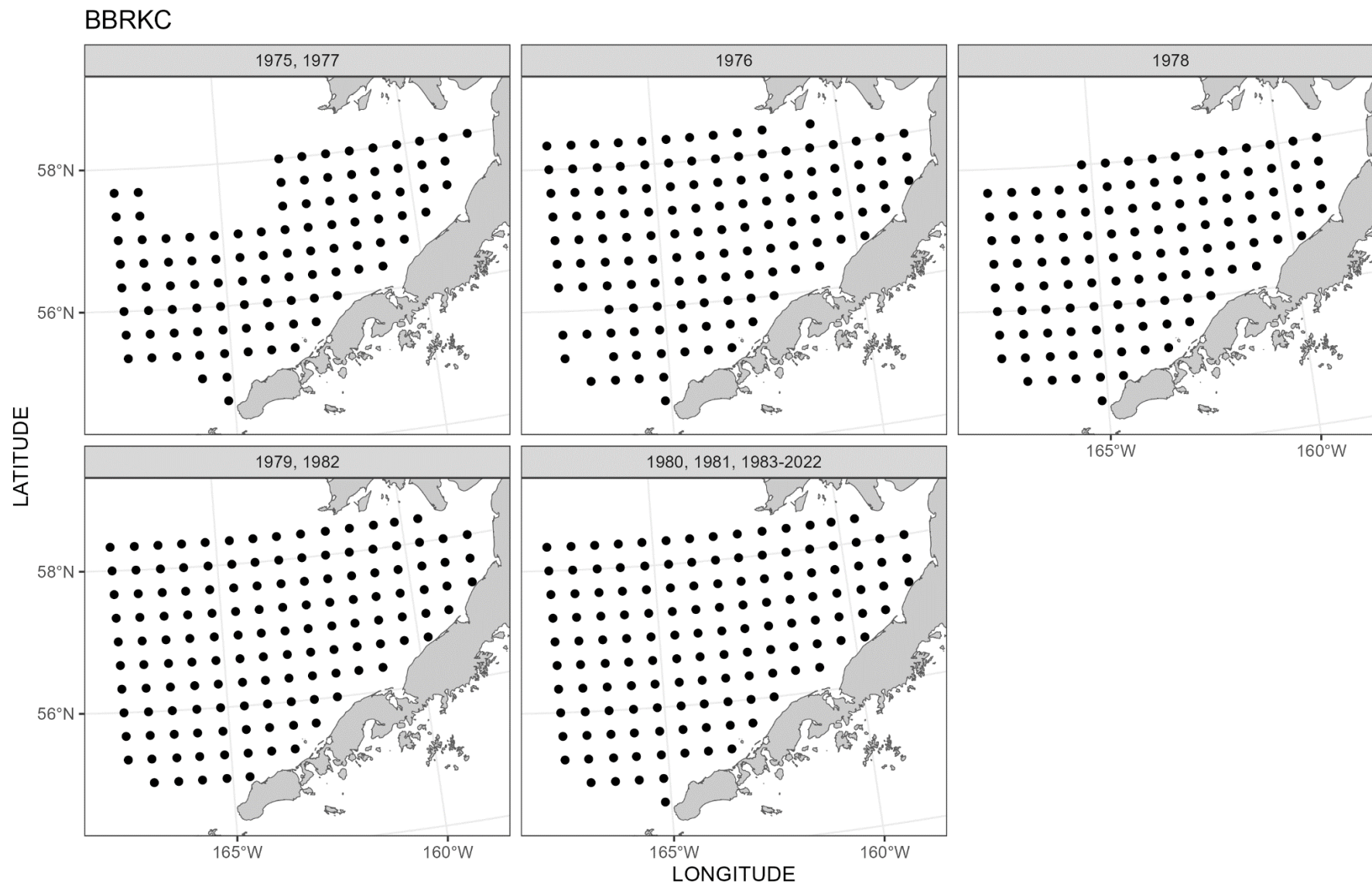# Survey history: considerations for model start dates
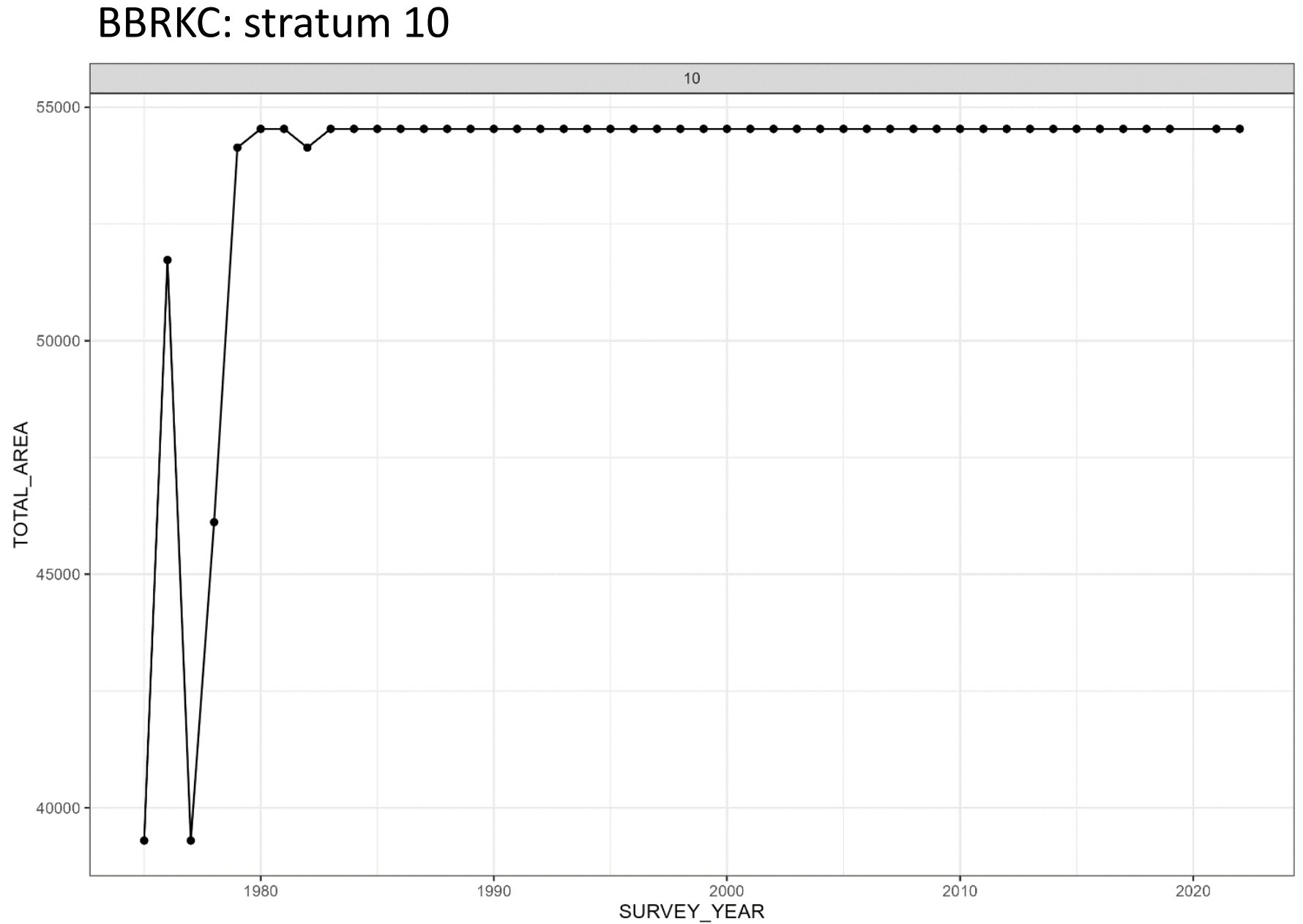
Mike Litzow & Emily Ryznar

