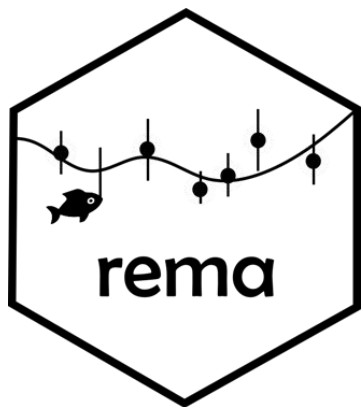




NOAA
FISHERIES

GOA Shortraker – Update Multiple Survey Model Using *rema* Package

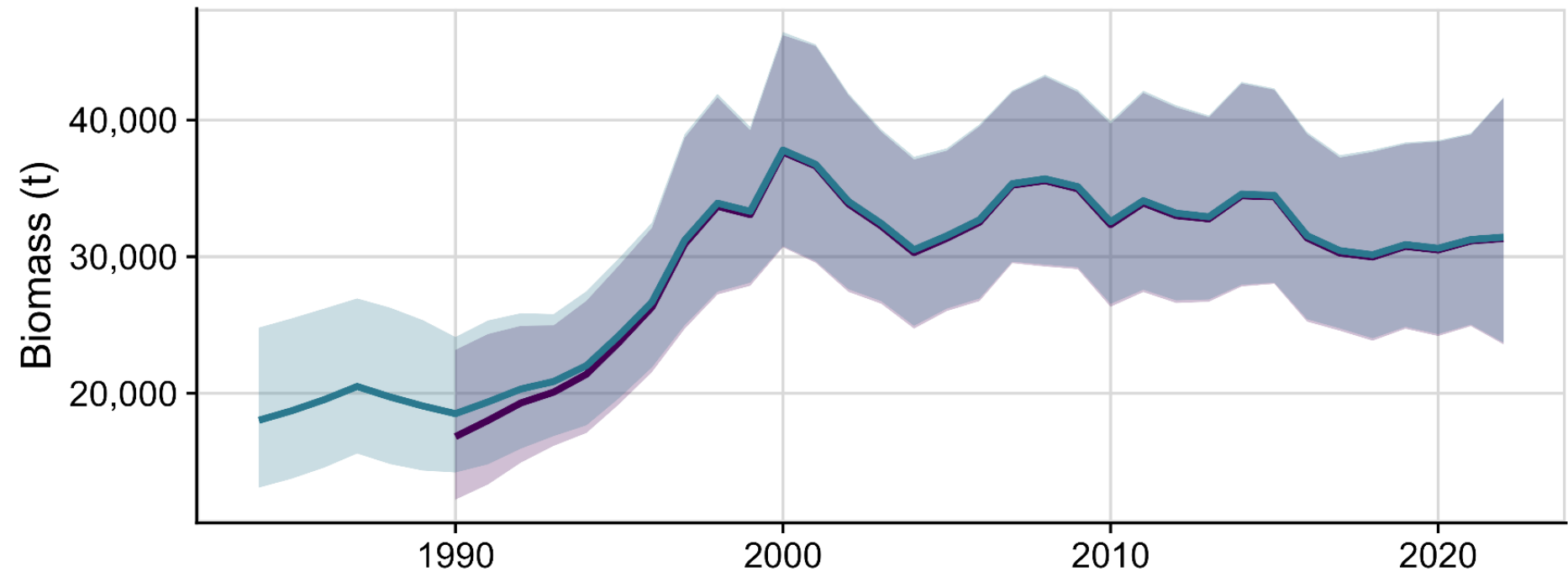
Kevin Siwicke, Katy Echave,
and Jane Sullivan



