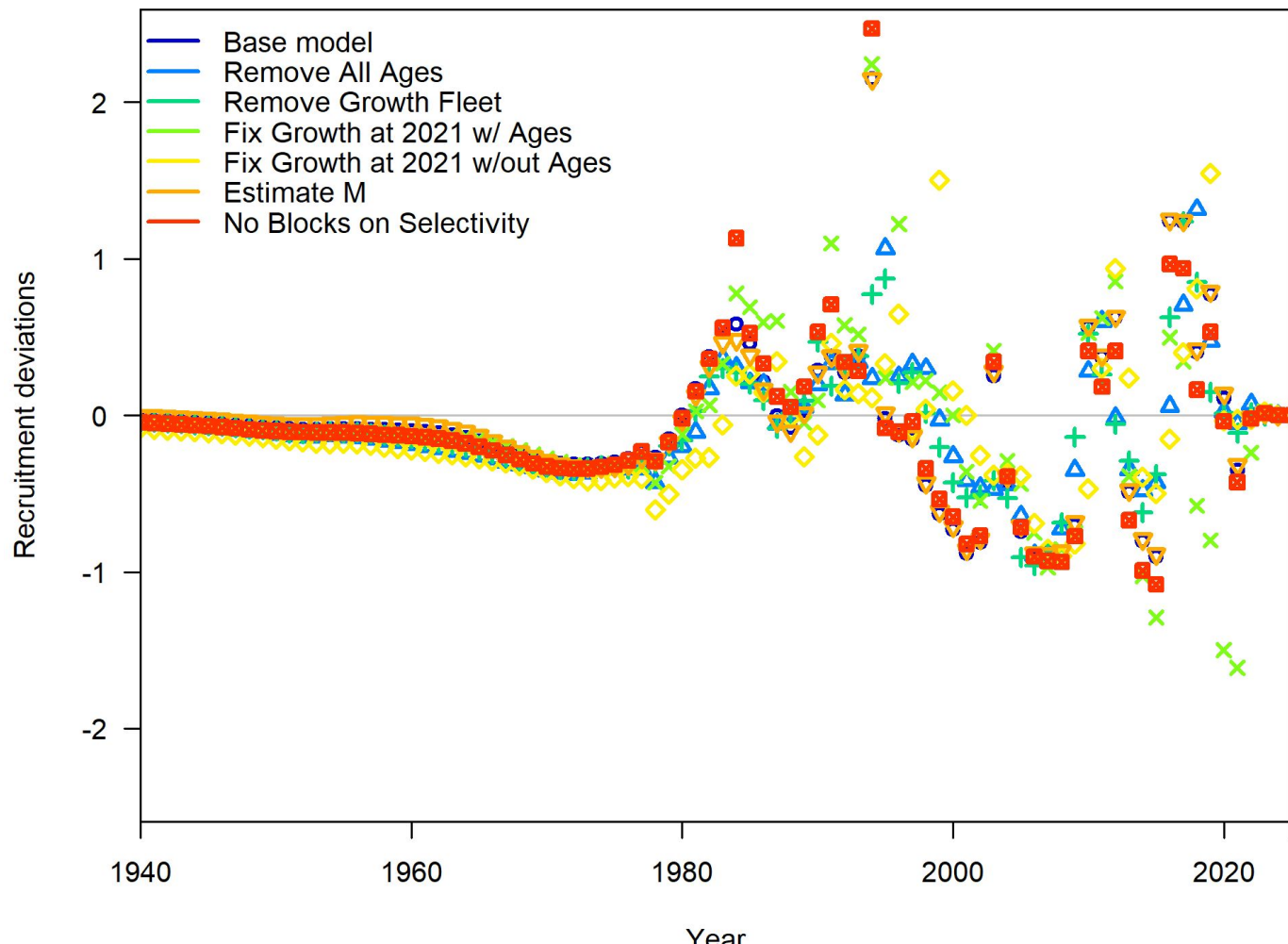


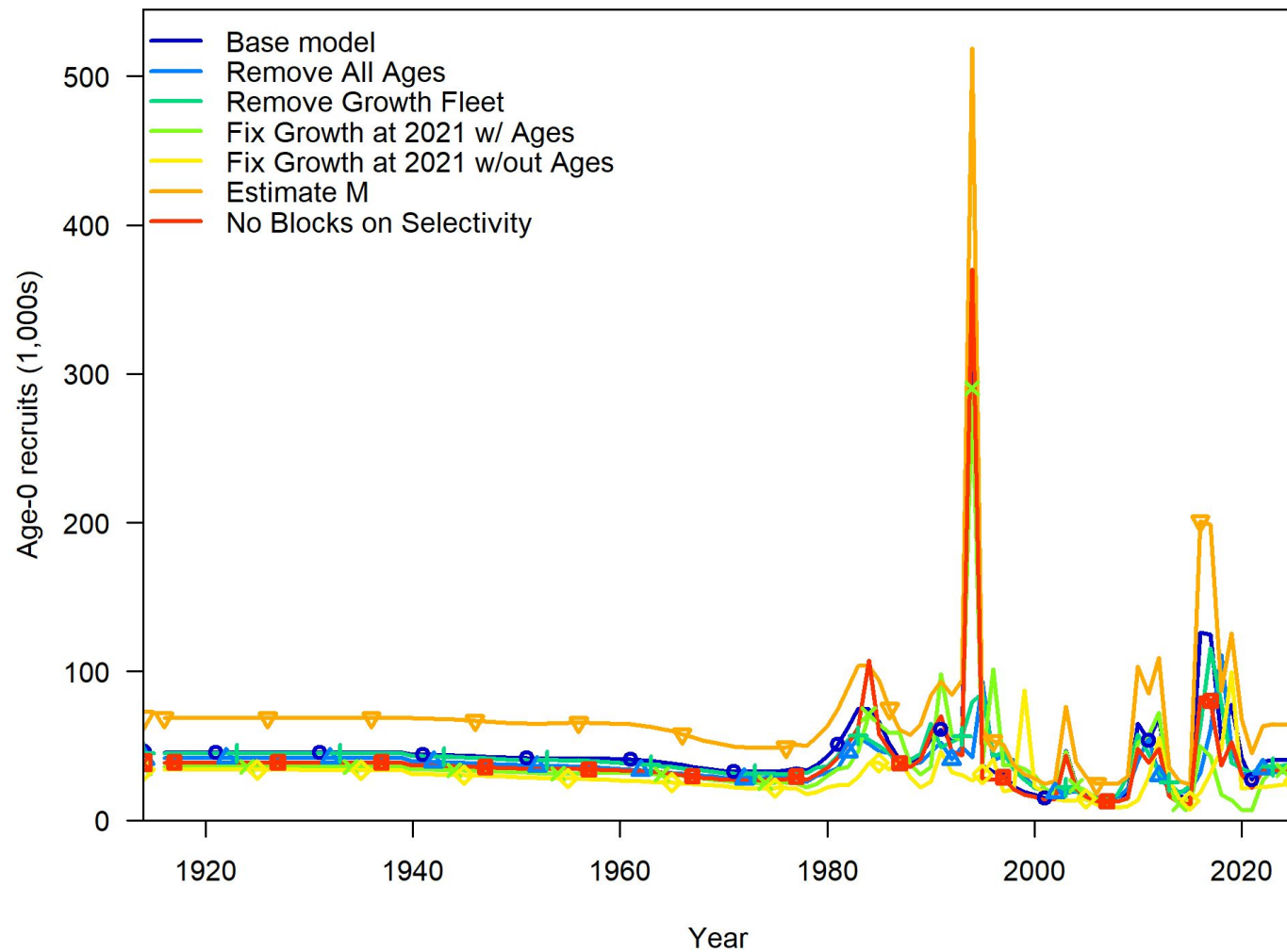
# STAR Panel Requests and Responses

Quillback STAT

## Request 1

Plot comparisons of age-0 recruits and recruitment deviations for sensitivities (two separate plots without confidence intervals). Sensitivities include 1) base model, 2) removal of all ages, 3) removal of growth fleet, 4) fixed growth at 2021 values with ages, 5) fixed growth at 2021 values without ages, 6) estimate M, and 7) no blocks on selectivity. Please separate sensitivities into multiple plots if you think they are difficult to interpret.





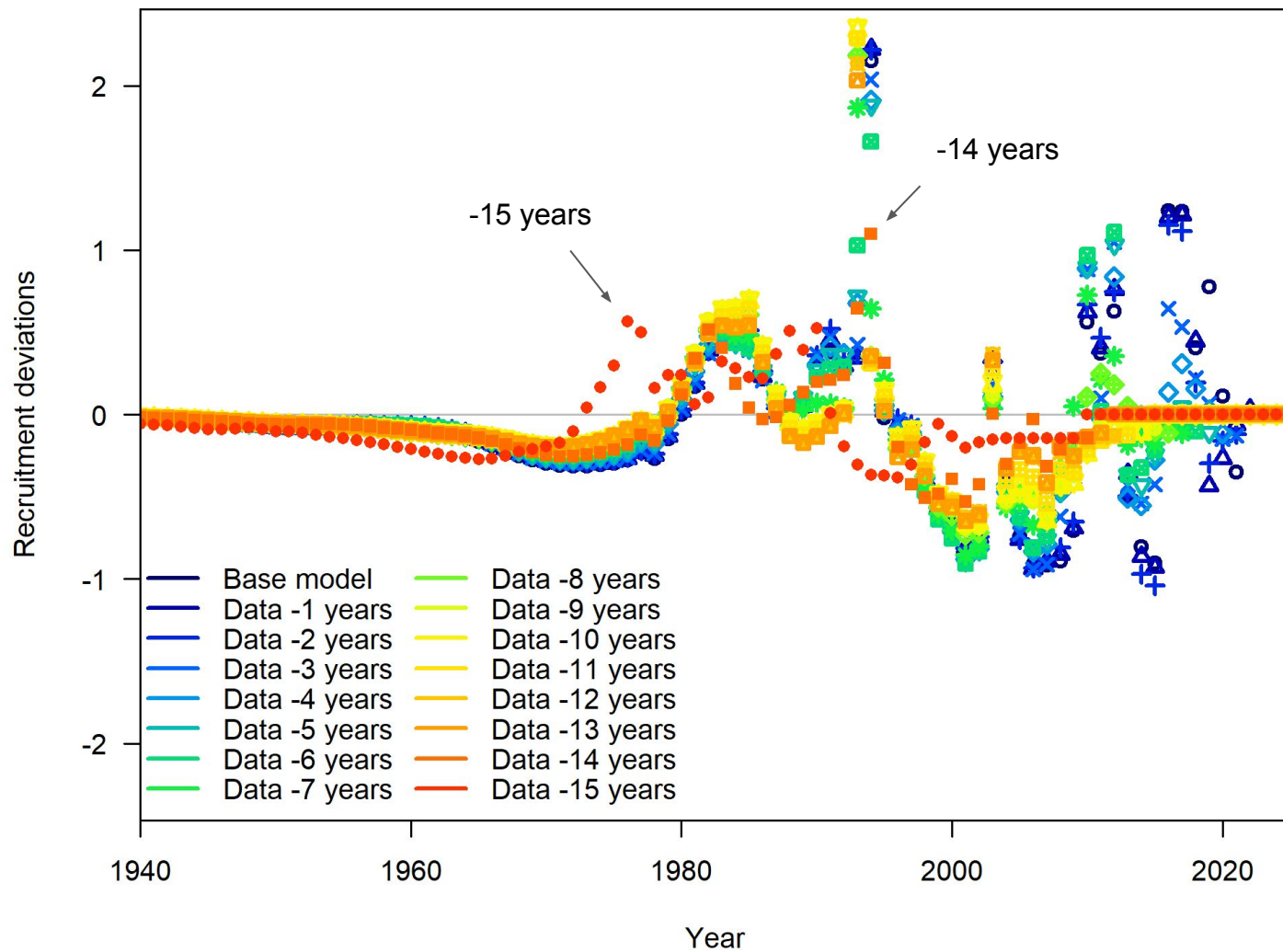
## Request 1: STAT response

**Age data contribute to the high peak in 1994, though years for other peaks vary by sensitivity.** The three scenarios removing age data reduced the peak in recruitment deviations and age-0 recruits in 1994. Removing all ages results in a peak in 1995 that is much smaller than the one in 1994 under the base model. Removing just growth fleet ages results in a smaller peak than the base spread across 1994 and 1995. Removing ages while fixing growth results in a peak in 1999 with lesser peaks in 1996 and 1991. Fixing growth with ages results in lesser peaks in 1991 and 1996 along with the 1994 peak.

## Request 2

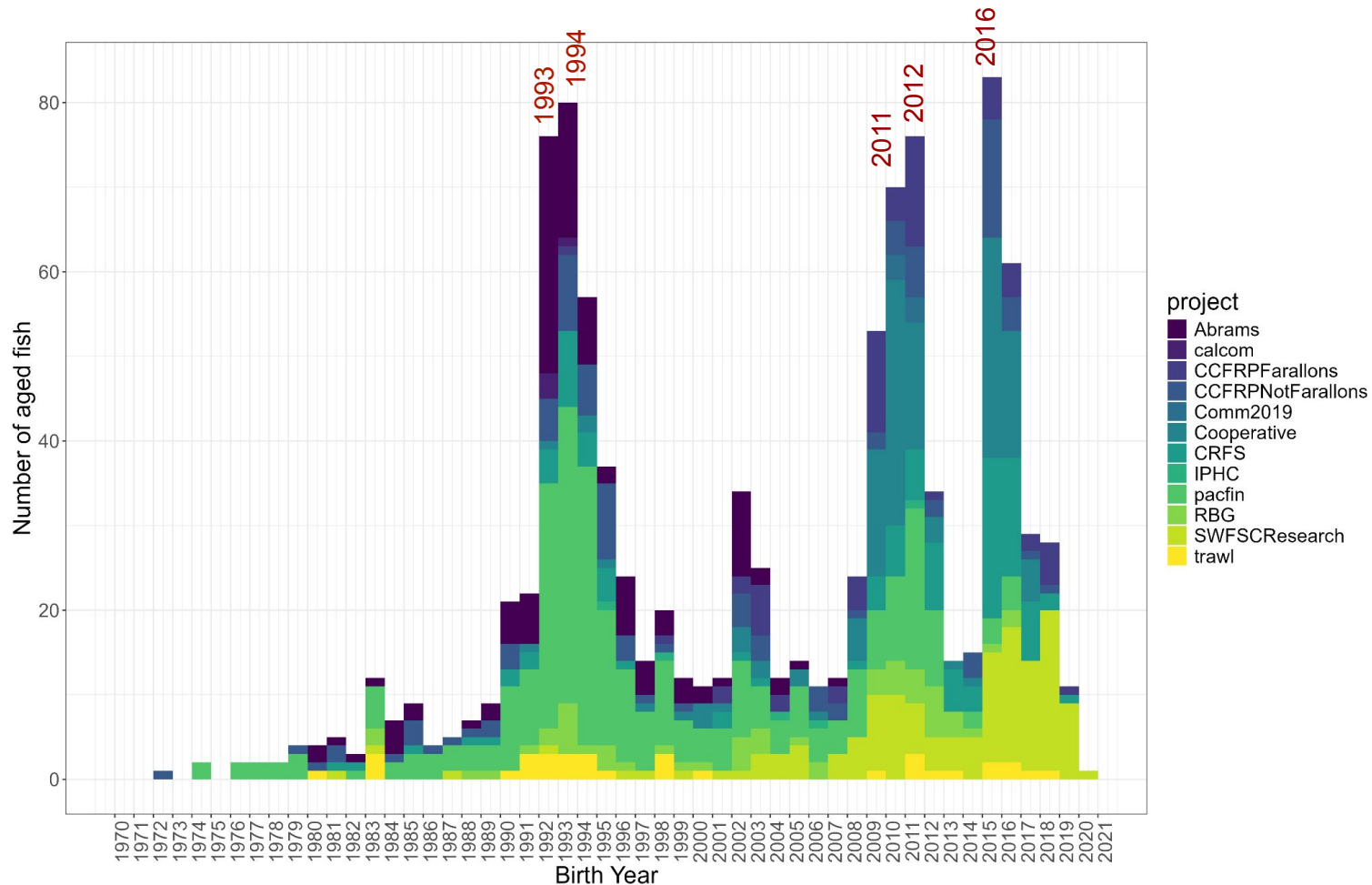
Plot comparisons of recruitment deviations for 15-year retrospective analysis using the pre-STAR base model.

