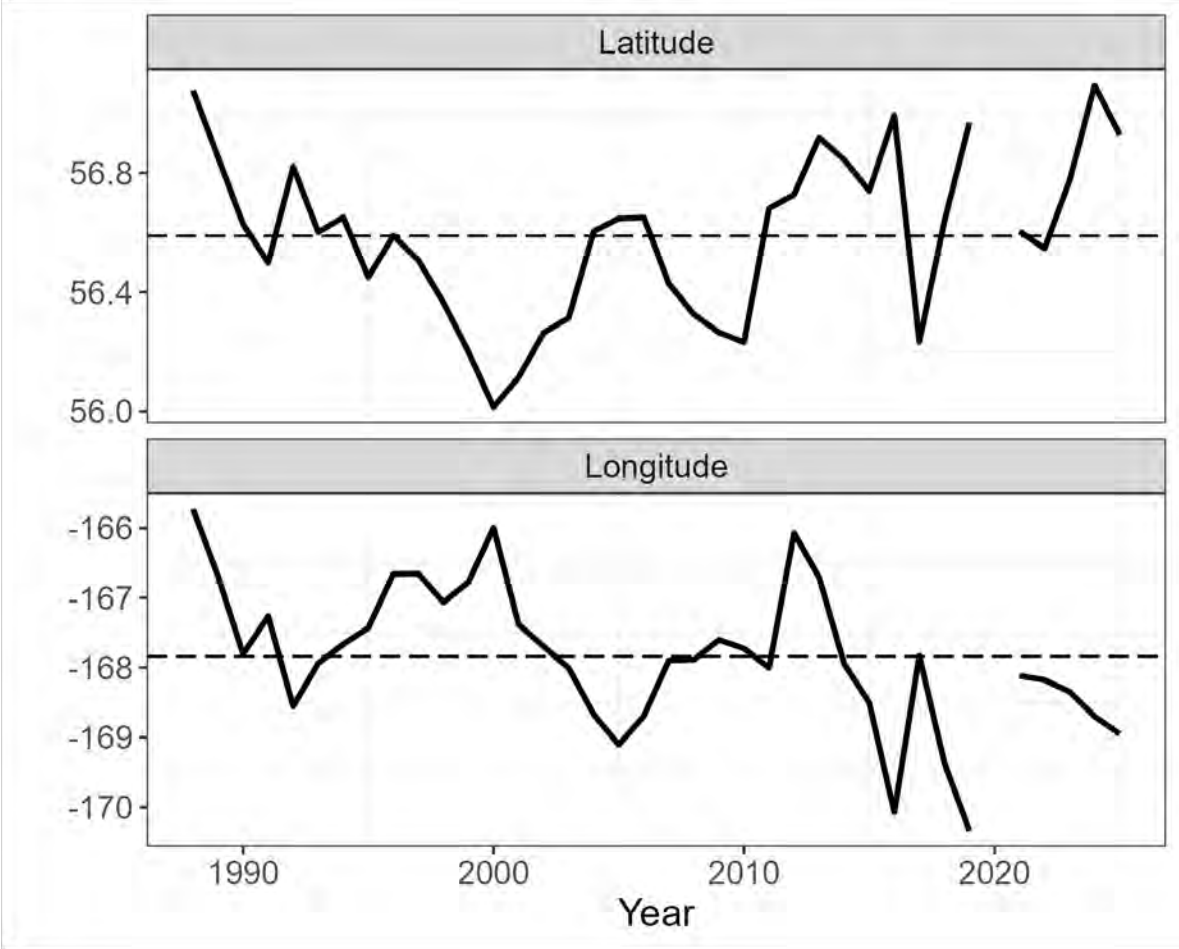
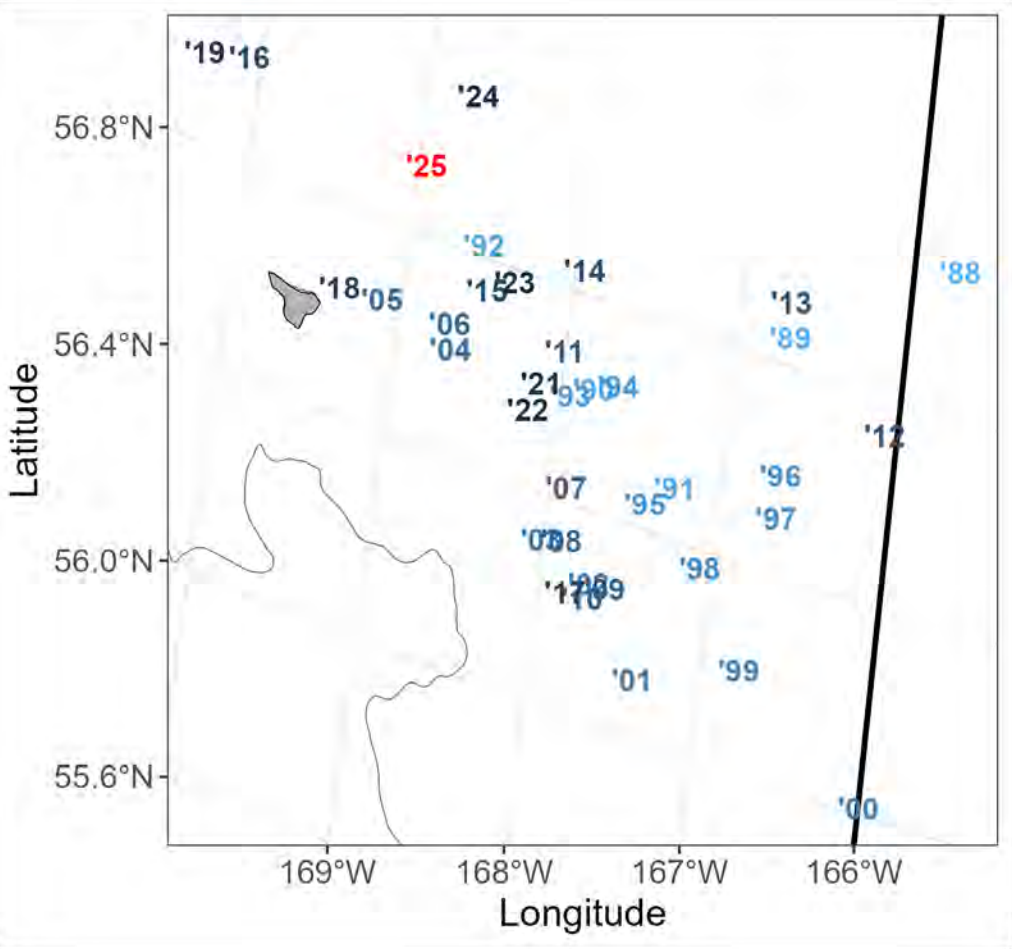
Tanner crab

Distribution by year

Tanner Crab Mature Female

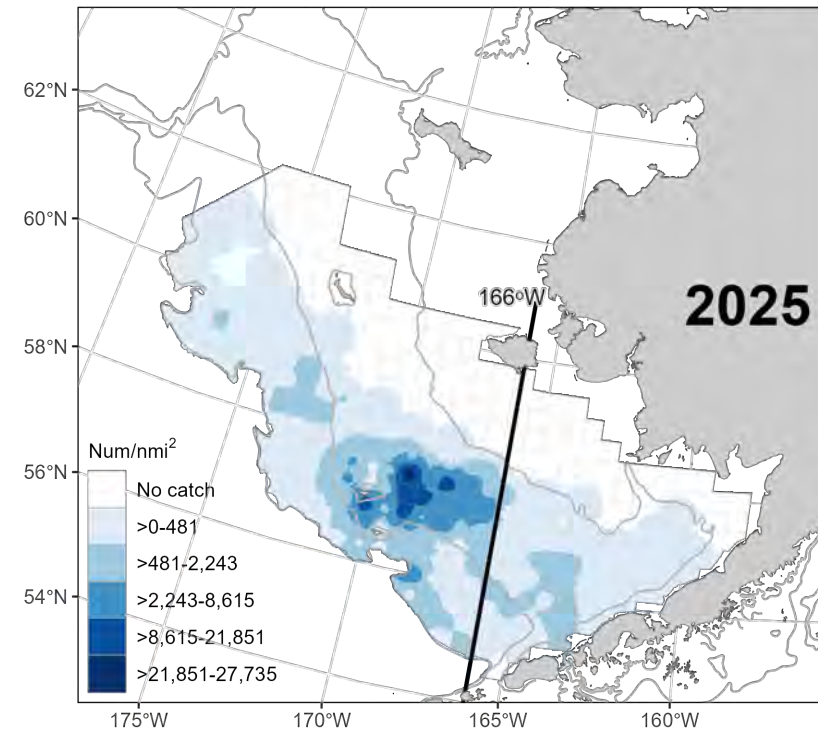
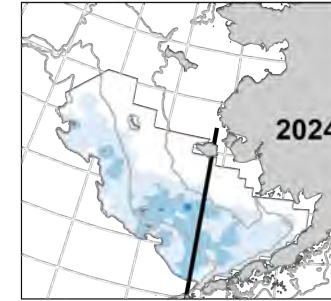
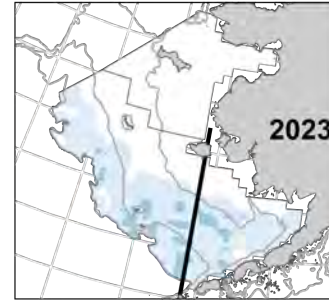
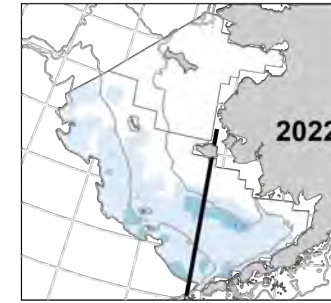
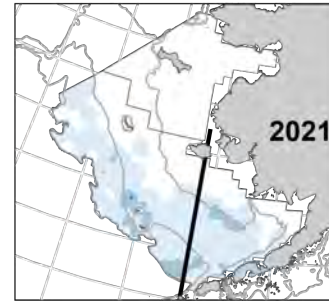


Tanner Crab Mature Female



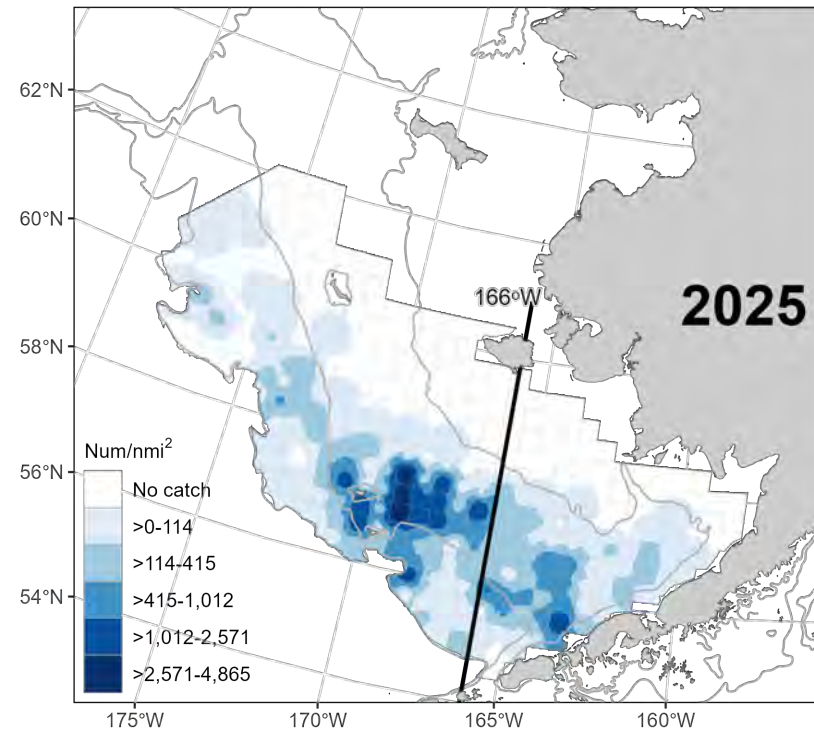
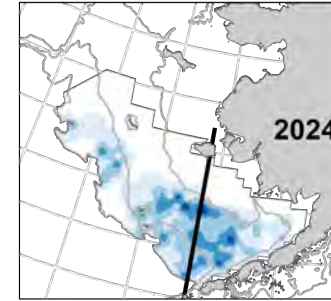
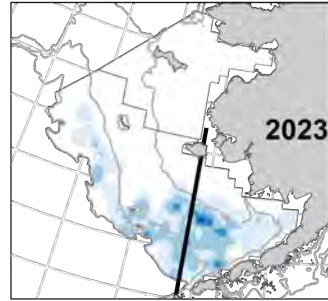
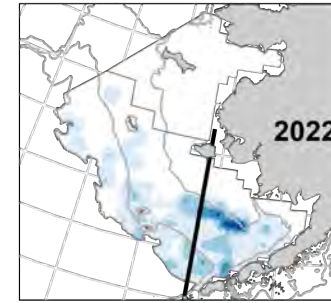
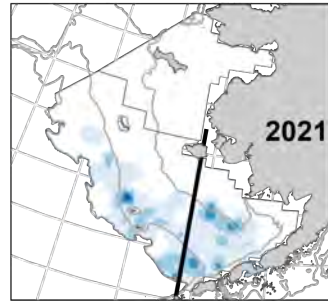
Distribution by year

Tanner Crab Legal Male

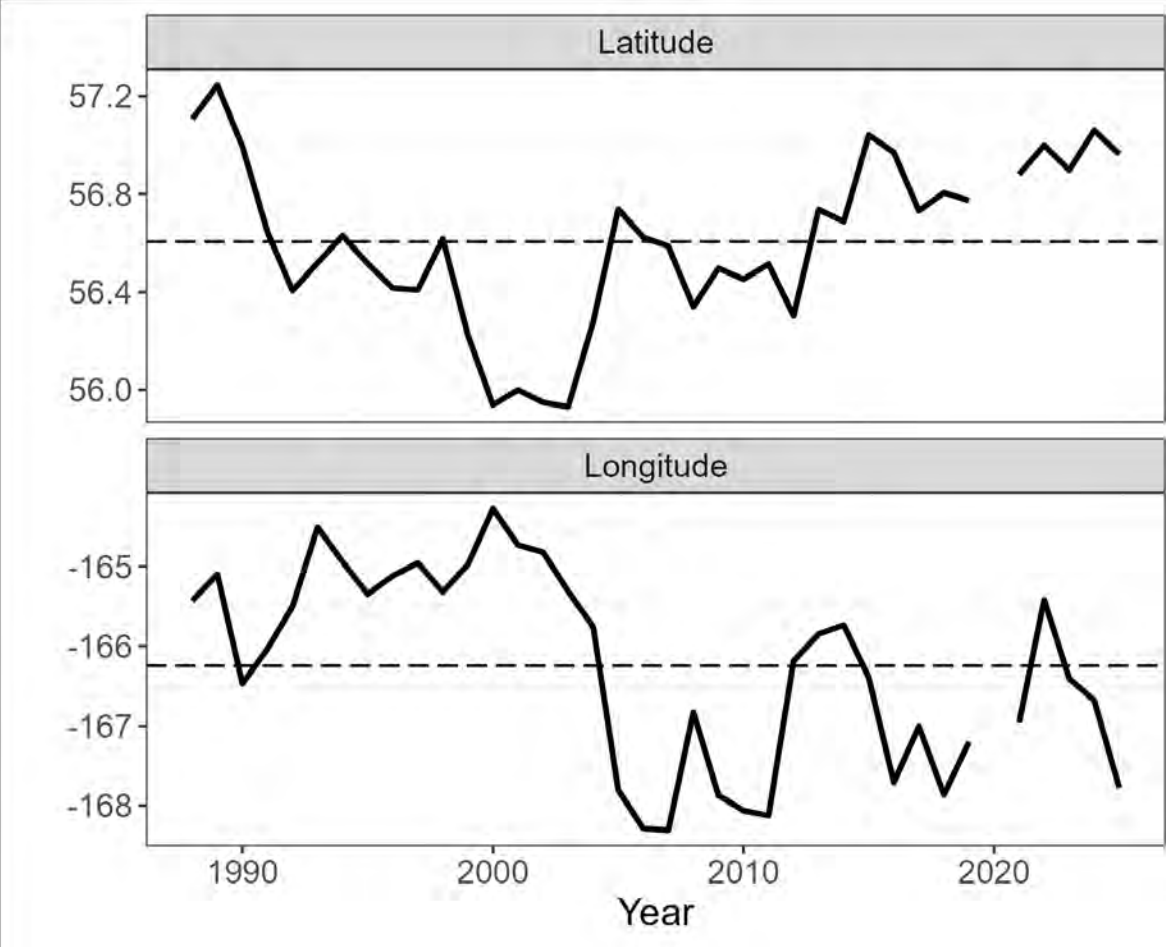
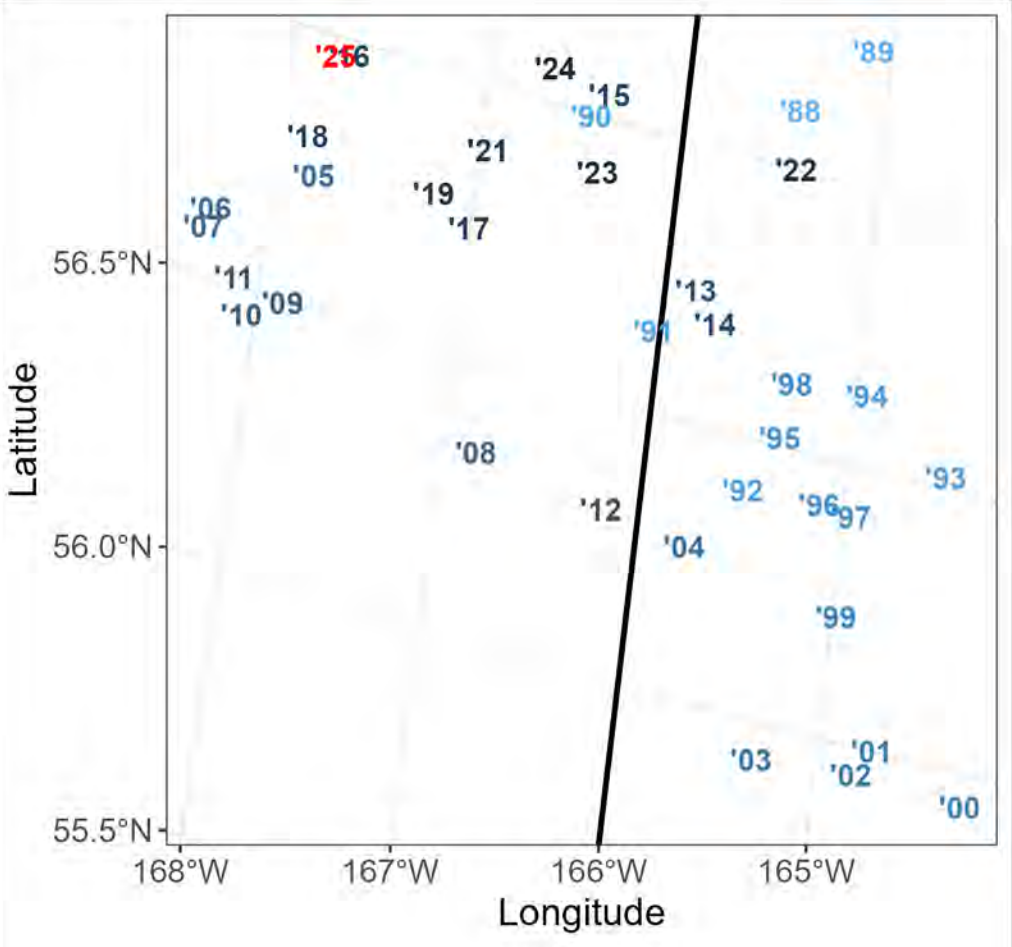