Outline

1. Correction to the two-survey ADMB model (**M19** → **M19***)
2. Remove 84/87 from the trawl survey (GPT recommended)

Model 19* Model 19* w/ 84/87

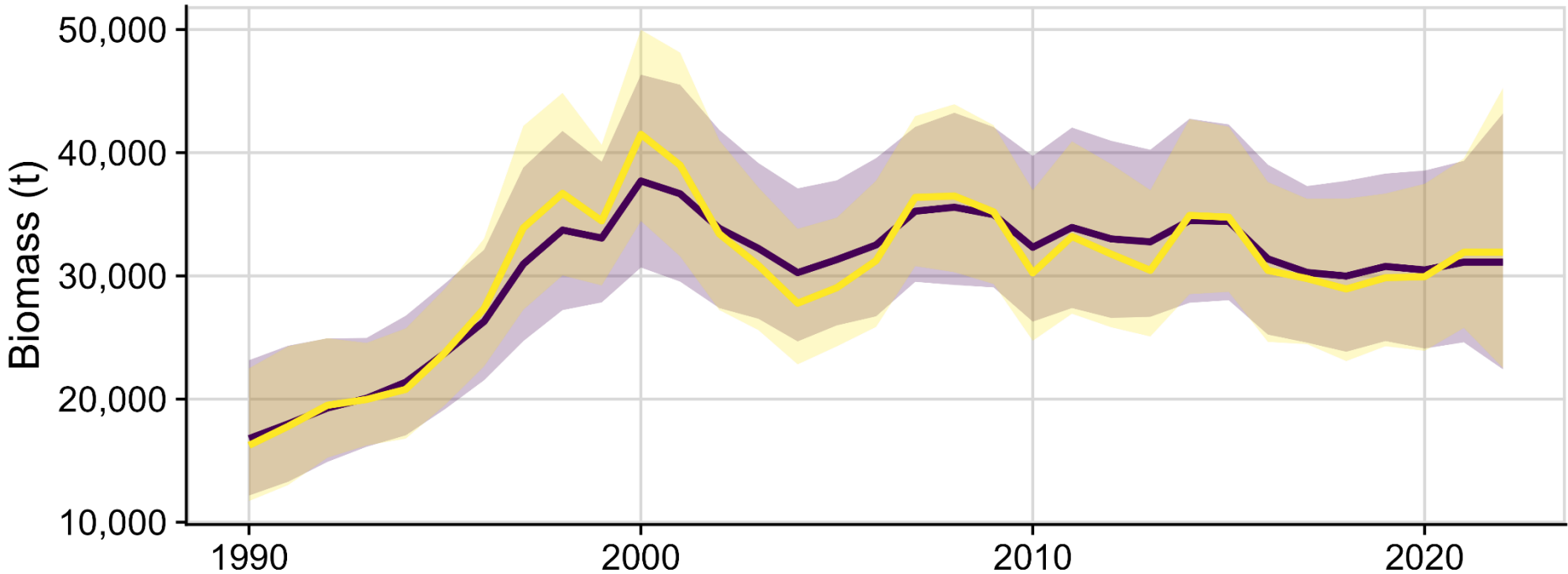


Outline

- ~~1. Correction to the two survey ADMB model (**M19** → **M19***)~~
- ~~2. Remove 84/87 from the trawl survey (GPT recommended)~~
3. Survey weights $LLS = 0.5$ (**M19***) → $LLS = 1.0$ (**M23.1**)
4. Striking a balance between surveys in REMA model
5. Apportionment options
6. Solicit your feedback and endorsement

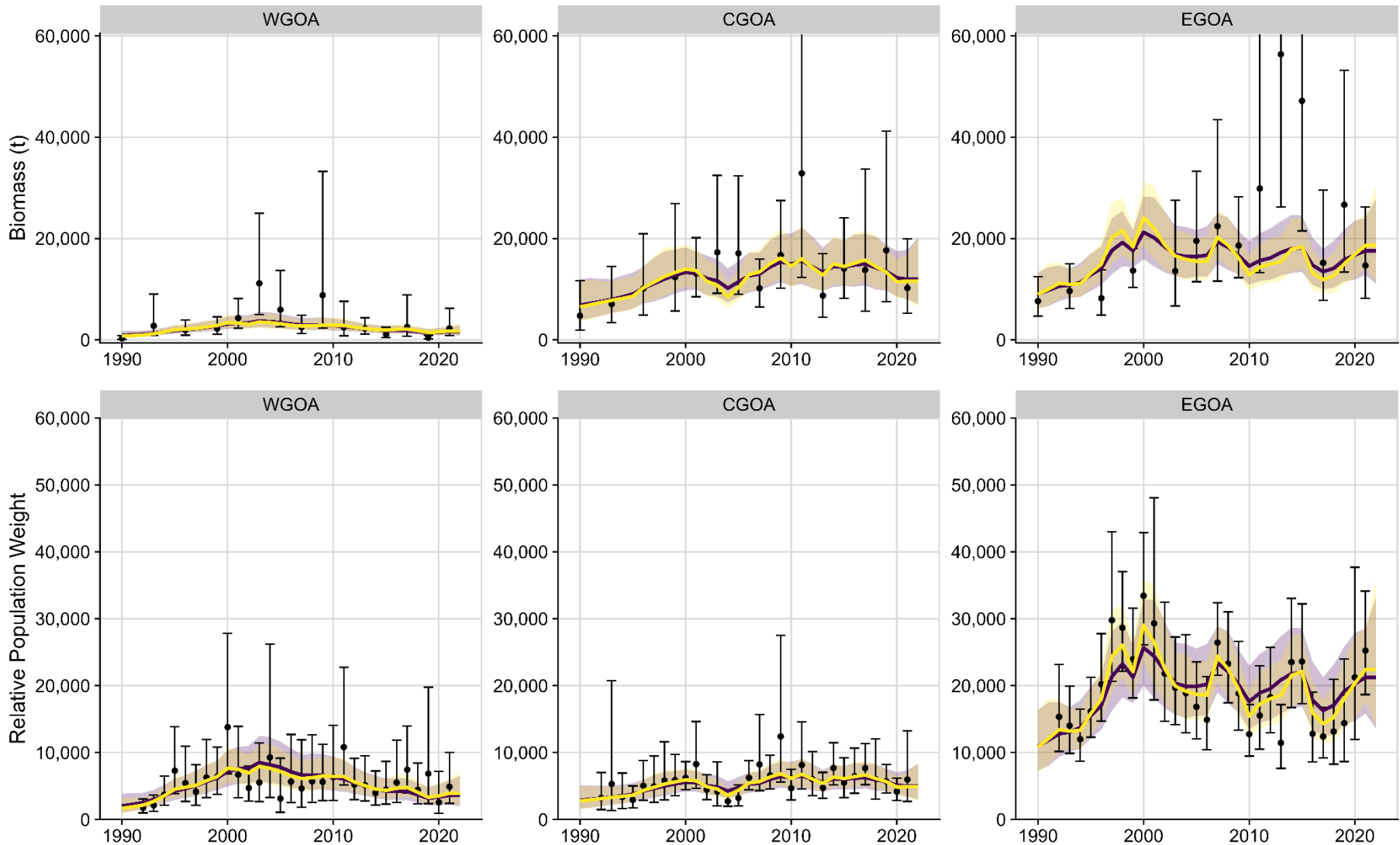
Unequal (LLS = 0.5) vs. Equal Survey Weights