NOAA Kodiak Lab

Spatial coverage, Bristol Bay District, 1975-2022
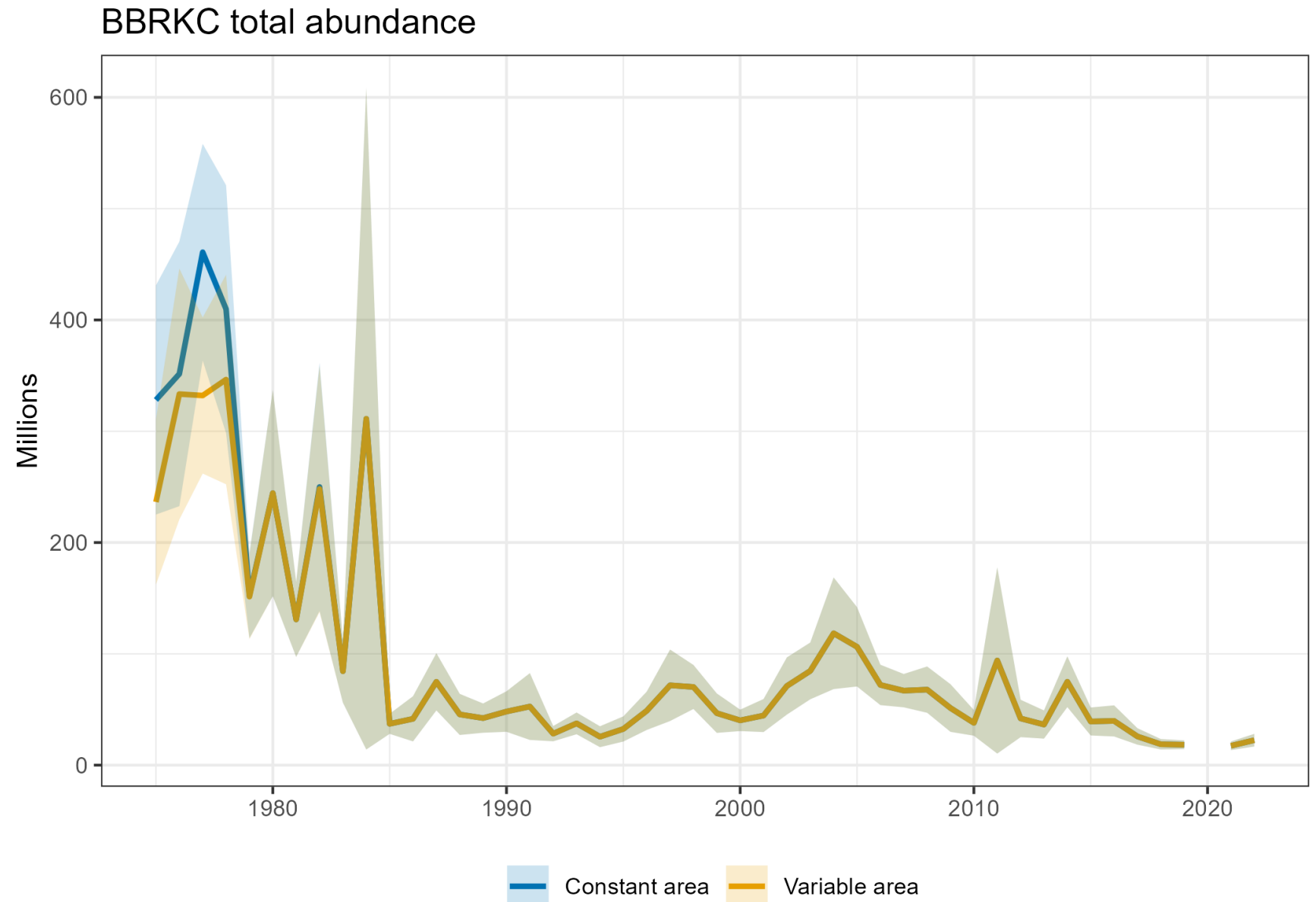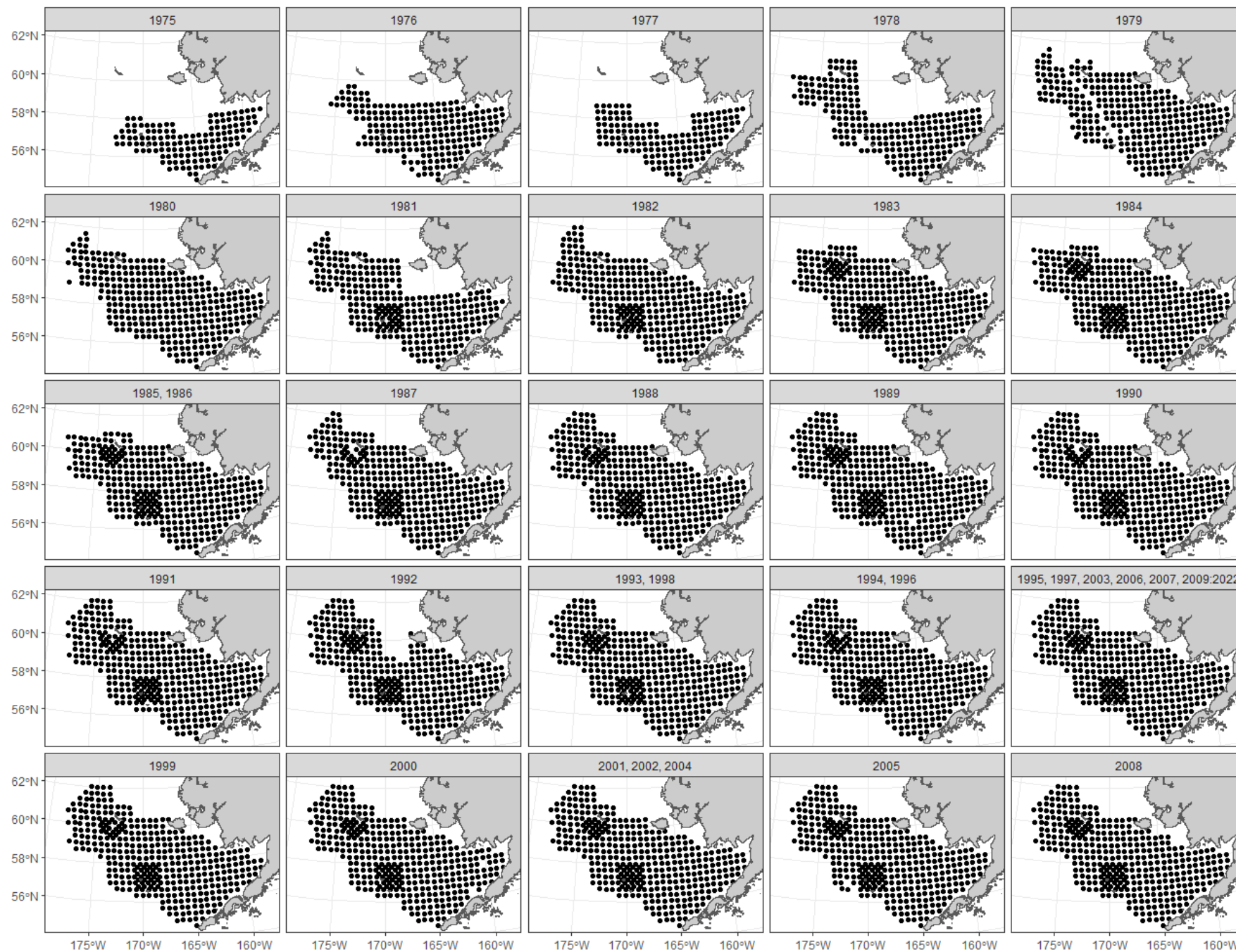
Stratum area varies by year: BBRKC