Distribution by year

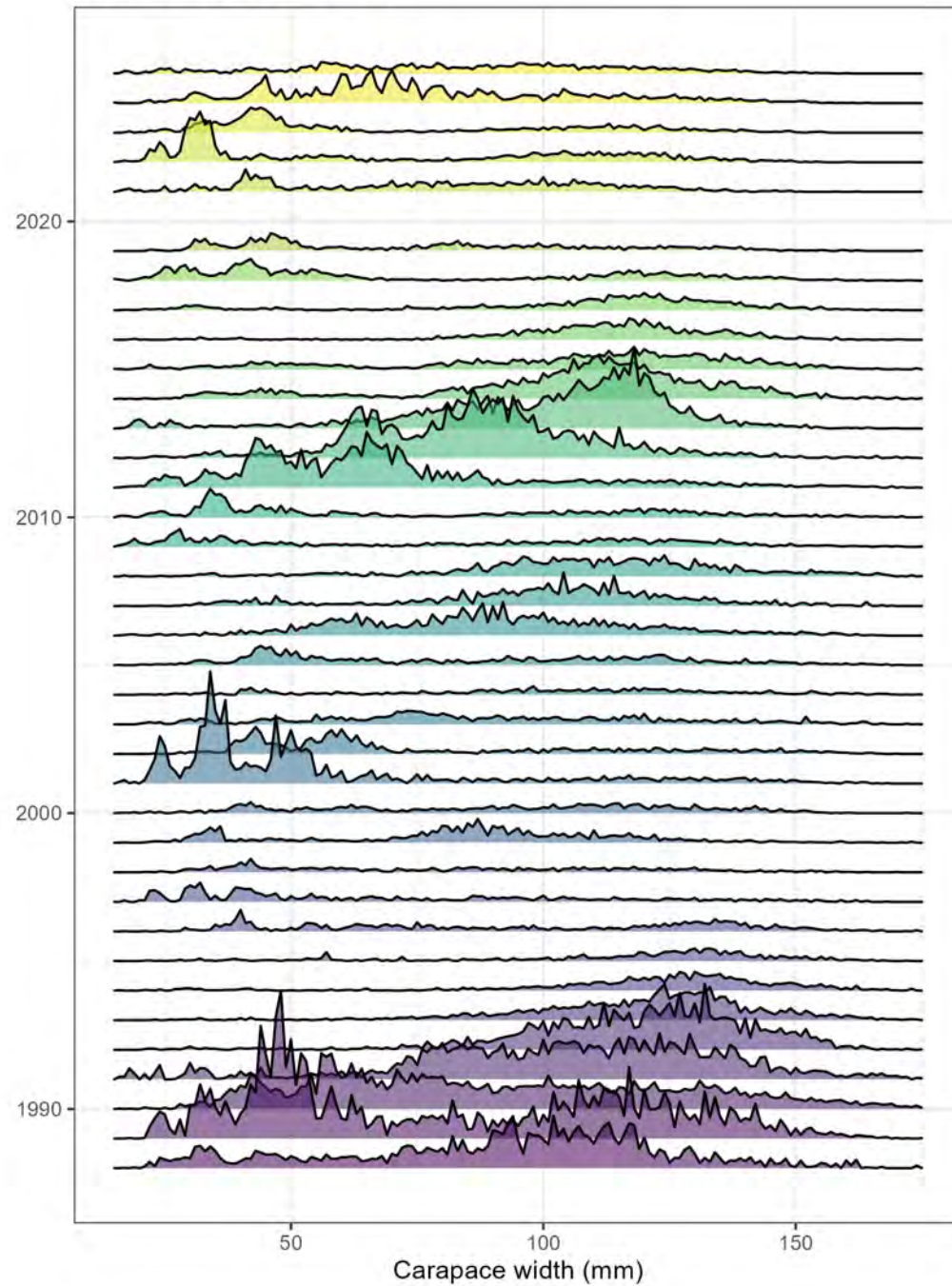
Tanner Crab Industry Preferred Male



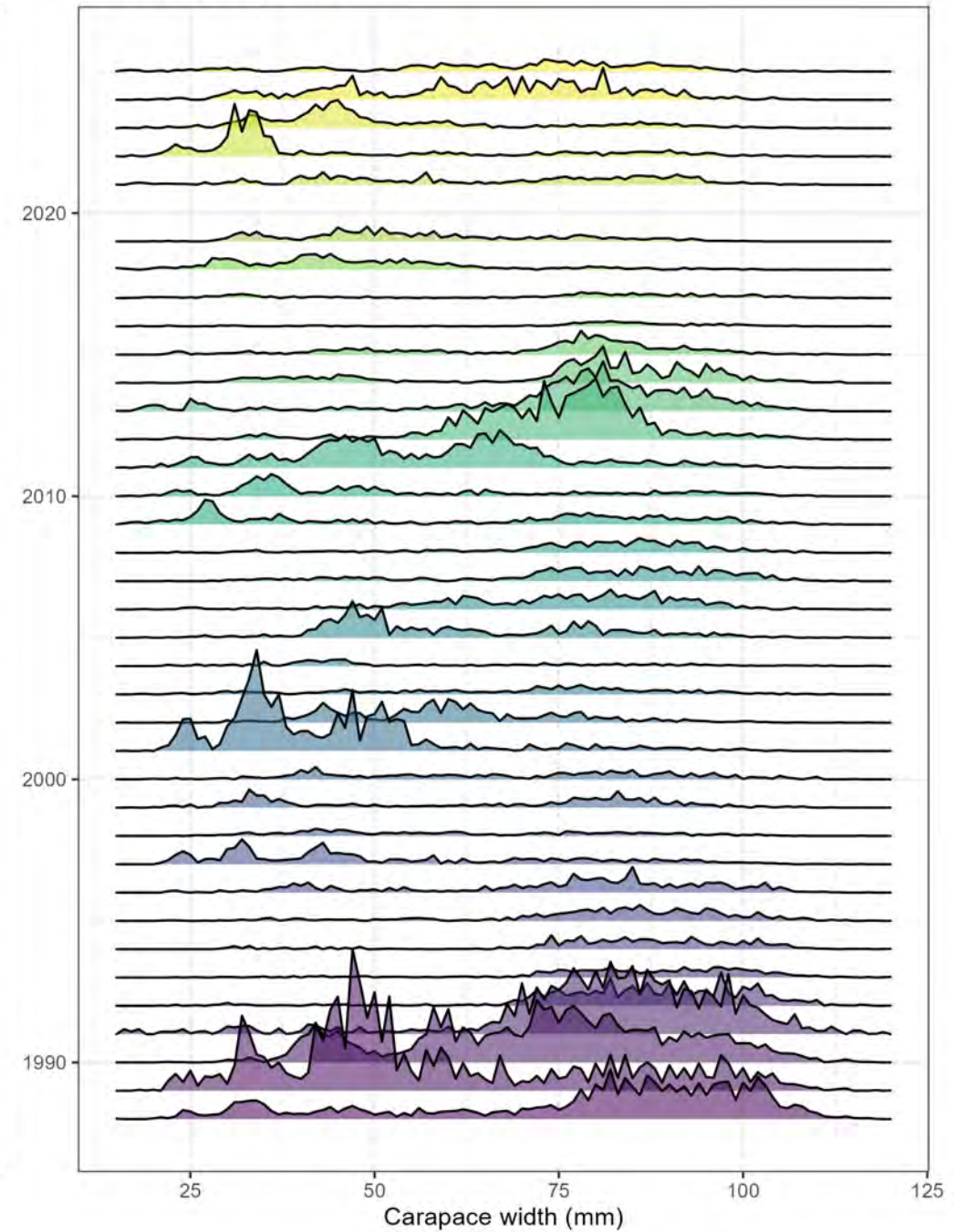
Tanner Crab Industry Preferred Male



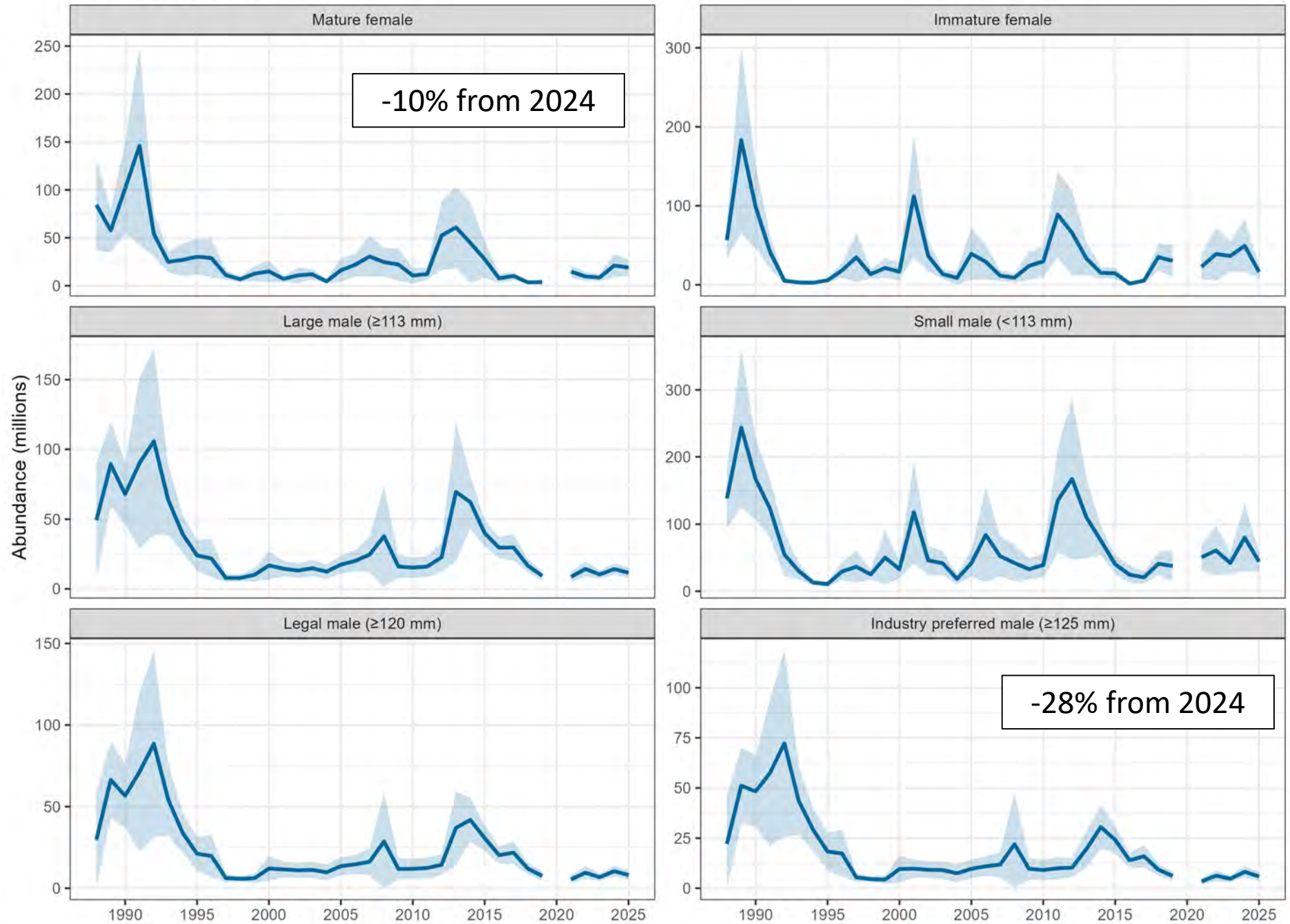
Male Tanner Crab East



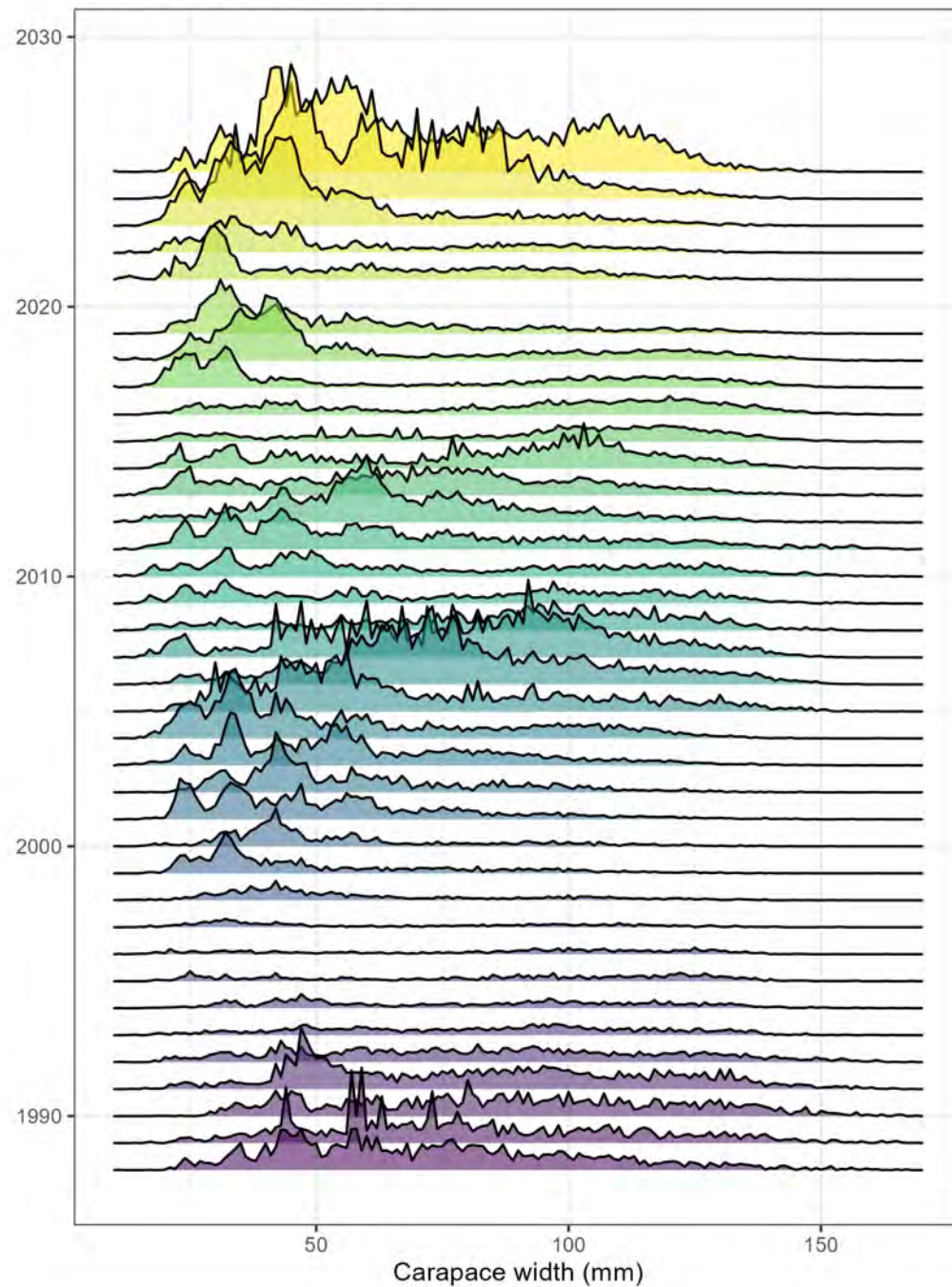
Female Tanner Crab East



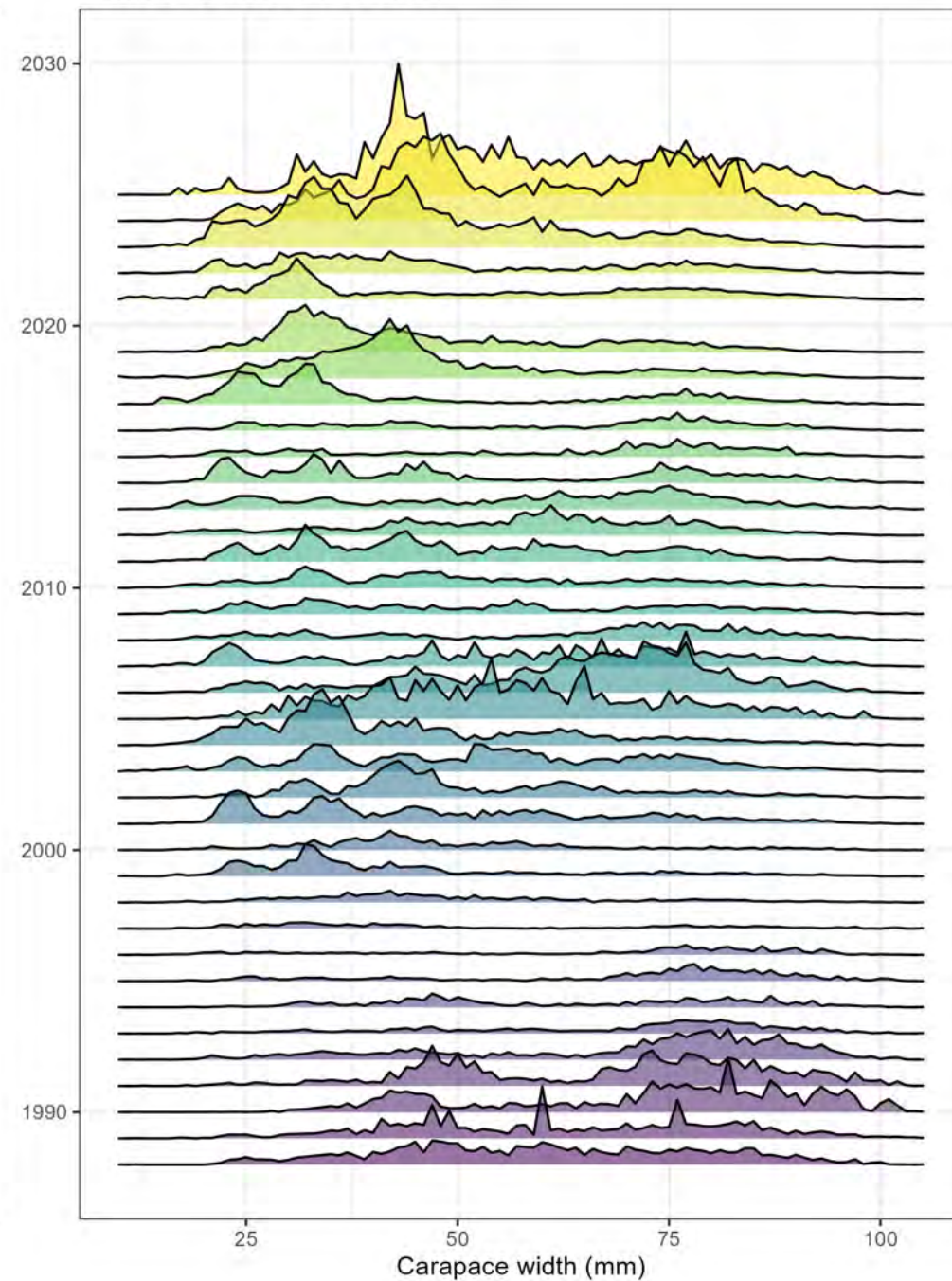