## Request 2



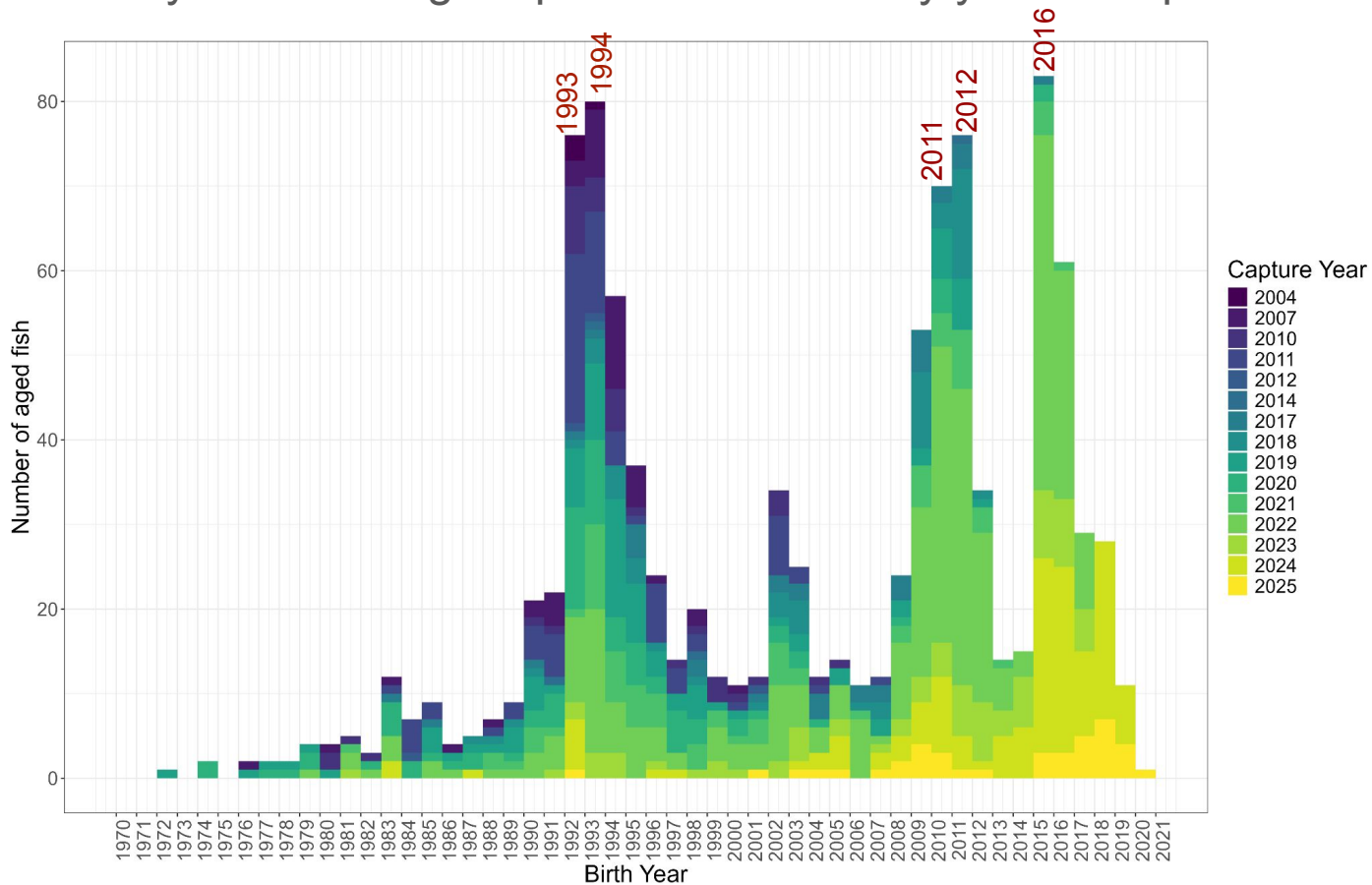
# Request 2

Birth year of the aged quillback rockfish by project



## Request 2

## Birth year of the aged quillback rockfish by year of capture

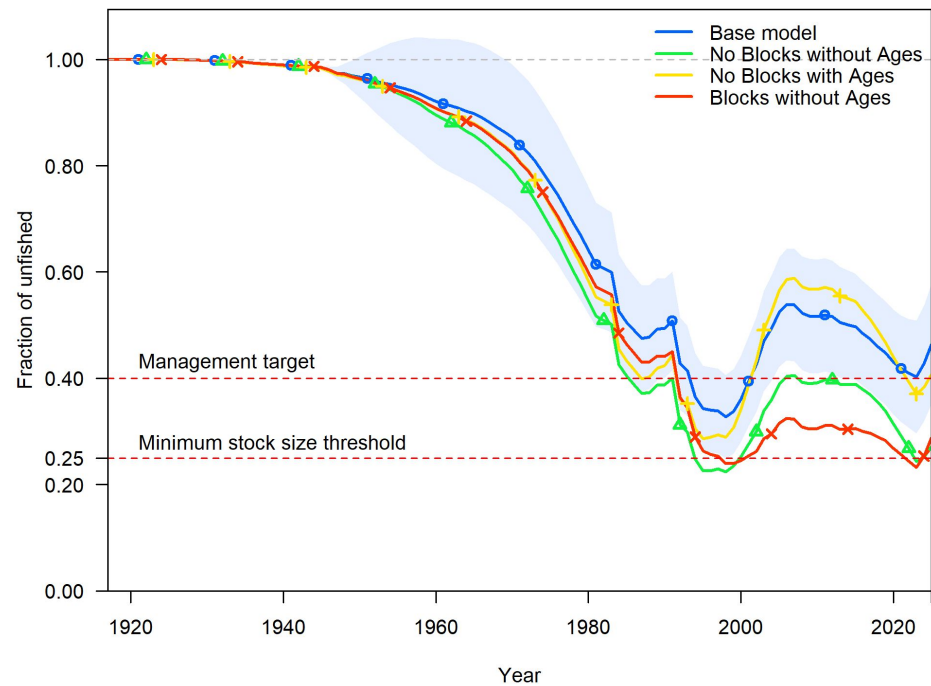
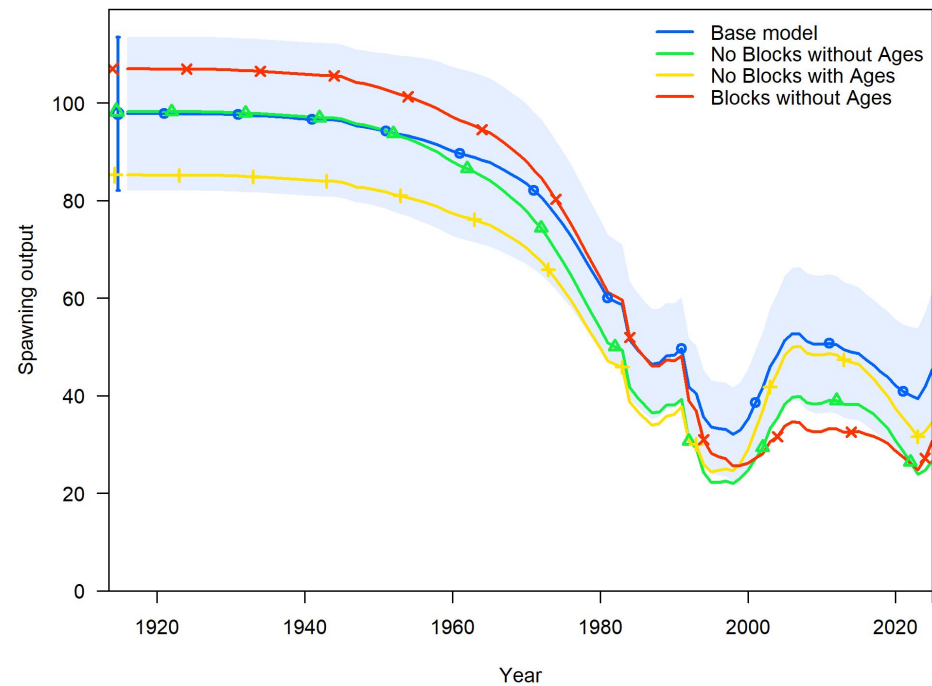


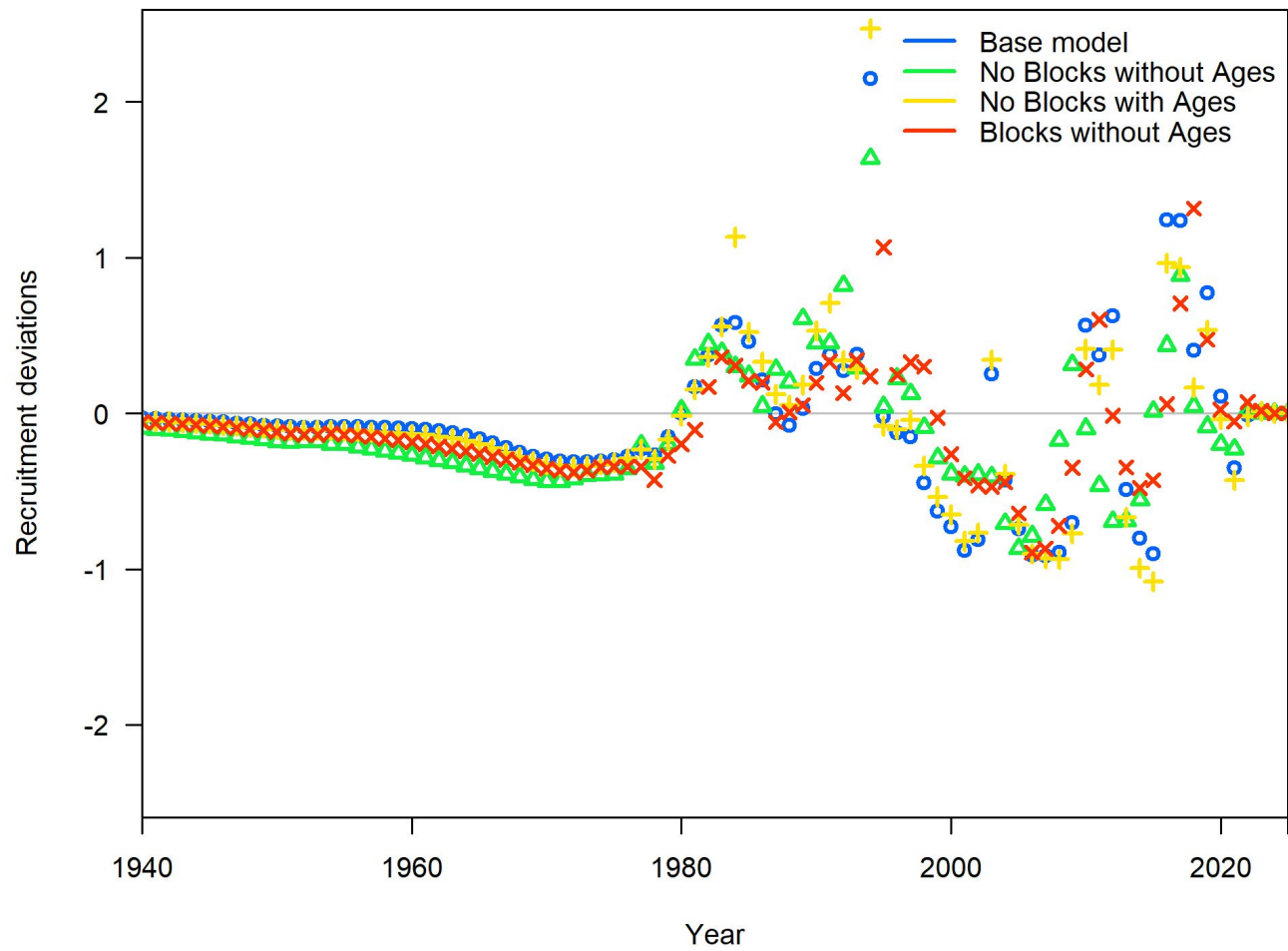
## Request 2: STAT response

**The estimation of the 1994 year class is robust to removals of the recent years of data.** When removing between the 6 and 13 most recent years of data, the largest year class moves back one year to 1993 and is of comparable magnitude to the base case 1994 year class. Only when 14 and 15 years of recent data are removed does the peak in 1993/1994 decrease to lower levels. The terminal year when removing 14 years of data is 2010, which is the first year that age data is included in the model.

### Request 3

Conduct a new sensitivity with no age data and no blocks on selectivity (all asymptotic) and compare this to the following runs: 1) the base model, 2) the current sensitivity with no age data with time blocks, 3) and the current sensitivity of no blocks on selectivity with age data. Separately plot the spawning output, fraction unfished, and recruitment deviations.





## Request 3: STAT response

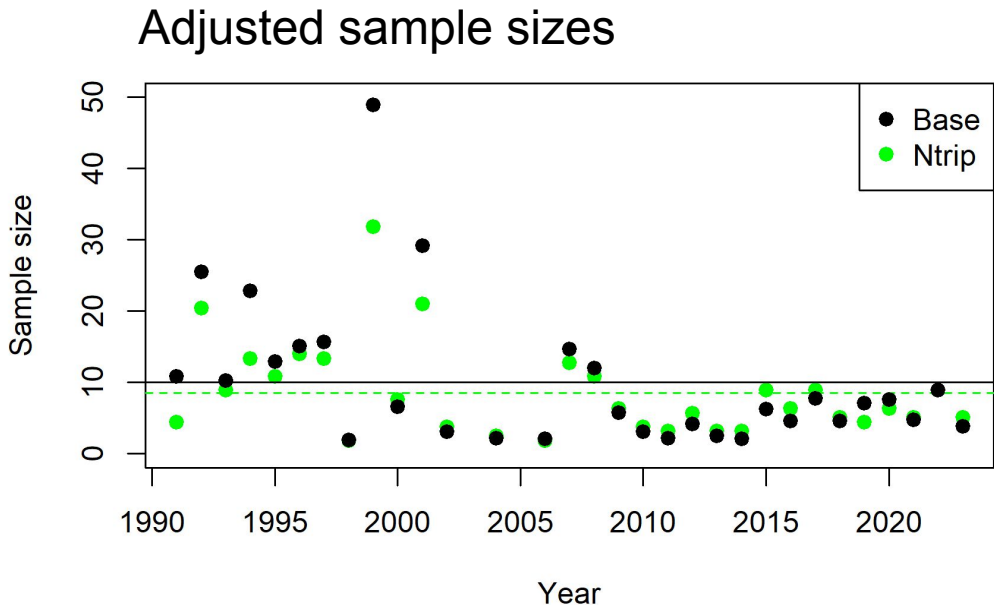
The scenario with no blocks and no ages decreases recent spawning output and thus also the fraction unfished. The scenario with no blocks but with ages decreases spawning output across the time series, such that the fraction unfished varies around the base value since 2000.

Retaining blocks and removing ages increases early spawning output but decreases it in recent years, resulting in low fraction unfinished in recent years. No blocks with ages increases the size of the recruitment peak in 1994 and no blocks without ages decreases the recruitment peak in 1994 (though the peak is still 1994), relative to the base model.

## Request 4

Recalculate the effective sample sizes for the commercial length composition data (see Tables 2 and 3) using the number of trips only and compare to the effective sample sizes used in the base case. Compare the effective sample sizes from this run to the effective sample sizes of the pre-STAR base. If materially different, present a comparison of spawning output, fraction unfished, and recruitment deviations for these two runs.

# Request 4: STAT response

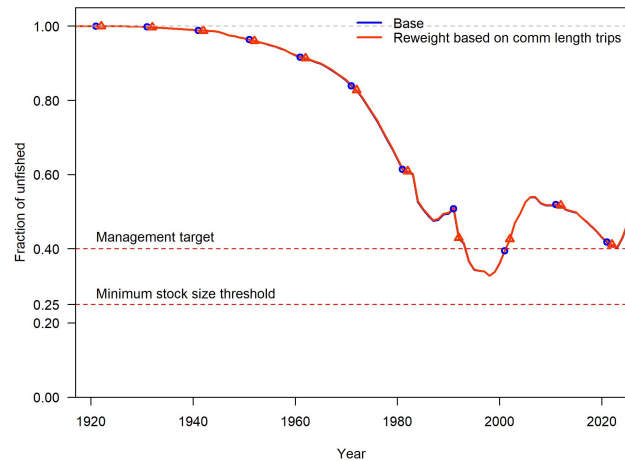
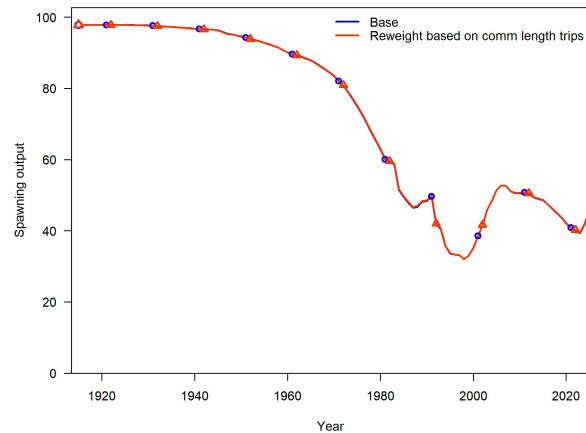
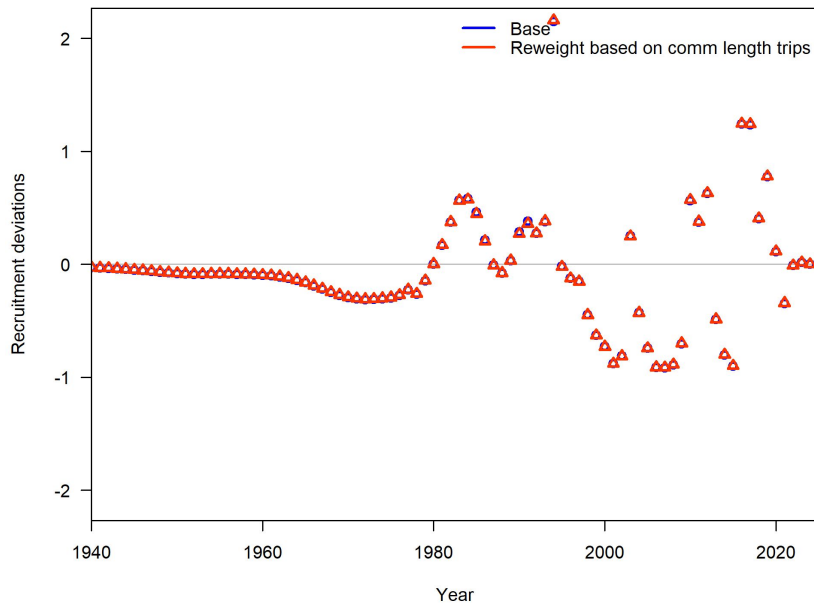


Lines reflect mean of adjusted sampled sizes

## Commercial length weighting value changes

| Type   | Fleet        | Base  | Using Ntrips for Com lengths |
|--------|--------------|-------|------------------------------|
| Length | Commercial   | 0.377 | 0.638                        |
| Length | Recreational | 0.180 | 0.180                        |
| Length | CCFRP        | 0.236 | 0.235                        |
| Length | ROV          | 0.170 | 0.171                        |
| CAAL   | Commercial   | 0.081 | 0.080                        |
| CAAL   | Growth       | 0.612 | 0.610                        |

# Request 4: STAT response



## Request 4: STAT response

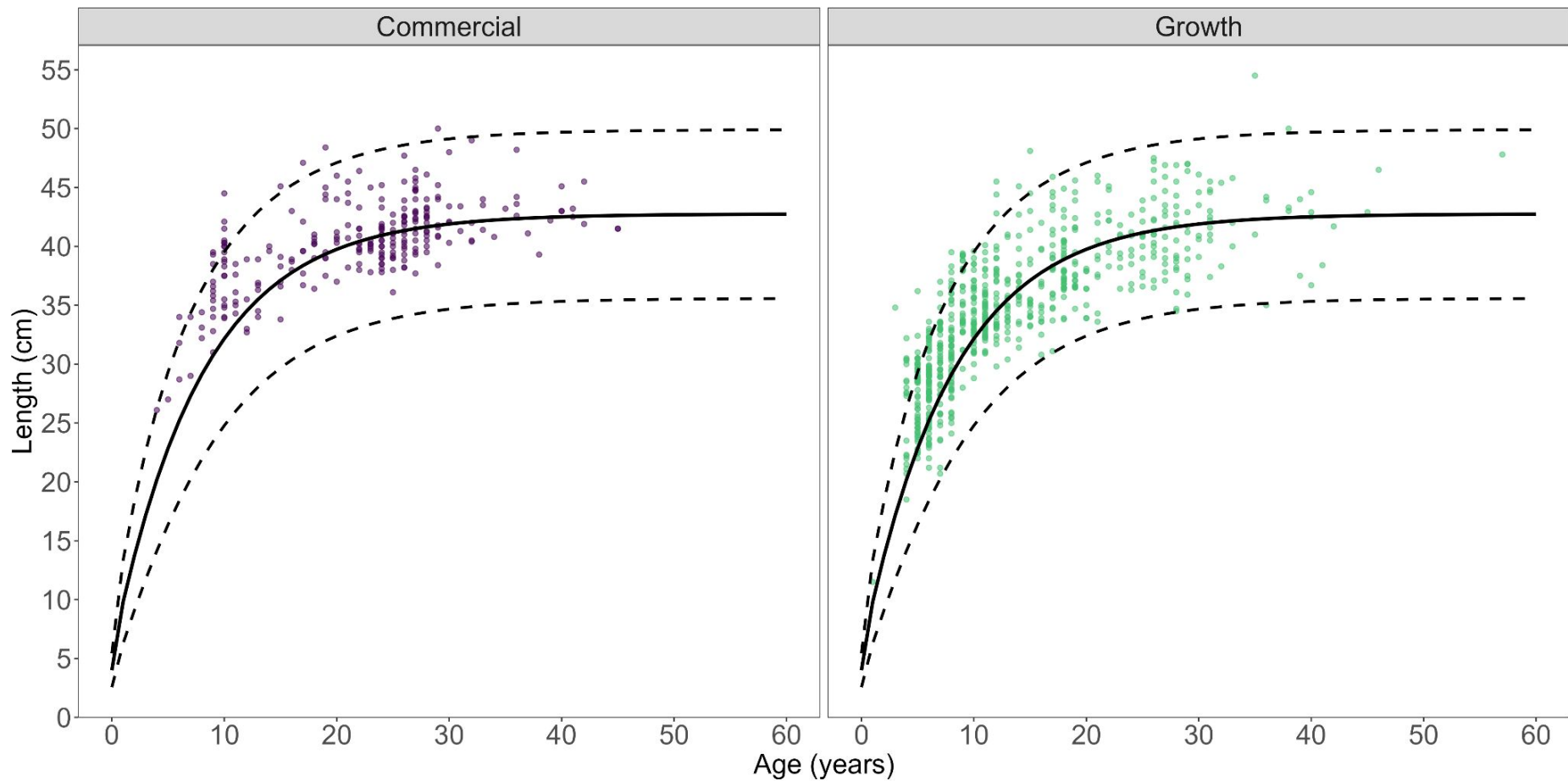
**We do not think that the commercial length composition data are over-weighted.** Weighting values and input sample sizes both inform the contribution of a data set to model fit, and decreases in one are offset by increases in the other.

Per Table 2 in the assessment report, the input sample size used in the proposed base model is higher (on average twice as high) than the number of trips, as it adds a component for the number of fish. However, the Francis weighting in the base model is approximately 60% lower compared to the tuned weighting value when using number of trips. This offsetting is showed by similar adjusted sample sizes on average between the base model and the requested run. While weighting values are applied across all years, input sample sizes are entered for each year, and so there is some variability in the difference of adjusted sample sizes by year, especially in the early years where more fish were sampled. Note that all other fleets have similar weighting values, and are minimally affected by changes in commercial length sample size. Also, note that the approach used in the base model to calculate input N is commonly used in west coast assessments.

## Request 5

Combining and expanding on Figures 18 and 19, plot the pre-base model fitted growth curve and estimated variability with fleet-specific (i.e., model named growth fleet and commercial fleet) observations of length-at-age.

# Request 5



## Request 5: STAT response

**The model estimated growth curve encompasses the available length-at-age data.** The growth fleet contains the majority of the available ages, but both fleets show a range of lengths at a given age.