BBRKC: stratum 10

Area-swept estimates depend on stratum area

- $total\ abundance = \sum(mean\ stratum\ cpue \times stratum\ area)$
- $Var(abundance) = \sum\left({}^{Var(stratum\ cpue) \times stratum\ cpue^2}/_n\right)$
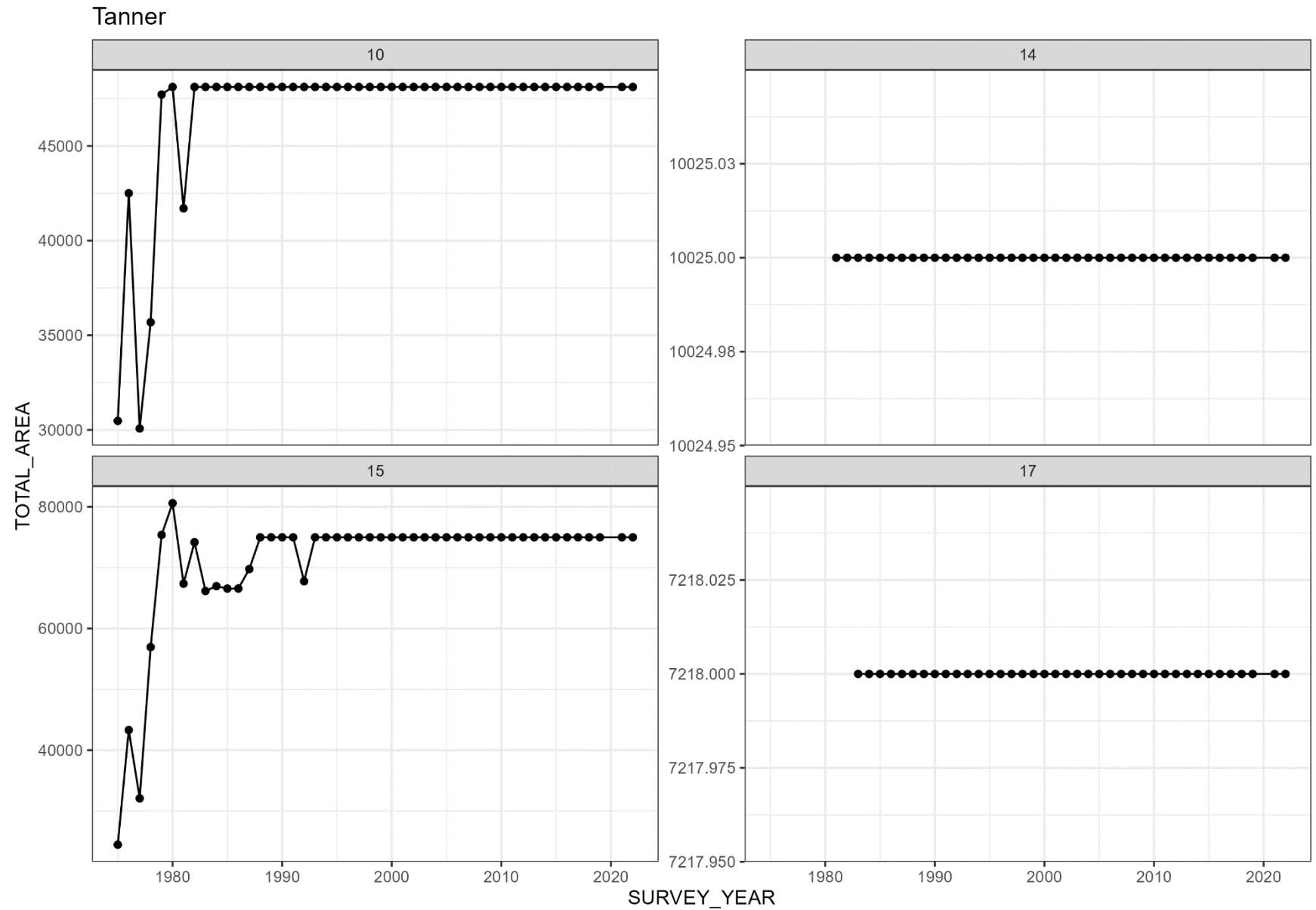
Variable stratum area affects area-swept abundance and biomass estimates
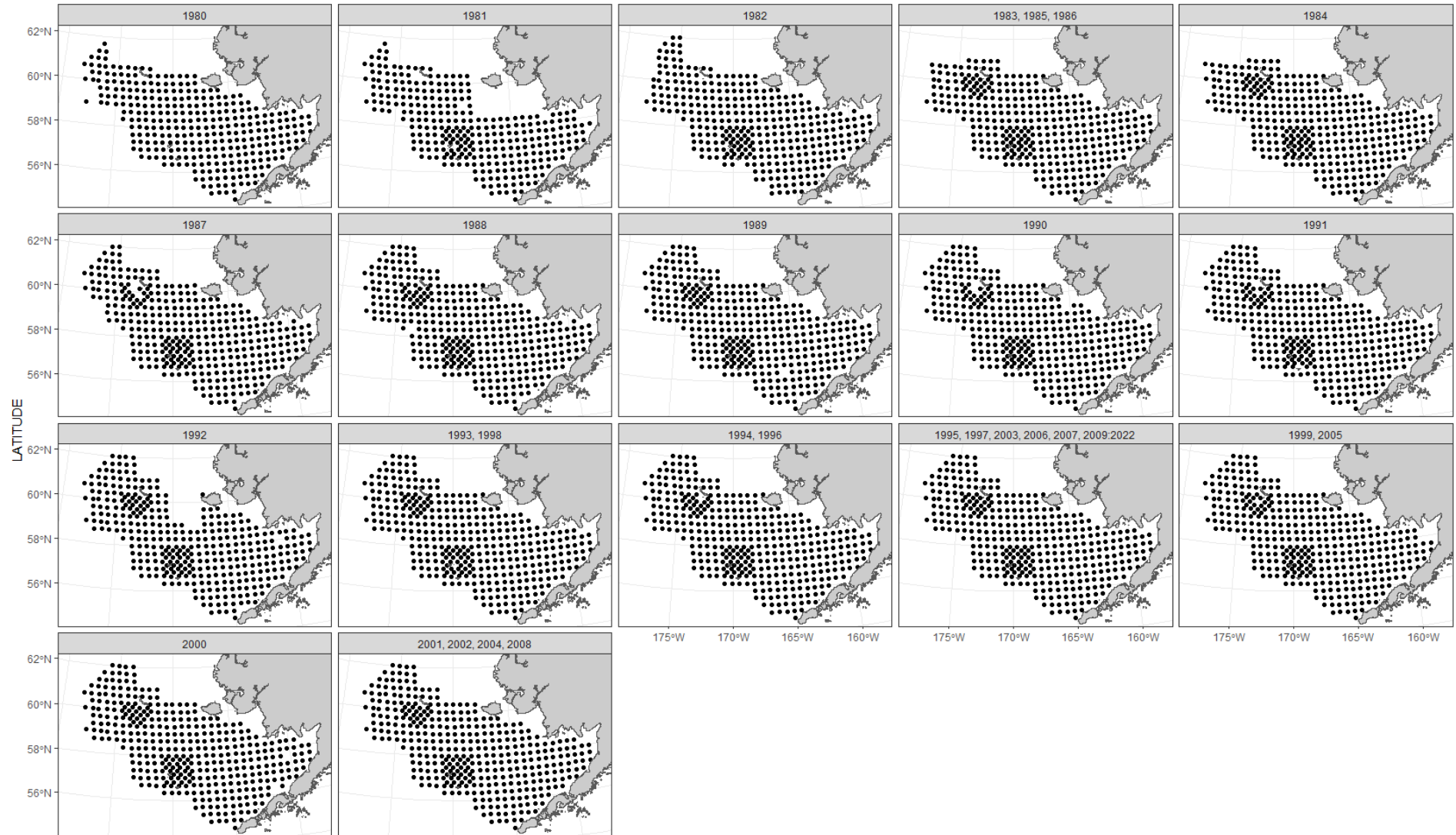

