Addendum

SEDAR 84 Puerto Rico Yellowtail Snapper

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1 Introduction

This addendum provides supplementary analyses developed in direct response to requests made by the SEDAR 84 Review Workshop Panel. The model runs and plots presented here build on the configurations documented in the SEDAR 84 Assessment Process Report for US Caribbean Yellowtail Snapper in Puerto Rico.

The additional model runs conducted during the Review Workshop are intended to document exploratory work that may inform next steps toward refining the assessment framework for consideration by the Caribbean Fishery Management Council's Science and Statistical Committee.

Only the model runs reviewed by the panel during the Review Workshop are included in this addendum. While additional exploratory analyses could be pursued (e.g., steepness values informed by FishBase rather than assuming steepness near 1), these were not examined during the workshop. Future work will integrate further panel recommendations and additional sensitivity analyses once the Review Workshop Report is finalized.

2 Key Considerations

- All model runs included here were developed under the direction of the Review Workshop Panel to explore data use, model behavior.
- The models remain preliminary and sensitive to consequential assumptions (e.g., initial equilibrium catch, recruitment steepness, selectivity). Further work is required to address these uncertainties and develop models more robust for informing management advice.
- At the panel's recommendation, an exploratory run was developed combining data from Puerto Rico and St. Thomas/St. John. This deviates from the Data Workshop guidance to analyze island platforms separately and to exclude pre-island-specific survey data. The panel suggested this deviation in an attempt to retain additional information to better fit length compositions and stabilize model initialization.
- These models do not represent final scientific advice. They are intermediate steps in an iterative review process leading to future model development, SSC review, and eventual management consideration.

3 Model Runs

Included is a compilation of the stock assessment model runs developed during the SEDAR 84 Review Workshop held from July 15 to July 18, 2025 in Fort Lauderdale, Florida.

Building on the models documented in the assessment process report for Yellowtail Snapper in Puerto Rico, the review workshop introduced several refinements and exploratory runs. The initial review workshop model used a single-sex configuration, applied the Stock Synthesis F method option 2 and corrected standard error units for the NCRMP survey index of abundance. The second model estimated two growth parameters (the growth coefficient K and the mean length at maximum age).

A third model for Puerto Rico Yellowtail Snapper added a survey corresponding to the spatially restricted years of the NCRMP and a combination of splines and time blocks to model selectivity and capture shifts in the size composition of the commercial hand line fleet. To test for model convergence, the fourth model built on this structure with estimated growth parameters (the growth coefficient K and the length at maximum age).

Finally, two models were developed with combined data from Puerto Rico and St. Thomas and St. John, USVI. These included two fleets and five surveys, with spatially restricted NCRMP surveys incorporated separately from the island-wide surveys recommended by the data workshop and included in the assessment report model runs. To test for model convergence, the second model built on this structure with fixed selectivity and steepness and estimated length at maximum age.

Table 1 summarizes the models described above and figures are provided in Section 6.

For each model, key Spawning Potential Ratio (SPR) plots are provided with horizontal red lines indicating the MSY proxy of 40% SPR. The SPR plot shows the estimated spawning potential ratio over time. Similarly, the unfished ratio plot presents the time series of the fraction of unfished spawning output. Lastly, the fishing intensity plot displays the inverse of the SPR (1 - SPR).

4 Conclusions and Next Steps

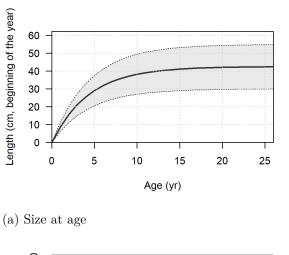
These analyses are exploratory and were conducted under panel direction during the SEDAR 84 Review Workshop. Further work is required to evaluate consequential assumptions, add sensitivity runs (e.g., steepness from FishBase), and ensure models are robust to uncertainty. Final recommendations and additional work steps will be determined following completion of the Review Workshop Report, outside of the SEDAR 84 process.

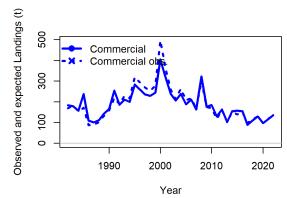
5 Tables

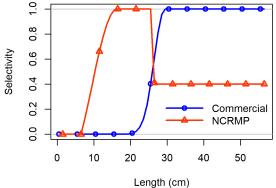
Table 1: Summary of Review Workshop SEDAR 84 models for Yellowtail Snapper in Puerto Rico.

Model	Description
PR_RW_1	Single Sex, F method 2, Catch SE = 0.3, and Corrected Survey SE
PR_RW_2 PR_RW_3	PR_RW_1 + Catch SE = 2 and Estimated Growth PR_RW_1 + La Parguera Survey and Selectivity Spline;
	does not converge
PR_RW_4	PR_RW_3 + Estimated Growth
PR_STTJ_RW_1	PR_RW_3 + STTJ Fleet and STJ Survey; does not converge
PR_STTJ_RW_2	PR_STTJ_RW_1 + Estimated Length at Maximum Age and Fixed Selectivity and 0.8 Steepness