Tanner Crab East



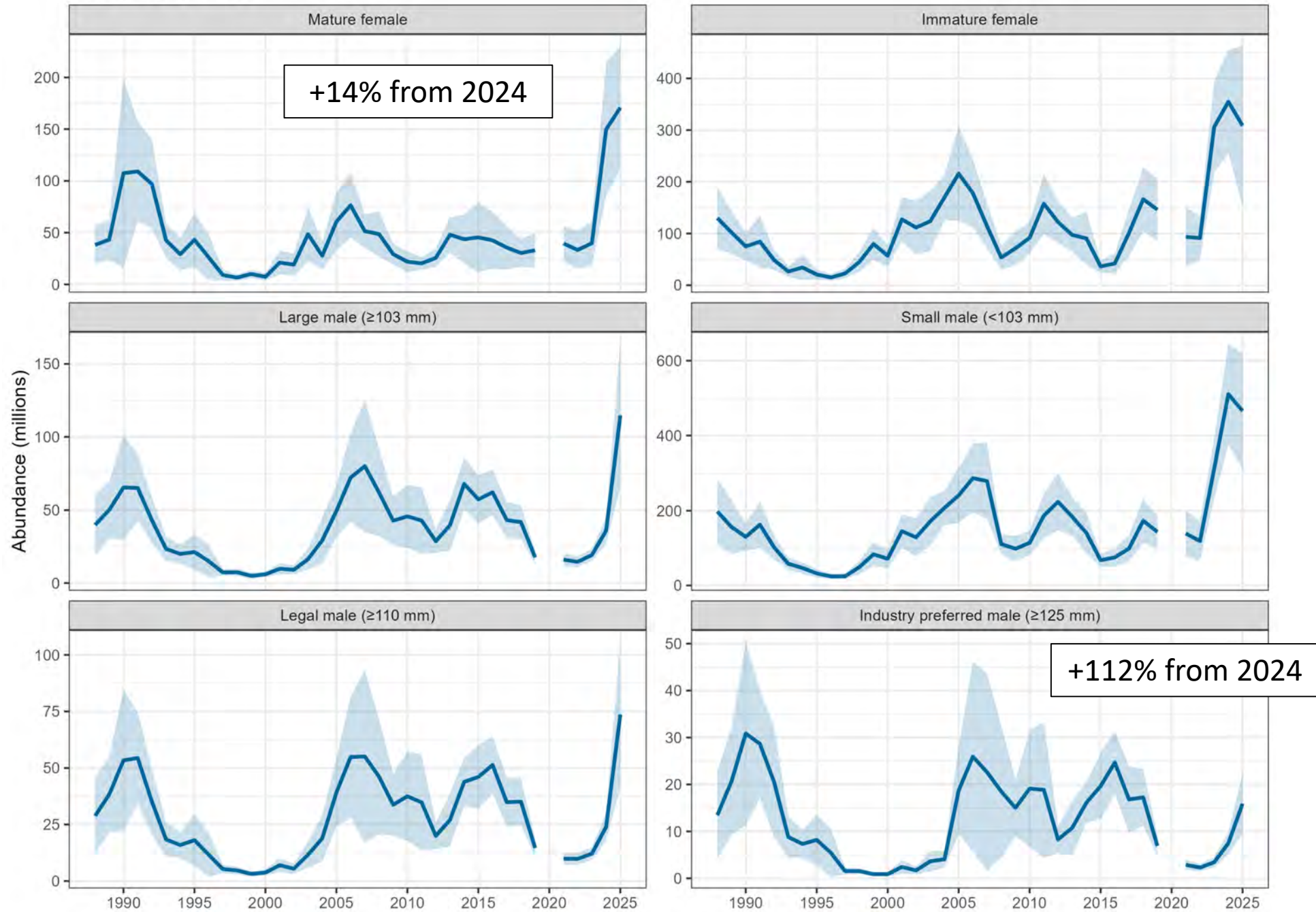
Male Tanner Crab West



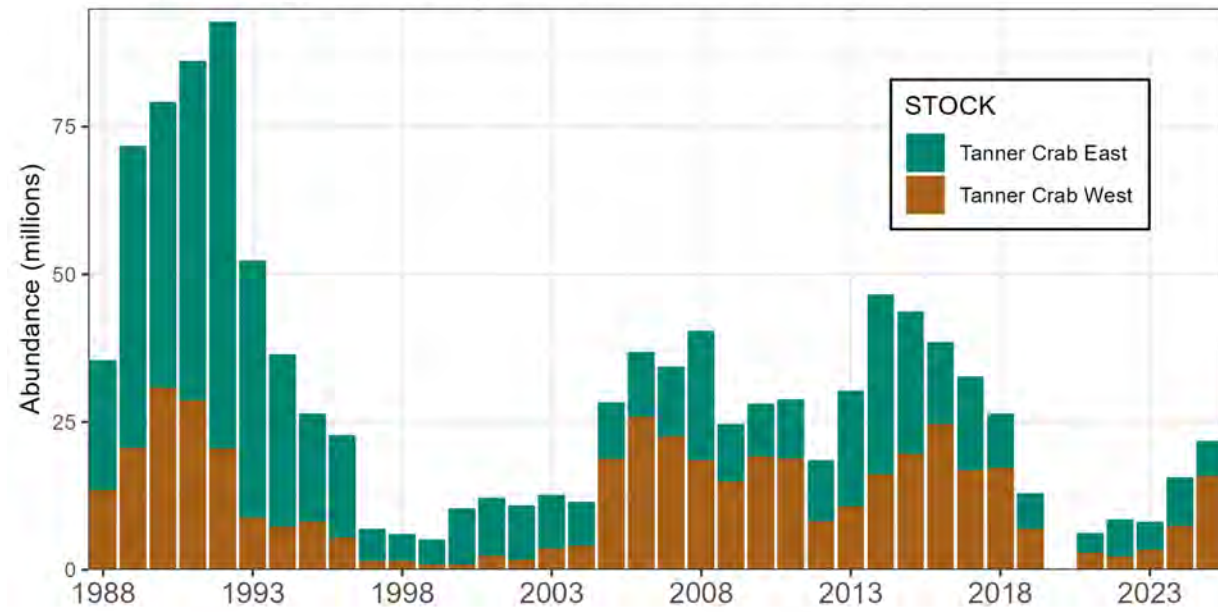
Female Tanner Crab West



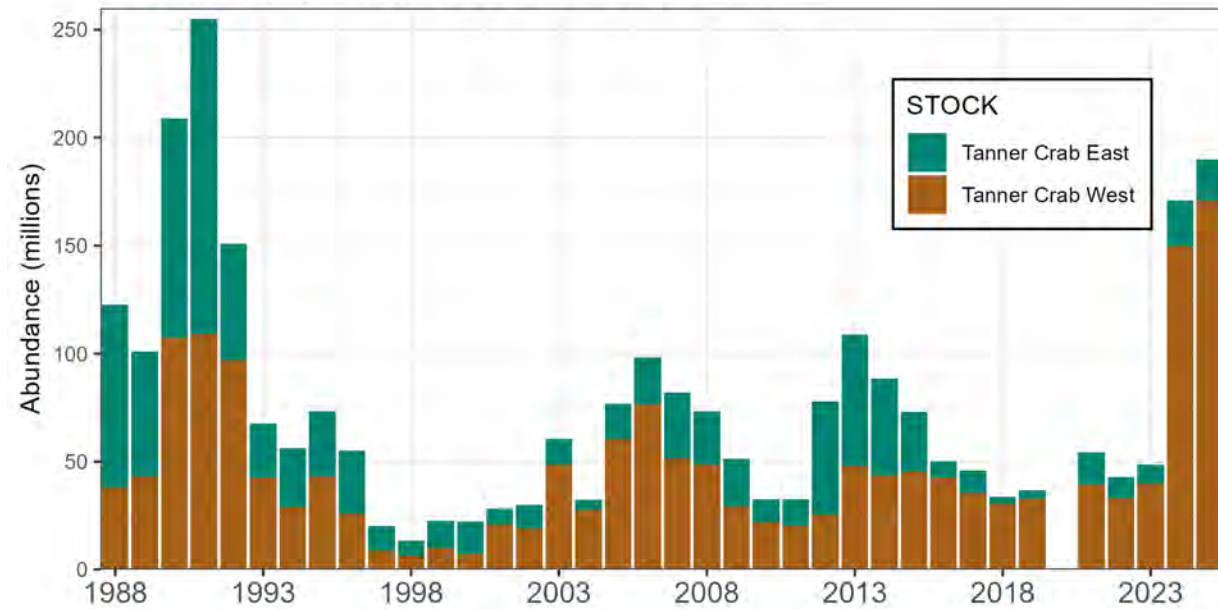
Tanner Crab West



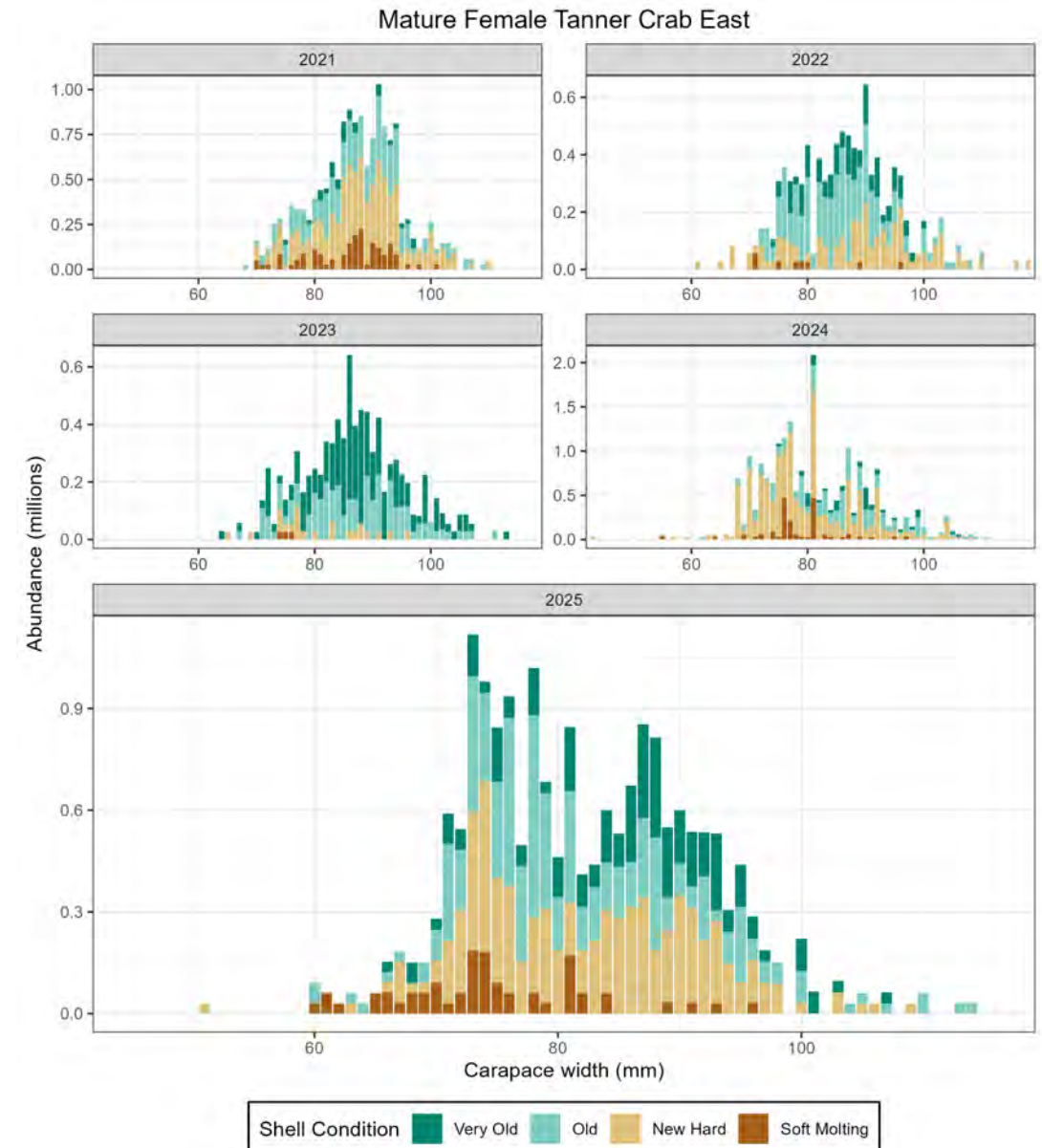
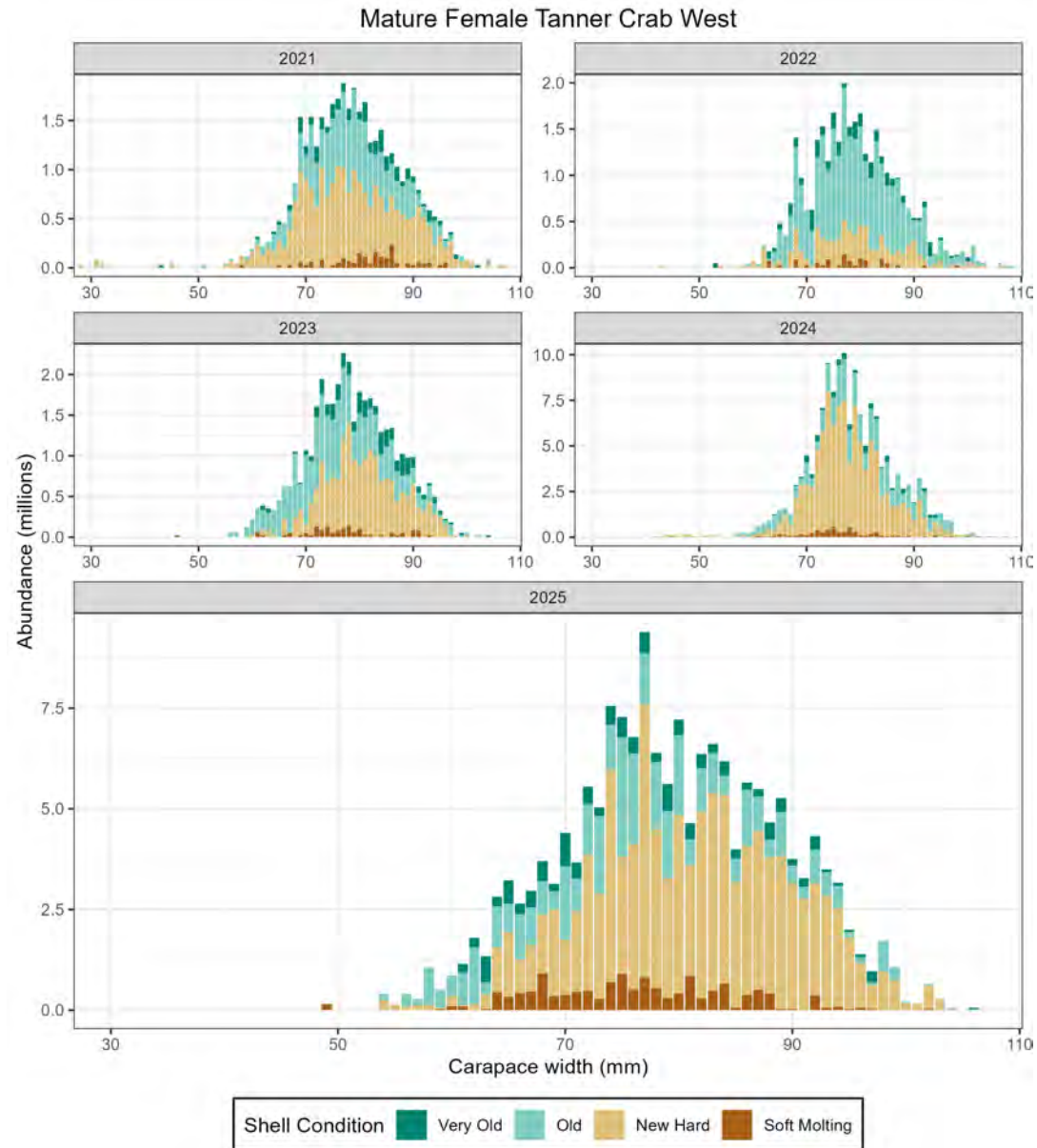
Eastern Bering Sea Industry Preferred Male Tanner Crab