## Request 6

Tune sigmaR using the built in approach within R4SS (i.e., looking at asymptotic variance and between standard errors of estimated recruitment deviations; equation 23 in SS manual) by running it at most twice. Present the spawning output, fraction unfished, and recruitment deviation plots. Present the method of tuning sigmaR along with the resulting value for sigmaR and the recruitment variance check plot from R4SS.

## Request 6: Tuning process

Method: Per the Stock Synthesis manual:  
“alternative values for sigmaR can be obtained from r4ss based on variability among recruitment deviations and the uncertainty in their estimates”

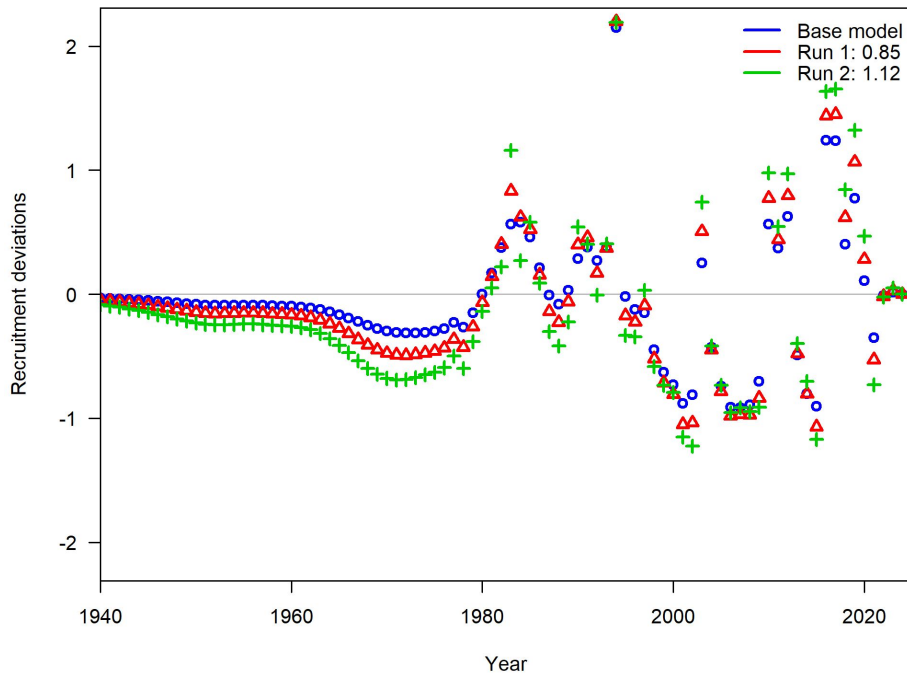
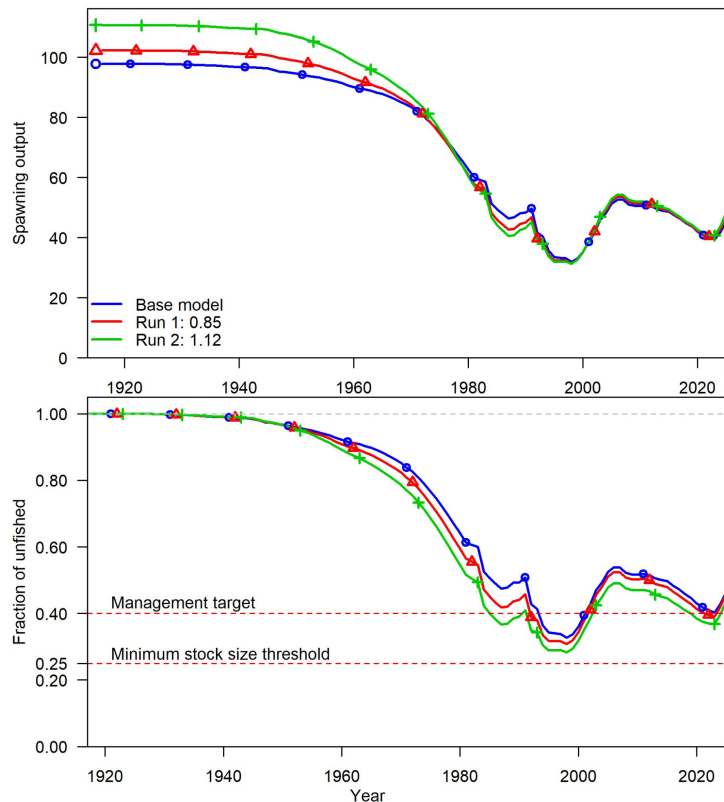
For formula is

$$\sigma_R^2 = \text{Var}(\hat{r}) + \overline{\text{SE}(\hat{r}_y)^2}$$

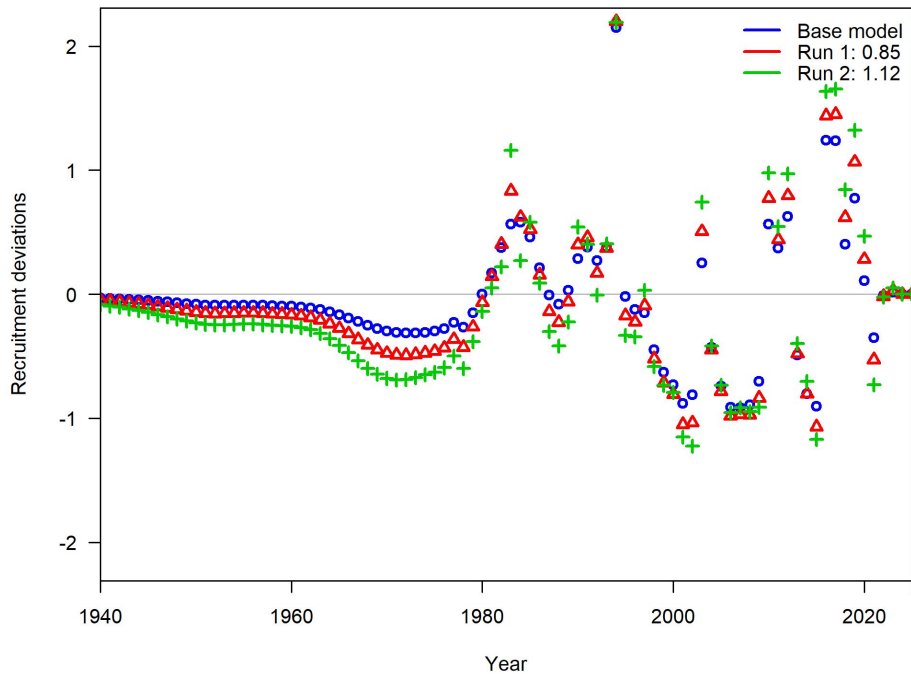
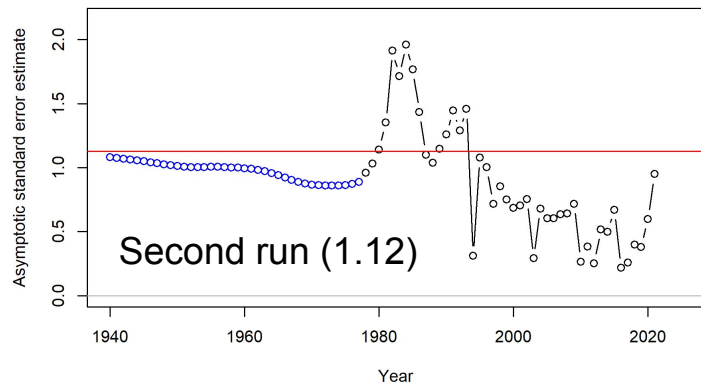
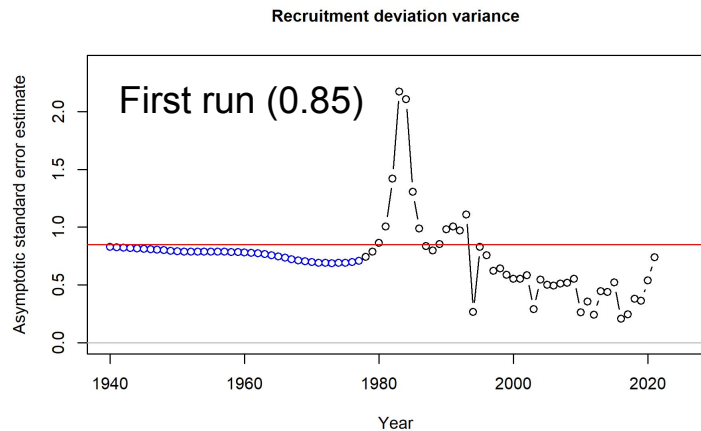
Simulation studies conducted by Methot and Taylor (2011) compared three methods of tuning where the above approach generally performed best.

| Run                    | sigmaR |
|------------------------|--------|
| Base model             | 0.6    |
| First suggested value  | 0.85   |
| Second suggested value | 1.12   |

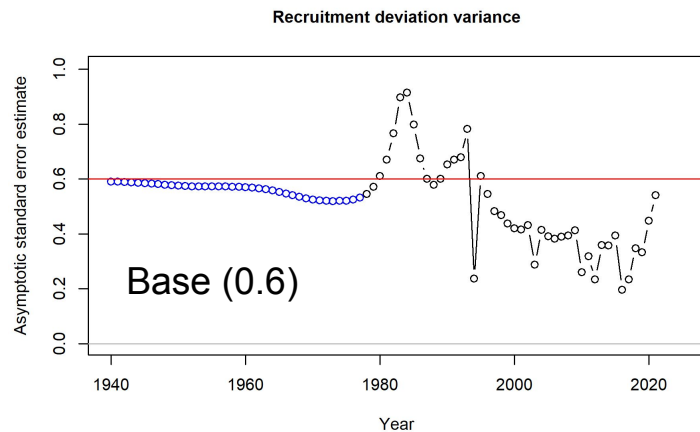
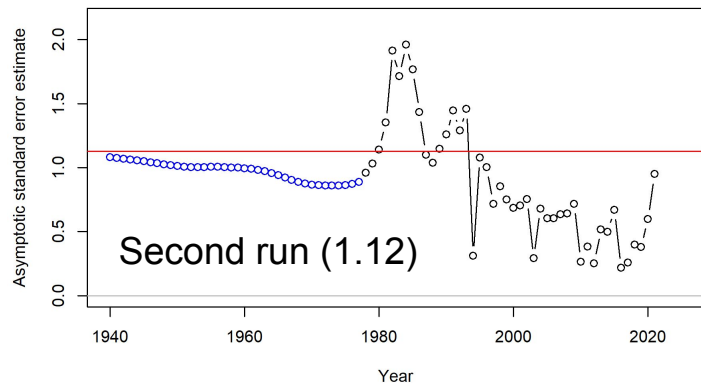
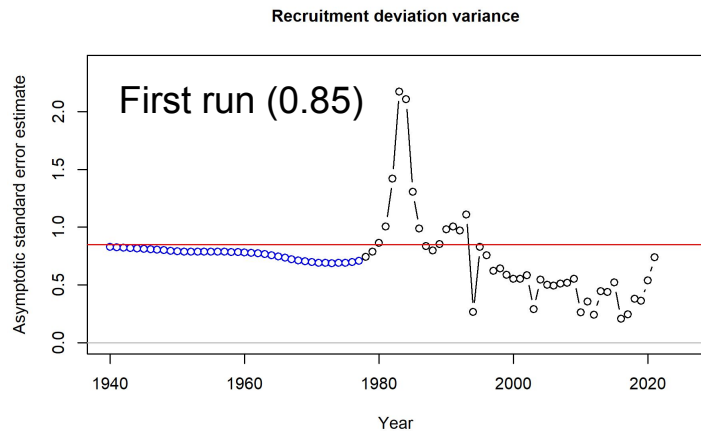
# Request 6: Plots