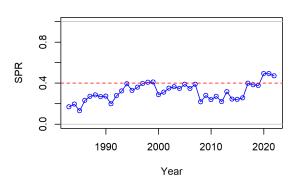
6 Figures





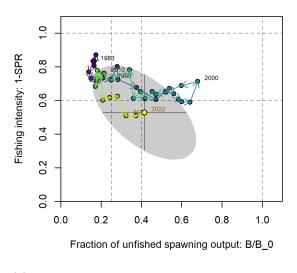


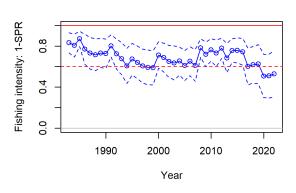
(b) Observed and expected landings



(c) Selectivity

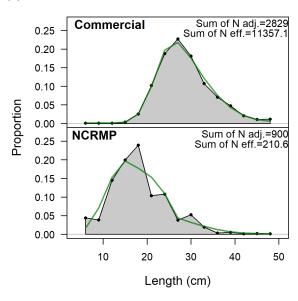
Figure 1: PR_RW_1

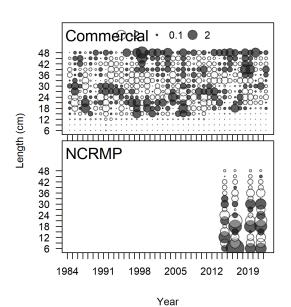




(b) SPR Ratio

(a) SPR Phase

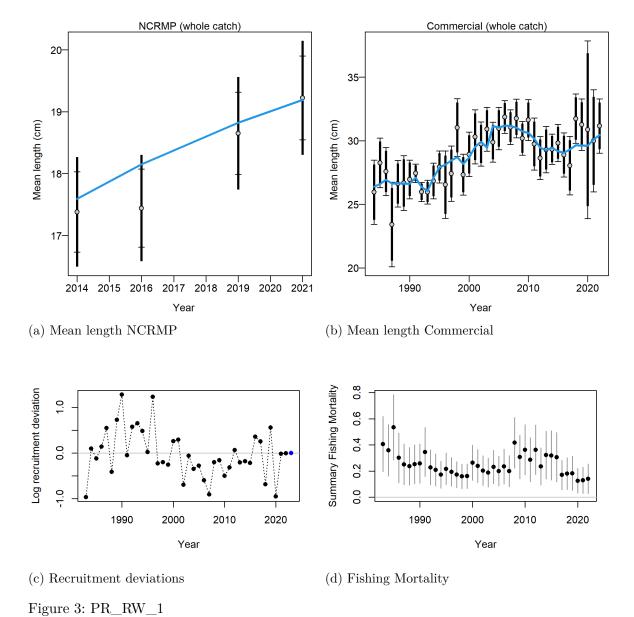


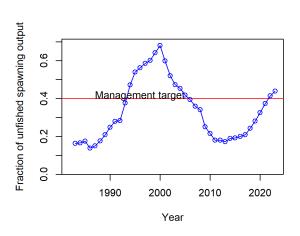


(c) Lenth fit aggregated across time

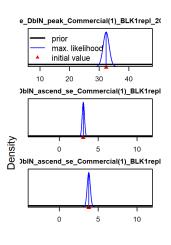
(d) Length fit

Figure 2: PR_RW_1





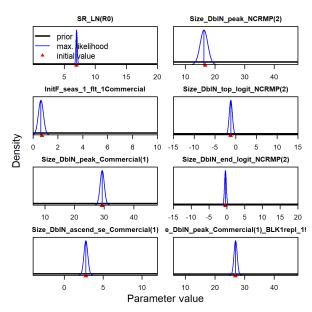
(a) Unfished ratio



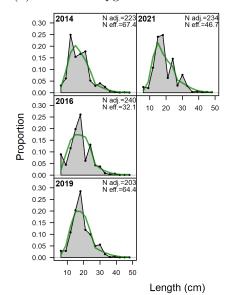
Parameter value

(c) Parameters pg. 2

Figure 4: PR_RW_1



(b) Parameters pg. 1



(d) Length comps NCRMP

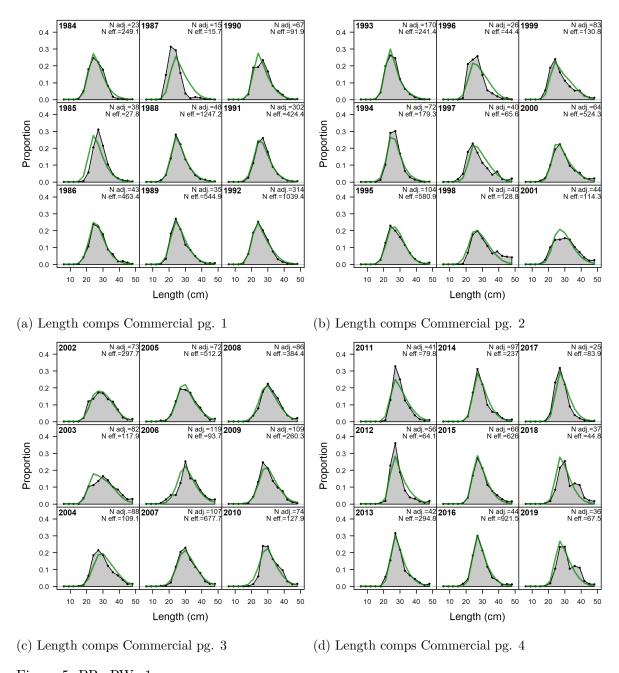
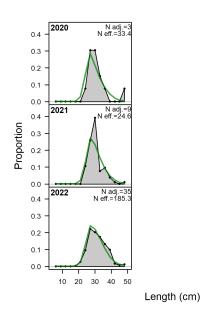
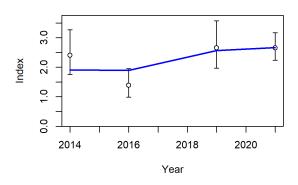


Figure 5: PR_RW_1



(a) Length comps Commercial pg. 5

Figure 6: PR_RW_1



(b) Index NCRMP

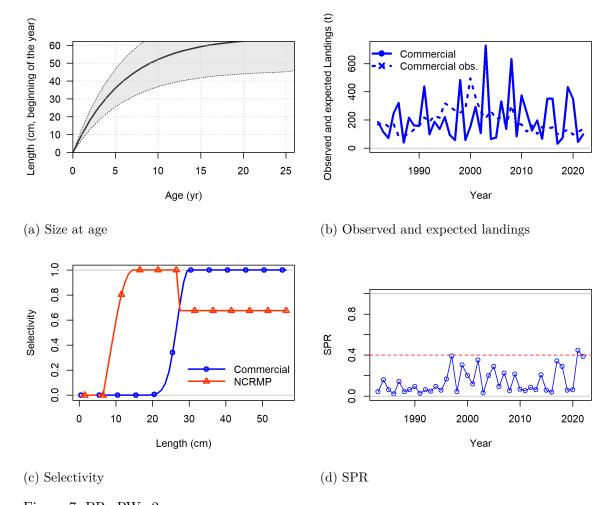
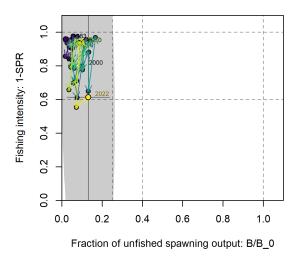
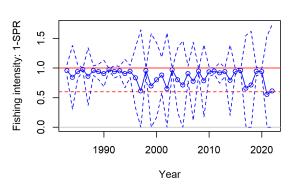