Model 19* Model 23.1 (LLS_wt = 1)



| Model | Process Error | AIC |
|---------------------|---------------|-------|
| 19* (LLS Wt = 0.5) | 0.17 | 162.6 |
| 23.1 (LLS Wt = 1.0) | 0.20 | 179.2 |

Model 19* (purple line) Model 23.1 (LLS_wt = 1) (yellow line)



| Model | q (WGOA) | q (CGOA) | q (EGOA) |
|---------------------|----------|----------|----------|
| 19* (LLS Wt = 0.5) | 2.23 | 0.42 | 1.21 |
| 23.1 (LLS Wt = 1.0) | 2.21 | 0.42 | 1.20 |

Reasons not to fix weight of LLS < 1

1. LLS is annual in GOA while BTS is biennial (was triennial)
2. LLS samples more (e.g., 2021 LLS = 4,091 vs. BTS = 470)
3. Less interannual variability in the LLS mean length relative to BTS
4. LLS adequately samples depths encompassing shortraker habitat while BTS effort drops off significantly at these depths
5. Untrawlable habitat can be sampled by LLS

Shortraker Length Composition by Survey

BTS mean:

50.3 cm

57.8 cm

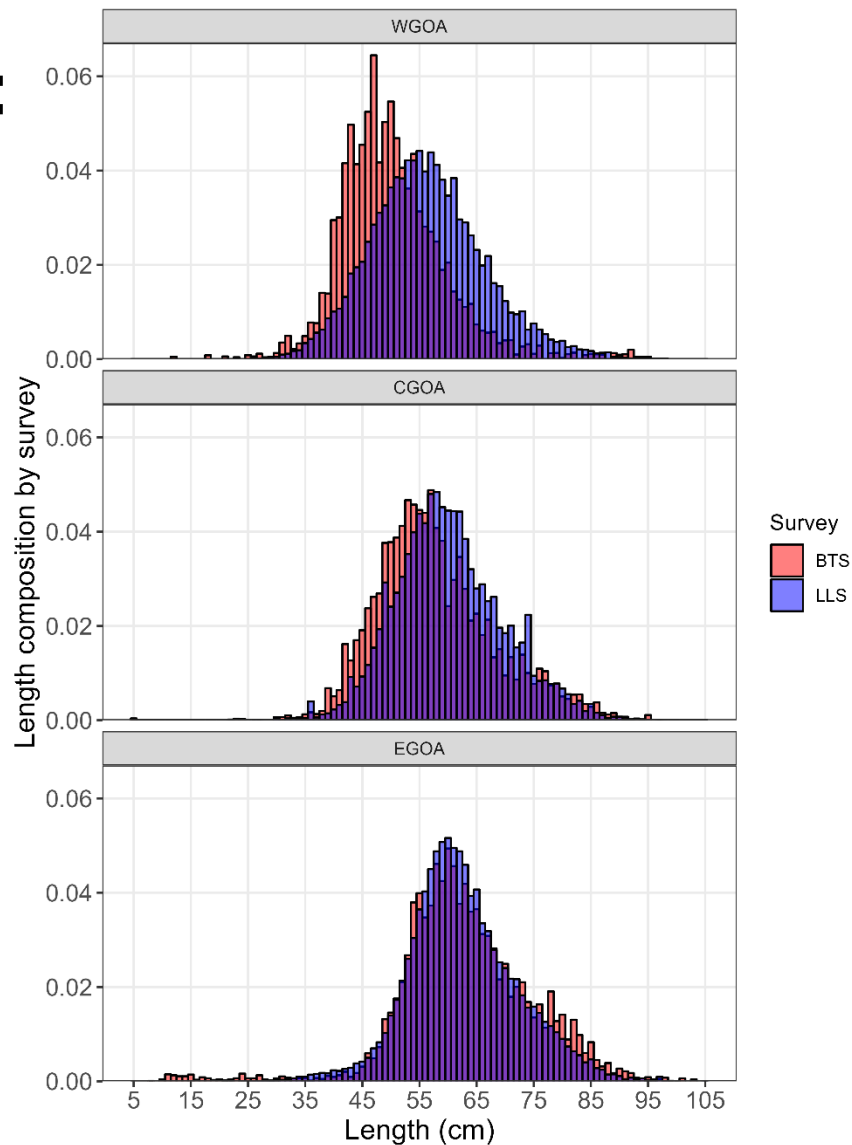
63.1 cm

LLS mean:

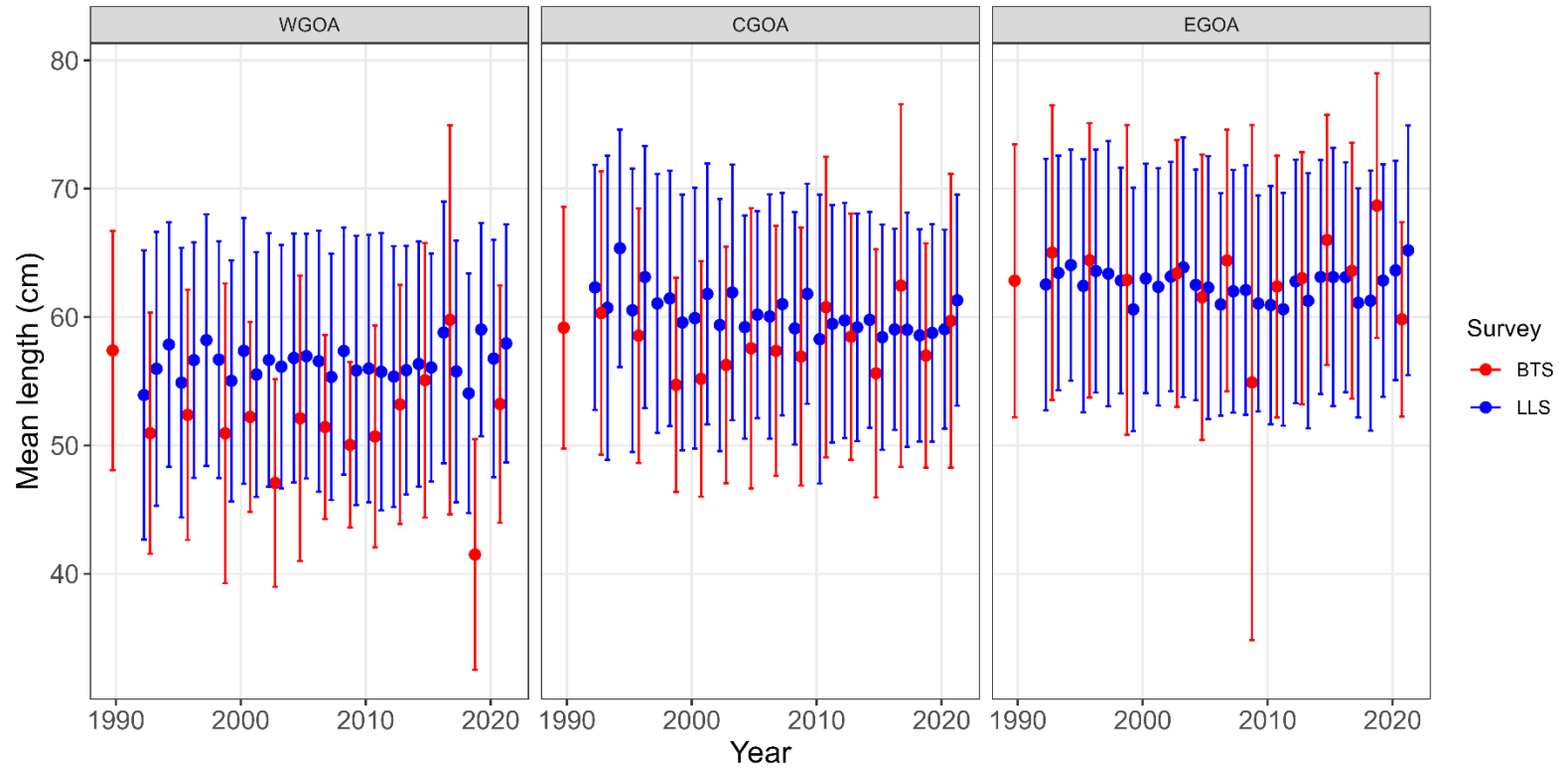
56.4 cm

60.2 cm

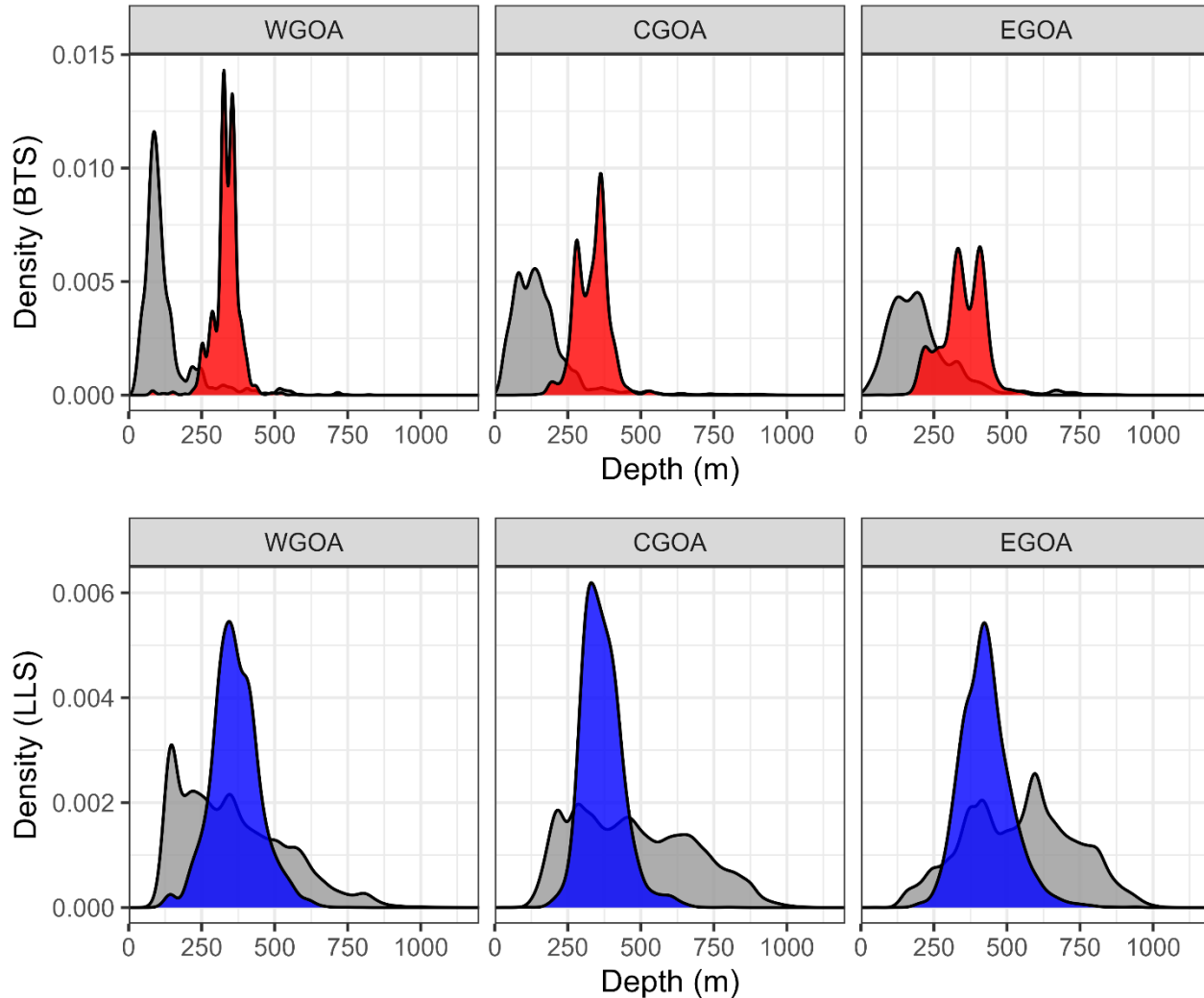
62.6 cm



Mean Length Time Series by Survey