# Request 6: Plots



# Request 6: Plots

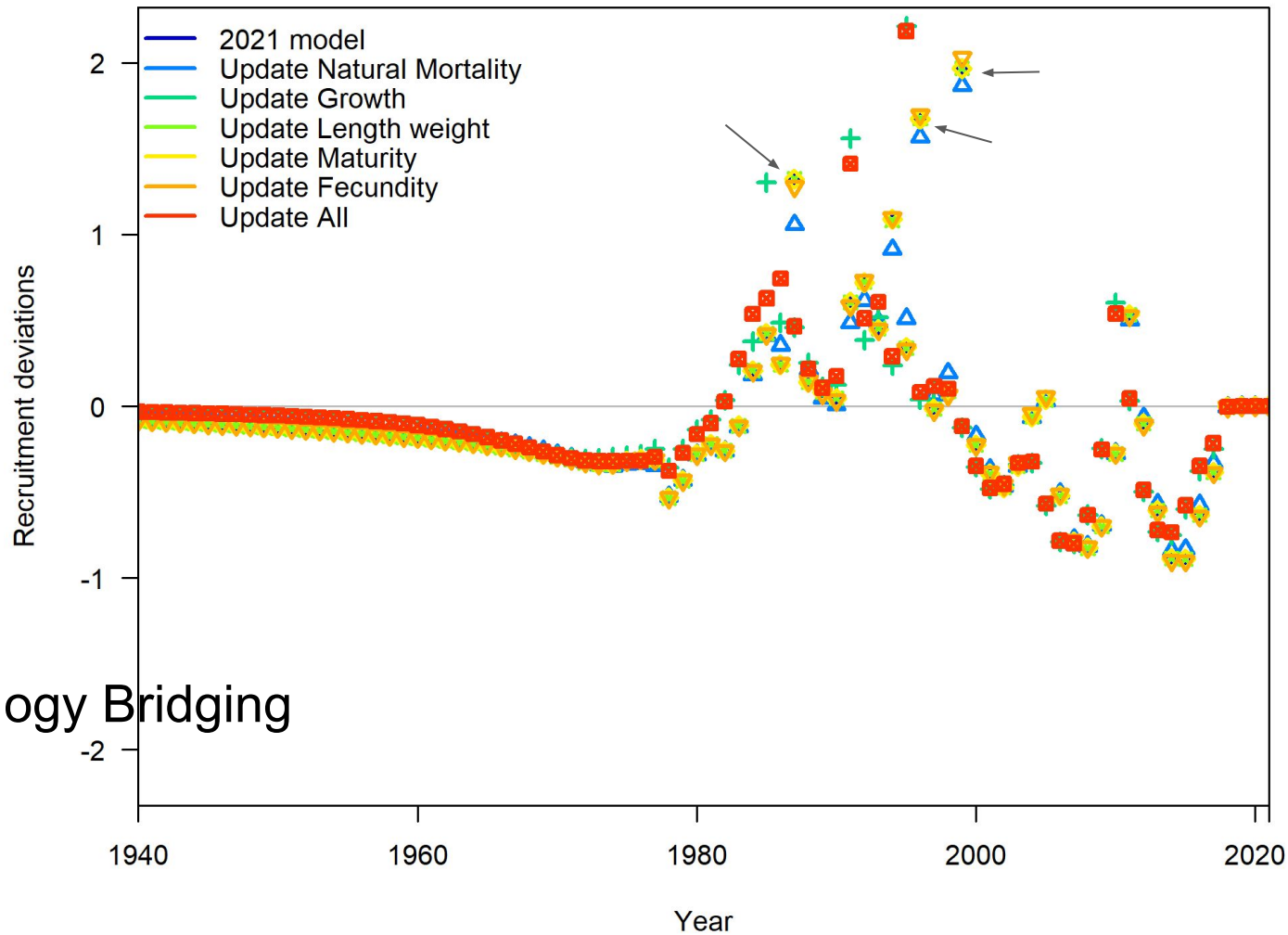


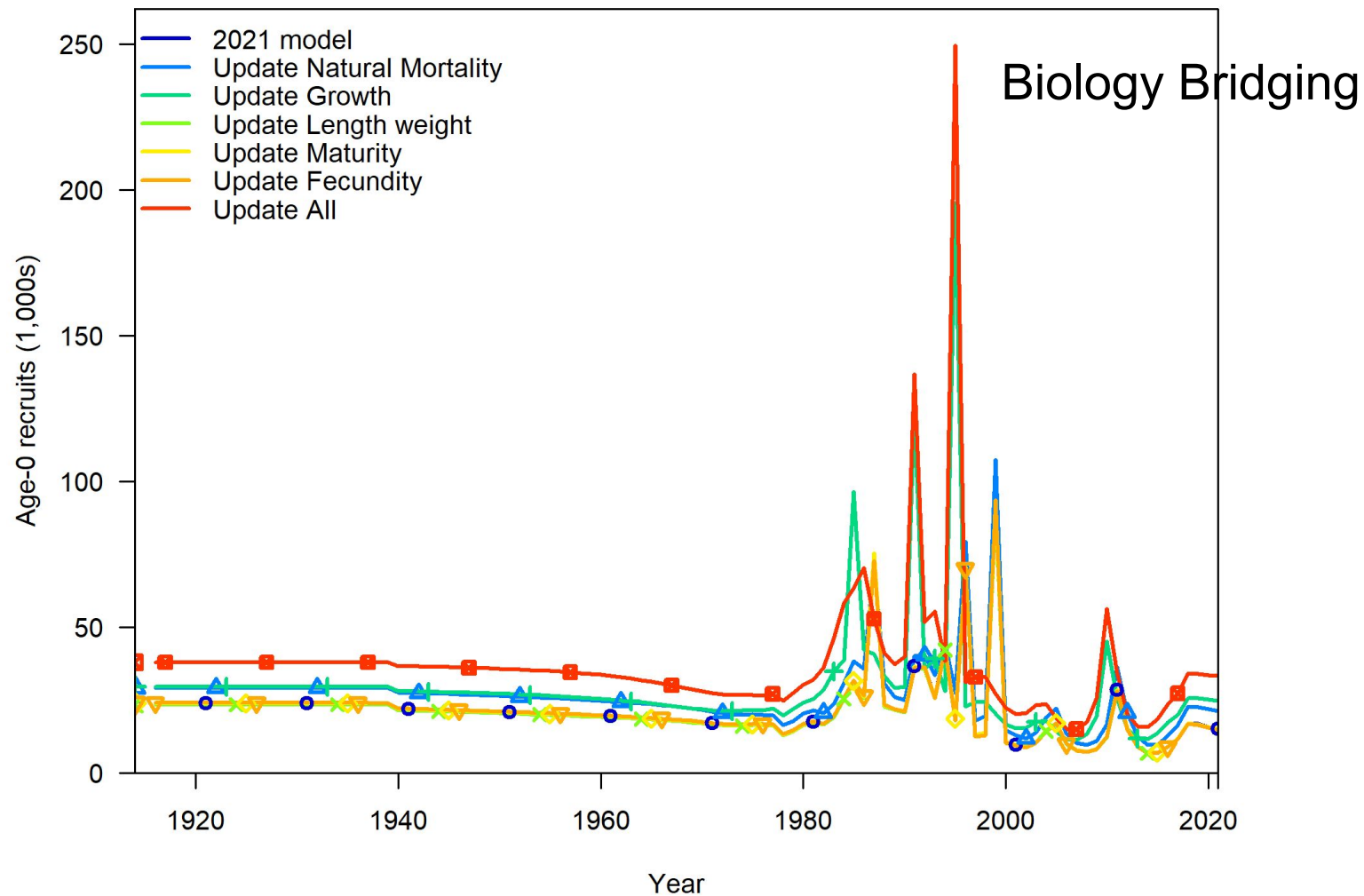
## Request 6: STAT response

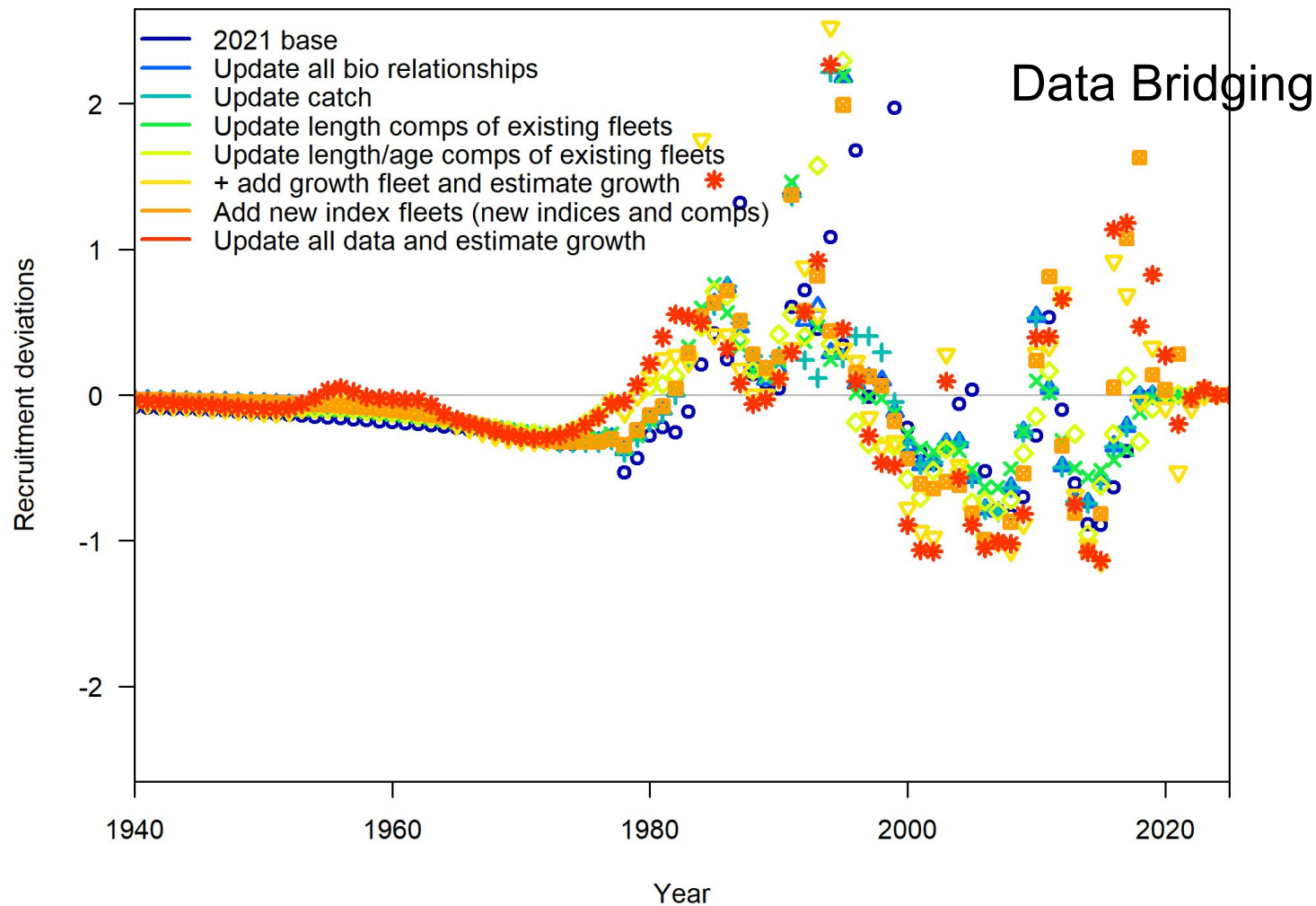
Tuning sigmaR using the procedure available in r4ss, which is based on a simulation study by Taylor and Methot (2011), indicates progressively higher alternative values for sigmaR. Running this procedure once gives an alternative sigmaR value of 0.85, while running the procedure on this new model gives an alternative sigmaR value of 1.12. Higher sigmaR values do not result in different recruitment deviation estimates for 1994, but do result in greater deviations in years prior to 1978, have greater uncertainty in the early 1980s deviations that are less informed by data, and have greater variability in years after around 2000. Note that higher values for sigmaR are not uncommon for west coast assessments, but are species-dependent.

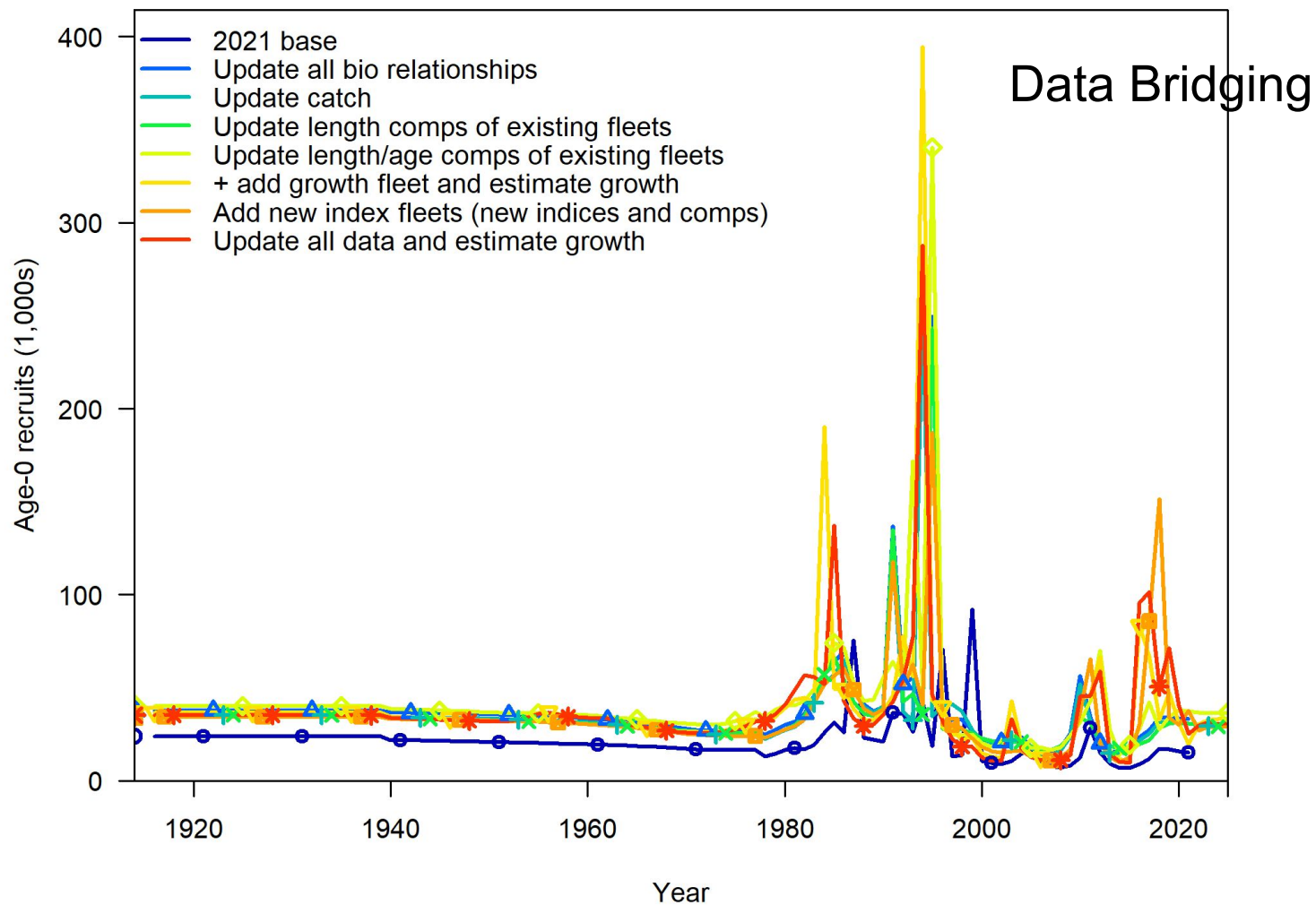
## Request 10

Plot comparisons of age-0 recruits and recruitment deviations for the biology and the data portions of the bridging analysis (without confidence intervals).









## Request 10: STAT Response

Large recruitment deviations were estimated in the 2021 and 2025 quillback rockfish assessments, and are common in other nearshore assessments.

Recruitment deviations from the biology bridging steps show high deviations were present before age data were added to the model, though in other years during the mid 1990. Recruitment deviations from the data bridging steps show high deviations were present before age data were added, indicating other sources of information supported high deviations.

## Request 7

Conduct a new sensitivity that adds conditional age at length data from CCFRP to the CCFRP fleet, release the sample size constraints on the CCFRP age sample sizes, and remove the growth fleet. Separately plot and compare the spawning output, fraction unfished, recruitment deviations, and if possible the growth curve. Please also report the suggested sigmaR from r4ss. Conduct further analyses for any other age data that were sourced from a fleet already represented in the base model. Please include justifications for inclusion/exclusion of data from the different datasets.

# Request 7: Growth ages added to specific fleets

Table 5: Summary of the number of age samples used for conditional age at length data for the growth fleet in the assessment model. See text for description of data sources. Ages in years that had fewer than 30 samples across all sources were excluded from final model fits, as described in the text.

| Year  | Abrams | CDFW Gfish | CDFW comm. | SWFSC Coop | IPHC | Surrendered | SWFSC Res. | WCG BTS | Misc. | CCFRP |
|-------|--------|------------|------------|------------|------|-------------|------------|---------|-------|-------|
| 1985  | 0      | 0          | 0          | 0          | 0    | 0           | 0          | 0       | 5     | 0     |
| 2004  | 0      | 0          | 0          | 0          | 0    | 0           | 0          | 0       | 4     | 0     |
| 2007  | 0      | 0          | 0          | 0          | 0    | 0           | 0          | 15      | 0     | 0     |
| 2010  | 37     | 0          | 0          | 0          | 0    | 0           | 0          | 0       | 0     | 0     |
| 2011  | 79     | 0          | 0          | 0          | 0    | 0           | 0          | 0       | 0     | 0     |
| 2014  | 0      | 0          | 0          | 0          | 0    | 0           | 0          | 4       | 0     | 0     |
| 2017  | 0      | 0          | 0          | 0          | 5    | 0           | 0          | 2       | 0     | 30    |
| 2018  | 0      | 0          | 0          | 0          | 0    | 0           | 0          | 0       | 0     | 55    |
| 2019  | 0      | 0          | 6          | 0          | 0    | 0           | 0          | 0       | 0     | 11    |
| 2020  | 0      | 0          | 0          | 0          | 0    | 0           | 0          | 0       | 0     | 7     |
| 2021  | 0      | 35         | 0          | 0          | 0    | 3           | 0          | 0       | 0     | 8     |
| 2022  | 0      | 43         | 0          | 132        | 0    | 43          | 0          | 0       | 0     | 19    |
| 2023  | 0      | 17         | 0          | 2          | 0    | 9           | 23         | 0       | 0     | 9     |
| 2024  | 0      | 16         | 0          | 0          | 0    | 0           | 73         | 13      | 0     | 31    |
| Total | 116    | 111        | 6          | 134        | 5    | 55          | 96         | 34      | 9     | 170   |

Recreational

CCFRP

## Request 7: Growth ages added to specific fleets

The STAT decided three additional sources of growth fleet ages could potentially be included as conditional age-at-length for the recreational fleet. These are the Abrams research ages, the CDFW private/rental ages collected by the groundfish team, and the SWFSC cooperative research ages.

**Abrams:** Jeff Abrams (2014) conducted a research study aboard recreational charter boats from Crescent City Harbor, Trinidad Bay and the Noyo River Harbor. Fishing gear was selected to mimic the recreational fleet.

**CDFW groundfish:** The CDFW groundfish team began sampling the private/rental fleet dockside in 2021 in a sampling design similar to the CRFS program, but not as part of the CRFS sampling program.

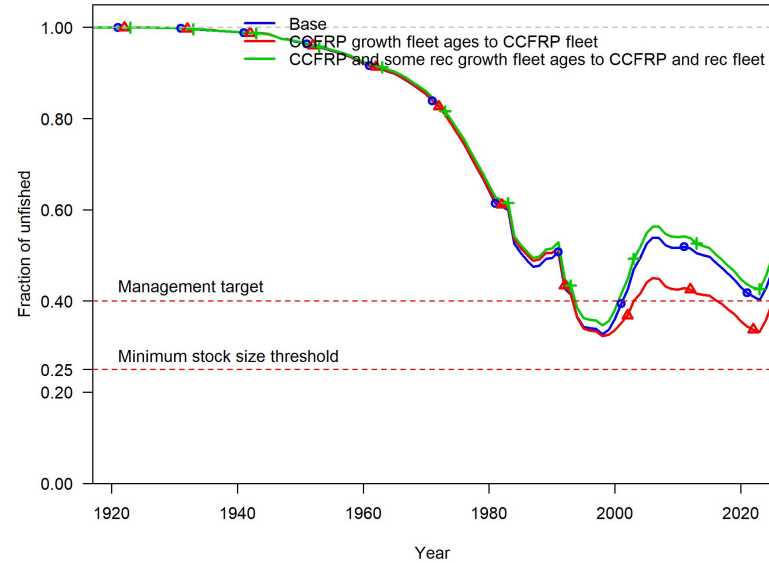
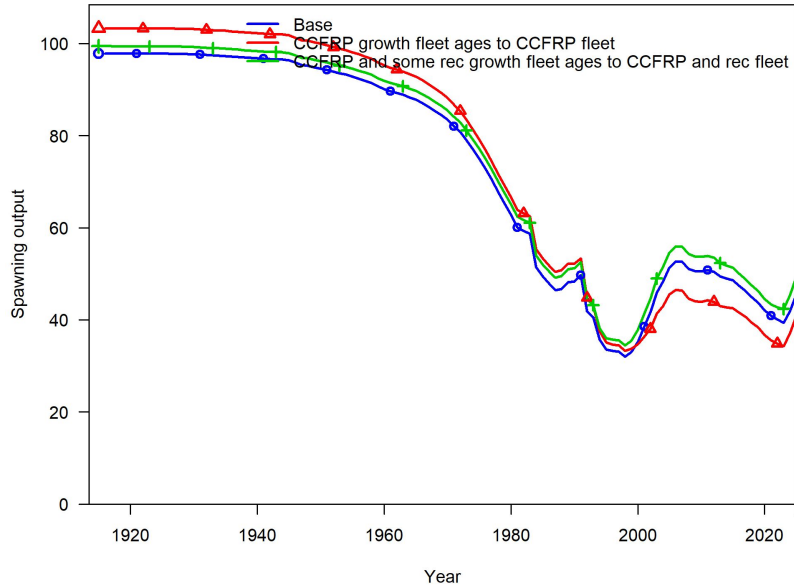
**SWFSC cooperative:** The SWFSC Groundfish Cooperative Data Collection (GCDC) collects age and length from paid passengers aboard party/charter vessels. The quillback rockfish were mainly collected during our pilot year and represents fish from the San Francisco CRFS district.

# Request 7: Growth ages added to specific fleets

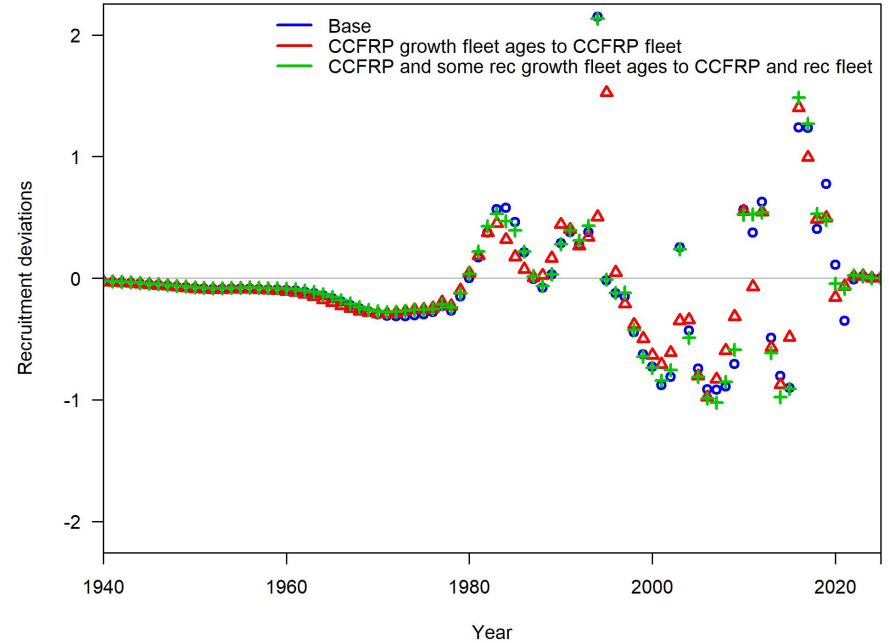
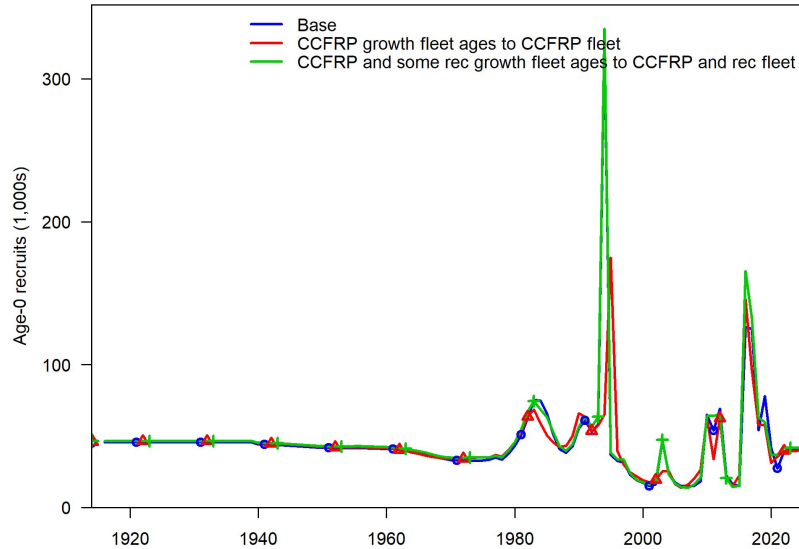
## Steps

- Generate conditional comps for CCFRP (and rec) only samples, include all years
- “Turn off” conditional comps for the growth fleet
- Initially used same weighting for growth fleet age comps, but also reweighted. Found that reweighting did not greatly affect results. Showing results for reweighted version
- Showing results for the CCFRP only run, and the CCFRP and rec run, compared to the base

# Request 7: Growth ages added to specific fleets

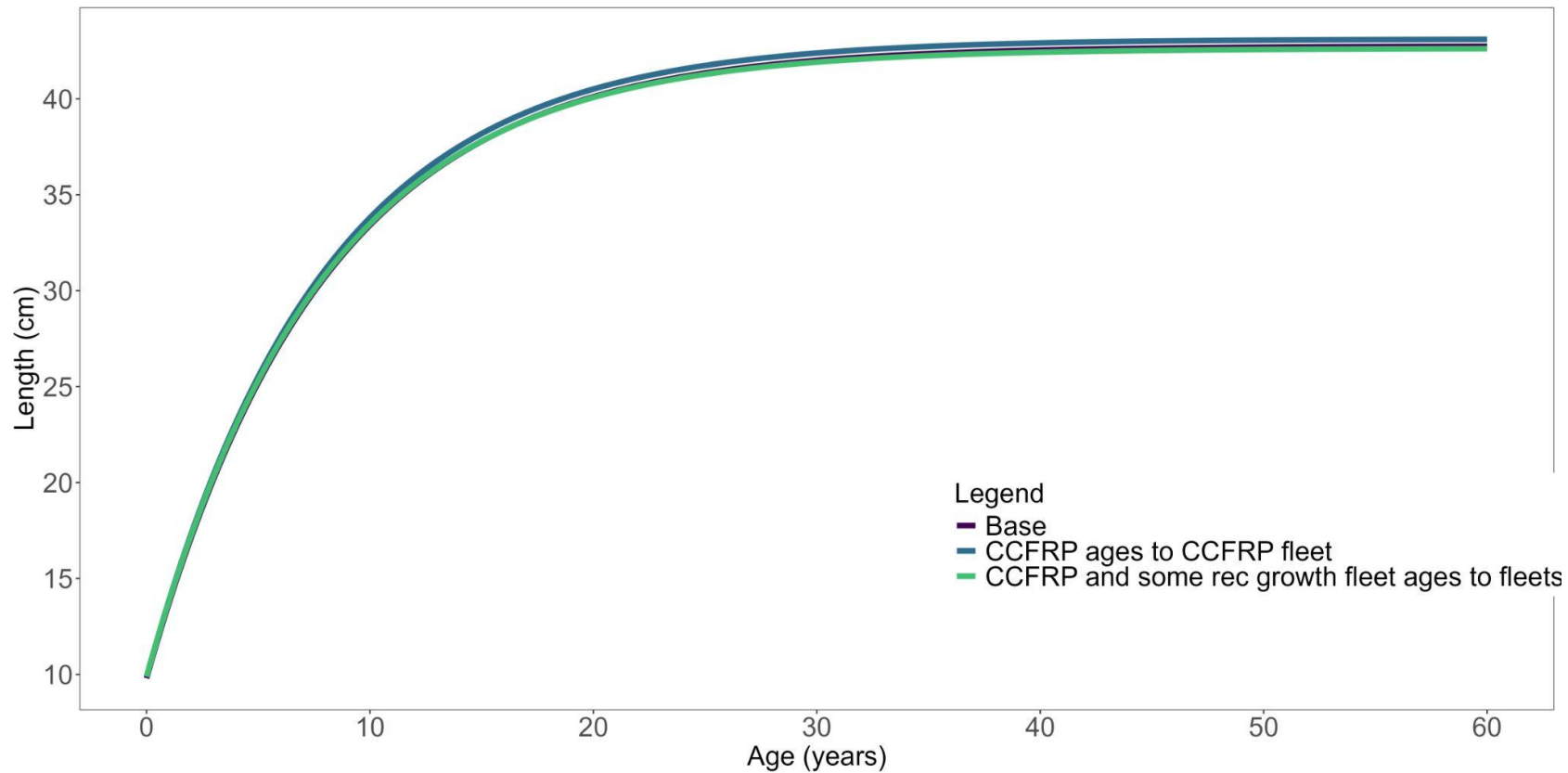


# Request 7: Growth ages added to specific fleets



Alt. sigmaR (one step): Base = 0.85  
CCFRP = 0.8  
CCFRP and Rec = 0.87

# Request 7: STAT response



## Request 7: STAT response

The more age data we keep, the more similar to the base model the results become. Moving only CCFRP age data from the growth to the CCFRP fleet results in higher initial spawning output and lower recent spawning output and therefore lower fraction unfished. Moving both CCFRP and some sources of ages most similar to the recreational fishery to their respective fleets results in similar spawning output and fraction unfished to the base. Peak recruitment is reduced when using only CCFRP ages, and occurs in 1995, whereas peak recruitment is similar to the base when using CCFRP and some recreationally attributed sources. Internally estimated growth curves were very similar among these scenarios, as was the alternative sigmaR values.