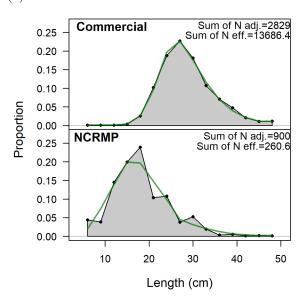
Figure 7: PR_RW_2

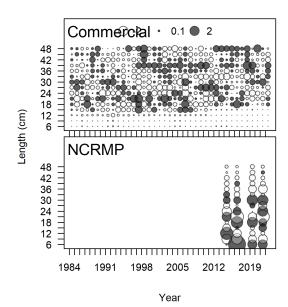




(b) SPR Ratio

(a) SPR Phase

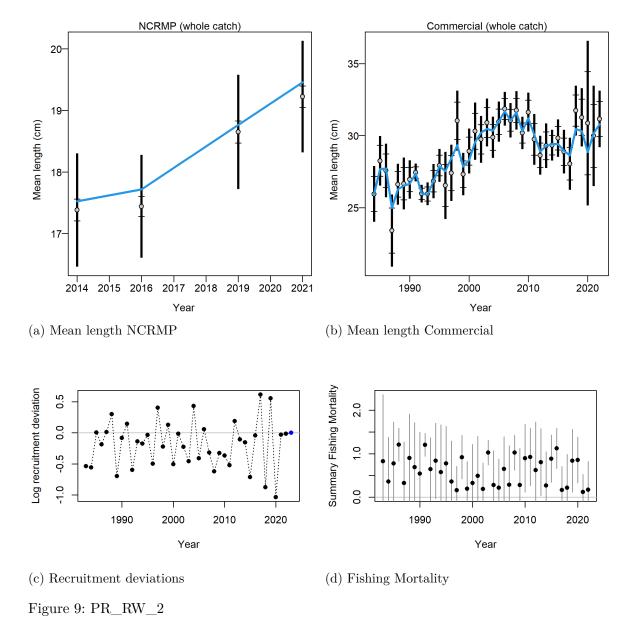




(c) Lenth fit aggregated across time

(d) Length fit

Figure 8: PR_RW_2



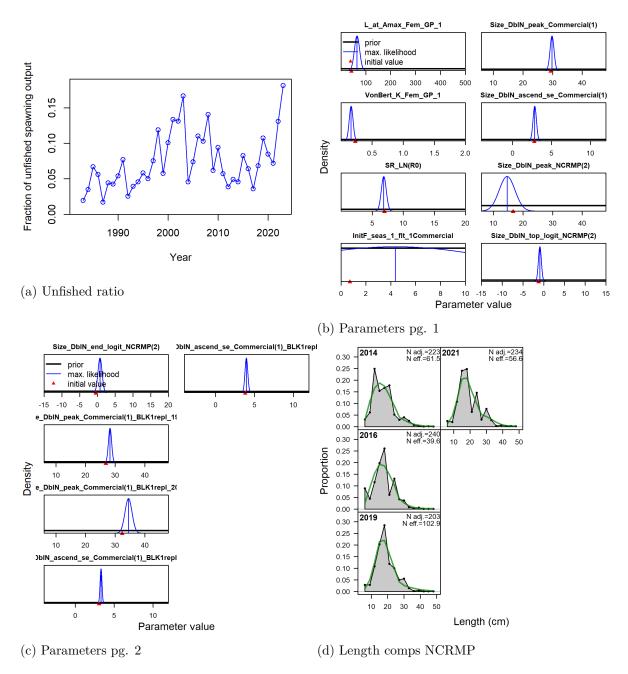


Figure 10: PR_RW_2

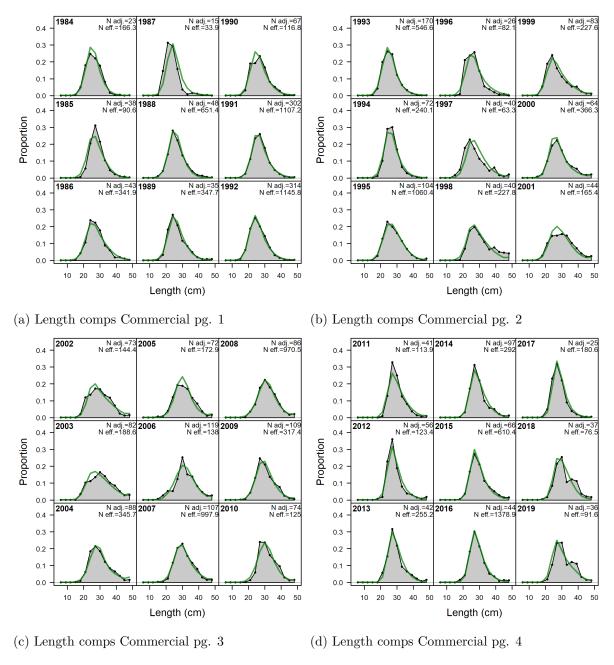
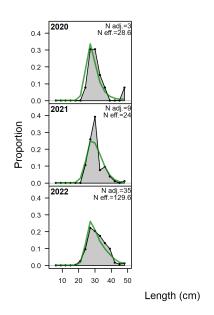
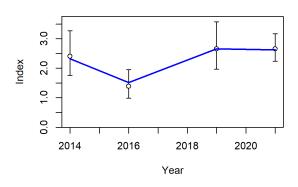