Eastern Bering Sea Mature Female Tanner Crab



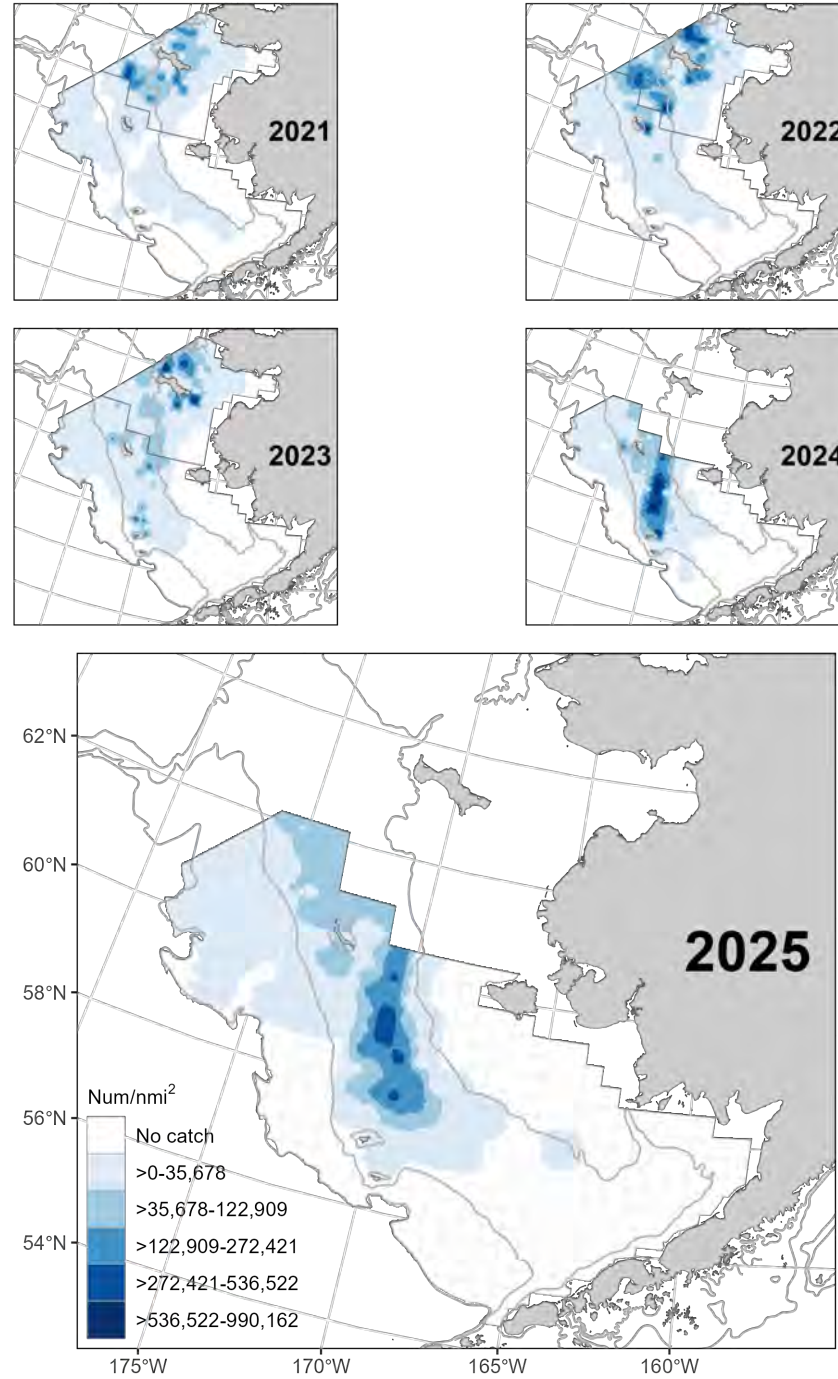
Abundance by size and shell condition



Snow crab

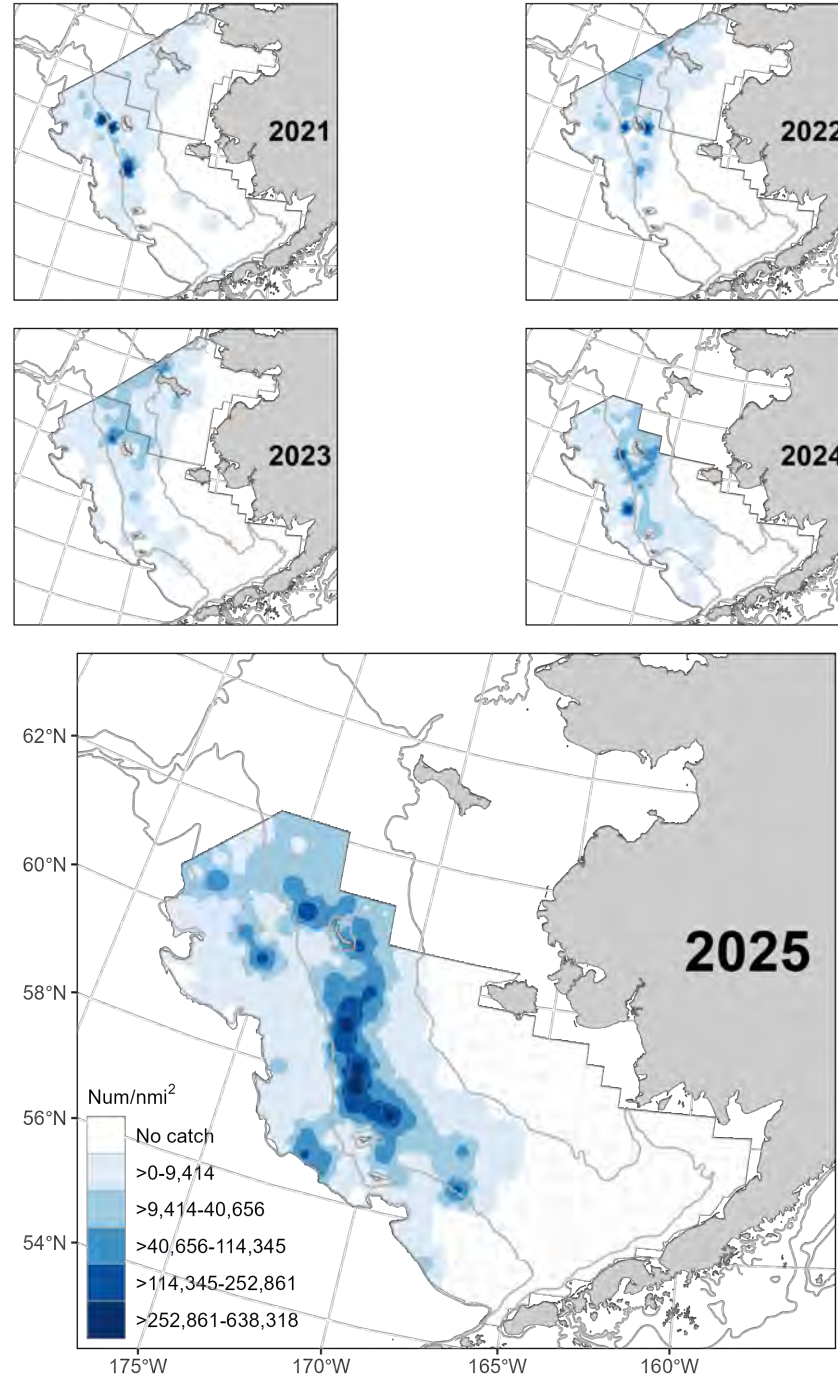
Distribution by year

Snow Crab Immature Female

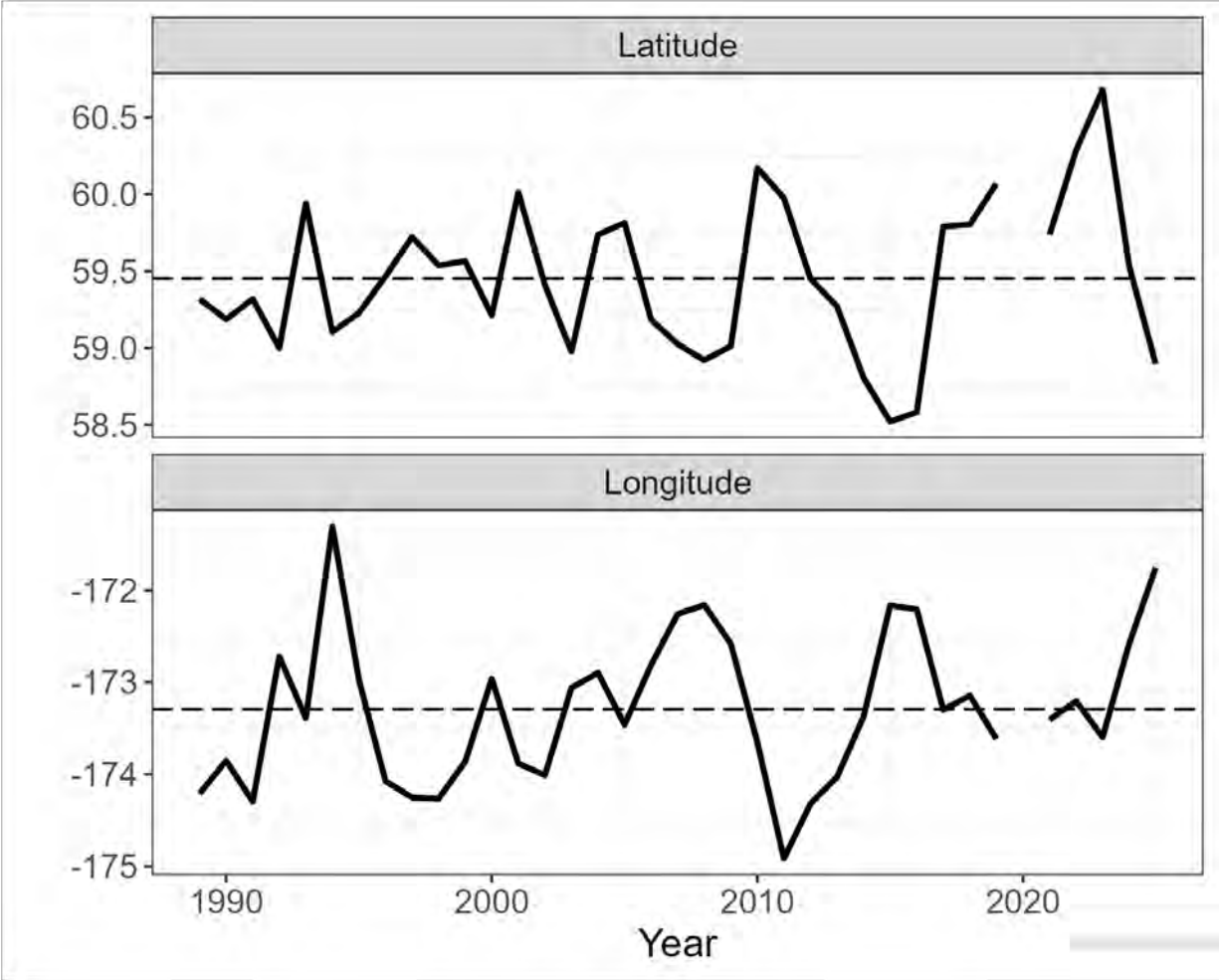
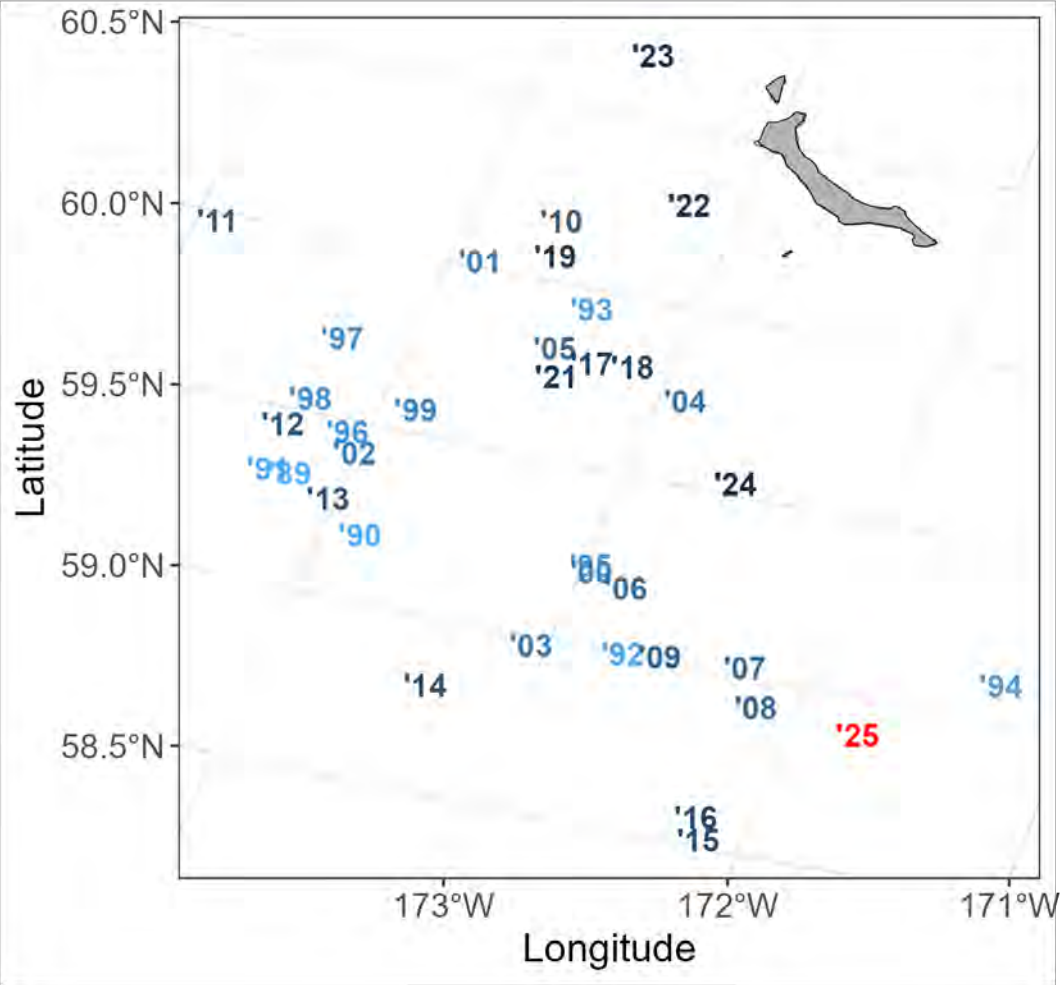