## Request 8

Conduct a new sensitivity that changes the growth fleet that estimates selectivity within the model. Separately plot and compare the spawning output, fraction unfished, recruitment deviations, and if possible the growth curve. Please also report the suggested sigmaR from r4ss.

# Request 8: STAT response

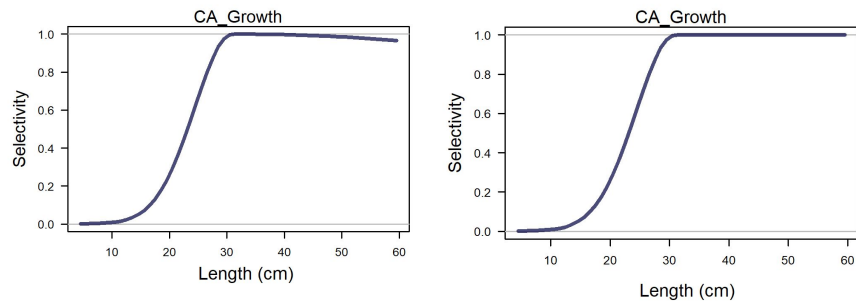
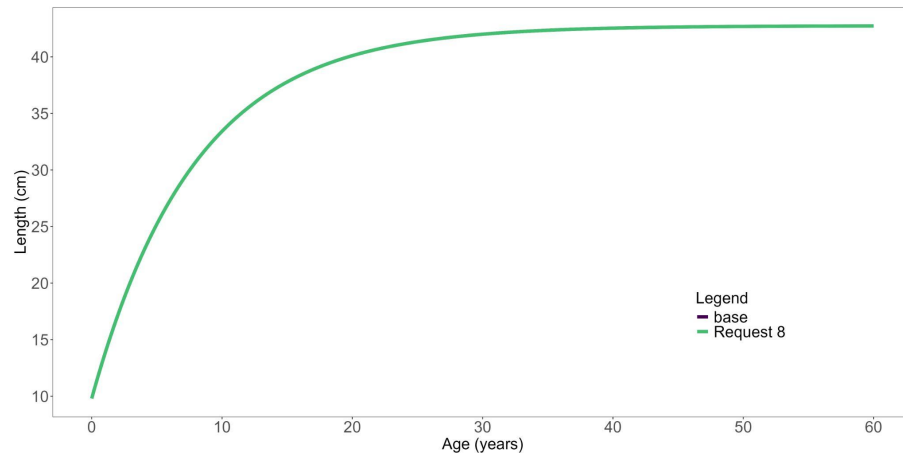
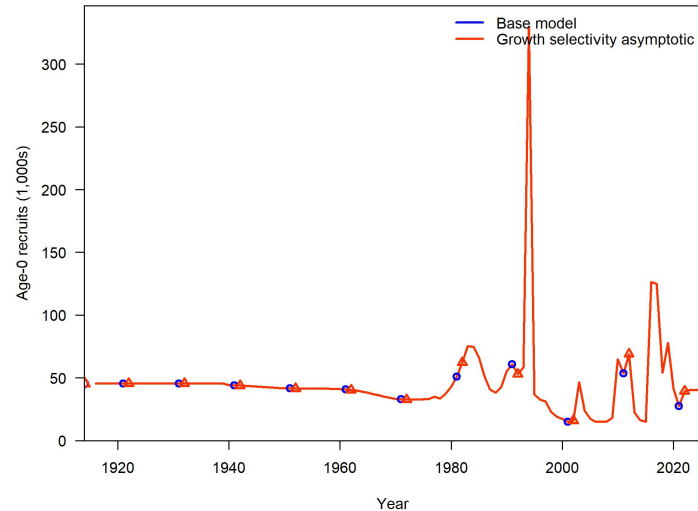
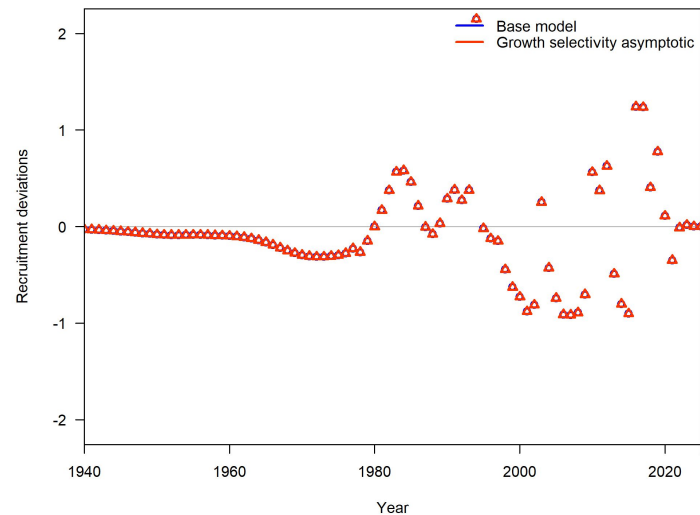
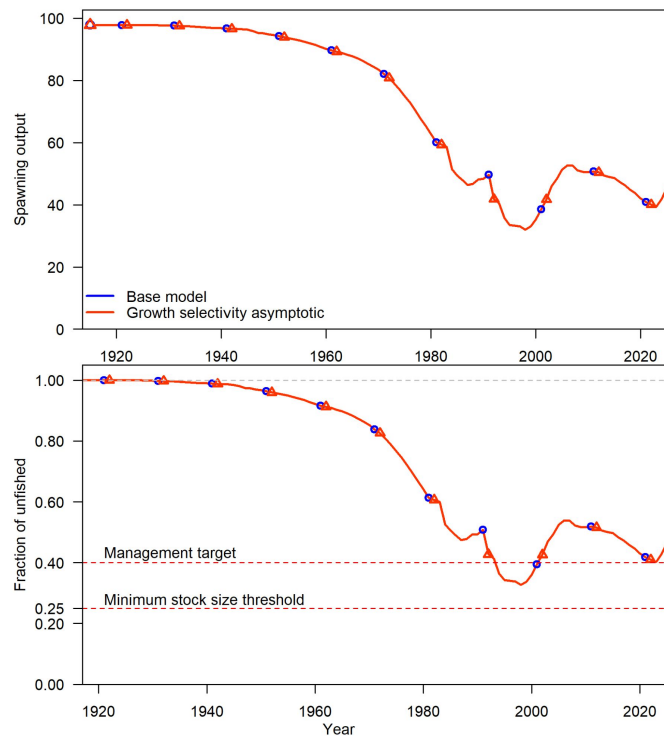


Figure X. Growth fleet selectivity when the growth fleet is allowed to take a dome shape (left) and when fixed to asymptotic (right). The base model assumed growth fleet selectivity is one.



# Request 8: STAT response



## Request 8: STAT response

When allowed to take a dome shape, the growth fleet is effectively asymptotic. The STAT moved forward with a comparison of asymptotic selectivity for the growth fleet in the comparison. There was no change in recruitment deviations, spawning output or fraction unfished. The r4ss suggested sigmaR is 0.85, the same as for the base model.

Request 9

Estimate the prior for  $M$  using the maximum age sampled in California.

## Request 9: STAT Response

The estimate of  $M$  that corresponds to the maximum age of aged fish observed in California (57 years) is 0.095. This would correspond to the profile run with  $M = 0.095$ , which is the line with orange triangles in Figure 56 of the provided preSTARpanel report.

**Request 11**      Instead of treating age data from CCFRP, Abrams (2014), the CDFW groundfish, and the SWFSC Cooperative as conditional age at length (CAAL) for the CCFRP and recreational fleets (as in Request 7), treat those data as marginal ages. Retain length-based selectivity and use the same effective sample sizes to enable comparability with earlier results (as in Request 7).

## Request 11: STAT Response

The STAT considered adding fish labeled as surrendered from Table 5 in the assessment report, which as noted during discussion, was actually fish collected opportunistically by agency staff. The addition of these data were included as they were “sourced from a fleet already represented by the base model” per request 7. Reweighting this model however resulted in upweighted values (Francis weight of 1.8) for the recreational ages after three iterations. Therefore, **to fulfill Request 11, the STAT used the model from Request 7 as presented to the STAR panel on June 25 (Day 3).**

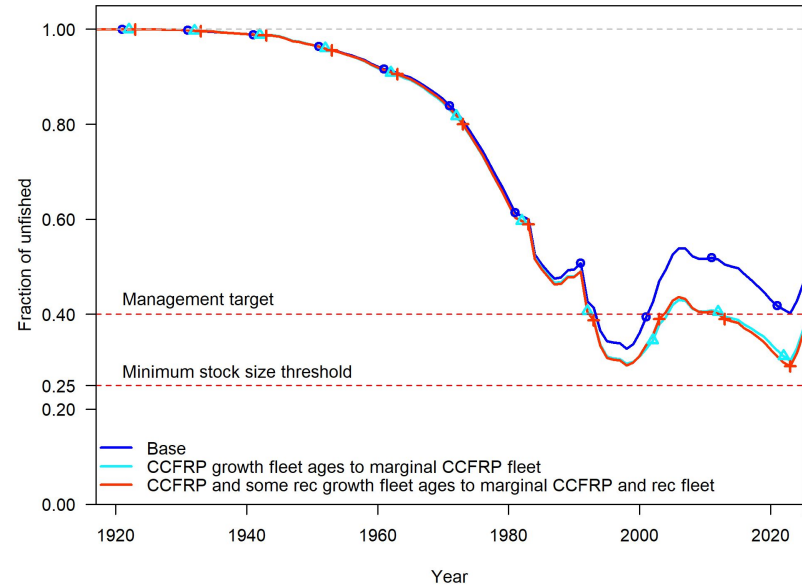
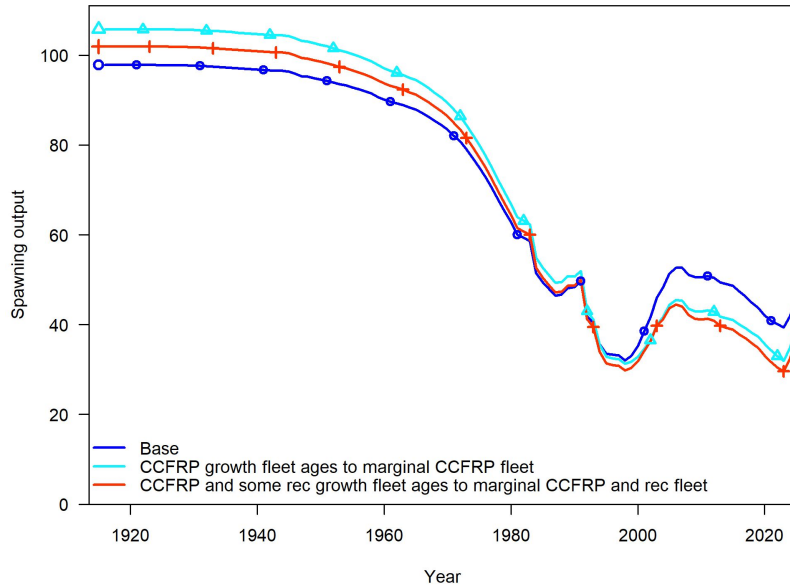
# Request 11: Growth ages added to specific fleets as marginals

## Steps

- Generate marginal comps for CCFRP (and rec) only samples, include all years
- “Turn off” conditional comps for the growth fleet
- Initially used same weighting for growth fleet age comps, but also reweighted. Found that reweighting downweighted age comps but did not greatly affect weights for other fleets. Showing results for reweighted version
- Showing results for the CCFRP only run, and the CCFRP and rec run, compared to the base
- Note when only using CCFRP marginal ages, the estimate of CV young is very low (0.01) and is near a bound

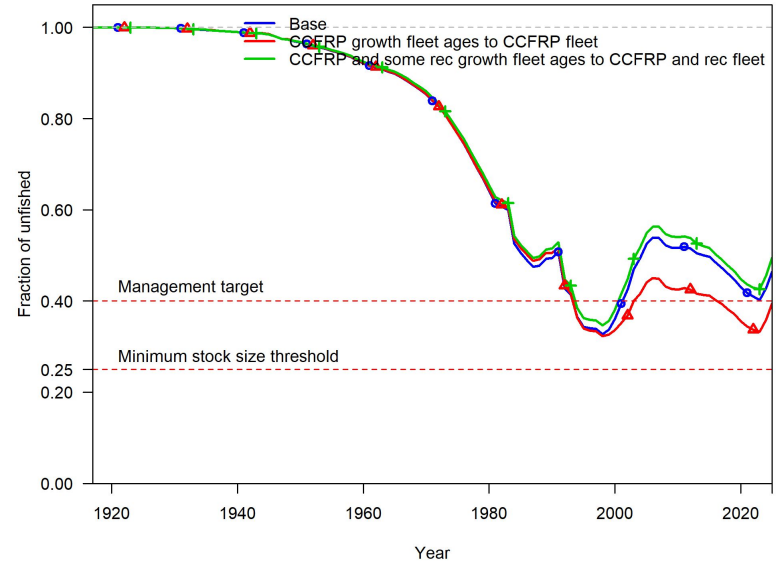
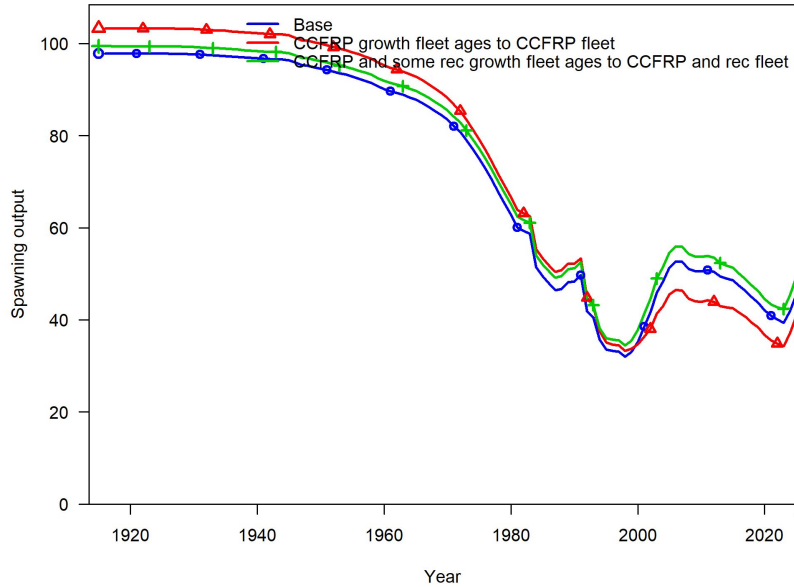
# Request 11: Growth ages added as marginals

Note that growth L1 and CV(L1) is very low for CCFRP run



In request 7 CCFRP and rec run is more similar to the base, whereas here the CCFRP and rec run is more similar to the CCFRP run

# Copied Slide from Request 7 (putting ages as CAAL)

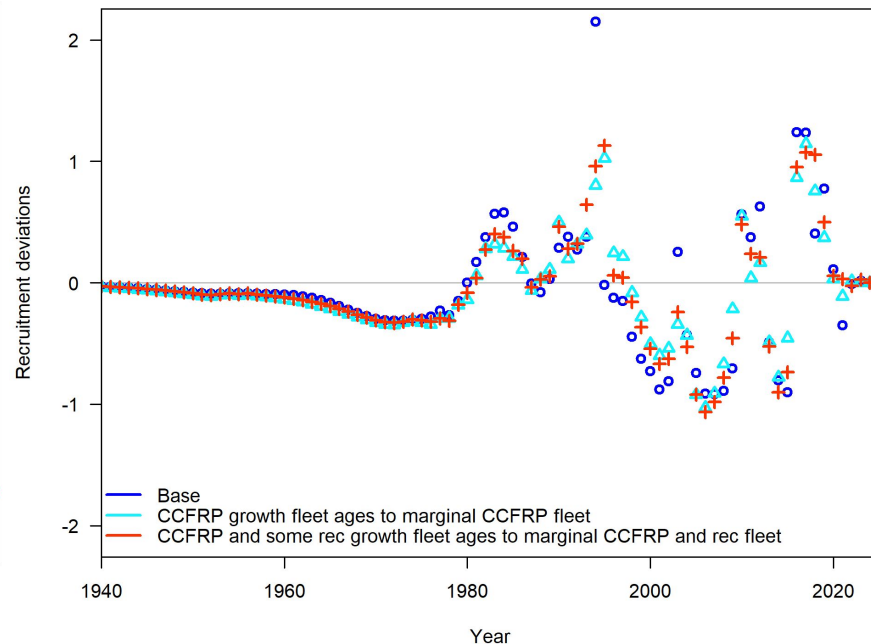
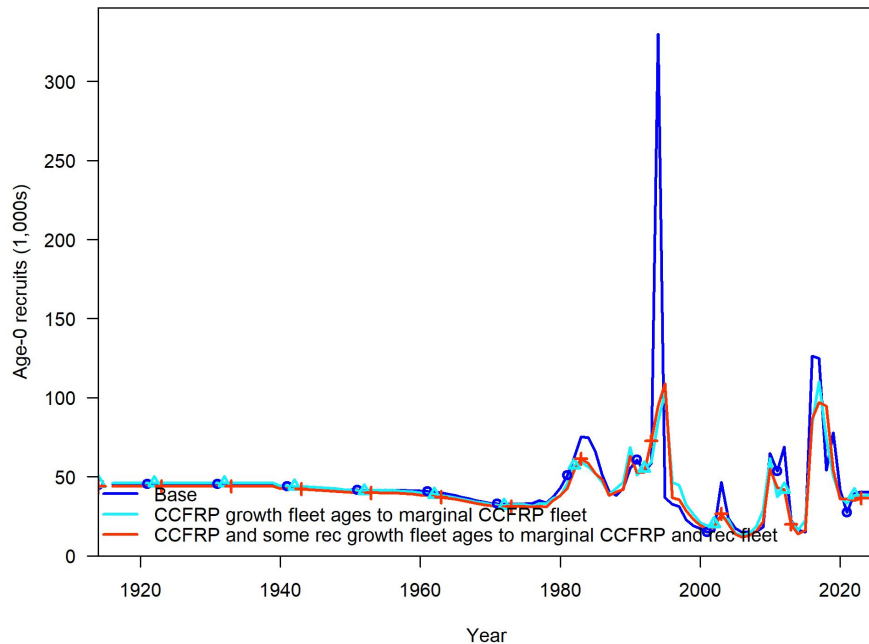