Figure 11: PR RW 2

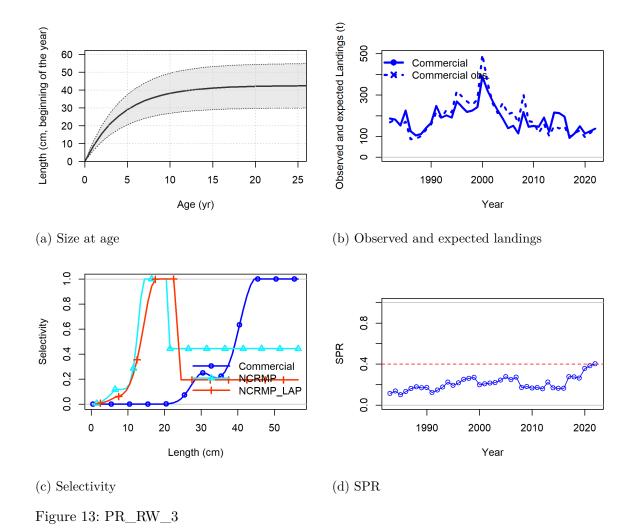


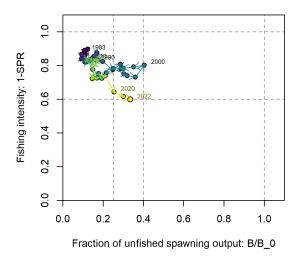
(a) Length comps Commercial pg. 5

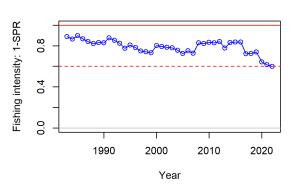
Figure 12: PR_RW_2



(b) Index NCRMP

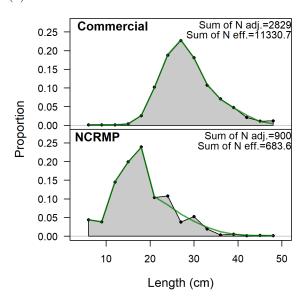


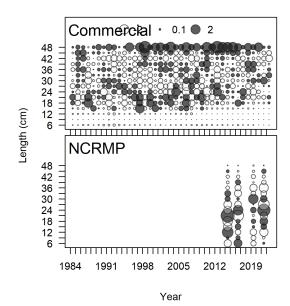




(b) SPR Ratio

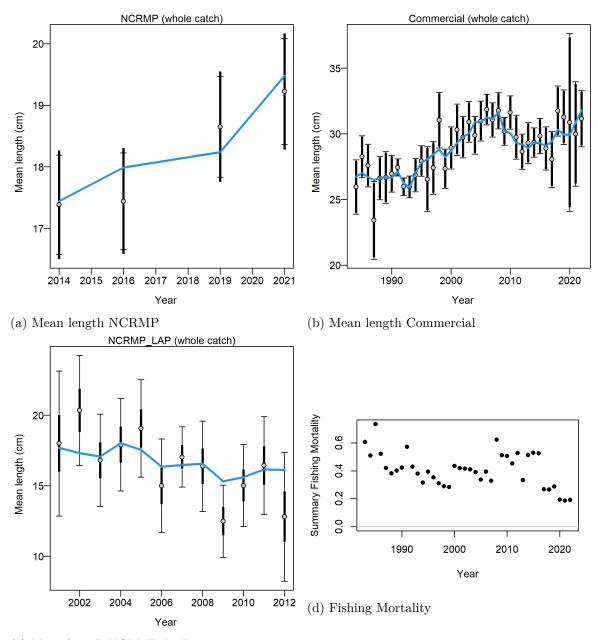
(a) SPR Phase





(c) Lenth fit aggregated across time

(d) Length fit



(c) Mean length NCRMP La Parguera

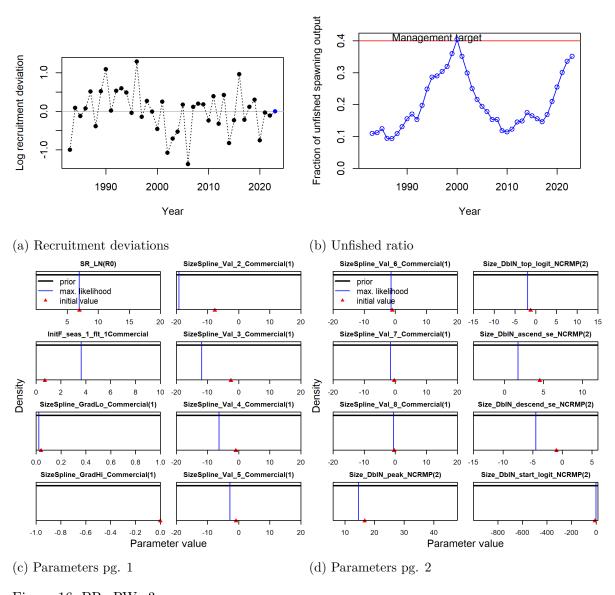


Figure 16: PR_RW_3

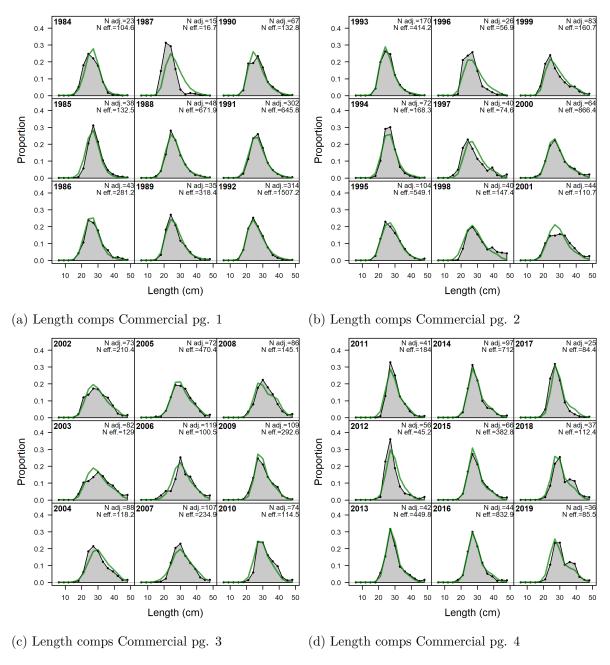
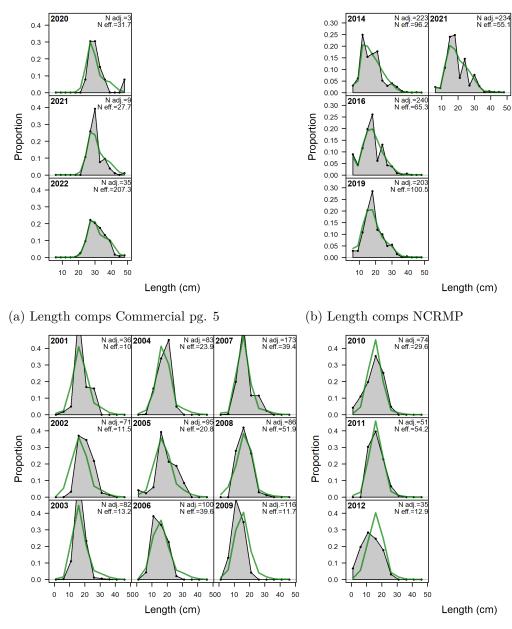


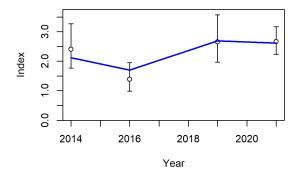
Figure 17: PR_RW_3

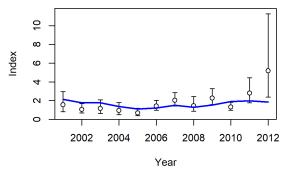


(c) Length comps La Parguera NCRMP pg. 1 $\,$ (d) I

(d) Length comps La Parguera NCRMP pg. 2

Figure 18: PR_RW_3





(a) Index NCRMP

Figure 19: PR_RW_3

(b) Index La Parguera NCRMP

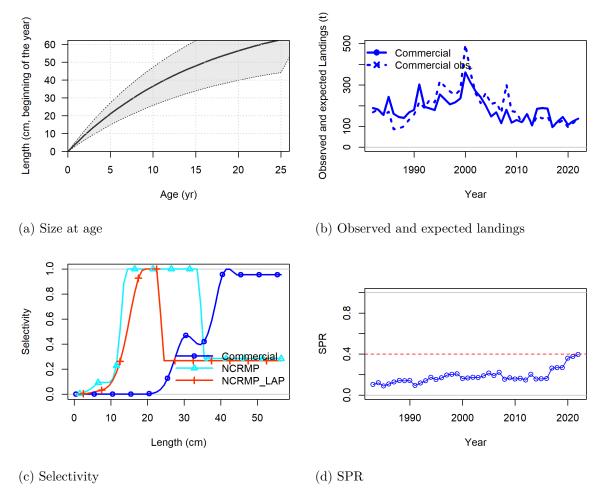
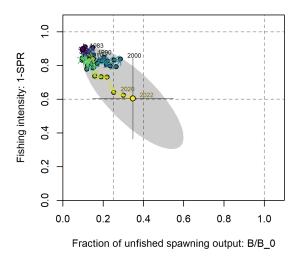
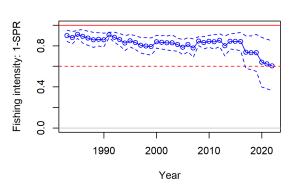