BBRKC total abundance

Spatial coverage, Tanner crab strata, 1975-2022

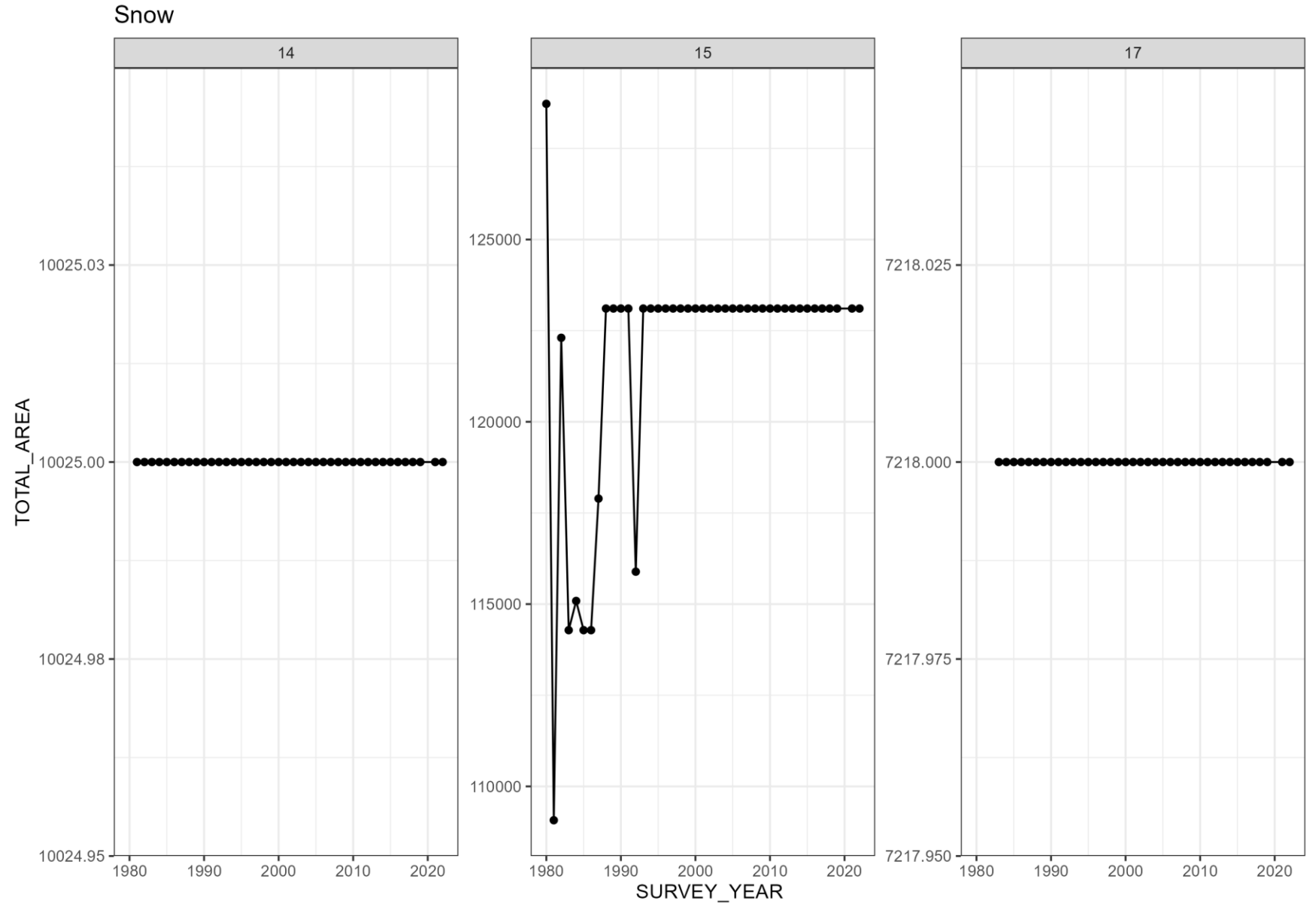Area varies by year: Tanner crab strata

Spatial coverage, snow crab strata, 1980-2022

# Area varies by year: snow crab strata

Conclusions

- Variable strata areas in early years need to be taken into account

- Stations aren't missing at random

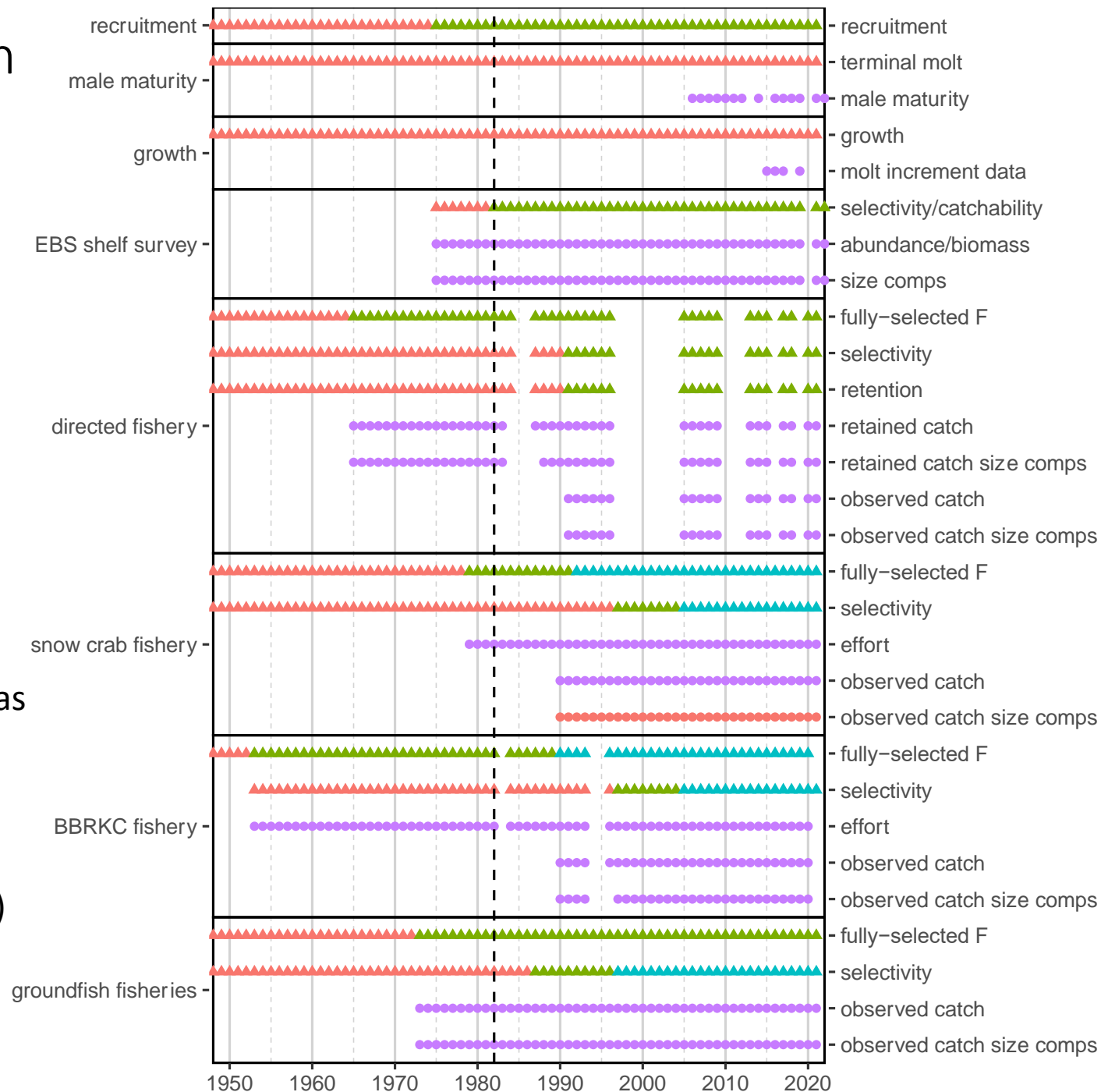- Method such as VAST could estimate missing station values