Distribution by year

Snow Crab Mature Female

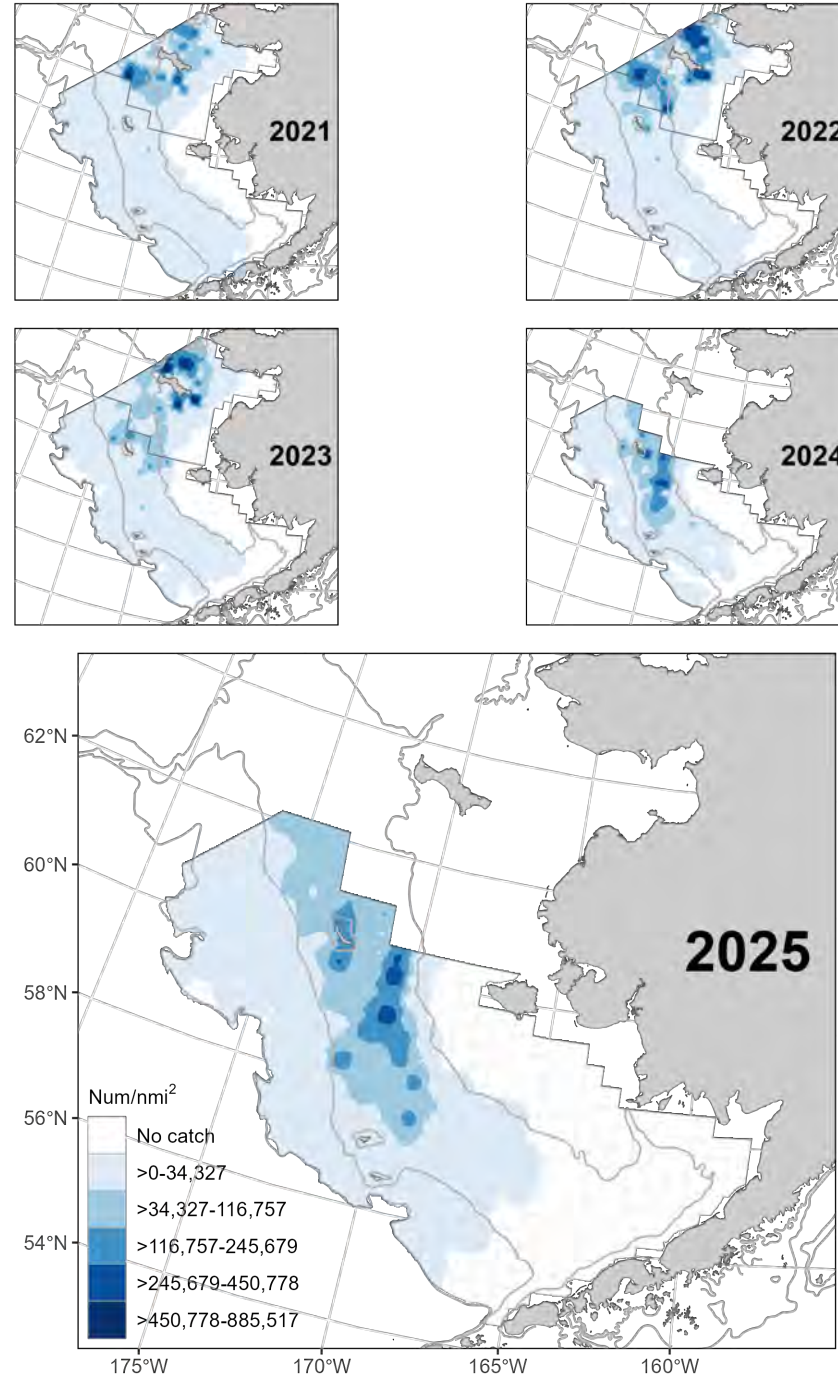


Snow Crab Mature Female



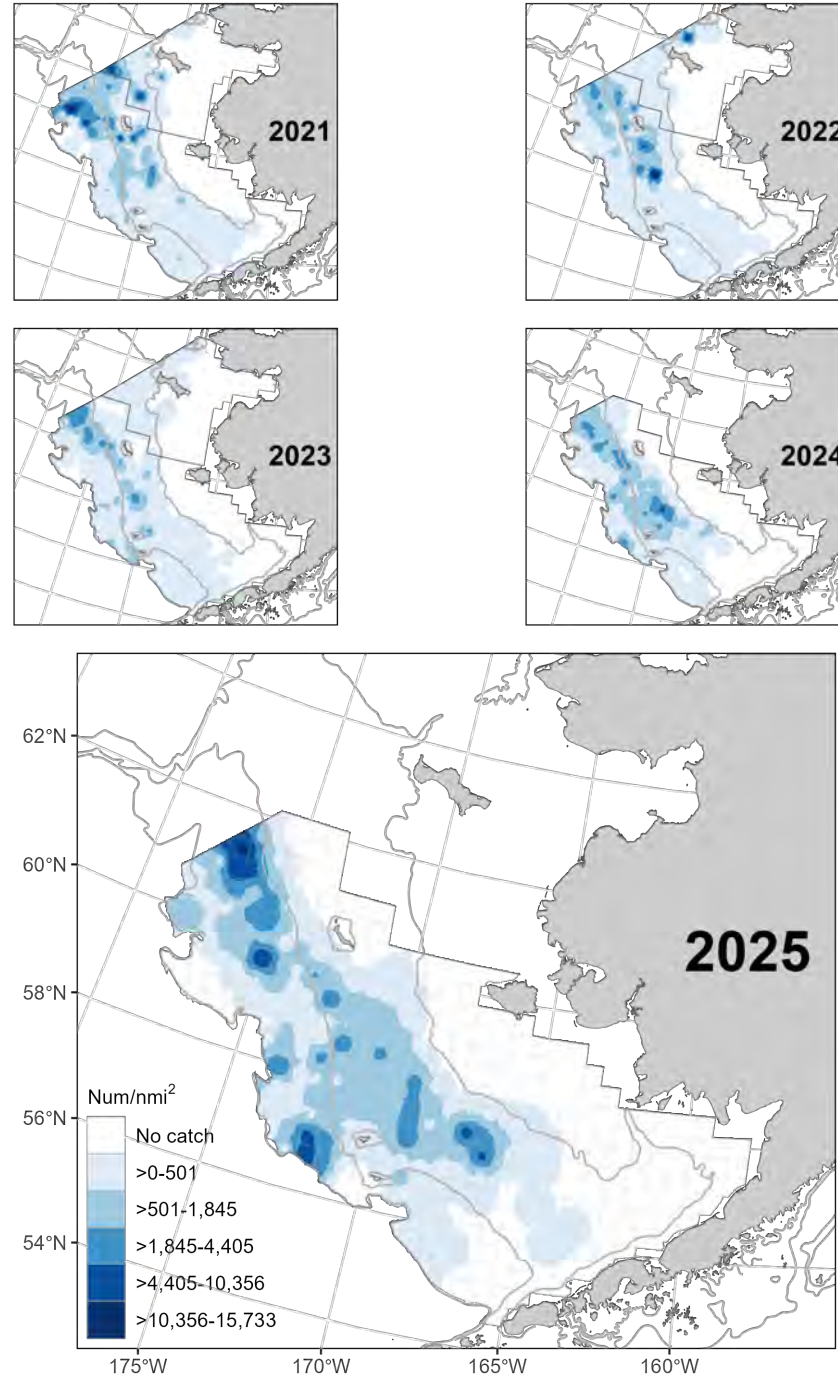
Distribution by year

Snow Crab Small Male (< 95 mm CW)



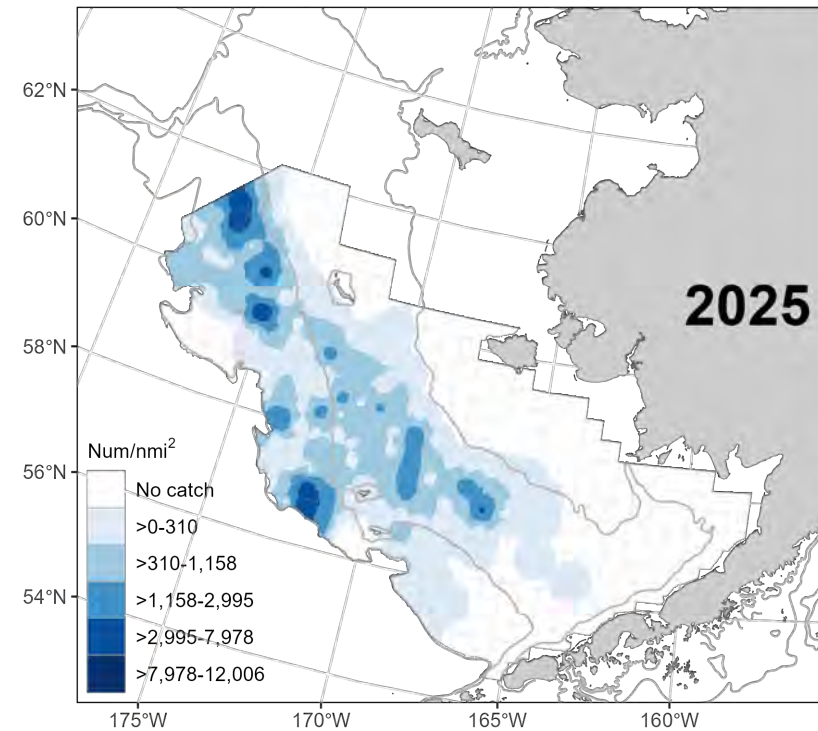
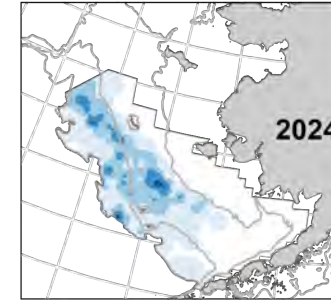
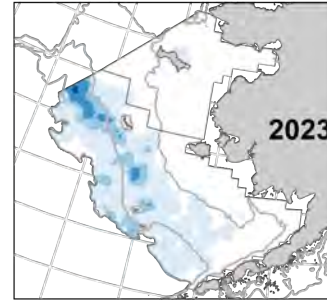
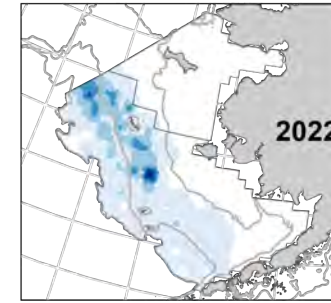
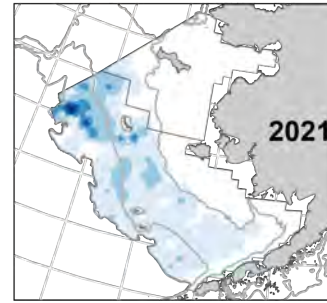
Distribution by year

Snow Crab Large Male (≥ 95 mm CW)

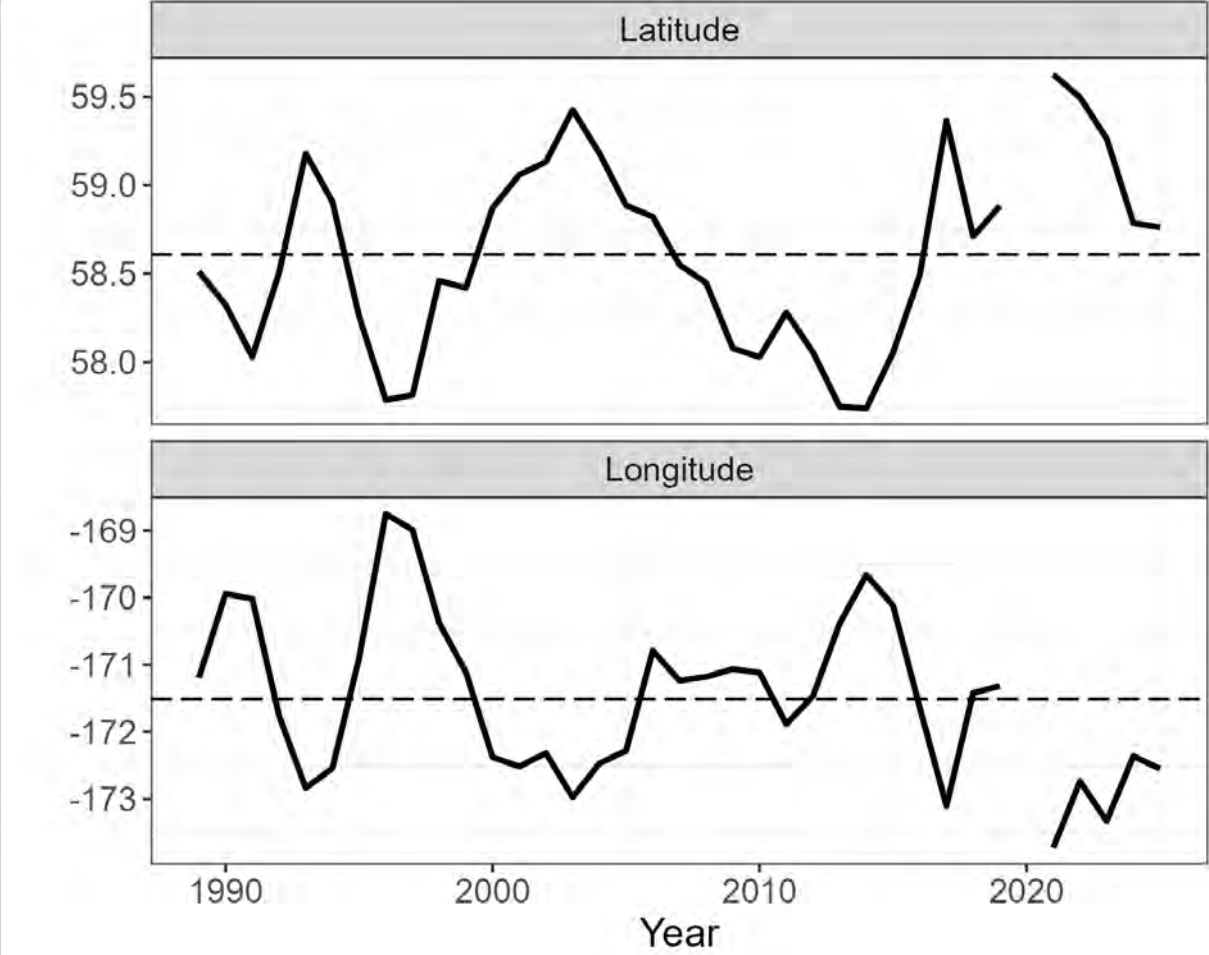
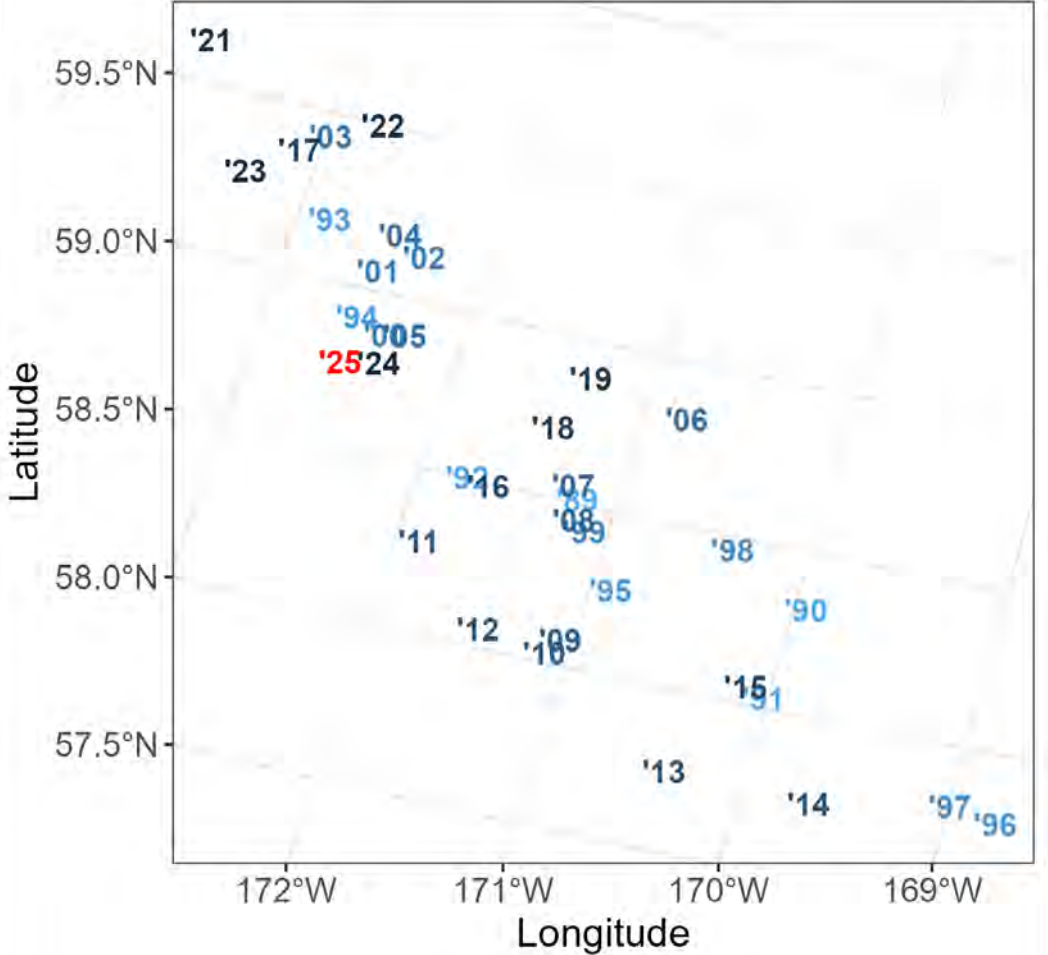