# Request 11: STAT Response

Alt. sigmaR (one step):

Base = 0.85    CCFRP = 0.73

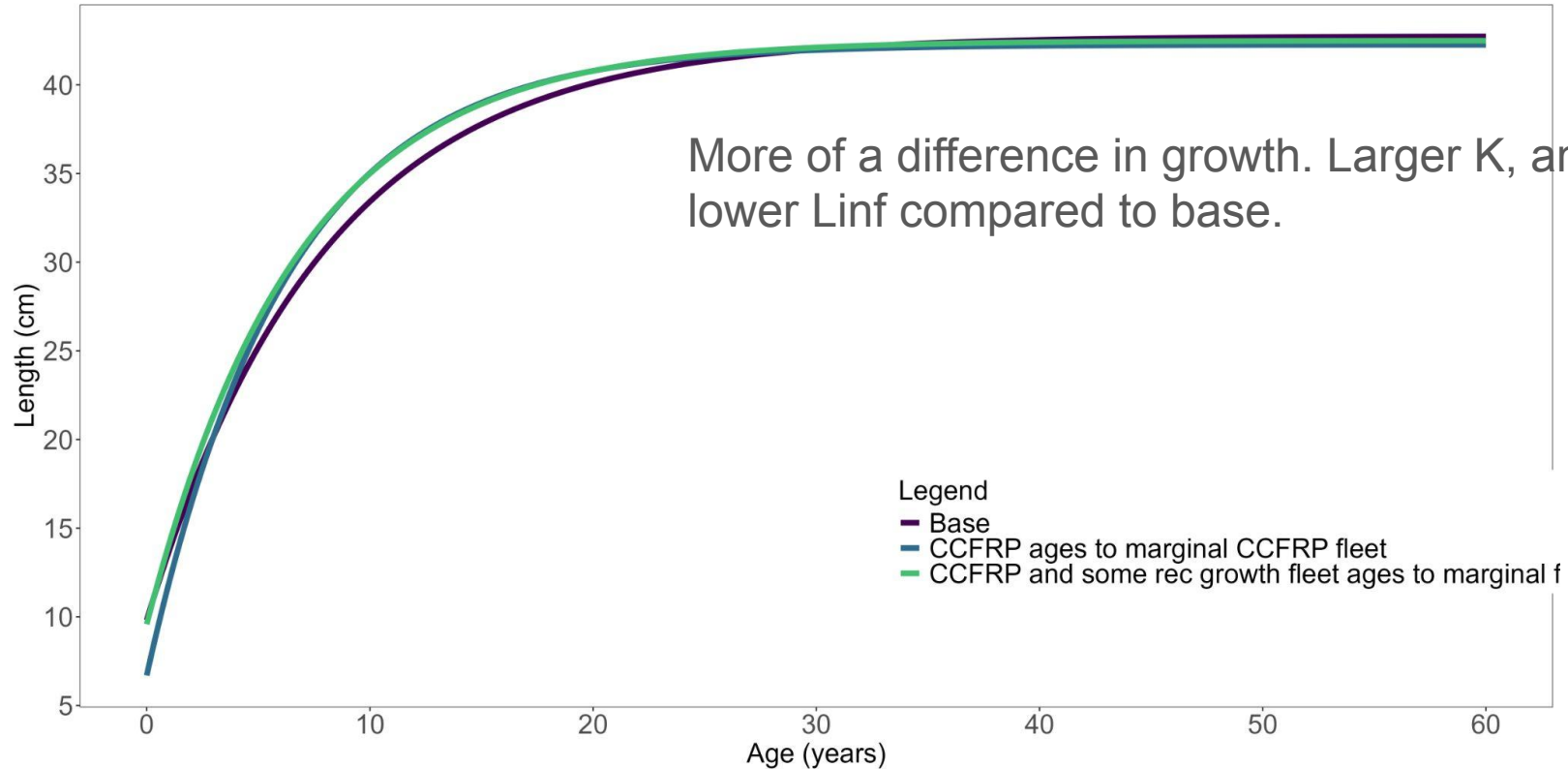
CCFRP and Rec = 0.78



Note that growth L1  
and CV(L1) is very  
low for CCFRP run

# Request 11: STAT Response

Note that growth L1 and CV(L1) is very low for CCFRP run



## Request 11: STAT Response

The STAT does not consider the age samples collected by Abrams (2014), CDFW (surrendered and groundfish staff collections), or the SWFSC Cooperative to be representative of the sampling conducted to collect lengths and data used to determine total catch. **The STAT does not consider the models explored as part of requests 7 and 11 as more viable base models than the preSTAR base model.**

# Request 11: STAT Response Continued

Additional rationale for preferring the preSTAR base model include

1. There was little difference in recruitment deviations or population trajectory between the preSTAR base model with the model from Request 7 that included CCFRP and recreational conditional ages assigned to their respective fleets.
2. Selectivity choices for the growth fleet are inconsequential to model results
3. Conditional age-at-length data are appropriate to model within a growth fleet as described in the [accepted best practices document](#), as referenced on the PAM site, speaks to this in the section on Growth (page 7). This practice has been followed in many assessments for nearshore rockfish species
4. Large recruitment deviations have been observed in other adopted West Coast groundfish assessments

## Request 11: STAT General Response

The STAR panel requested that the STAT explore a number of processes; including treatment of age data, growth, recruitment deviations,  $\sigma_R$ , and selectivity. All of these are useful to explore and aid to better understand the model. The language of these requests and their rationale, however, indicate these are explorations or sensitivities.

The STAT does not consider the the explorations up to this request as viable options for a base model. The practice of utilizing a growth fleet when age data from surveys is limited is an accepted practice and many nearshore and deeper nearshore West Coast groundfish species have fixed  $\sigma_R$  and high recruitment deviatations.

# ACCEPTED PRACTICES GUIDELINES FOR GROUND FISH STOCK ASSESSMENTS IN 2025 AND 2026 (section on growth)

**Growth.** For some species, there may be length or age data available from special projects that fall outside normal sampling programs (e.g., research samples from nearshore nursery areas). Such data may provide information that more completely informs growth curves and can be used in an assessment. Such data are typically not appropriate to use in modeling fishery selectivities. However, these data can be included and associated with their own fleet where there is a shortage of other age data in the model. Including conditional age-at-length data as a survey fleet with constant selectivity for all ages and lengths should set up the model to use the data as desired, unless there is evidence of age-based selectivity (as opposed to length-based selectivity). Non-randomly collected fishery age data stratified by length can be included (with or without the randomly collected fishery data) as conditional age-at-length data associated with that fishery.

# PFMC adopted assessments with a separate “growth” fleet

Conditional age-at-length data within a growth fleet have been used in other assessments. These include:

2015: [California and Oregon black rockfish](#) (Cope et al. 2015), [China rockfish](#) (Dick et al. 2016), [Oregon kelp greenling](#) (Berger et al. 2015)

2017: [Oregon blue/deacon rockfish](#) (Dick et al. 2017)

2019: [California/Oregon Cabezon](#) (Cope et al. 2019), [Gopher/black-and-yellow](#) (Monk and He 2019)

2021: [Lingcod north](#) (Taylor et al. 2021) and [Lingcod south](#) (Johnson et al. 2021) but with estimated selectivity

2023: [Copper north of Pt. Conception](#) (Monk et al. 2023), [Copper south of Pt. Conception](#) (Wetzel et al. 2023)

# Recruitment deviations of other nearshore species

| Assessment                     | sigmaR     | Recruitment deviations   |
|--------------------------------|------------|--------------------------|
| 2015 California black rockfish | Fixed 0.5  | Figure 67                |
| 2015 Oregon kelp greenling     | Fixed 0.65 | Figure 59 age-0 recruits |
| 2019 Gopher/black-and-yellow   | Fixed 0.5  | Figure 61                |
| 2021 lingcod assessments       | Fixed 0.6  | Figure v north model     |

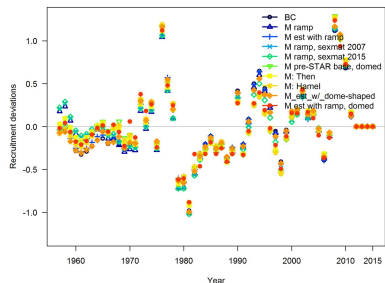


Figure 67: Comparison of recruitment deviations and sensitivity runs that alter natural mortality specification in the California base model.

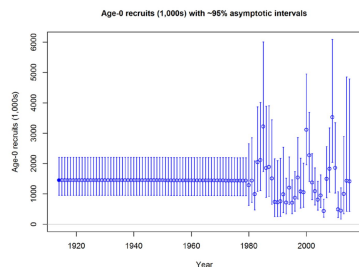


Figure 59: Base model estimates of age-0 recruitment with ~95% confidence intervals.

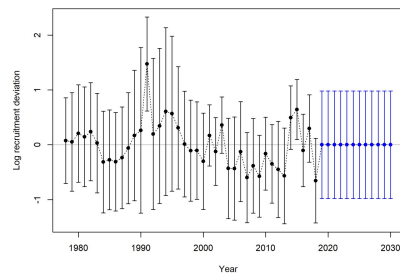


Figure 61: Estimated time-series of recruitment deviations for GBYR with 95% intervals.

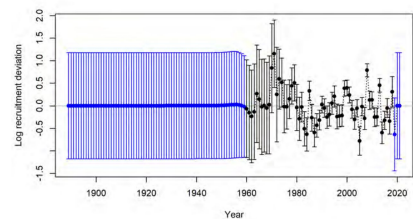


Figure v: Estimated time series of recruitment deviations. Black points are for years that were constrained to sum to zero and are part of the 'main' period, and blue points are for early deviations (left) and late or forecast deviations (right). Bars represent 95% intervals.

# Recruitment deviations of other nearshore species

| Assessment                      | sigmaR    | Recruitment deviations |
|---------------------------------|-----------|------------------------|
| 2021 Oregon vermilion rockfish  | Fixed 0.6 | Figure v               |
| 2021 California north vermilion | Fixed 0.5 | Figure 103             |
| 2021 California south vermilion | Fixed 0.5 | Figure 105             |
| 2023 California black rockfish  | Fixed 0.6 | Figure ES7             |

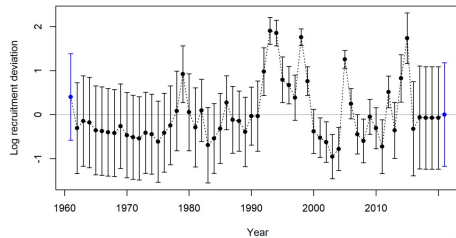


Figure v: Estimated time series of recruitment deviations.

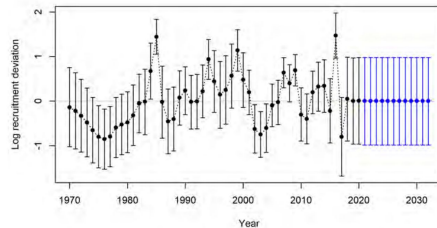


Figure 103: Estimated time series of recruitment deviations.

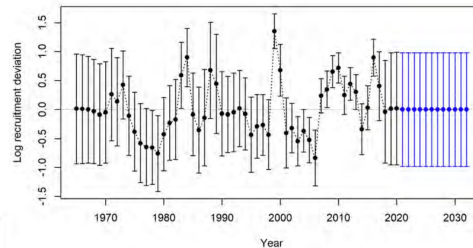


Figure 105: Estimated time series of recruitment deviations.

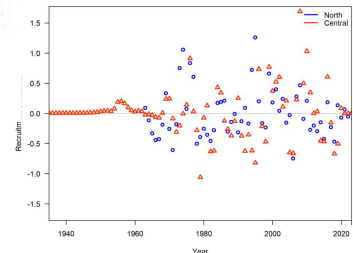


Figure ES7. Comparison of estimated annual recruitment deviations in the northern and central area models.

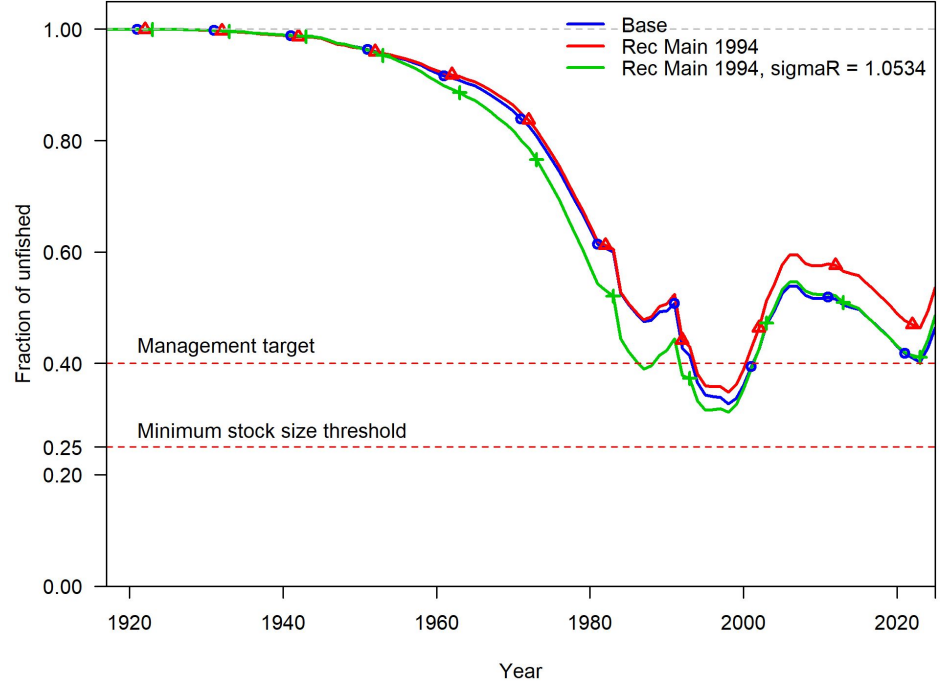
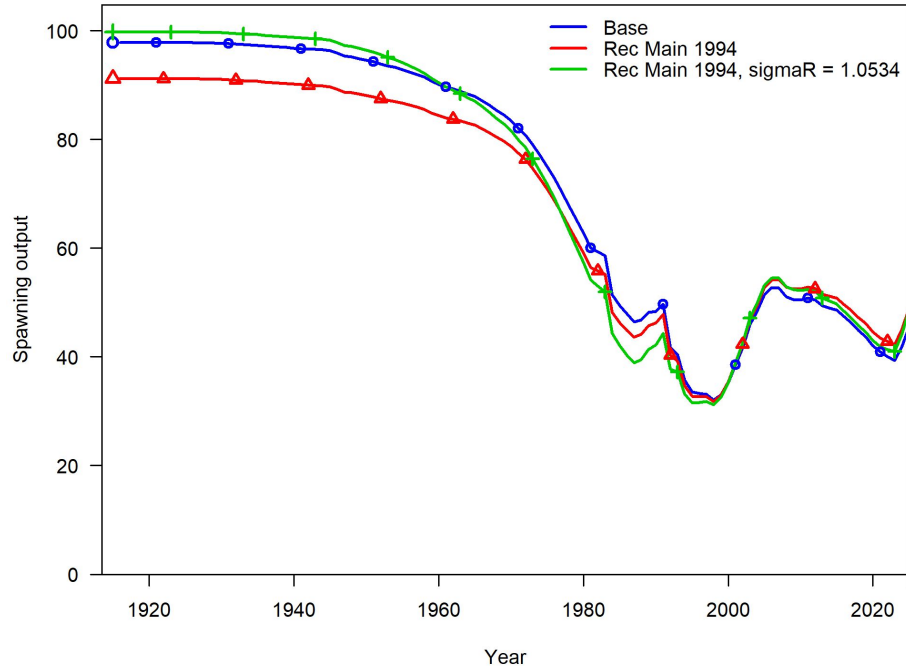
## Request 12

Redefine the main period of recruitment to begin in 1994 and tune sigmaR. Conduct two iterations of the tuning method and report the suggested sigmaR for each iteration, including the final iteration (i.e., 3 suggested sigmaR values). Please present the spawning output, fraction unfished, recruitment deviation plots, the resulting value for sigmaR, and the recruitment variance check plot from r4ss. Use the pre-STAR base model to begin this process and compare to the following models: adjusting the main period and final tuned sigmaR (3 models in total).

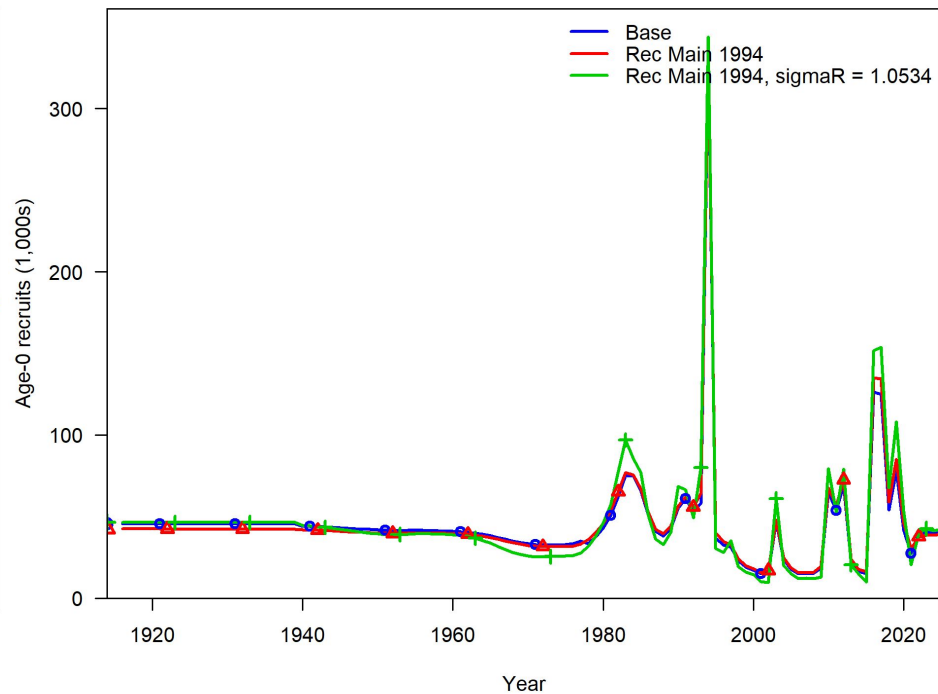
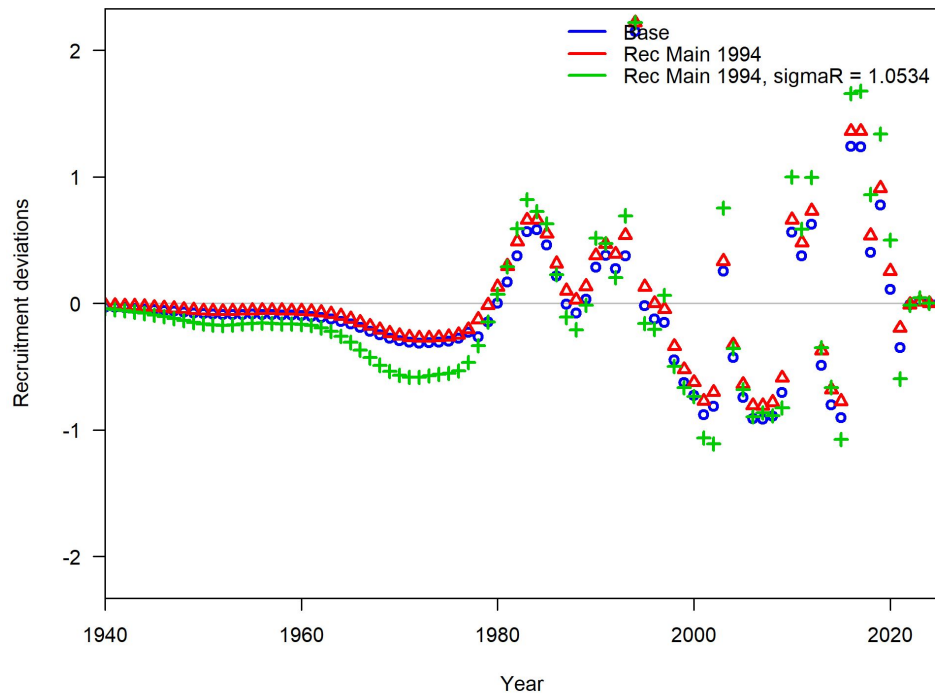
## Request 12: STAT Response

| Run                                          | sigmaR |
|----------------------------------------------|--------|
| Base                                         | 0.6    |
| Alternative from Main RecDevs Start 1994     | 0.88   |
| 2nd Alternative from Main RecDevs Start 1994 | 1.05   |
| 3rd Alternative from Main RecDevs Start 1994 | 1.14   |