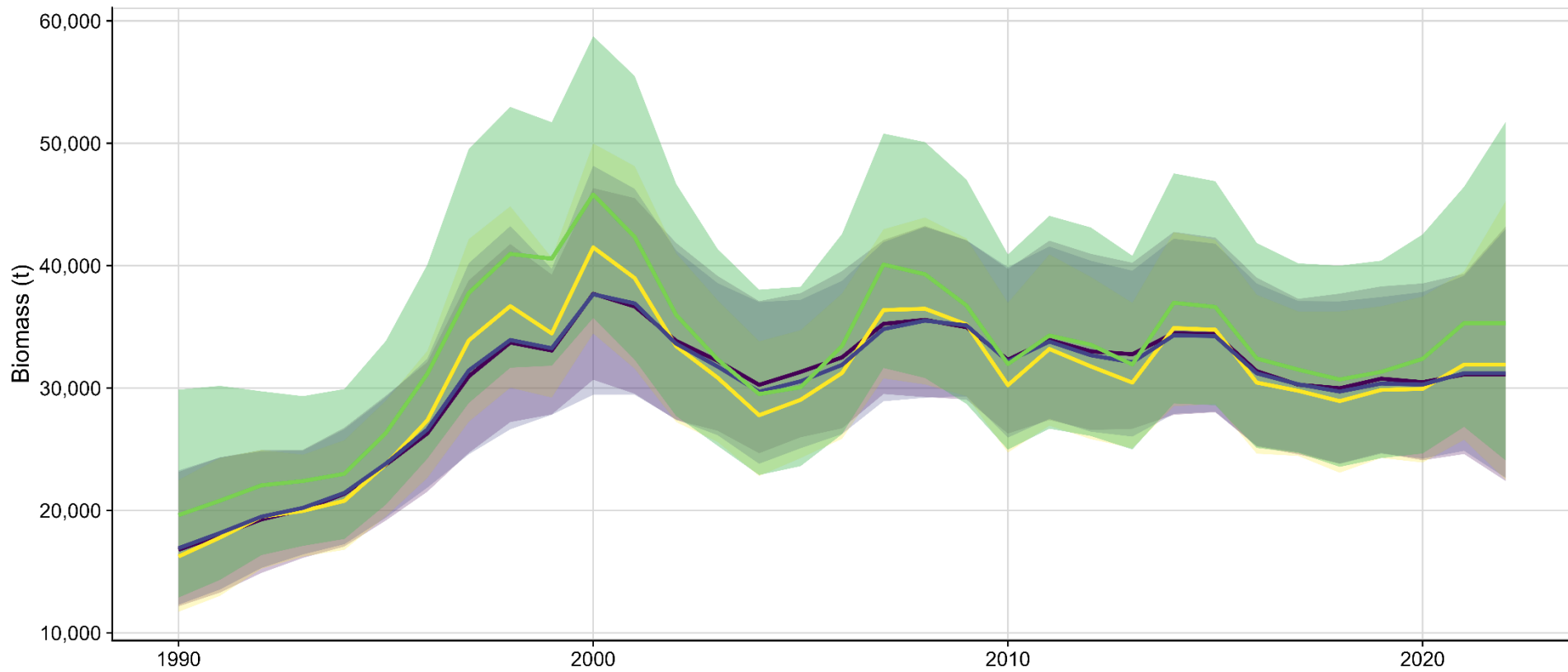


Shortheaded Hake Depths (Red/Blue) Relative to Survey Effort (Grey)



Equal Survey Weights & Additional Obs. Err.

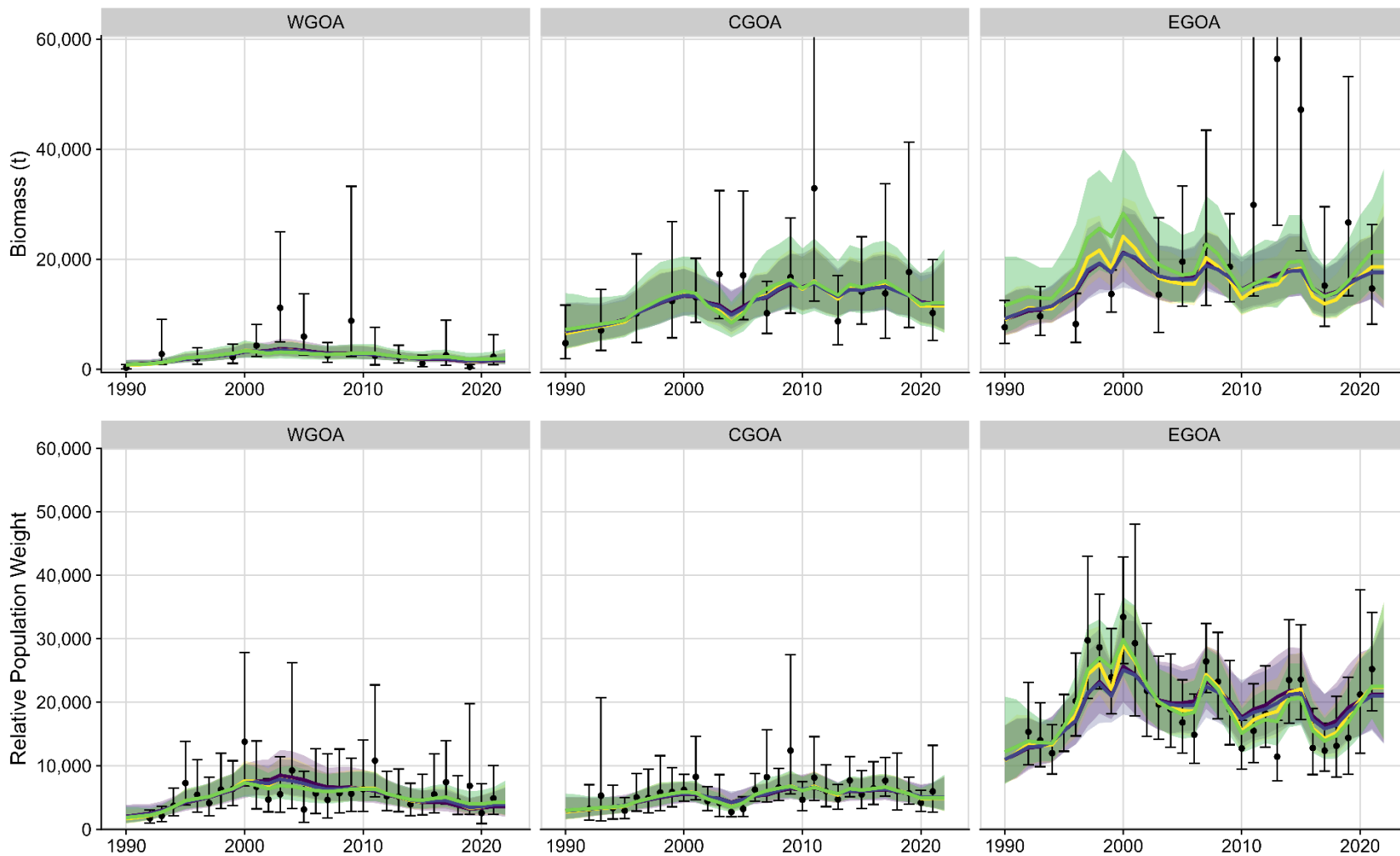
■ Model 19*
 ■ Model 23.1 (LLS_wt = 1)
 ■ Model 23.2 (23.1 w/ extra BTS OE)
 ■ Model 23.3 (23.1 w/ extra LLS OE)
 ■ Model 23.4 (23.1 w/ Both extra OE)