Distribution by year

Snow Crab Industry Preferred Male

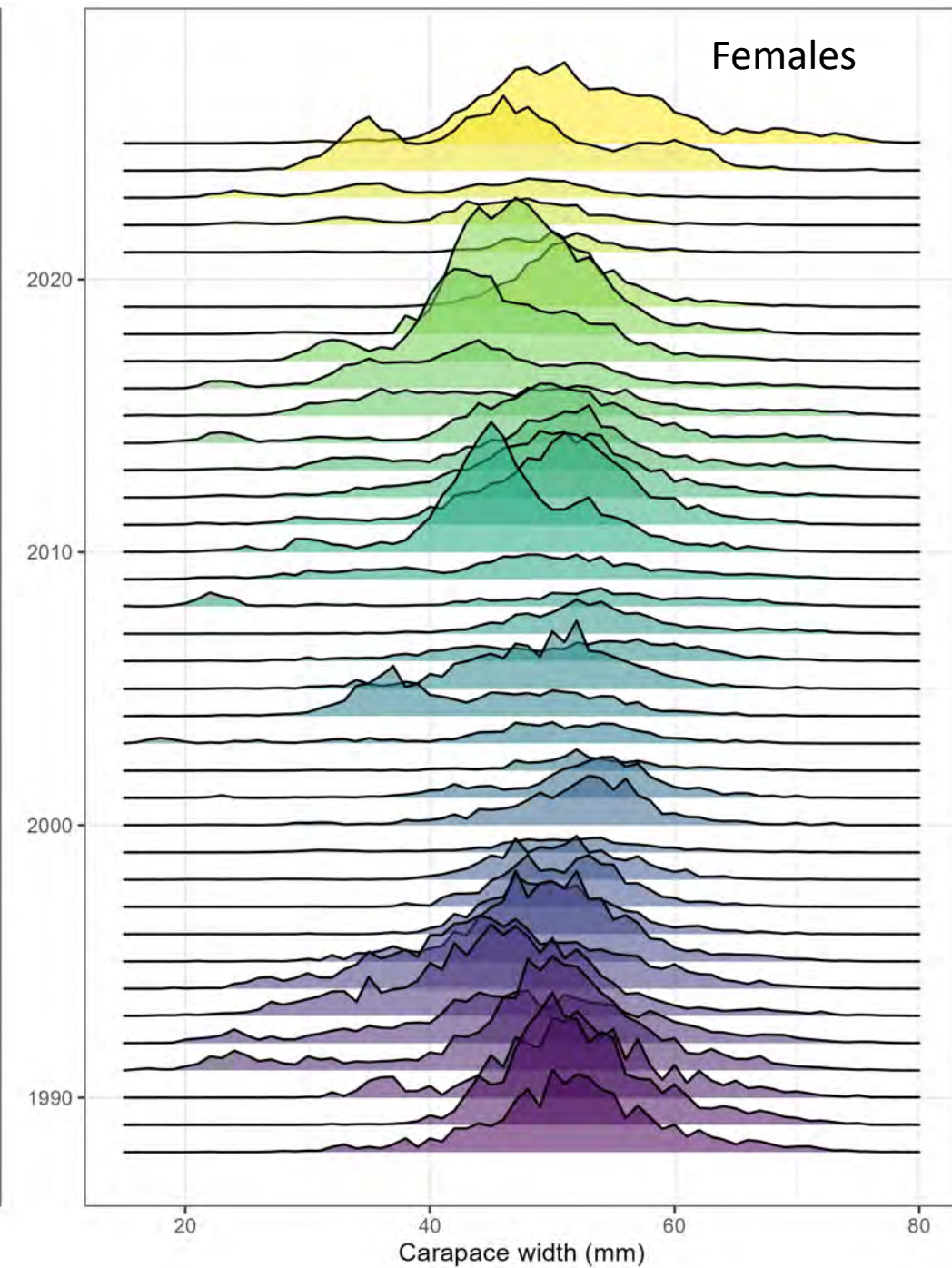
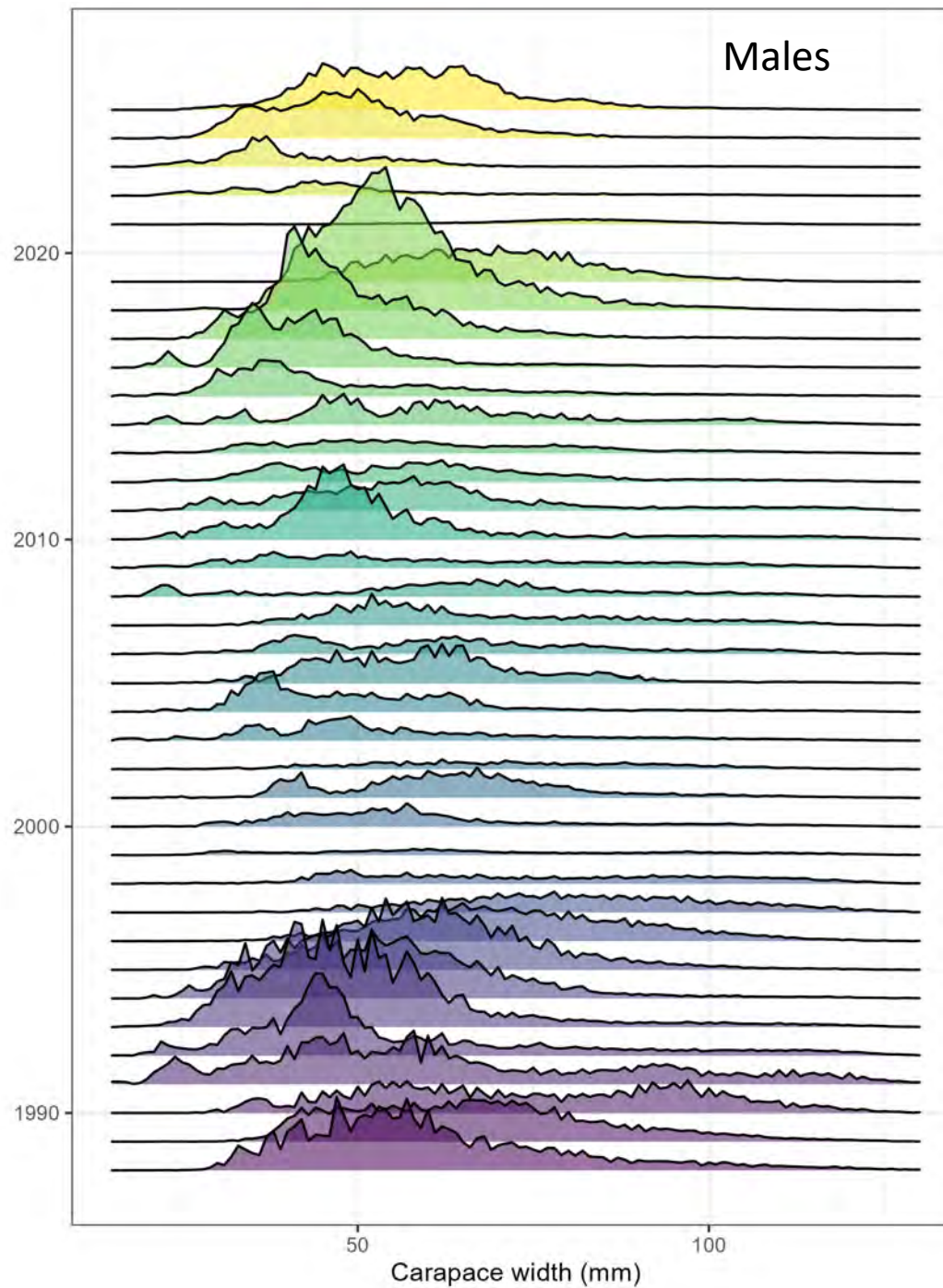


Snow Crab Industry Preferred Male



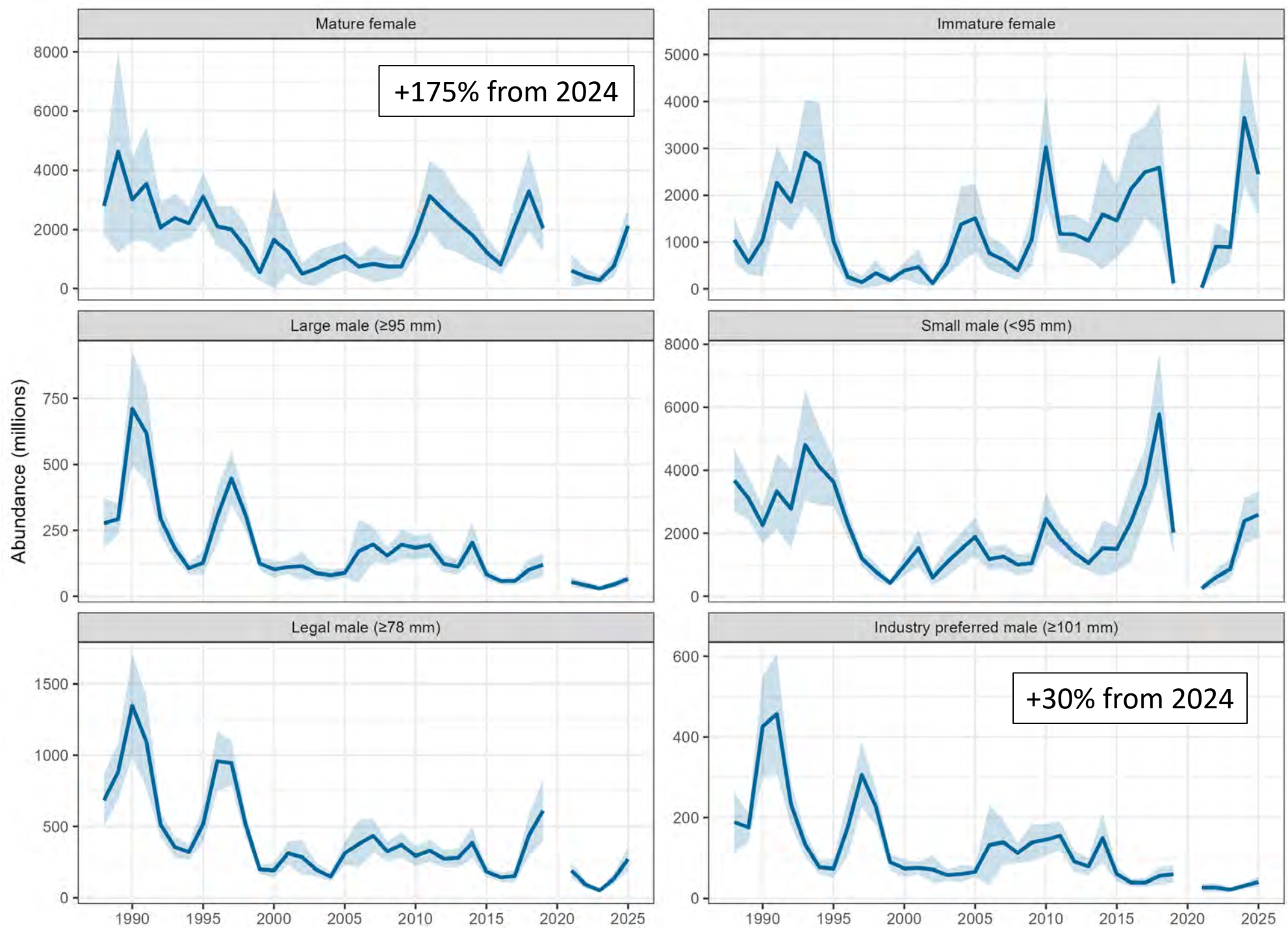
Snow crab

- Males observed since 2022/23 approaching 4" (101 mm)
- Males are not reaching the same large sizes seen in 1980s/1990s
- Unprecedented abundance of larger females



Snow crab

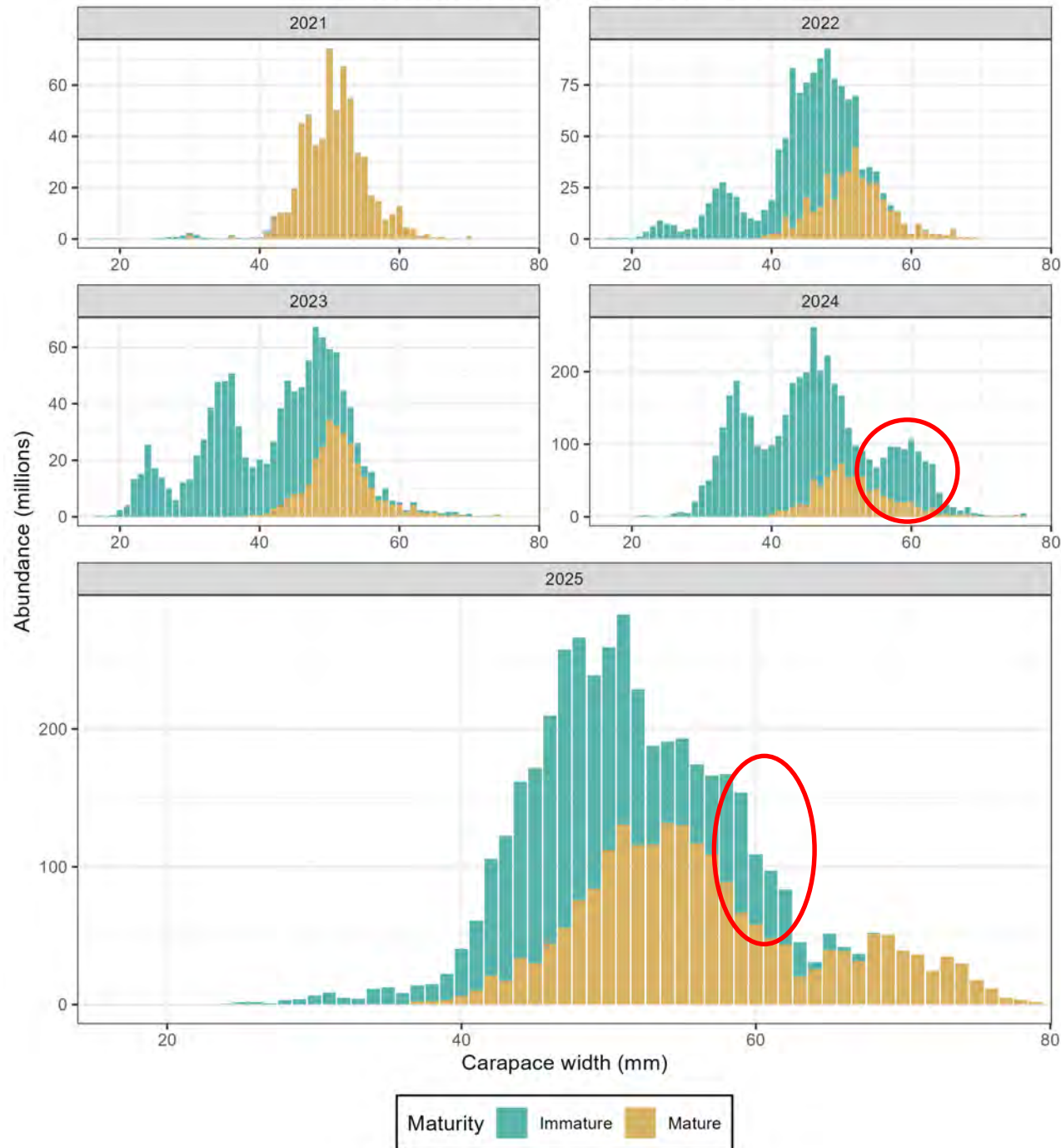
- Recovery continues with high abundance of small size classes
- Mature female abundance near time series mean
- Industry-preferred male abundance still near time series low



Female Eastern Bering Sea Snow Crab

Abundance by size and shell condition

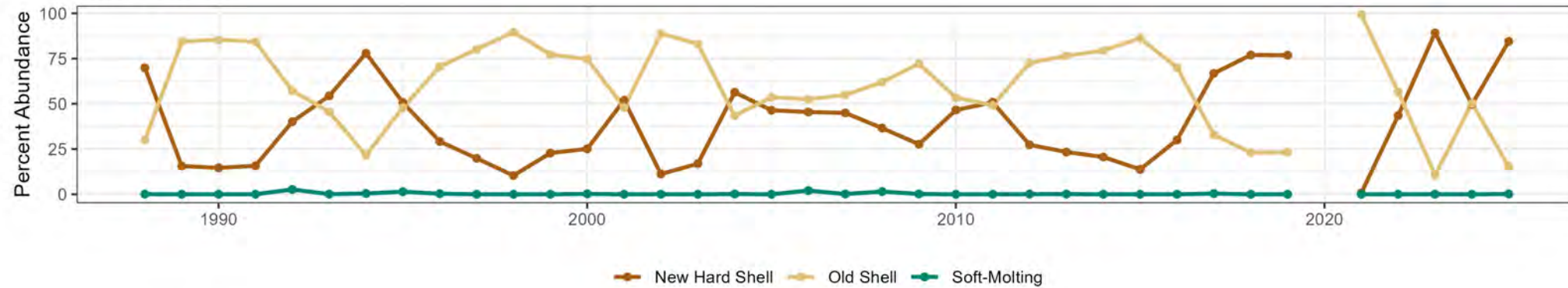
- Unusual abundance of large immature females continues