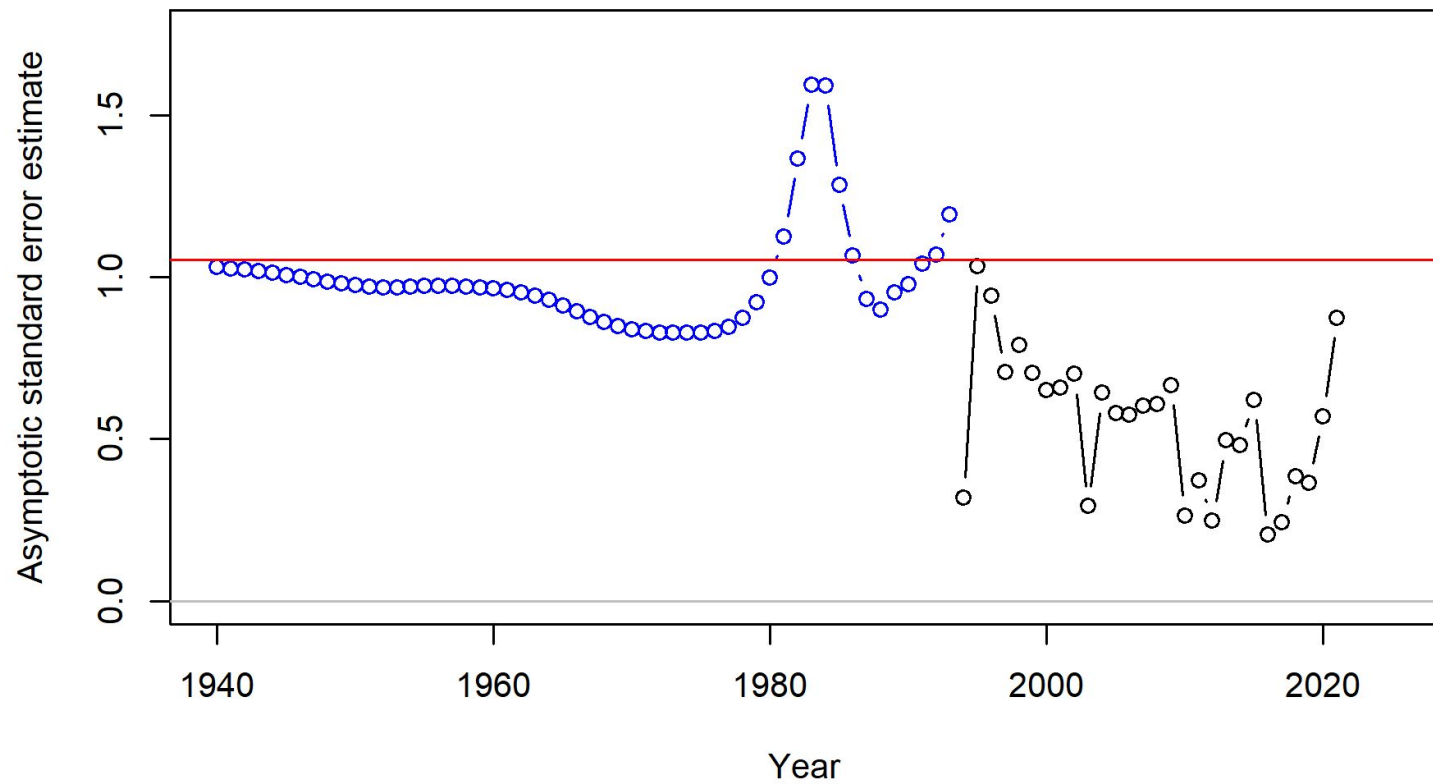
# Request 12: STAT Response



# Request 12: STAT Response



## Recruitment deviation variance



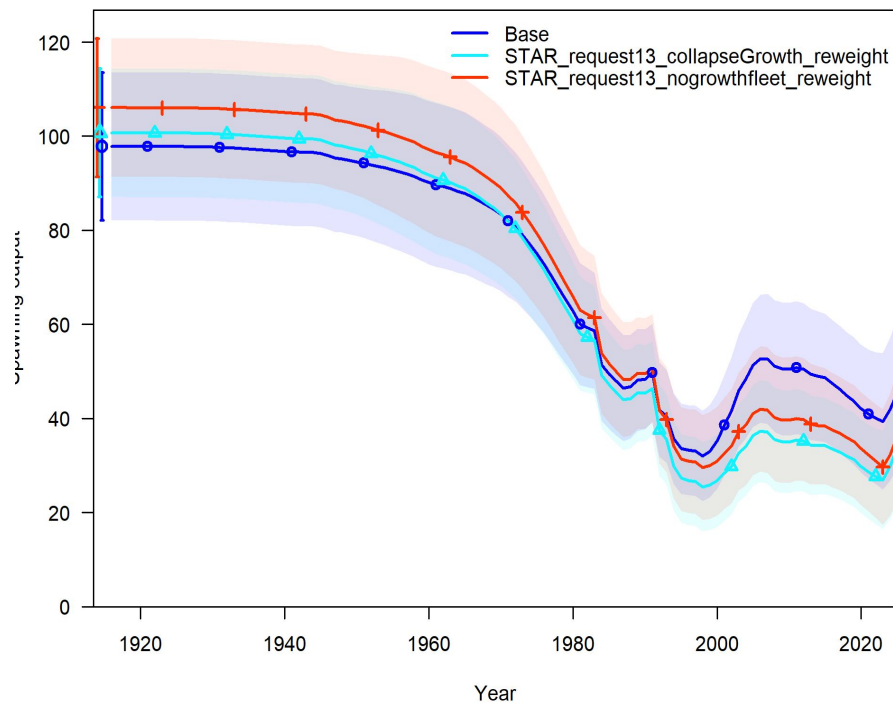
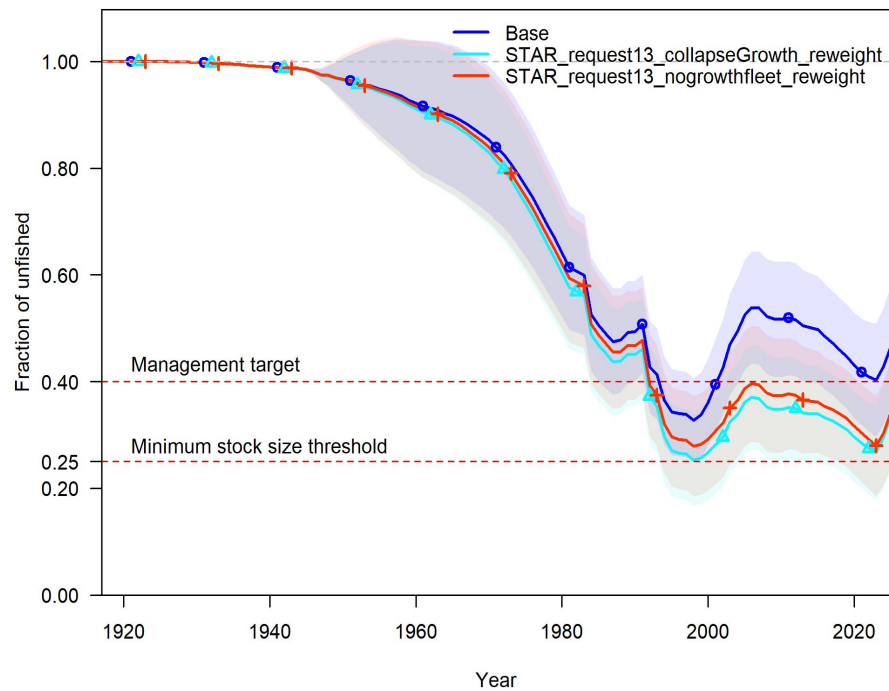
## Request 12: STAT Response

The recommended sigma R continues to increase when the main period for recruitment deviation estimation is adjusted to 1994. Adjusting the main period to start in 1994 results in a recruitment deviation time series that is very similar to the preSTAR base model. Increasing sigmaR increases the magnitude of deviations across the time series and all scenarios estimate comparable deviations in 1994. Adjusting the main period to 1994 decreases initial spawning output and increases final fraction unfished in the first iteration. Continuing to increase sigmaR results in a similar trajectory with the preSTAR base except for some differences in the 1980s.

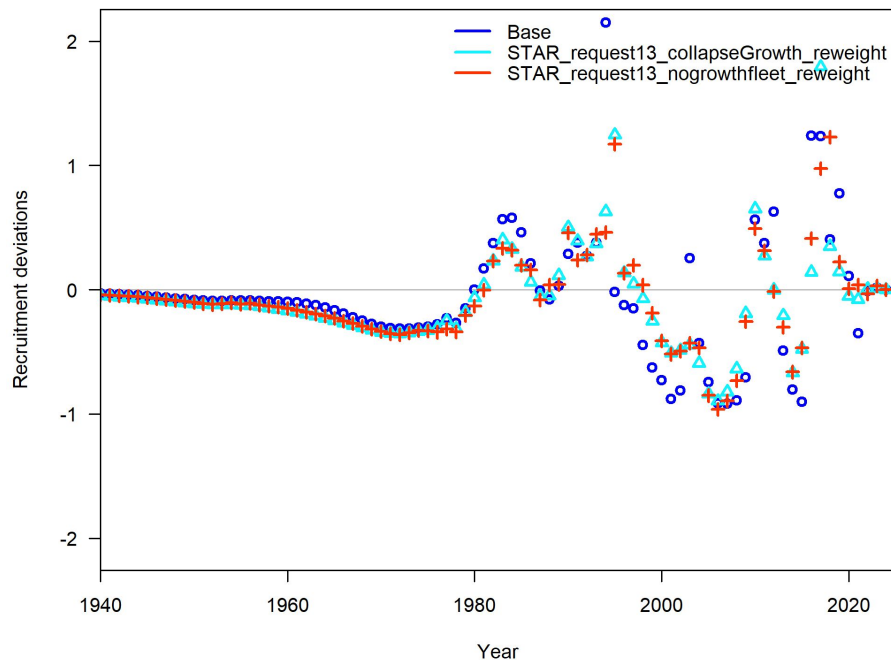
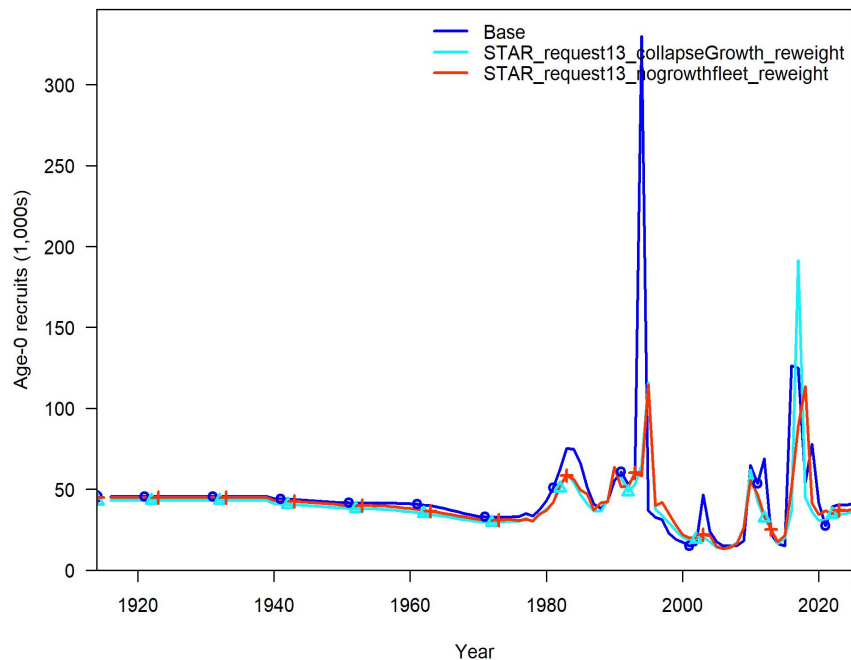
## Request 13

Run two models to compare to the preSTAR base model: 1) remove the growth fleet and 2) collapse the growth fleet CAAL observations into a single year and put that in the model as 1920. Please tune these models using the Francis method and report the suggested sigmaR. Present comparisons of spawning output, fraction unfished, recruitment, and recruitment deviations. If possible, please show the model estimated growth curves with variability and all age-at-length observations included in the preSTAR base model (similar to Request 5, replicated for each run), along with estimated values of growth parameters. Please have the r4ss plots available for further evaluation during the meeting (e.g., fits to data). Please include any additional runs that include portions of the data currently in the growth fleet that the STAT would like considered.

# Request 13 - STAT response



# Request 13 - STAT response



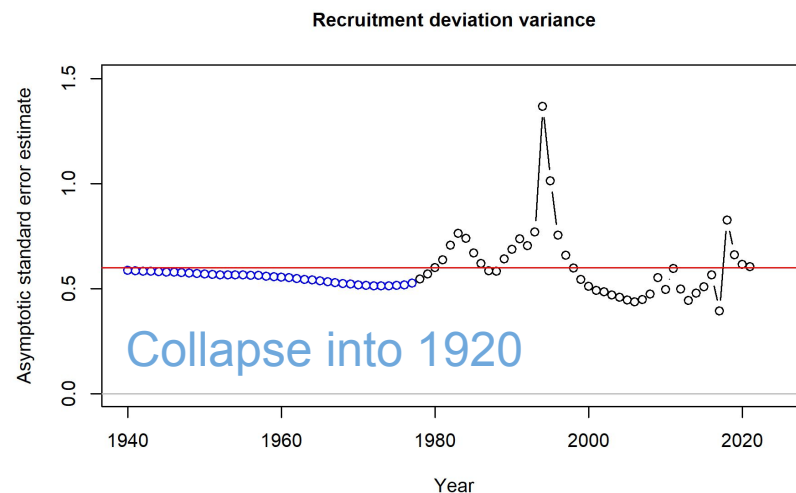
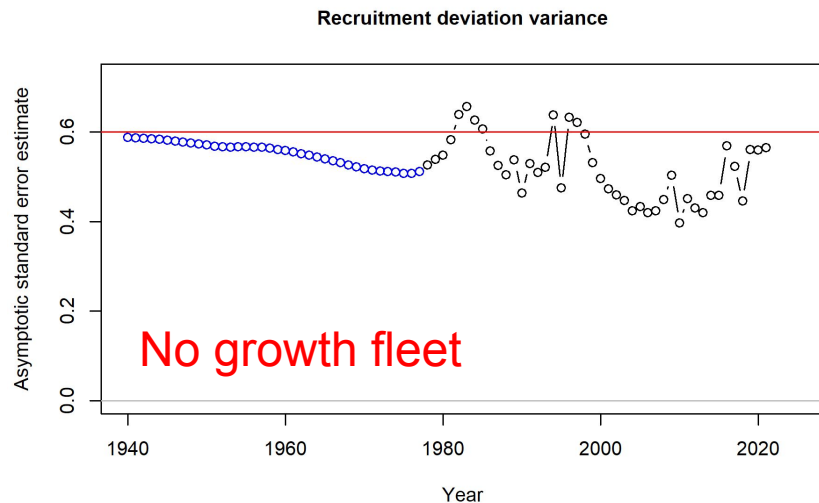
# Request 13 - STAT response

Alt. sigmaR (one step):

Base = 0.85

No growth fleet = 0.73

Collapse to 1920 = 0.82



# Request 13 - STAT response

Base:

$K = 0.126$

$L_{inf} = 42.75$  (CV = 0.085)

$L1 = 9.8$  (CV = 0.18)

No growth fleet:

$K = 0.147$

$L_{inf} = 42.76$  (CV = 0.09)

$L1 = 9.6$  (CV = 0.02)

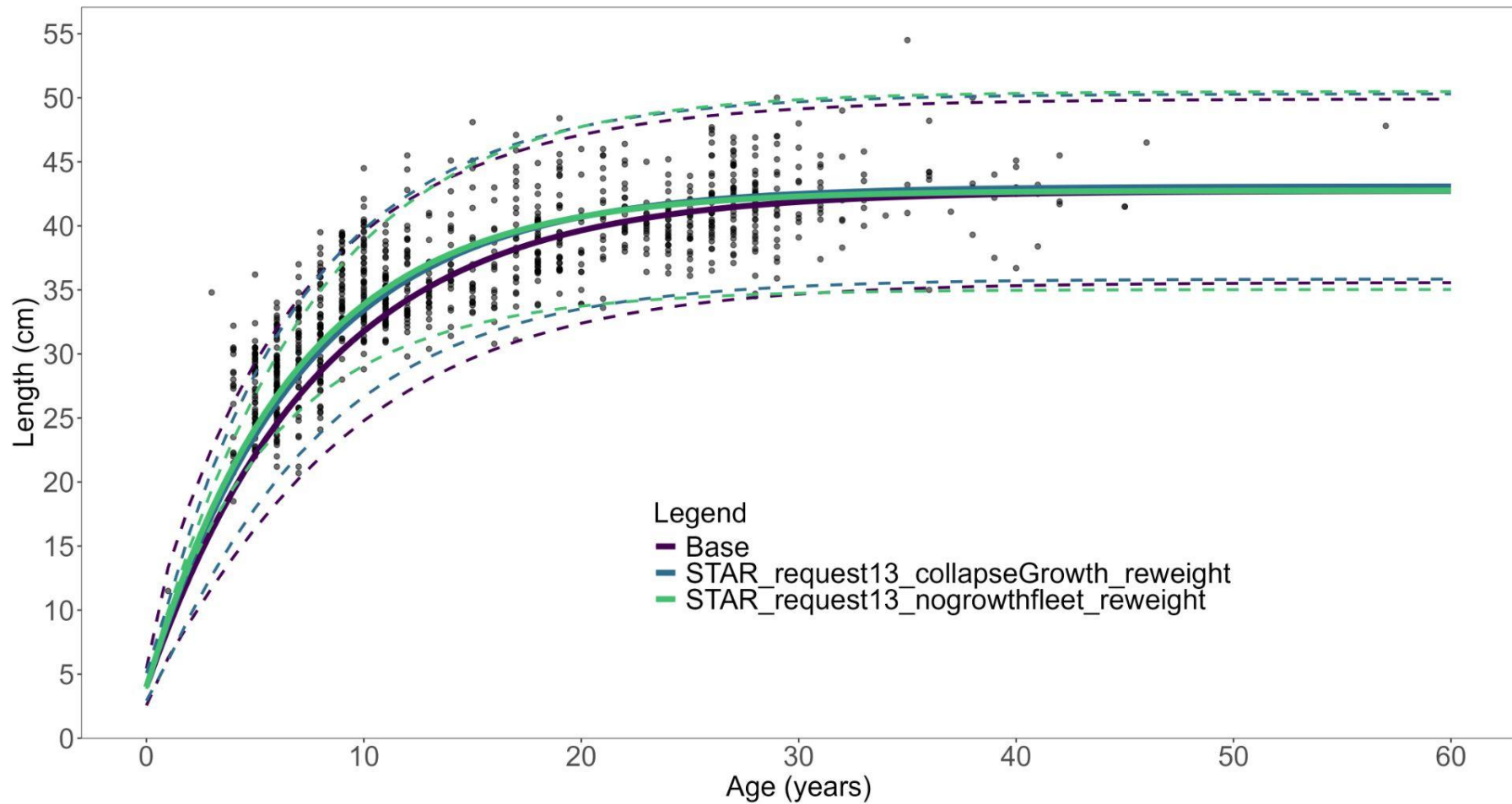
Still working on the plots

Compress to 1920:

$K = 0.140$

$L_{inf} = 43.08$  (CV = 0.086)

$L1 = 8.31$  (CV = 0.138)



## Request 13 - STAT response

The run compressing the growth fleet ages to 1920 results in population trajectories similar to the run without the growth fleet entirely. Both runs are very near to the uncertainty intervals of the base model. Recruitment deviations for each run peak in 1995 at a value lower than the 1994 value from the base model, though in the case of the compress-to-1920 run, a large peak in the mid 2010s is also observed. The plot of variability in recruitment deviations for the run with growth fleet ages compressed to 1920 shows that the spike in 1995 is uncertain. Thus the model wants a recruitment signal in 1995, and that signal is now poorly informed given the reduced amount of data from compressing the growth curve to 1920. Patterns observed of increasing sigmaR are similar to those already found.