Same

| Model | Process Error | AIC |
|------------------------------|---------------|-------|
| 23.2 (23.1 w/ extra BTS OE) | 0.20 | 165.3 |
| 23.3 (23.1 w/ extra LLS OE) | 0.17 | 179.9 |
| 23.4 (23.1 w/ Both extra OE) | 0.20 | 167.3 |

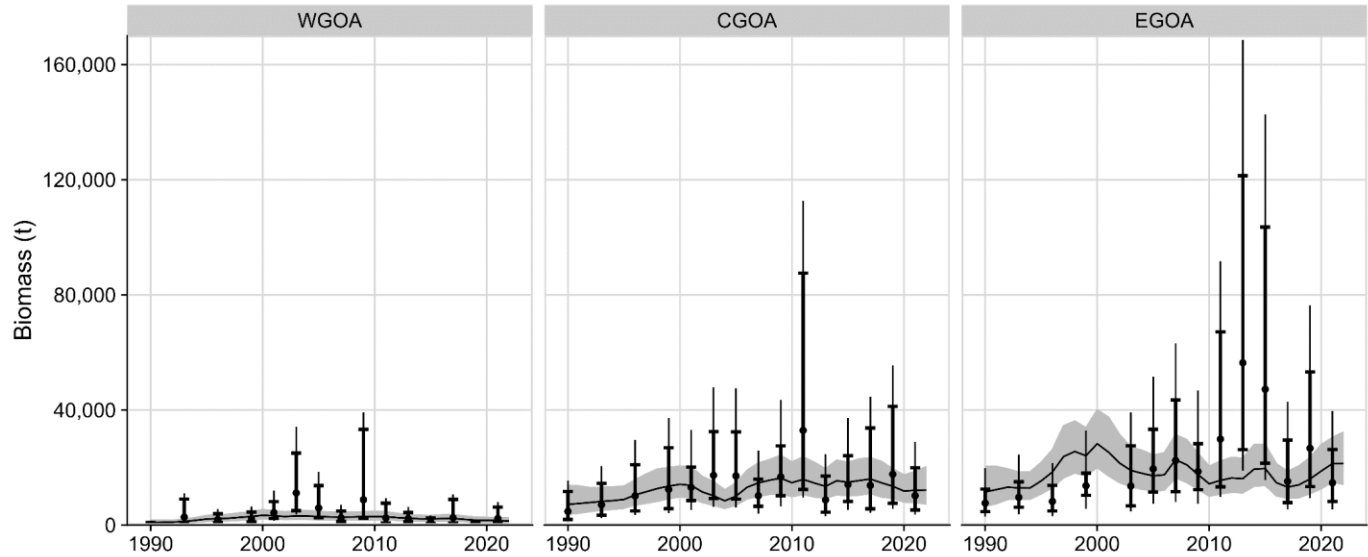
■ Model 19*
 ■ Model 23.1 (LLS_wt = 1)
 ■ Model 23.2 (23.1 w/ extra BTS OE)
 ■ Model 23.3 (23.1 w/ extra LLS OE)
 ■ Model 23.4 (23.1 w/ Both extra OE)



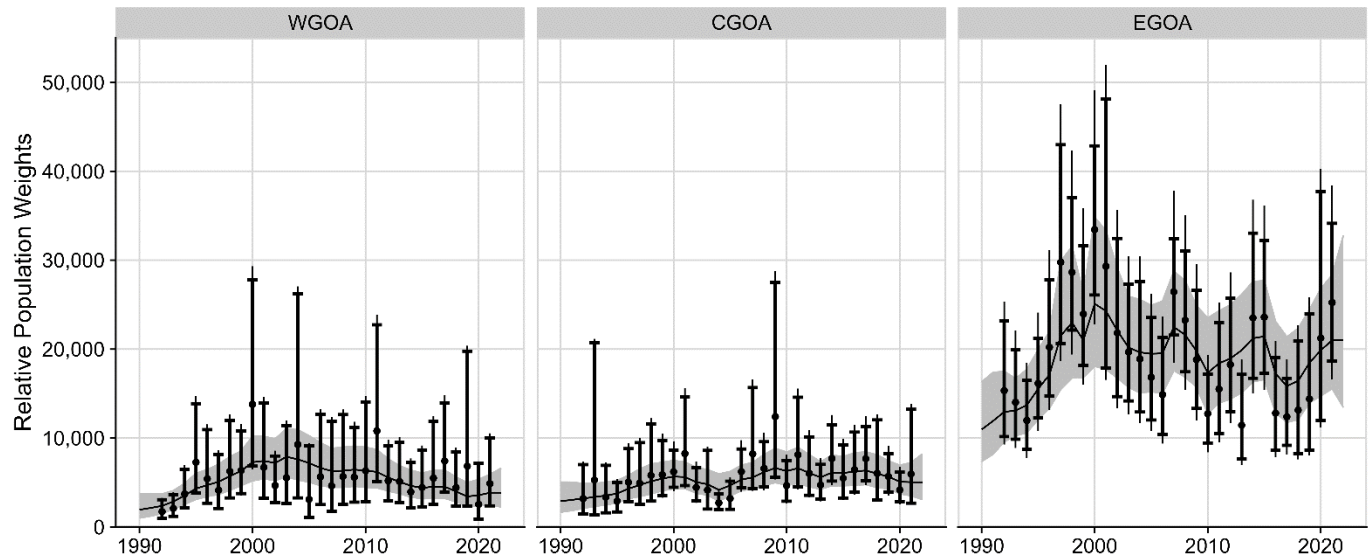
| Model | q (WGOA) | q (CGOA) | q (EGOA) | + biomass_cv | + cpue_cv |
|-------|----------|----------|----------|--------------|-----------|
| 23.2 | 2.15 | 0.42 | 1.05 | 0.45 | NA |
| 23.3 | 2.22 | 0.42 | 1.20 | NA | 0.15 |
| 23.4 | 2.15 | 0.42 | 1.05 | 0.45 | ~ 0 |