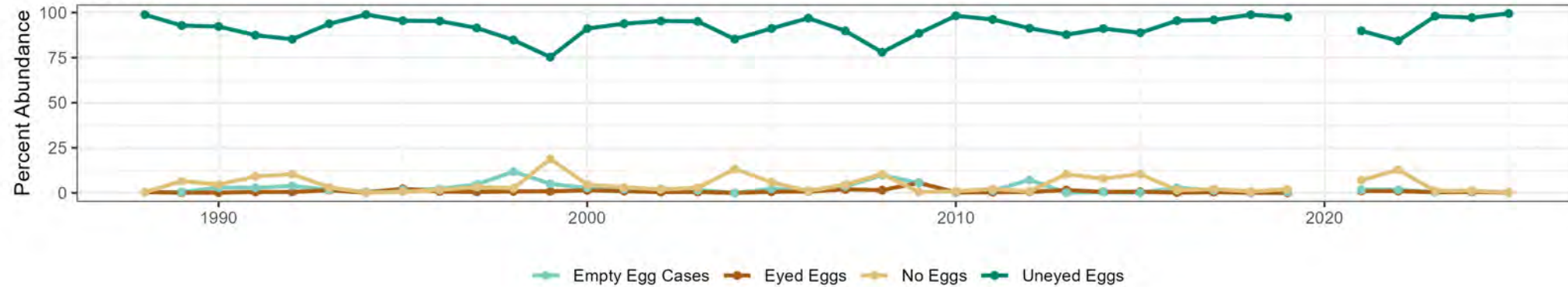
- Clutch fullness remains high

Mature Female Eastern Bering Sea Snow Crab

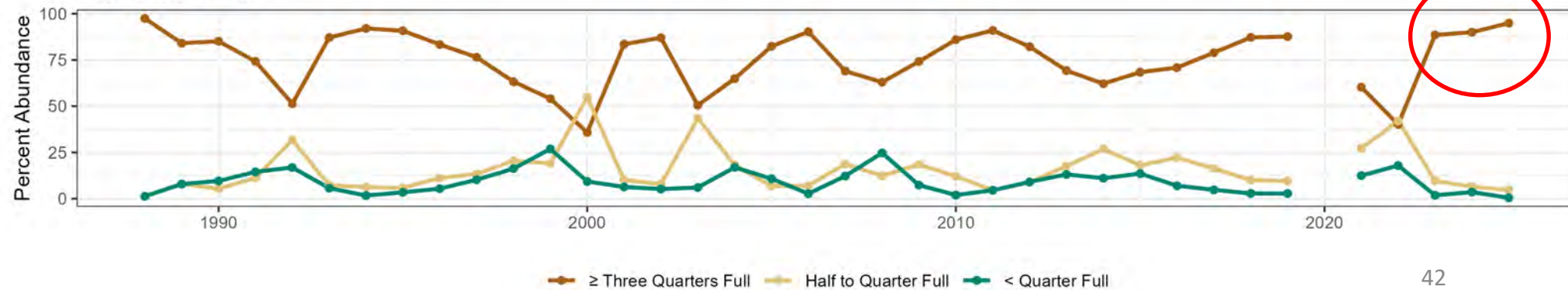
Shell Condition



Egg Condition



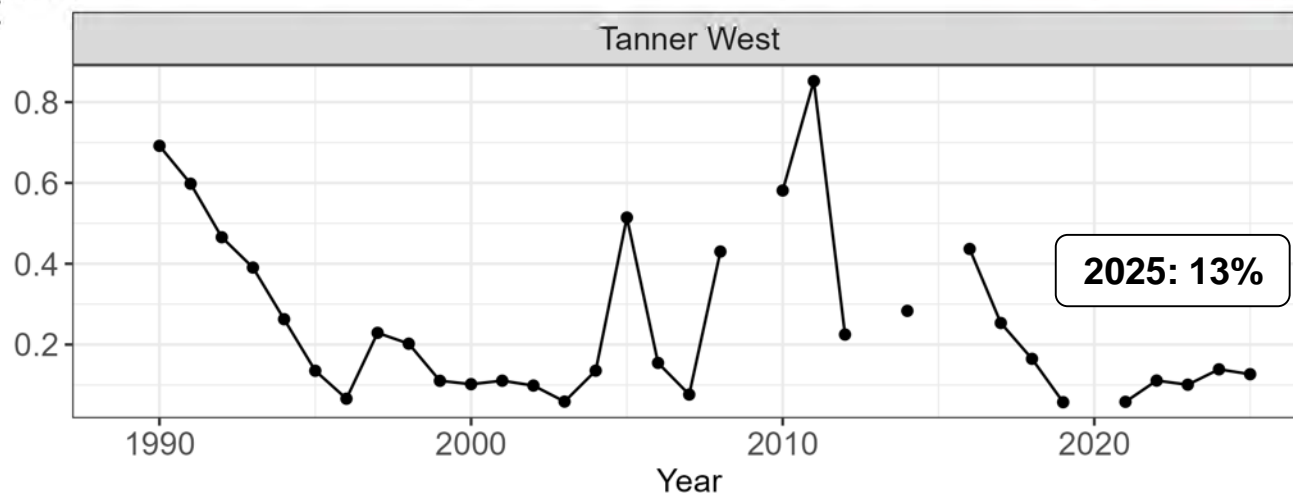
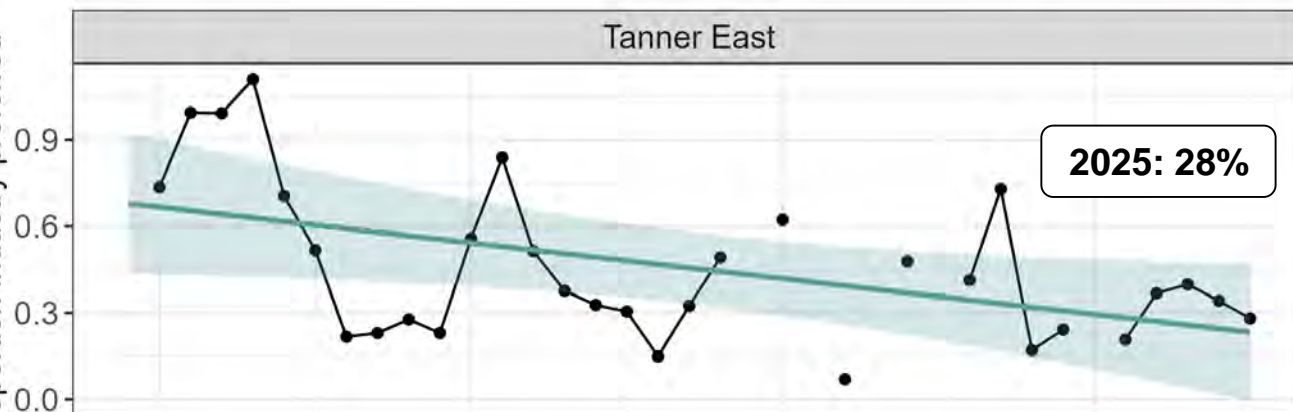
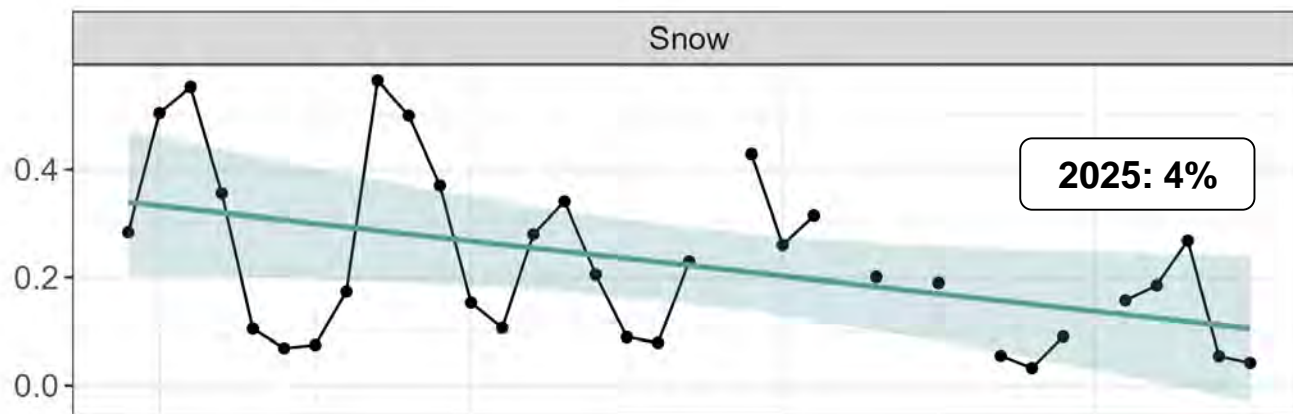
Clutch Fullness



New-shell males: proportion maturing at industry-preferred size

GAMMs with AR1 correlation structure

Proportion industry preferred



Snow

Approximate significance of smooth terms:

	edf	Ref.df	F	p-value
s(YEAR)	1	1	4.037	0.0536 .

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) = 0.185

Scale est. = 0.017955 n = 32

> |

Tanner East

Approximate significance of smooth terms:

	edf	Ref.df	F	p-value
s(YEAR)	1	1	4.554	0.0414 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

R-sq.(adj) = 0.219

Scale est. = 0.049306 n = 31

> |

Tanner West

Approximate significance of smooth terms:

	edf	Ref.df	F	p-value
s(YEAR)	1	1	0.999	0.326

R-sq.(adj) = -0.00117

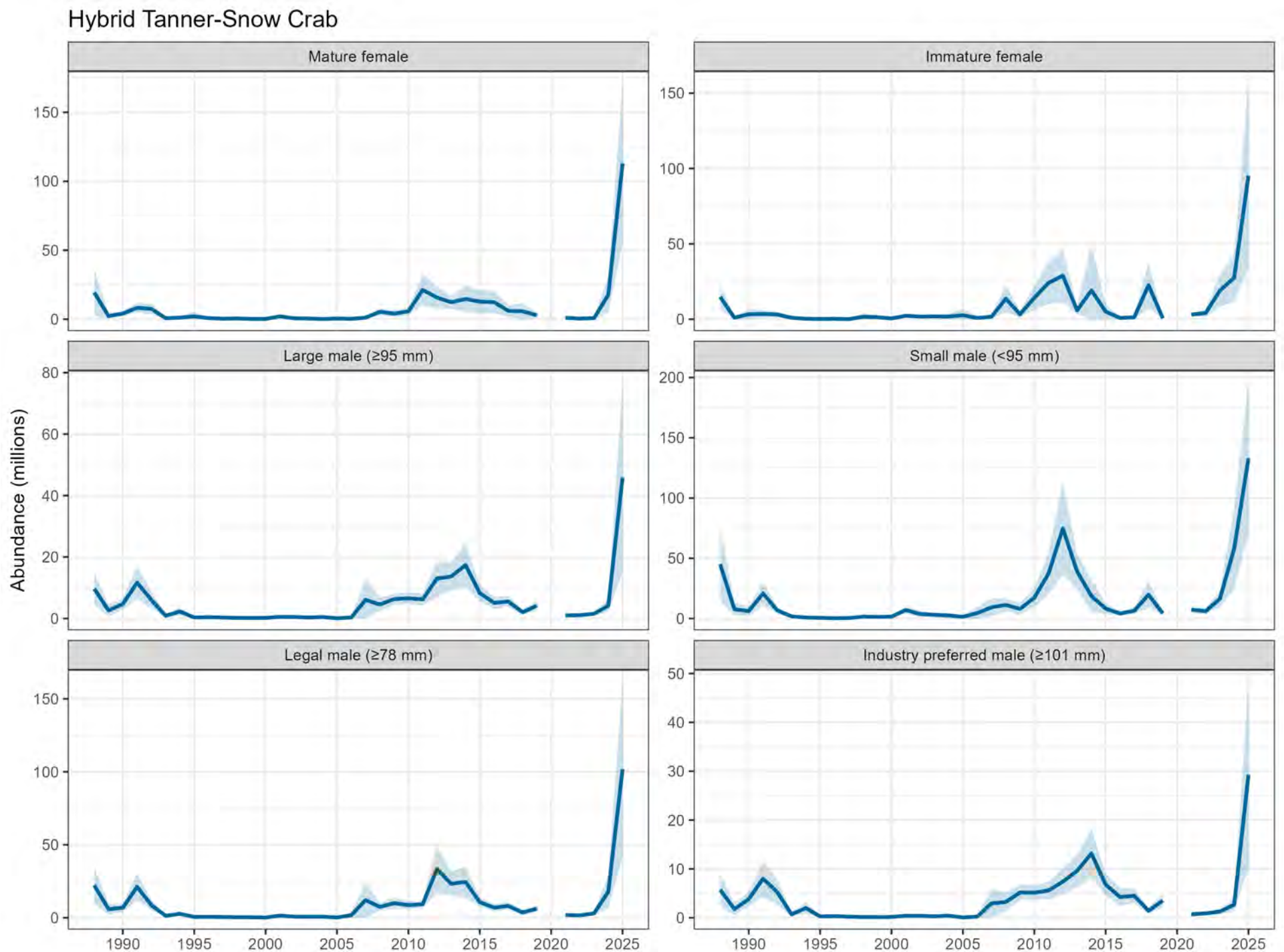
Scale est. = 0.011703 n = 32

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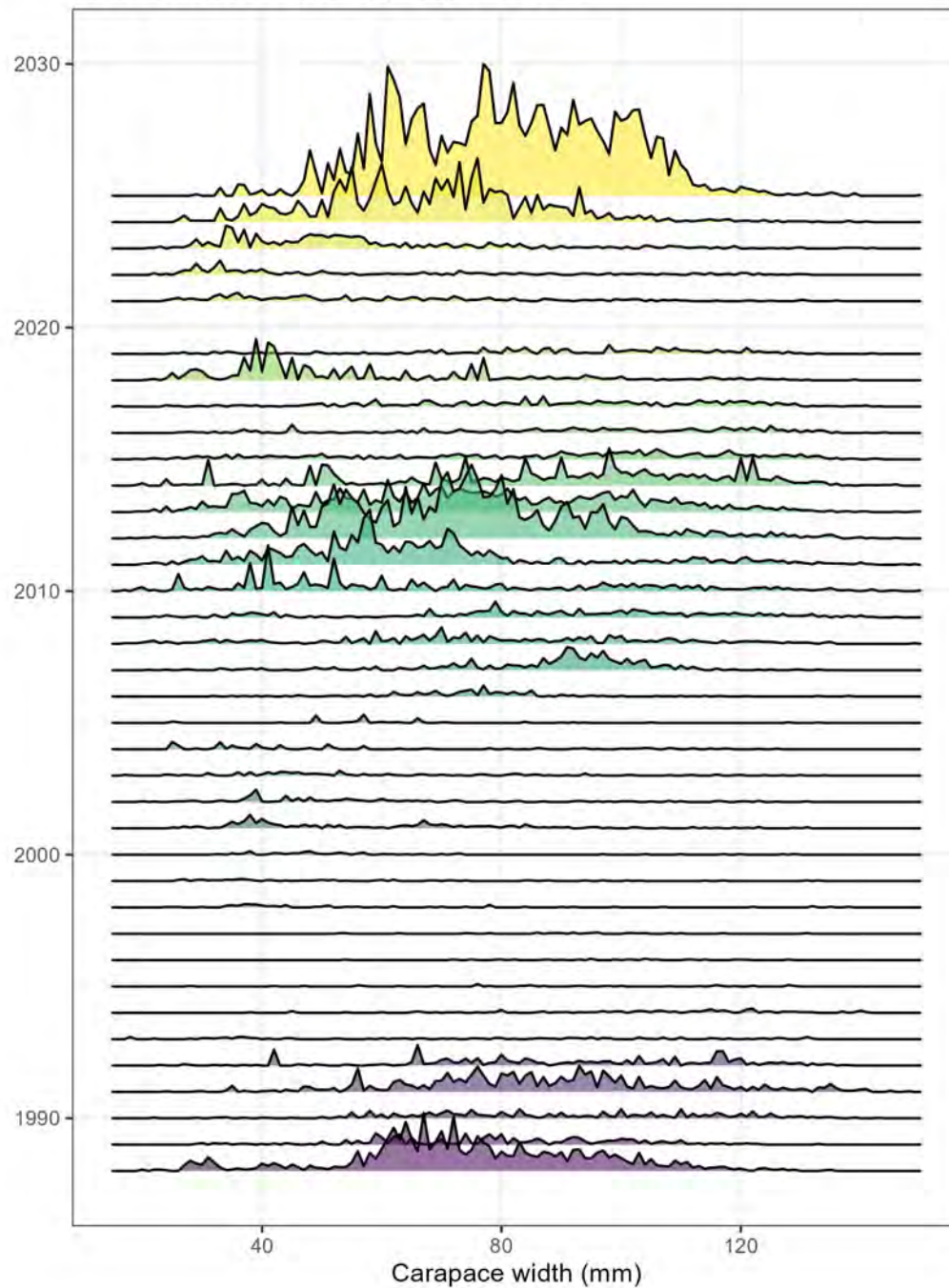
Chionoecetes hybrids

Hybrids

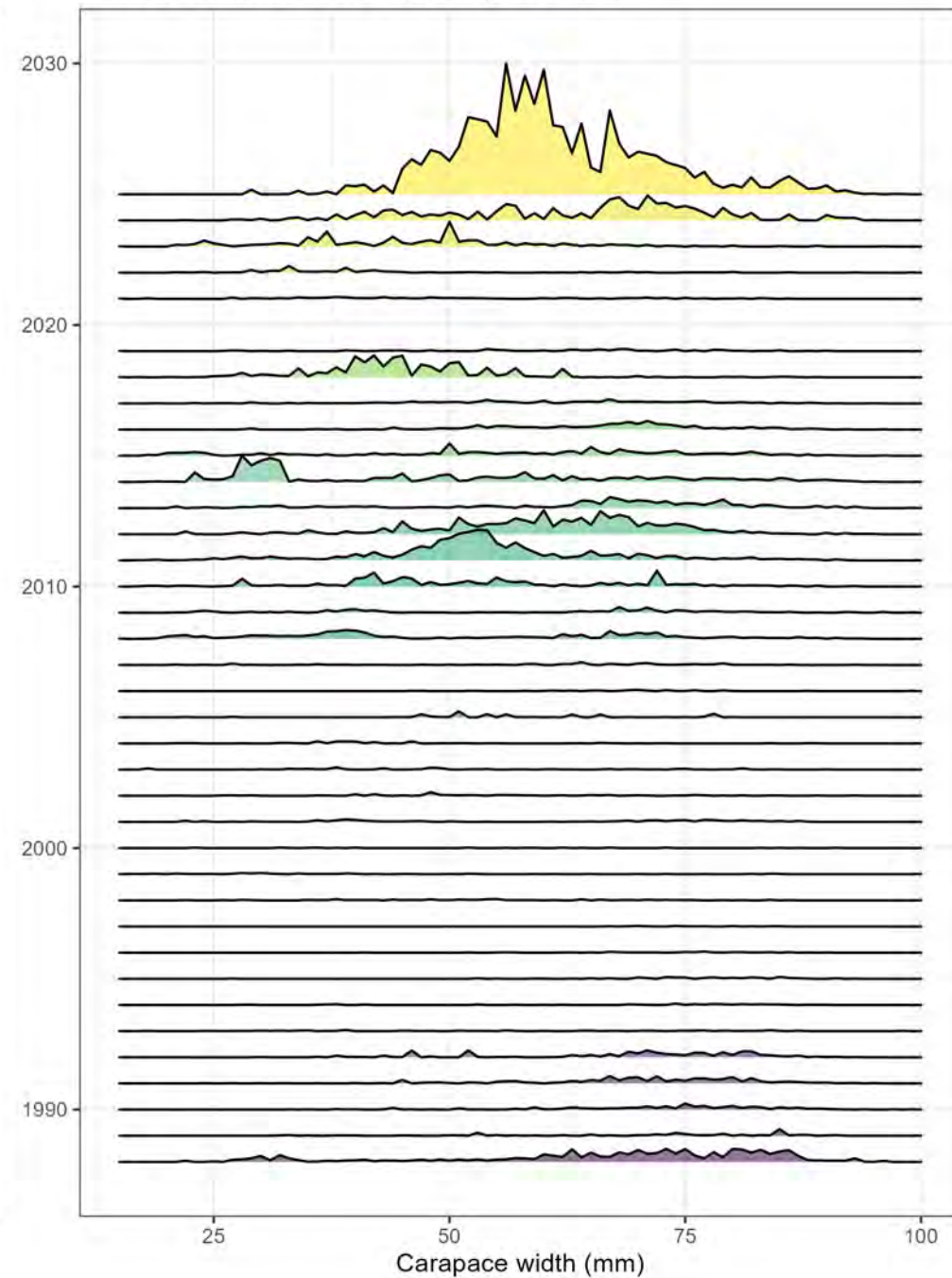
- Unprecedented abundance for all size-sex categories
- 20% of *Chionoecetes* males ≥ 101 mm CW were hybrids
- High confidence that these results are not data artefacts