We note that the run excluding growth ages is in line with the pattern observed from models run with varying degrees of age data removed; runs with progressively more ages removed become less and less similar to the base. This progression of runs requested by the panel during this week would be valuable to include in the final assessment report as a sensitivity group.

## Request 14

Compare three runs: 1) pre-STAR base, 2) CCFRP included in the CCFRP fleet and removing the growth fleet (as in Request 7), and 3) CCFRP & growth fleet: including the CCFRP fleet (as in Request 7) and keeping a growth fleet with only the Abrams data. Please tune these models using the Francis method and report the suggested sigmaR. Present comparisons of spawning output, fraction unfished, recruitment, and recruitment deviations. If possible, please show the model estimated growth curves with variability and all age-at-length observations included in the preSTAR base model (similar to Request 5, replicated for each run), along with estimated values of growth parameters. Please have the r4ss plots available for further evaluation during the meeting (e.g., fits to data).

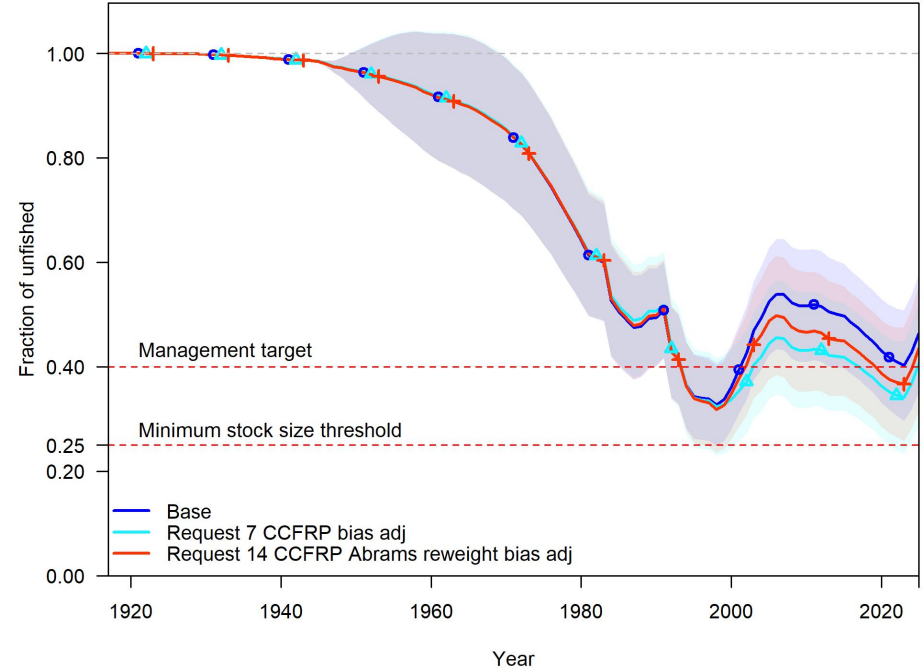
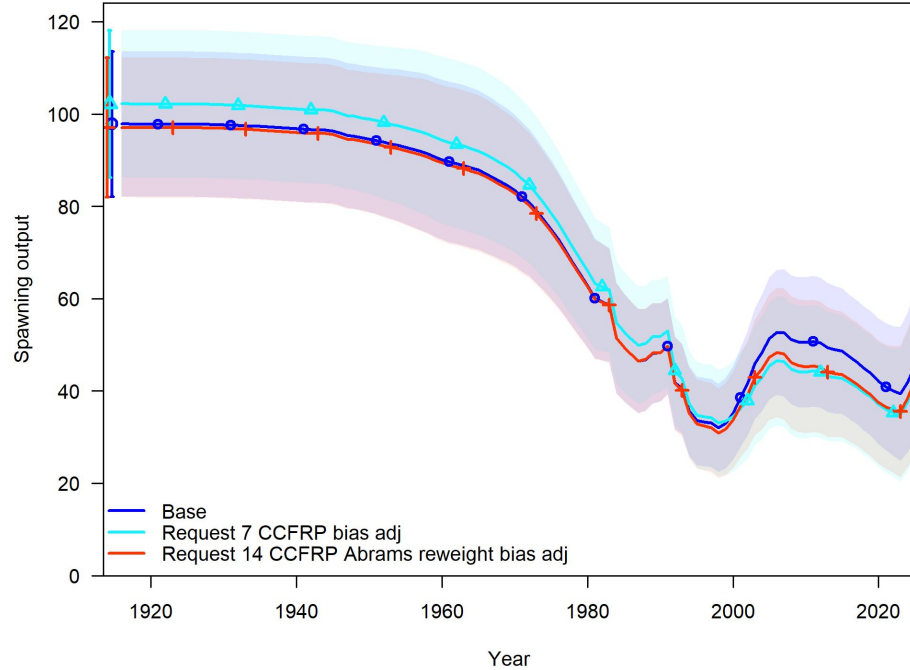
## Request 14: STAT Response

**Model 2** Request 7 (CCFRP ages moved from the growth fleet to the CCFRP fleet) was rerun with a bias ramp adjustment following current practice. This change was relatively small and did not change model results in any appreciable manner.

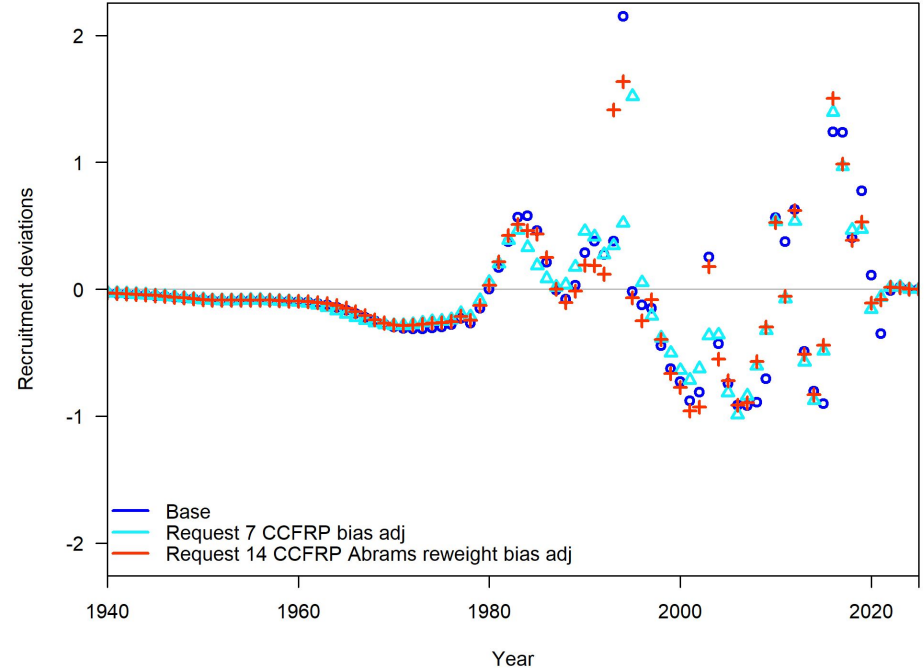
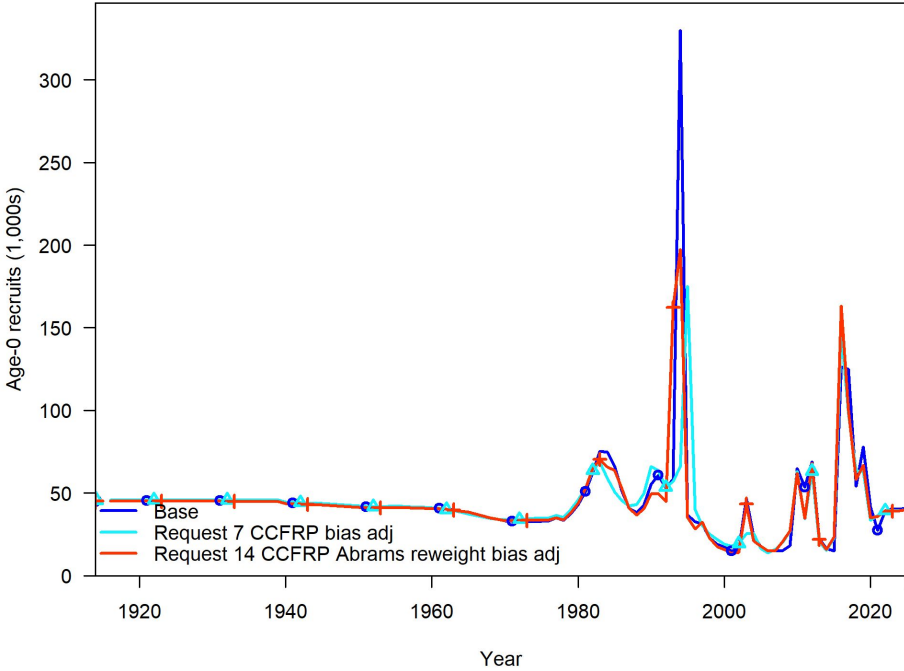
**Model 3** (CCFRP ages moved from the growth fleet to the CCFRP fleet and only Abrams ages remaining in the growth fleet) was set up. The model was weighted using the current procedure and then rerun with a bias ramp adjustment.

Note that in both of these models all the available data were included

# Request 14: STAT Response



# Request 14: STAT Response



# Request 14 - STAT response

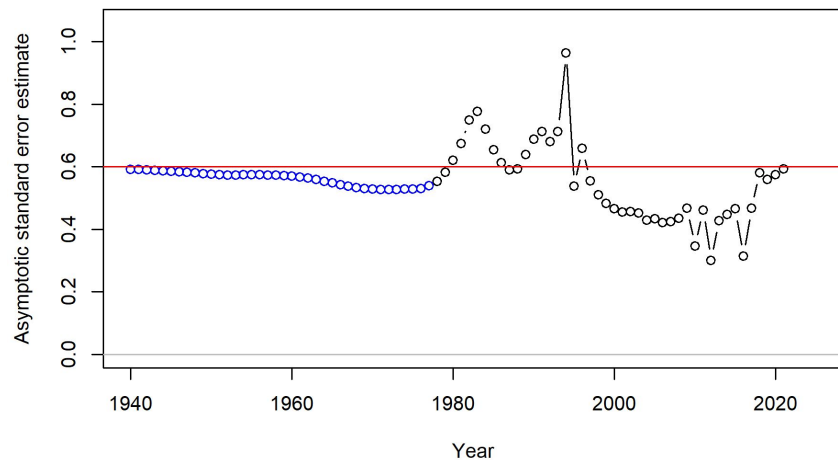
Alt. sigmaR (one step):

Base = 0.85

CCFRP = 0.82

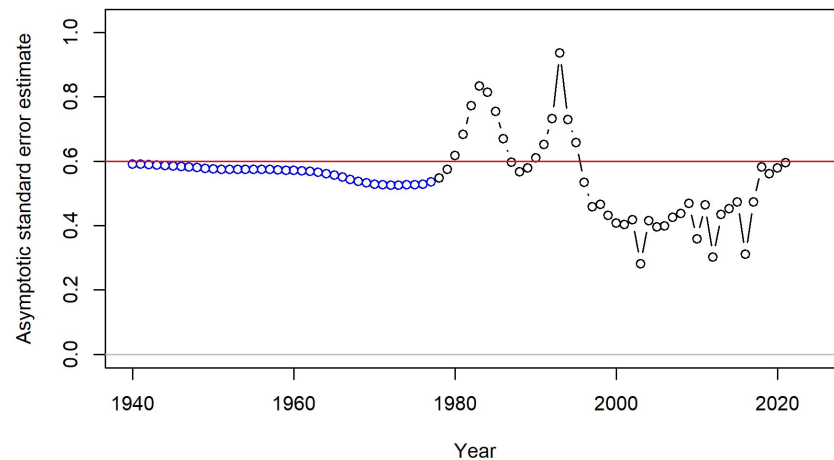
CCFRP Abrams = 0.85

Recruitment deviation variance



CCFRP

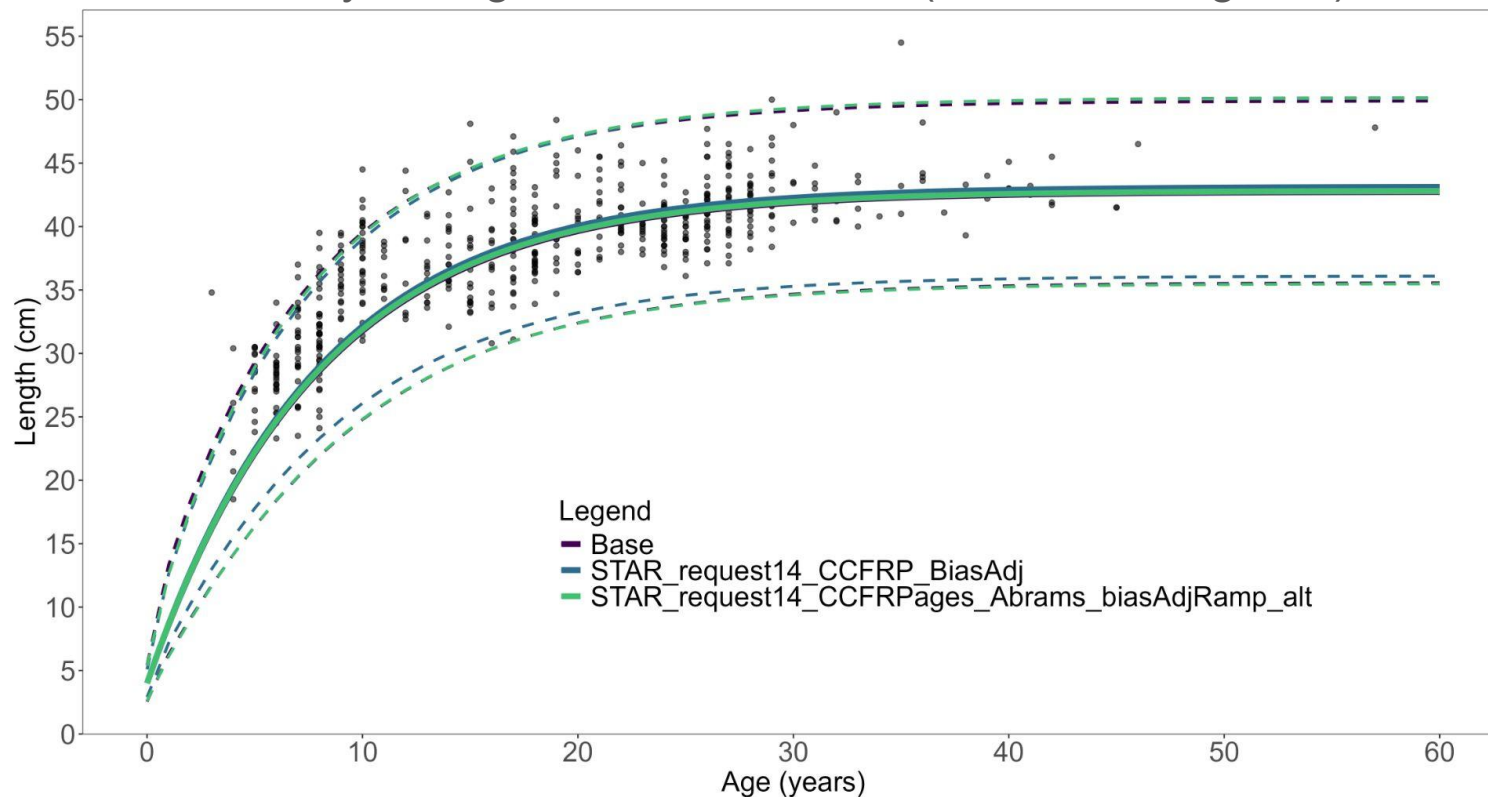
Recruitment deviation variance



CCFRP Abrams

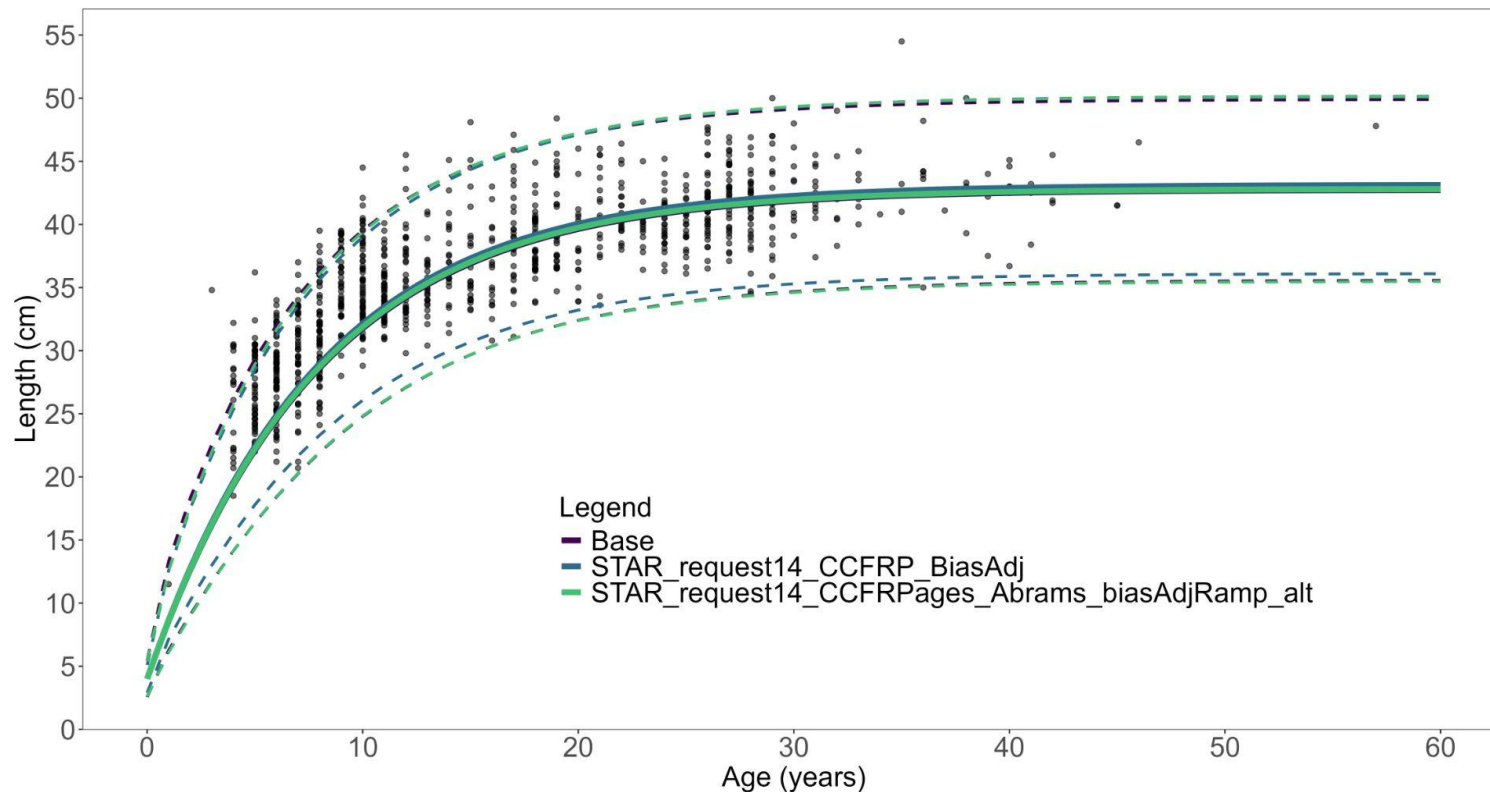
# Response 14 - STAT response

Includes only the age data in model 14 (base behind green)



# Response 14 - STAT response

All available age data in the base model plotted



## Response 14 - STAT response

The trajectories and estimated growth for the two requested additional runs are very similar. The recruitment deviations are also dampened without the remaining available age data.

The STAT continues to support the preSTAR base model, but recognizes the panel's concerns and uncertainty in the model. Given that this is a nearshore species with limited standardized sampling, the proposed base model with the CCFRP and Abrams data, which are the data from the growth fleet we view as most representative, is a reasonable alternative.