Tanner crab start date considerations: Survey characteristics

- **Gear**
    - pre-1982: several types(?)
    - 1982+: 83-112 Eastern otter trawl
- **Spatial coverage**
    - 1975-1981 : annually variable
    - 1982-1987 : more consistent
        - Pribs high density stations added
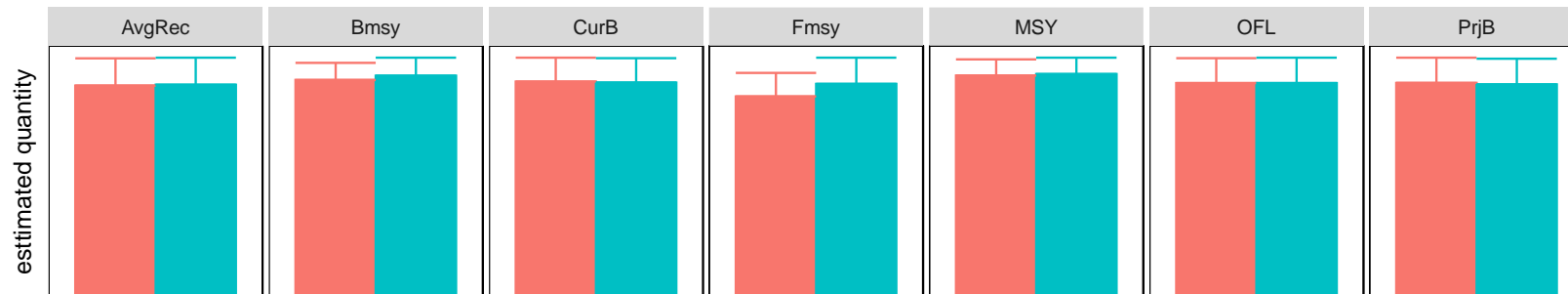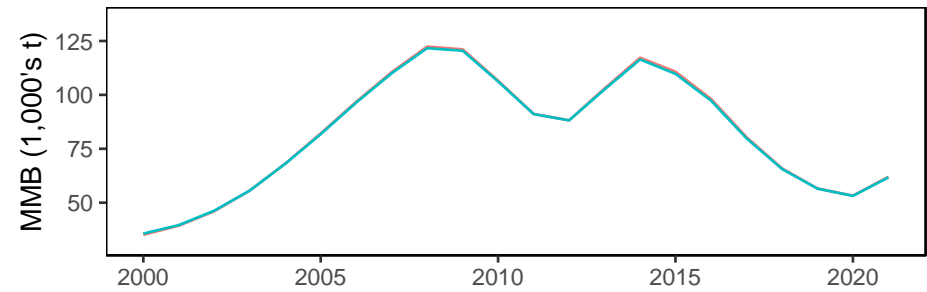