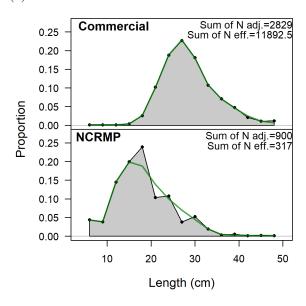
Figure 20: PR_RW_4

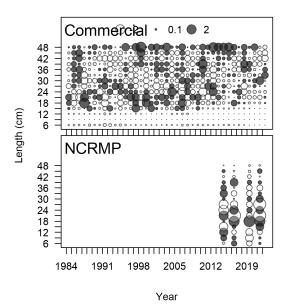




(b) SPR Ratio

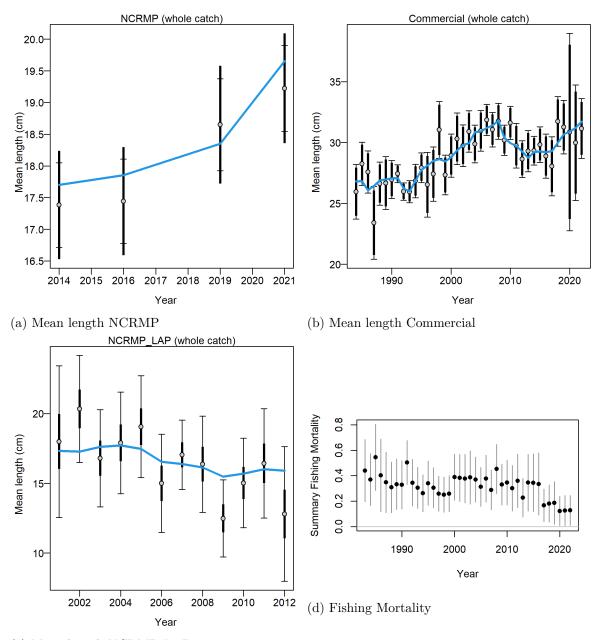
(a) SPR Phase





(c) Lenth fit aggregated across time

(d) Length fit



(c) Mean length NCRMP La Parguera

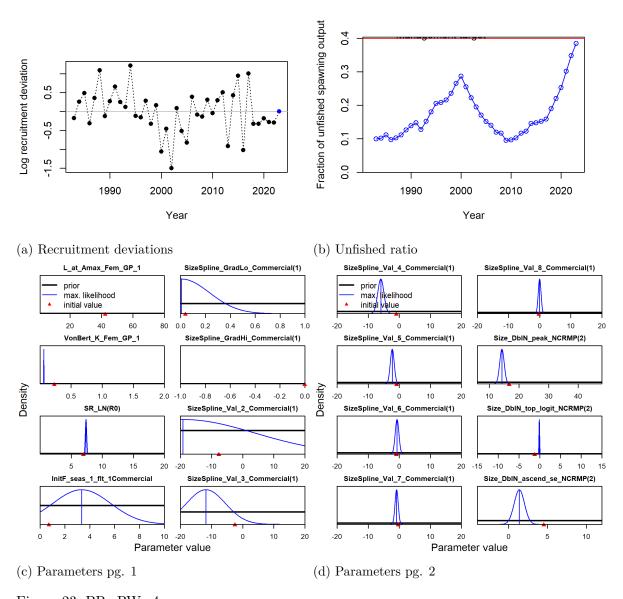


Figure 23: PR_RW_4

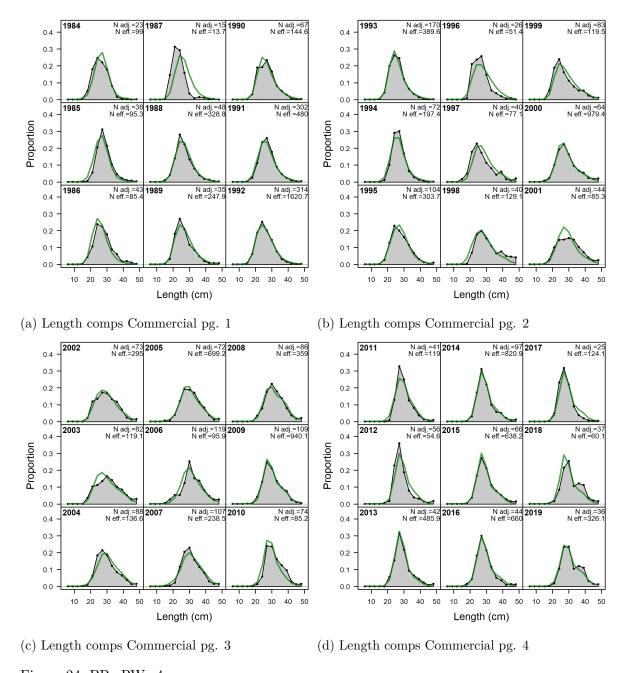
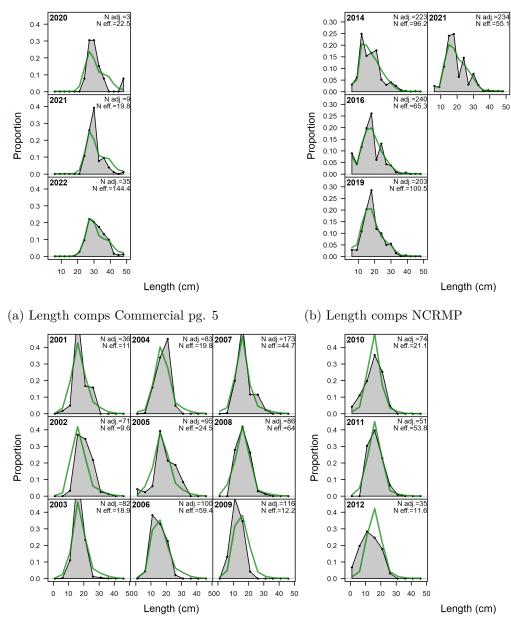


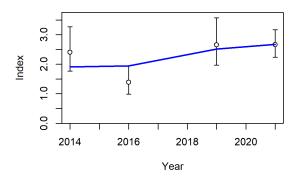
Figure 24: PR_RW_4

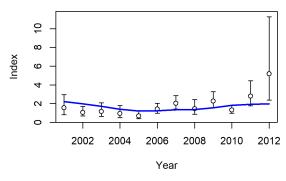


(c) Length comps La Parguera NCRMP pg. 1

(d) Length comps La Parguera NCRMP pg. 2

Figure 25: PR_RW_4





(a) Index NCRMP

Figure 26: PR_RW_4

(b) Index La Parguera NCRMP

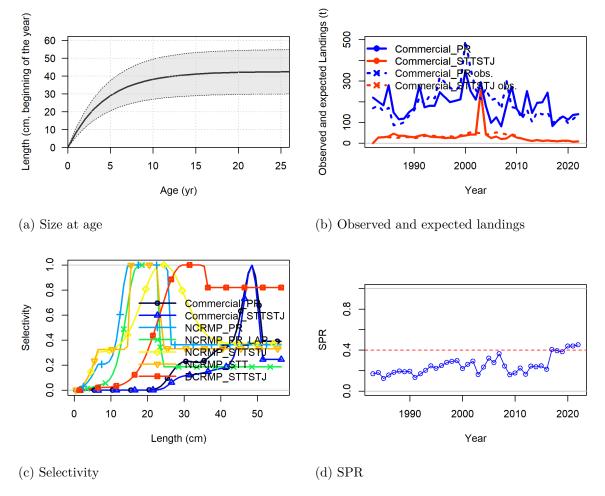
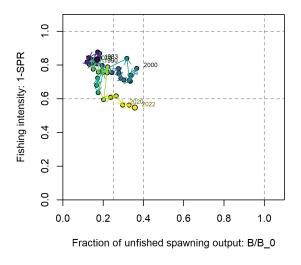
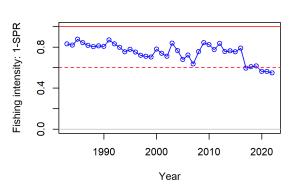