Male *Chionoecetes* spp. Hybrid Crab

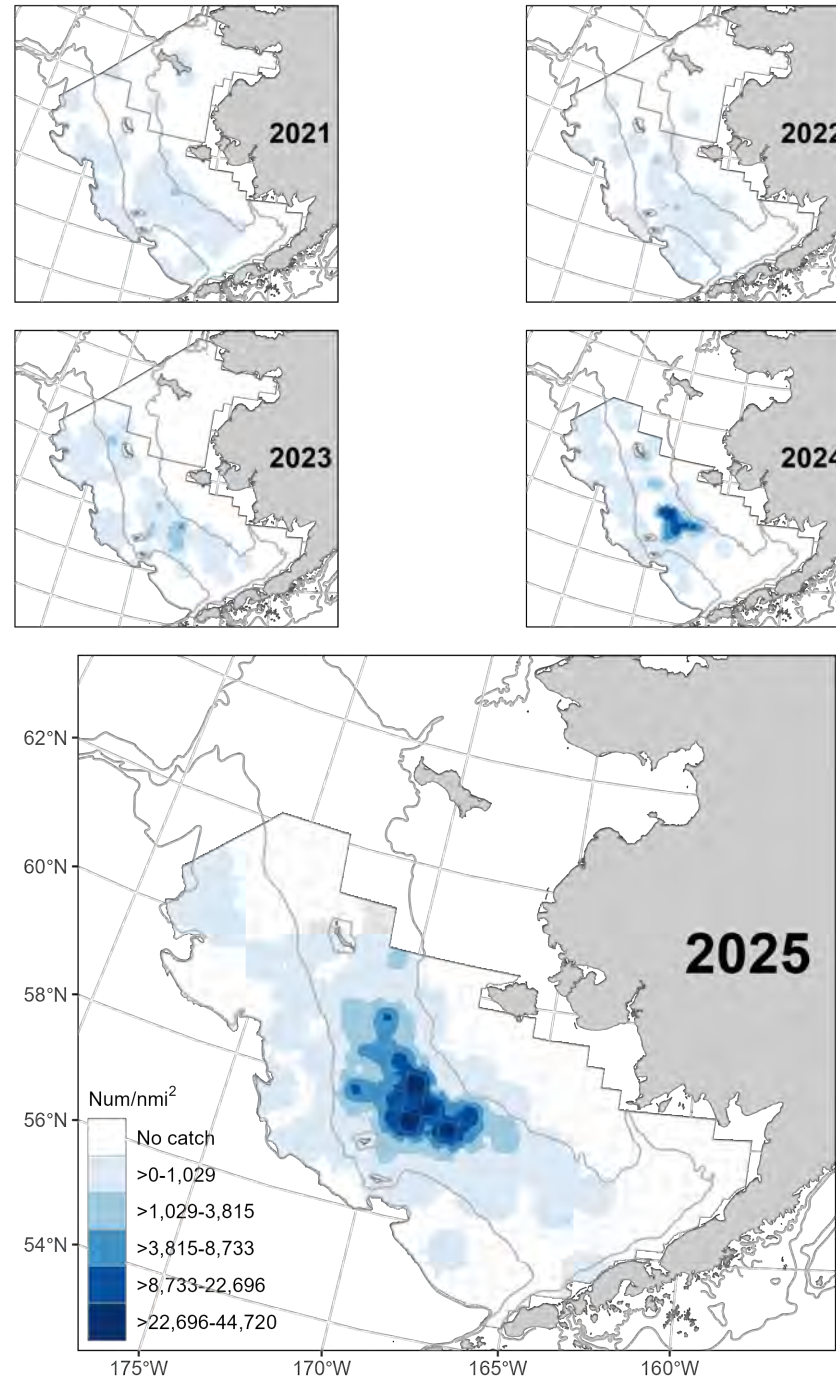


Female *Chionoecetes* spp. Hybrid Crab



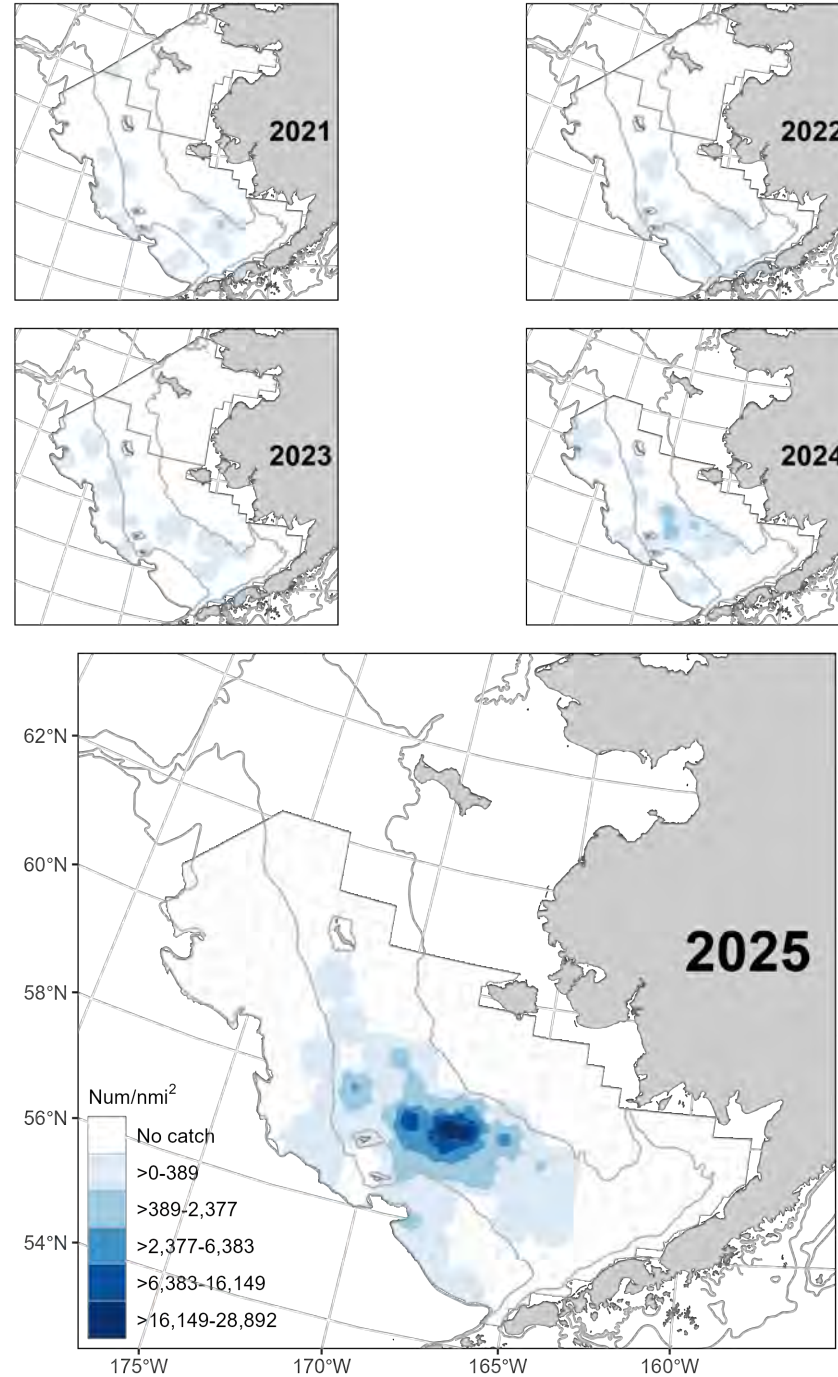
Distribution by year

Chionoecetes spp. Hybrid Small Male (< 95 mm CW)



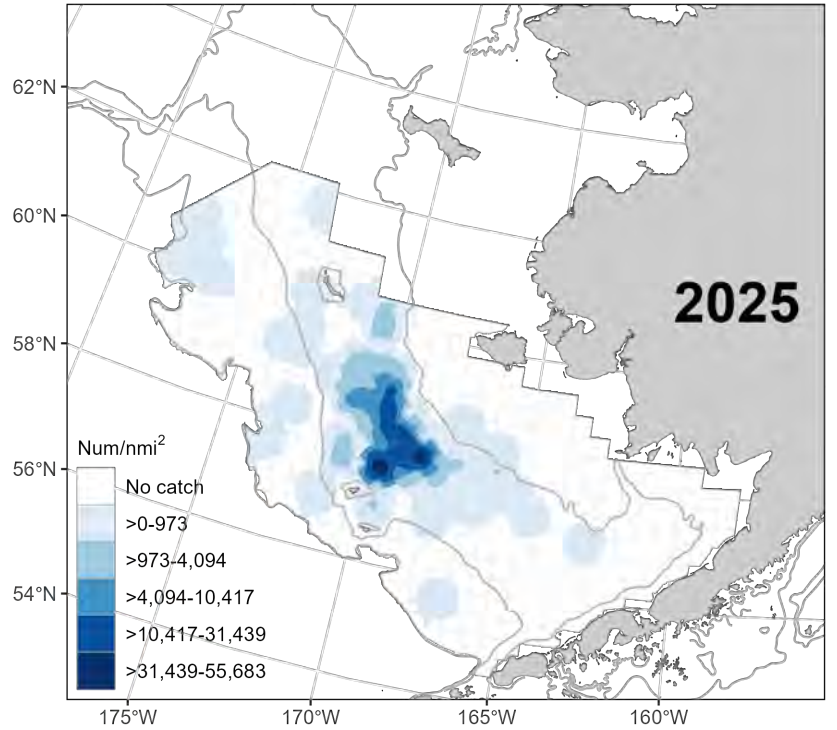
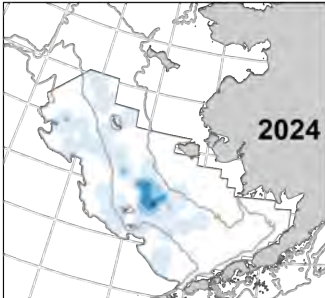
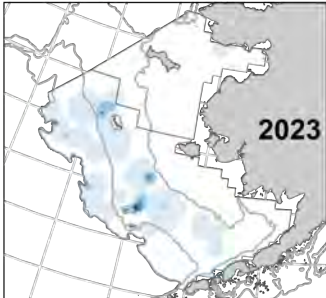
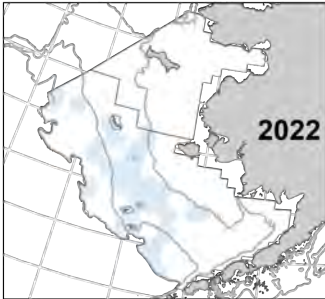
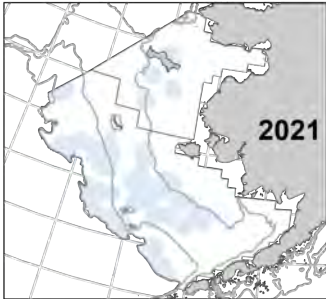
Distribution by year

Chionoecetes spp. Hybrid Large Male (≥ 95 mm CW)



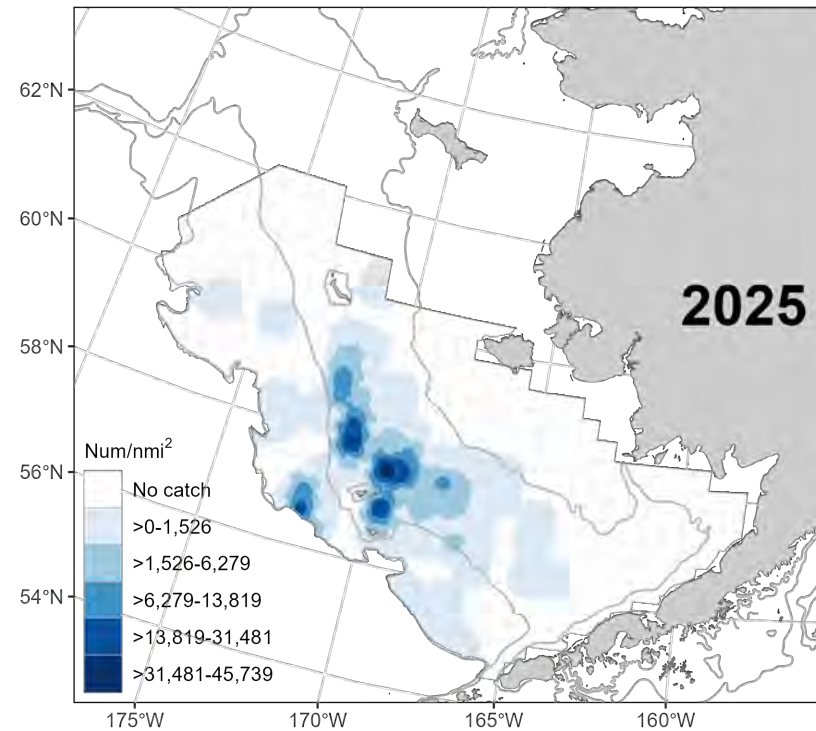
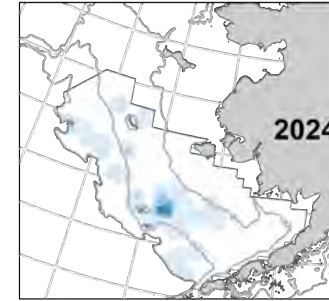
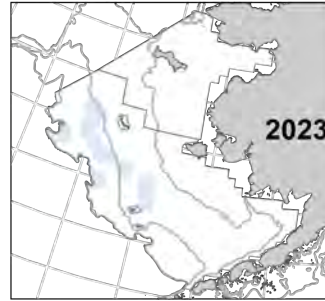
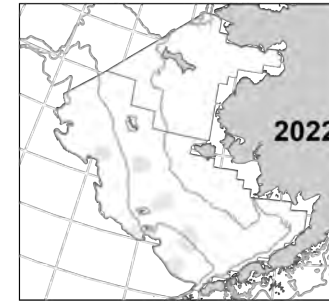
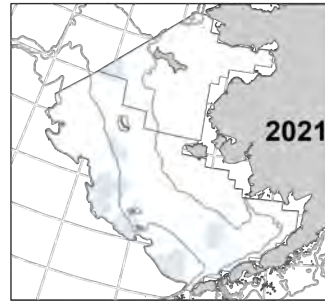
Distribution
by year

Chionoecetes spp. Hybrid Immature Female



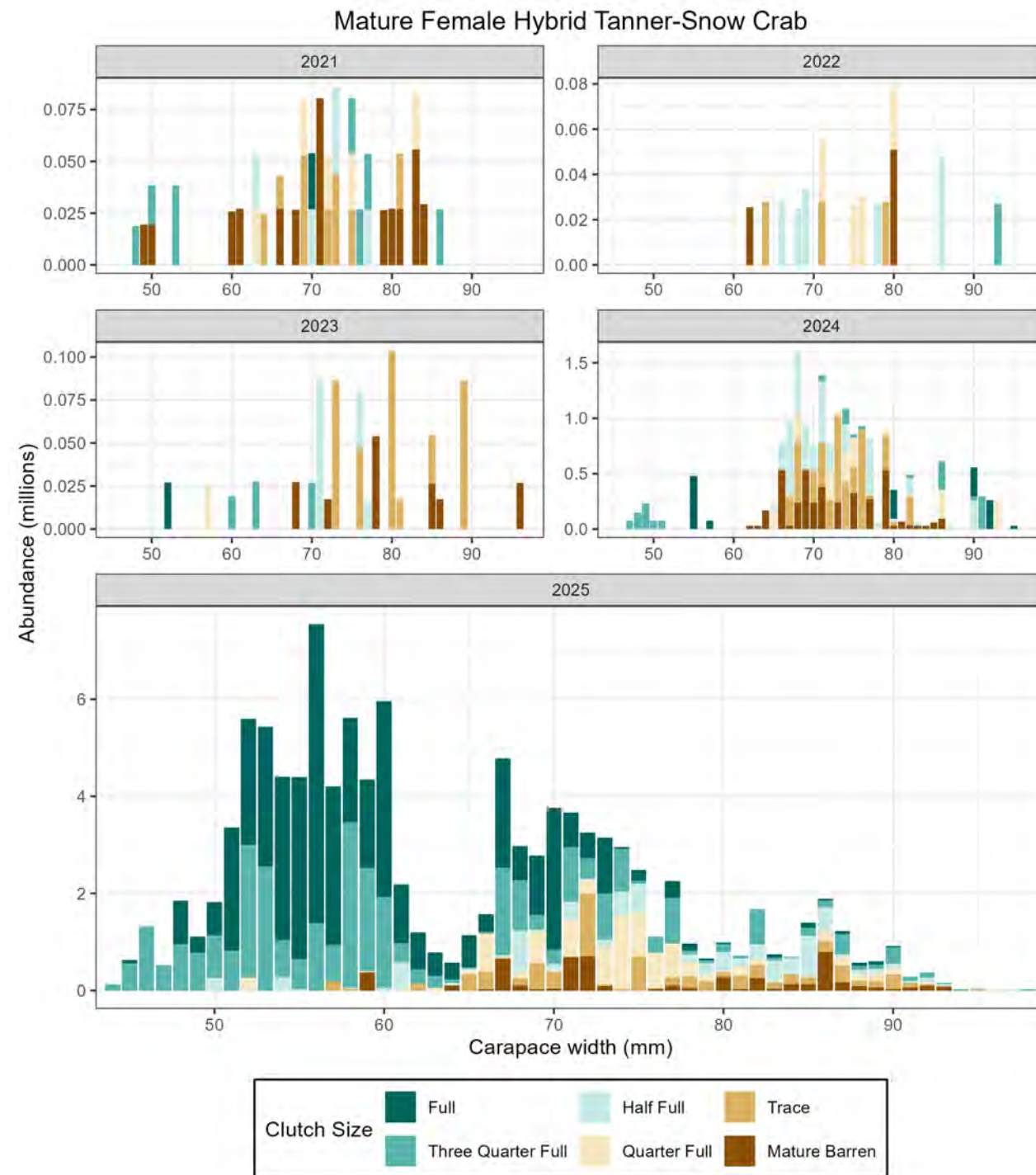
Distribution by year

Chionoecetes spp. Hybrid Mature Female



Hybrid clutch size

- Bimodal size distribution for mature females
- Smaller females $\frac{3}{4}$ full - full (atypical)
- Larger females empty - $\frac{1}{4}$ full (more typical)



Questions



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