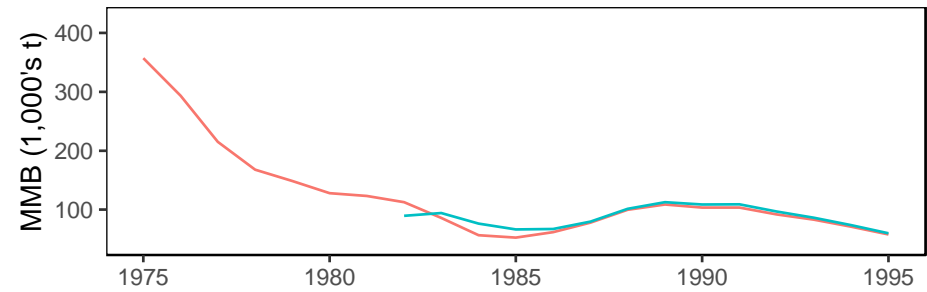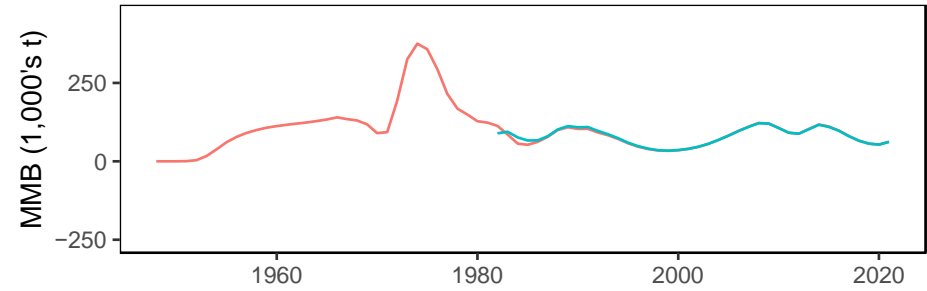   - 1988+: most consistent
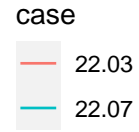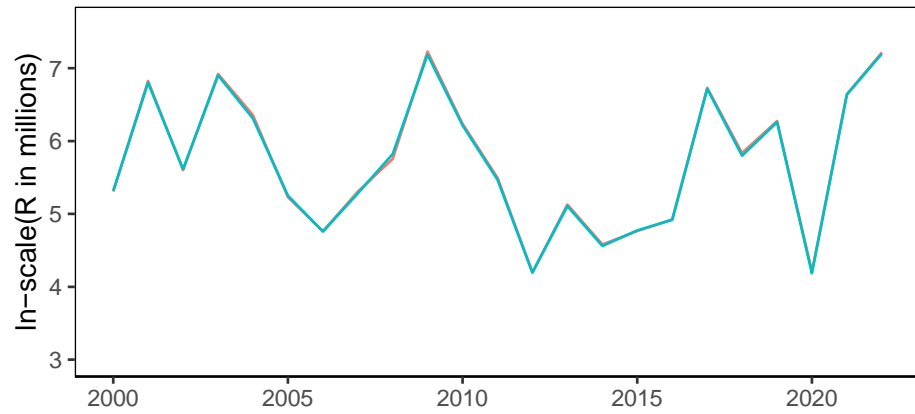   - Northwest corner stations added
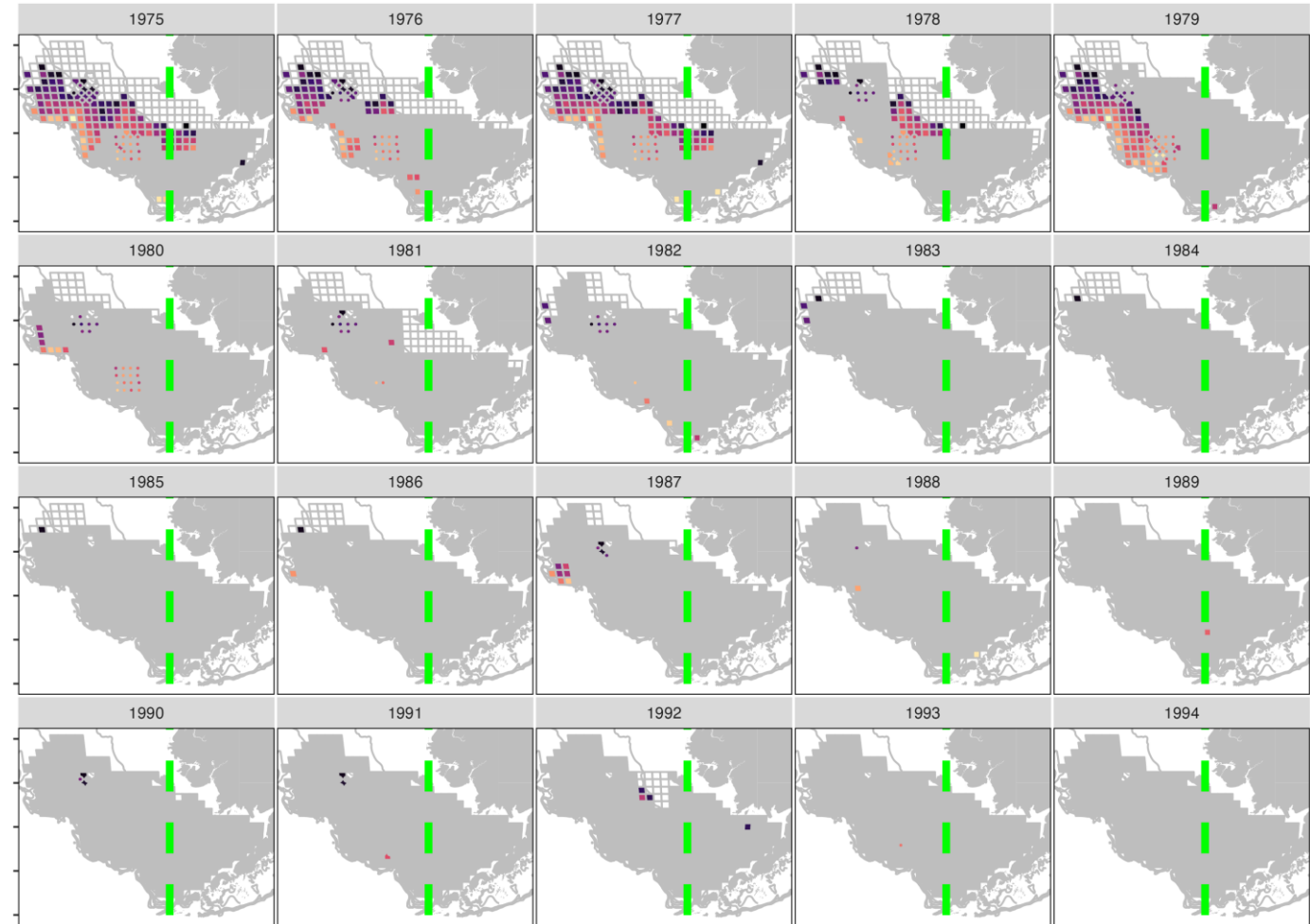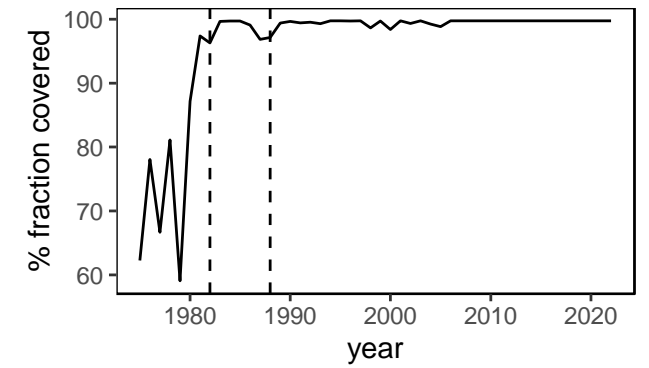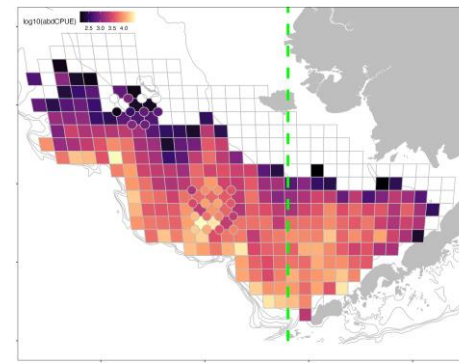
Tanner crab: Current Configuration