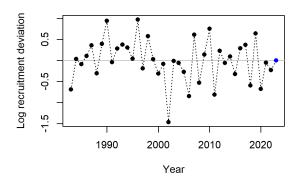
Figure 27: PR_STTJ_RW_1

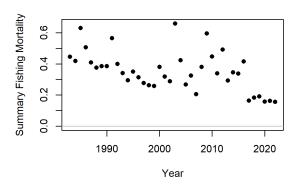




(b) SPR Ratio

(a) SPR Phase

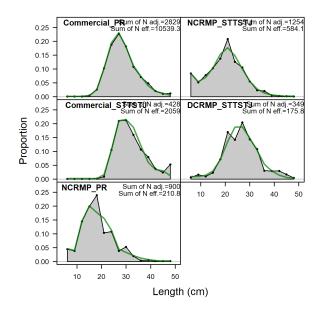


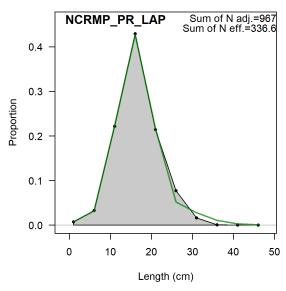


(c) Recruitment deviations

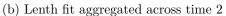
Figure 28: PR_STTJ_RW_1

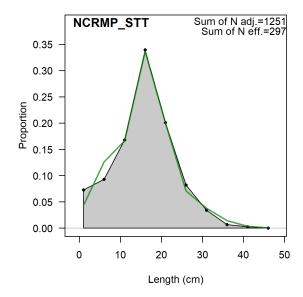
(d) Fishing Mortality





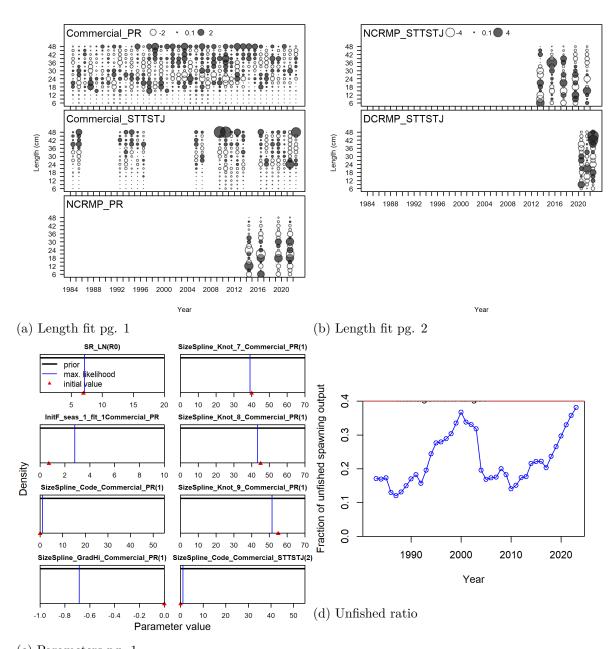
(a) Lenth fit aggregated across time 1





(c) Lenth fit aggregated across time 3

Figure 29: PR_STTJ_RW_1



(c) Parameters pg. 1

Figure 30: PR_STTJ_RW_1

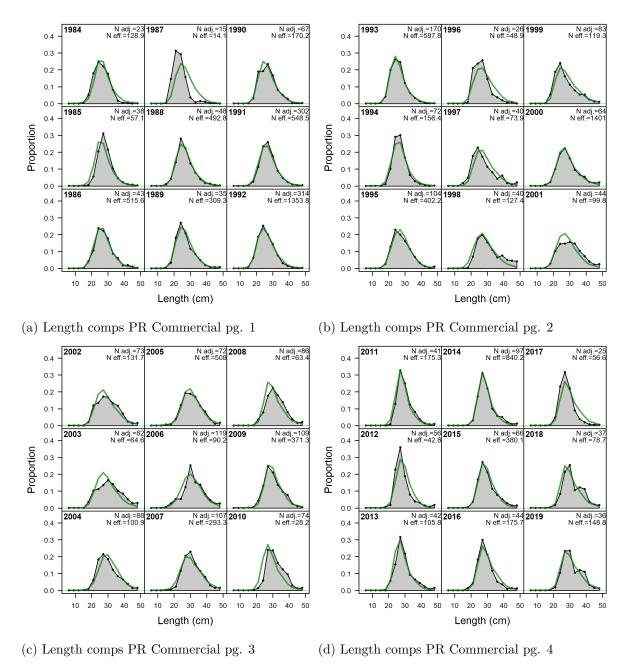
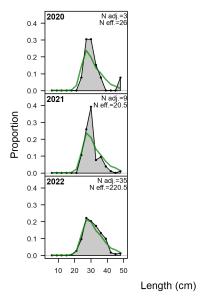
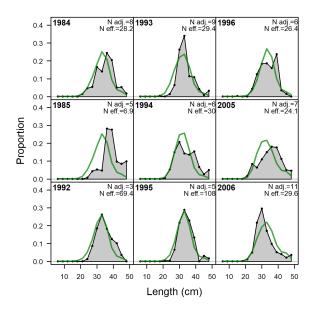
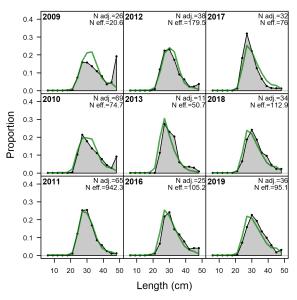


Figure 31: PR STTJ RW 1

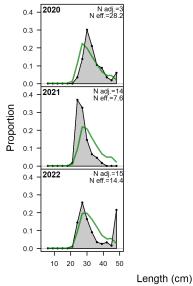




(a) Length comps PR Commercial pg. 5



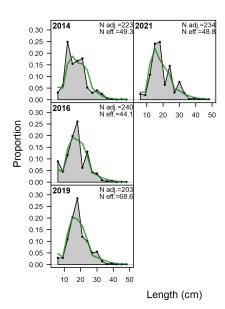
(b) Length comps STTJ Commercial pg. 1



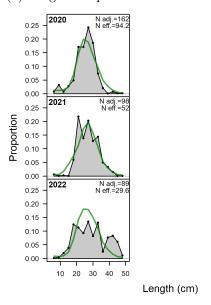
(c) Length comps STTJ Commercial pg. 2

(d) Length comps STTJ Commercial pg. 3

Figure 32: PR_STTJ_RW_1

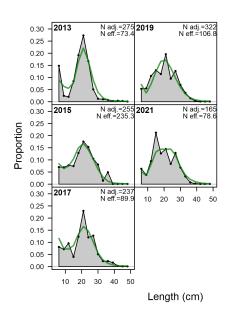


(a) Length comps PR NCRMP

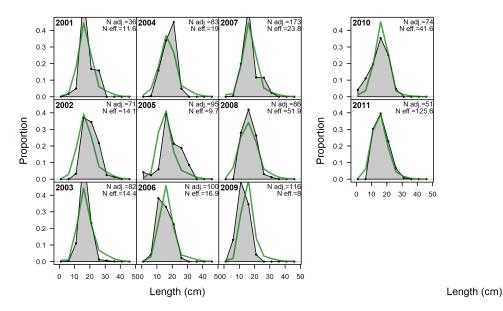


(c) Length comps STTJ DCRMP

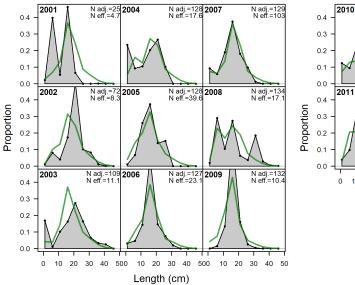
Figure 33: $PR_STTJ_RW_1$



(b) Length comps STTJ NCRMP



(a) Length comps PR La Parguera NCRMP pg. 1 (b) Length comps PR La Parguera NCRMP pg. 2



0.4 2010 N adj =134 N eff = 38
0.2
0.1
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2011 N adj =133 N eff = 24.1
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Length (cm)

(c) Mean length STT NCRMP pg. 1

(d) Mean length STT NCRMP pg. 2

Figure 34: PR_STTJ_RW_1

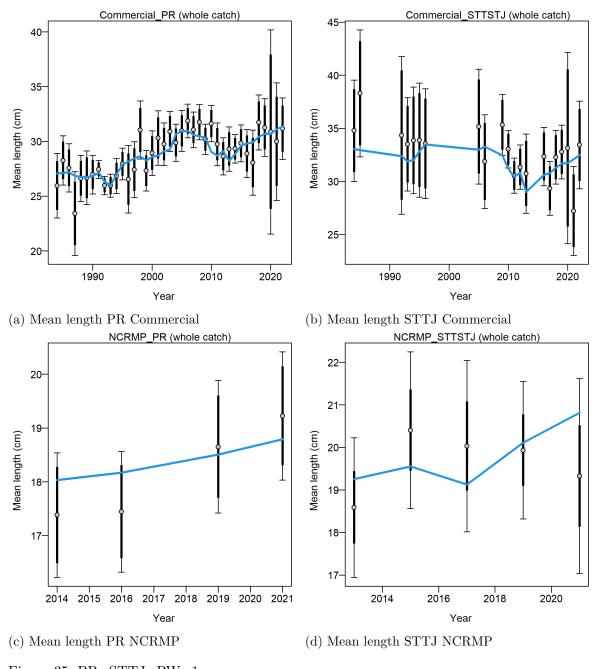
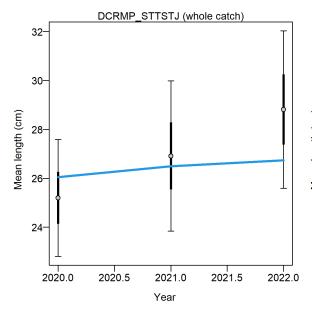
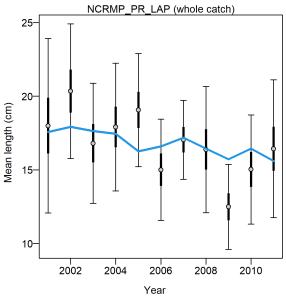
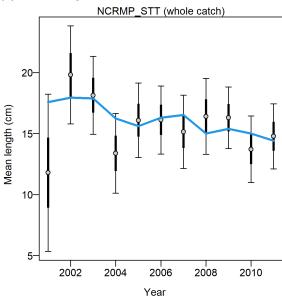