Additional Obs. Err.

**BTS
(M23.2)**

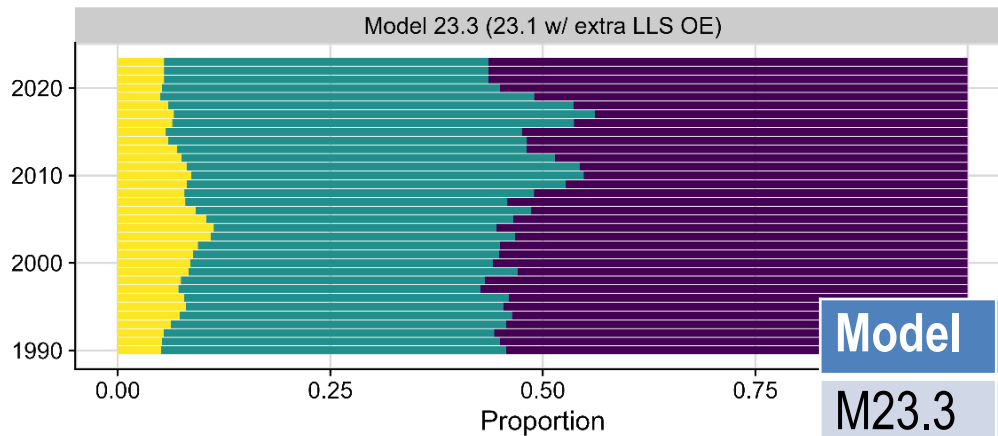


**LLS
(M23.3)**

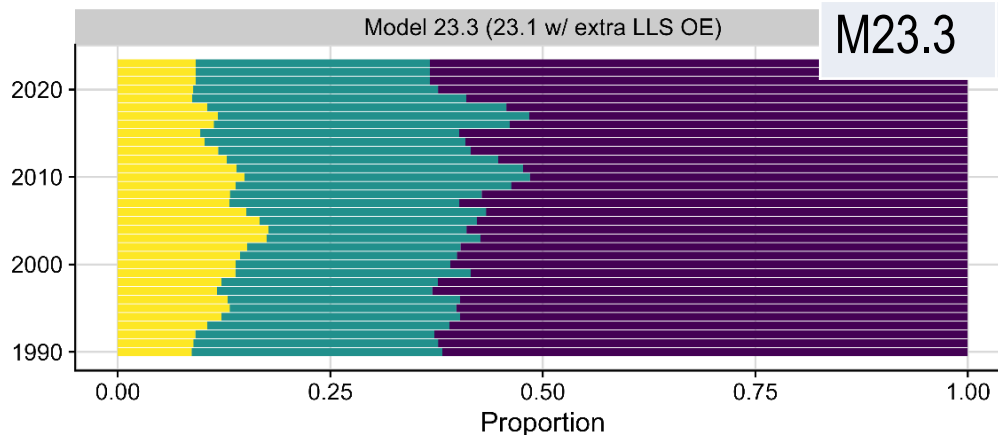


Apportionment Proposals

1. Standard (based on predicted biomass by area)
2. Combined (based on predicted biomass and RPWs by area)



| Model | Method | WGOA | CGOA | EGOA |
|-------|---------------|------|-------|-------|
| M23.3 | Biomass | 5.4% | 38.2% | 56.4% |
| M23.3 | Biomass + RPW | 9.2% | 27.5% | 63.3% |



Authors' Recommendations

1. Use the *rema* package (ADMB -> TMB/corrected)
2. Remove 84/87 from the BTS
3. Use equal weights (LLS = 1.0)
4. Estimate additional observation error for just LLS (Model 23.3)
5. Apportionment: use average of both surveys





Thank You

**Feedback and
Questions?**