- Retained catch data
  - starts in 1965
  - size comps start in 1980
- Total catch data
  - starts in 1990/91
- Survey data
  - starts in 1975
  - two catchability/selectivity periods reflecting gear/spatial coverage changes
- Current model starts in 1948
  - size structure built up to 1974 by recruitment as RW
  - 351 estimated parameters
- Potential start times
  - 1982 (start of consistent EBS shelf survey gear)
    - 409 estimated parameters
  - 1990 (start of total catch data)

Tanner crab: model comparisons

BBRKC – considerations for removing early years of data

Starting model with data from 1985+ :
- Avoids dramatic abundance decline of early 1980s
- No recruitment associated with extremely high M being used for estimating $B_{35\%}$

Data by type and year
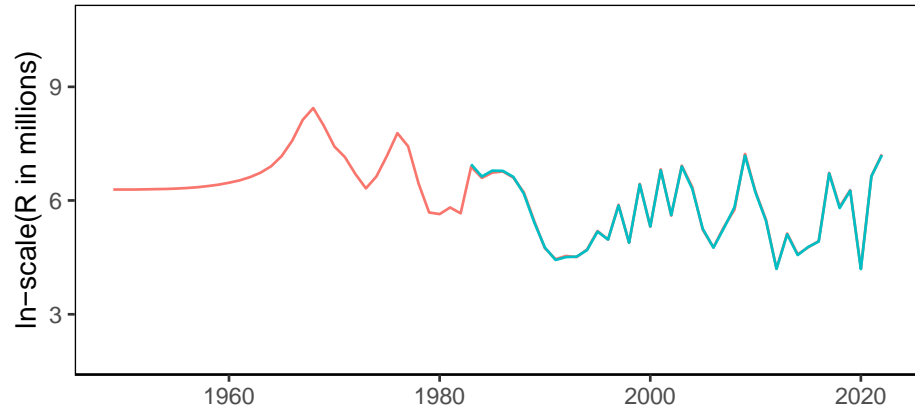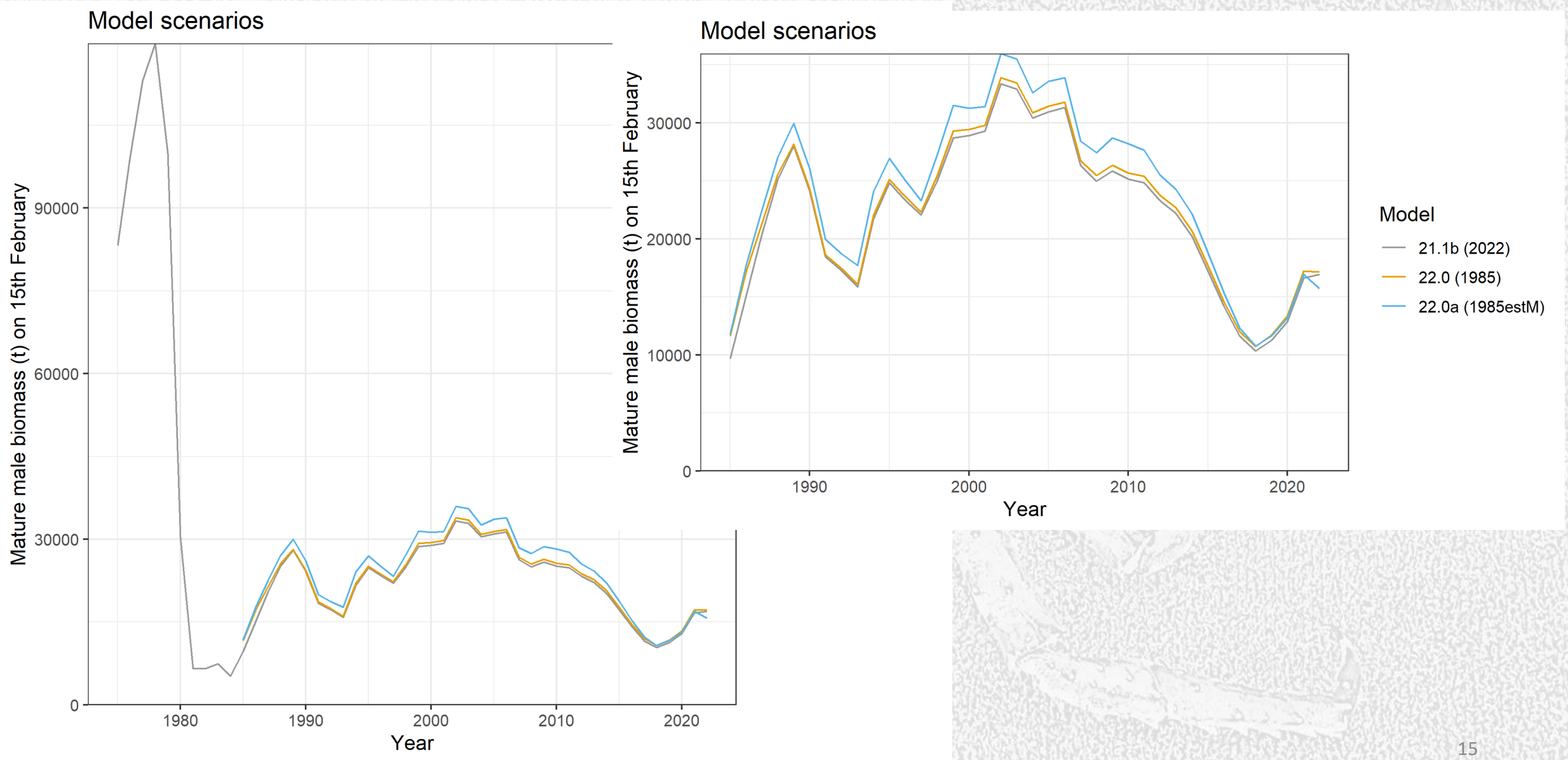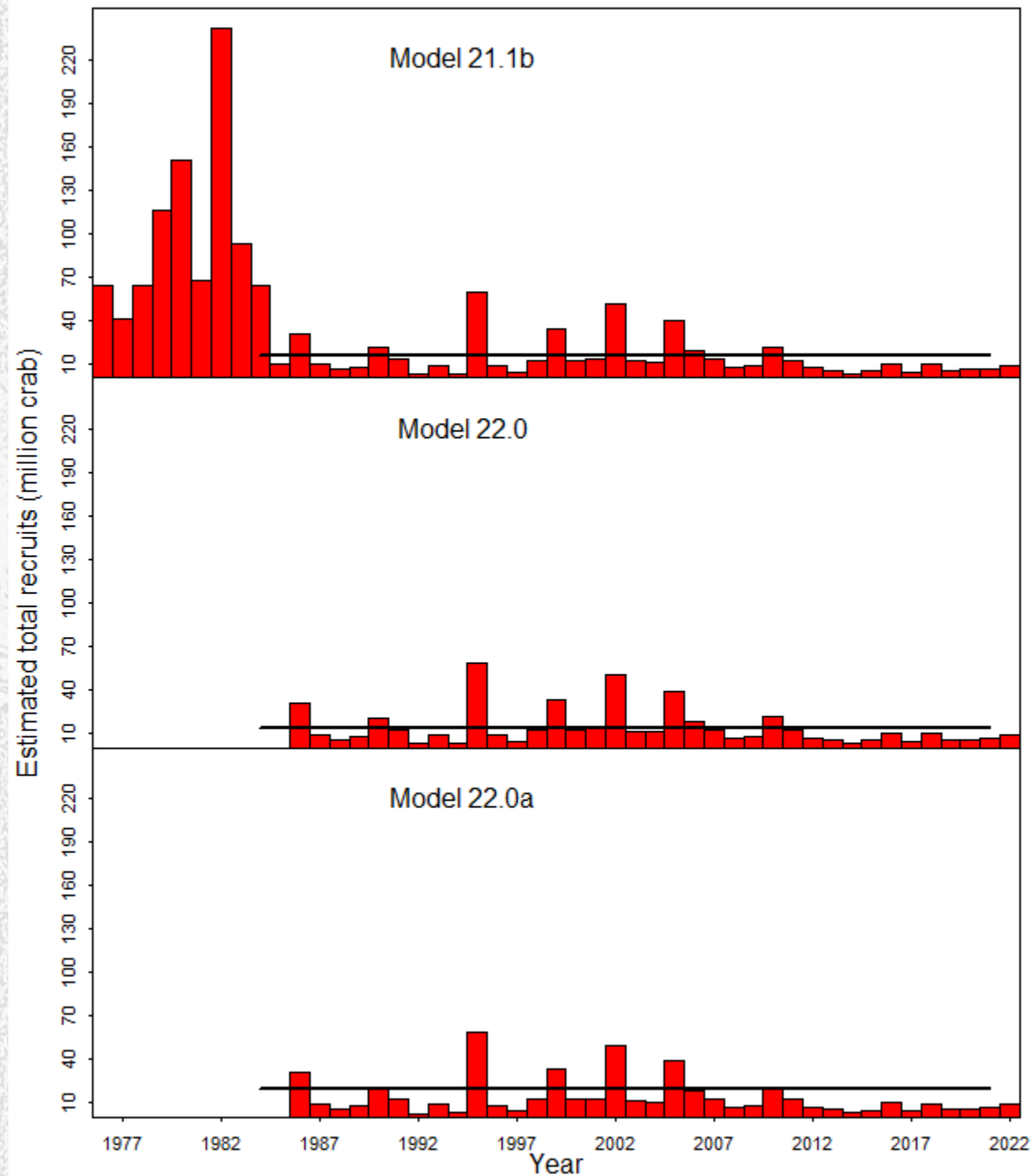
Mature male biomass (2022 final SAFE)

Recruitment (2022 final SAFE)

Suggested guidelines for moving the start of data into the model

- What is the purpose of the model?
- Is the early data highly influential in the model output?
- Does it help define "stock status"?
- Data quality?
- Model comparison checks: (?)