Figure 35: PR_STTJ_RW_1





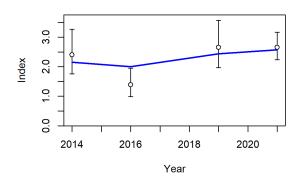
(a) Mean length STTJ DCRMP

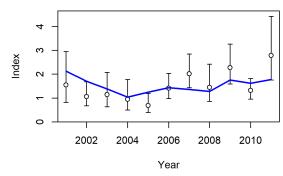


(b) Mean length PR La Parguera NCRMP

(c) Mean length STT NCRMP

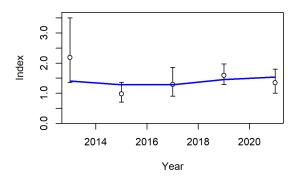
Figure 36: PR_STTJ_RW_1

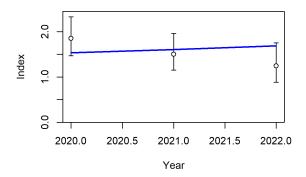




(a) Index PR NCRMP

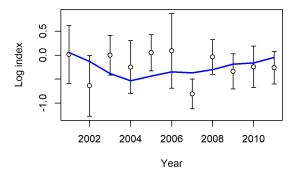






(c) Index STTJ NCRMP





(e) Index STT NCRMP

Figure 37: PR_STTJ_RW_1

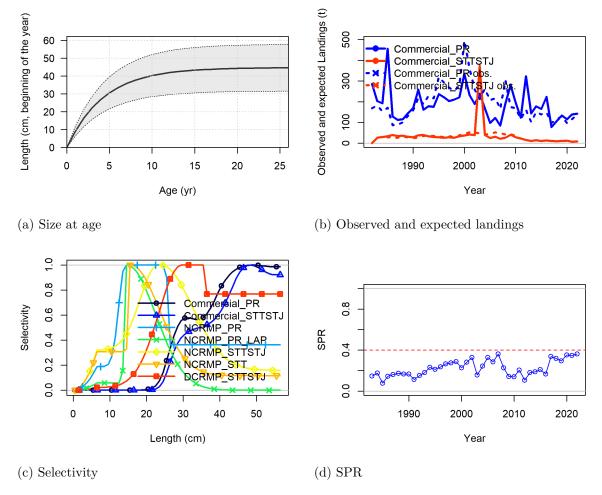
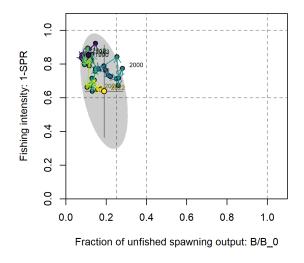
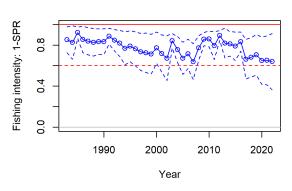


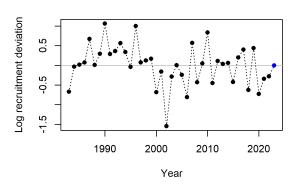
Figure 38: PR_STTJ_RW_2

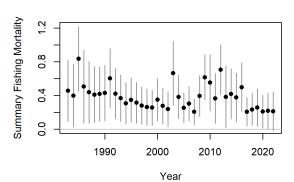




(b) SPR Ratio

(a) SPR Phase

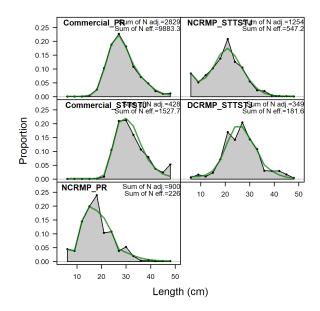


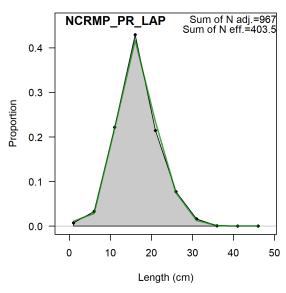


(c) Recruitment deviations

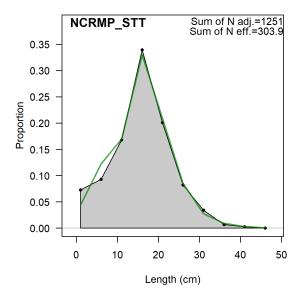
Figure 39: $PR_STTJ_RW_2$

(d) Fishing Mortality



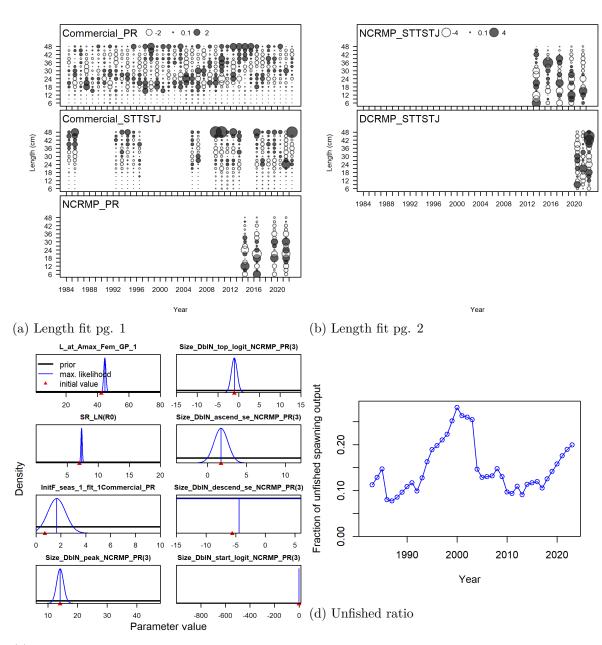


- (a) Lenth fit aggregated across time 1
- (b) Lenth fit aggregated across time 2



(c) Lenth fit aggregated across time 3

Figure 40: $PR_STTJ_RW_2$



(c) Parameters pg. 1

Figure 41: PR_STTJ_RW_2

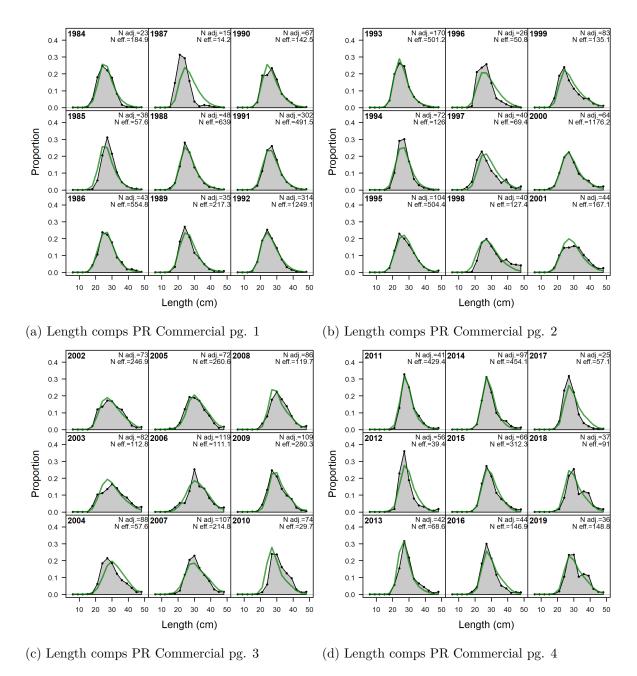
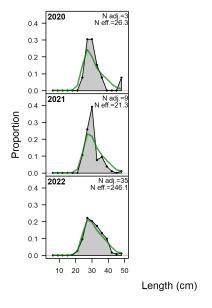
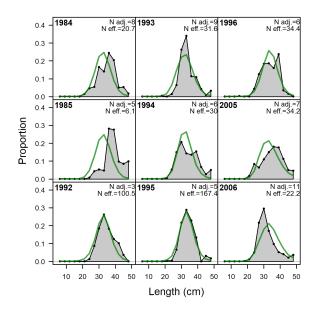
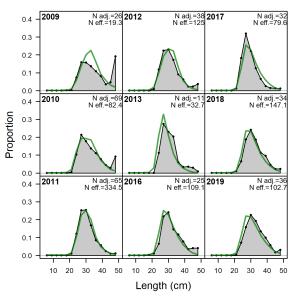


Figure 42: PR STTJ RW 2

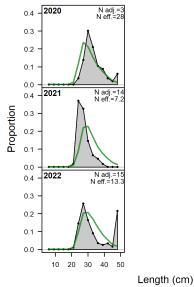




(a) Length comps PR Commercial pg. 5



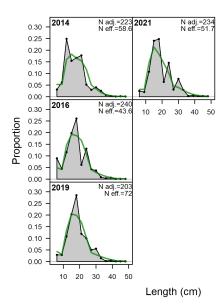
(b) Length comps STTJ Commercial pg. 1



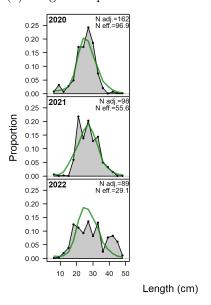
(c) Length comps STTJ Commercial pg. 2

(d) Length comps STTJ Commercial pg. 3

Figure 43: PR_STTJ_RW_2

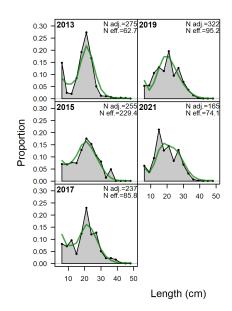


(a) Length comps PR NCRMP

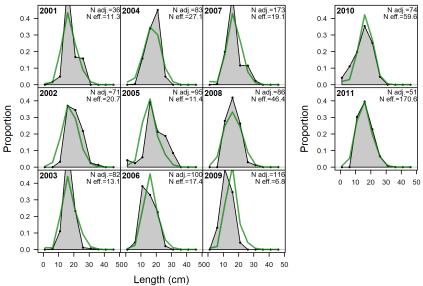


(c) Length comps STTJ DCRMP

Figure 44: PR_STTJ_RW_2

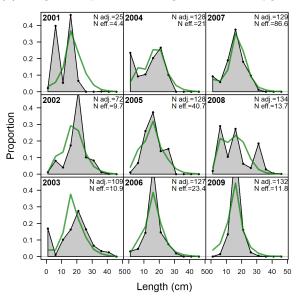


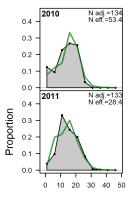
(b) Length comps STTJ NCRMP



Length (cm)

(a) Length comps PR La Parguera NCRMP pg. 1 (b) Length comps PR La Parguera NCRMP pg. 2





Length (cm)

(c) Mean length STT NCRMP pg. 1

(d) Mean length STT NCRMP pg. 2

Figure 45: PR_STTJ_RW_2

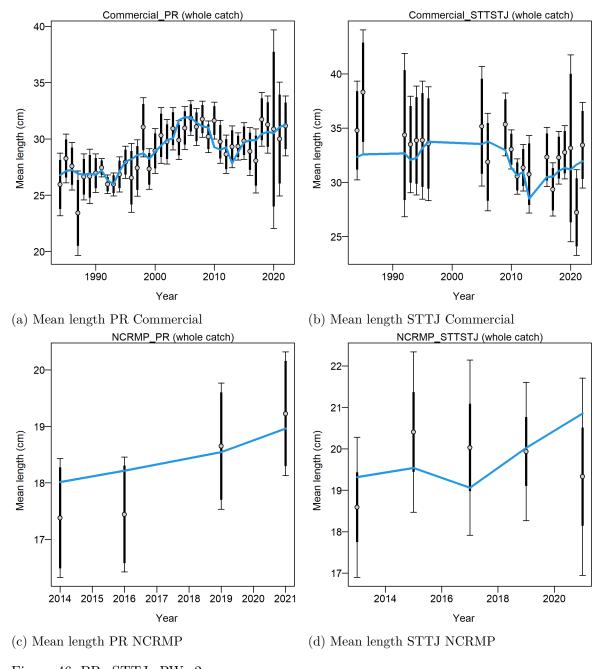
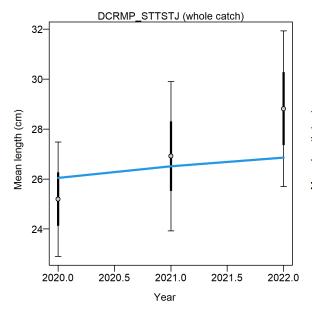
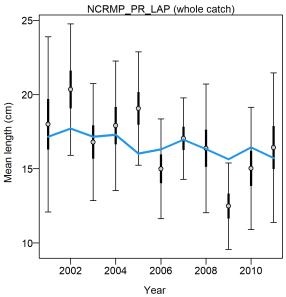
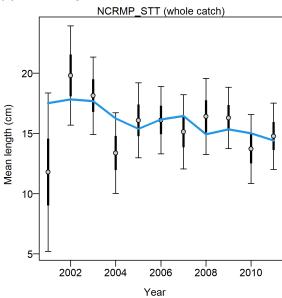


Figure 46: PR_STTJ_RW_2





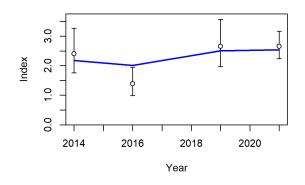
(a) Mean length STTJ DCRMP

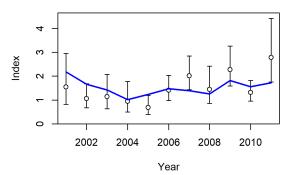


(b) Mean length PR La Parguera NCRMP

(c) Mean length STT NCRMP

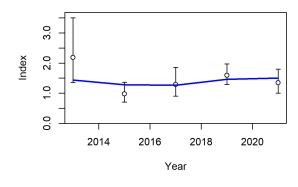
Figure 47: PR_STTJ_RW_2

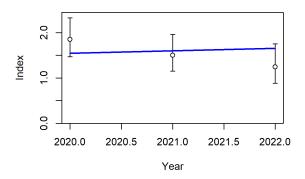




(a) Index PR NCRMP

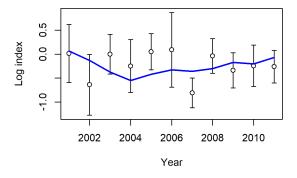






(c) Index STTJ NCRMP

(d) Index STTJ DCRMP



(e) Index STT NCRMP

Figure 48: PR_STTJ_RW_2