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# Case Studies: King Mackerel, Gray Snapper

Standing, Reef Fish, Mackerel,  
Ecosystem, & Socioeconomic MRIP SSC  
Meeting  
July 8-9, 2020

# Case Studies

- Three estimate series:
  - **BASE:** uncalibrated estimates
  - **ACAL:** estimates calibrated for APAIS only
  - **FCAL:** estimates fully calibrated for APAIS and FES
- 1981-2017
- Trends in landings, releases
- Change ratios among series
- Example point estimates

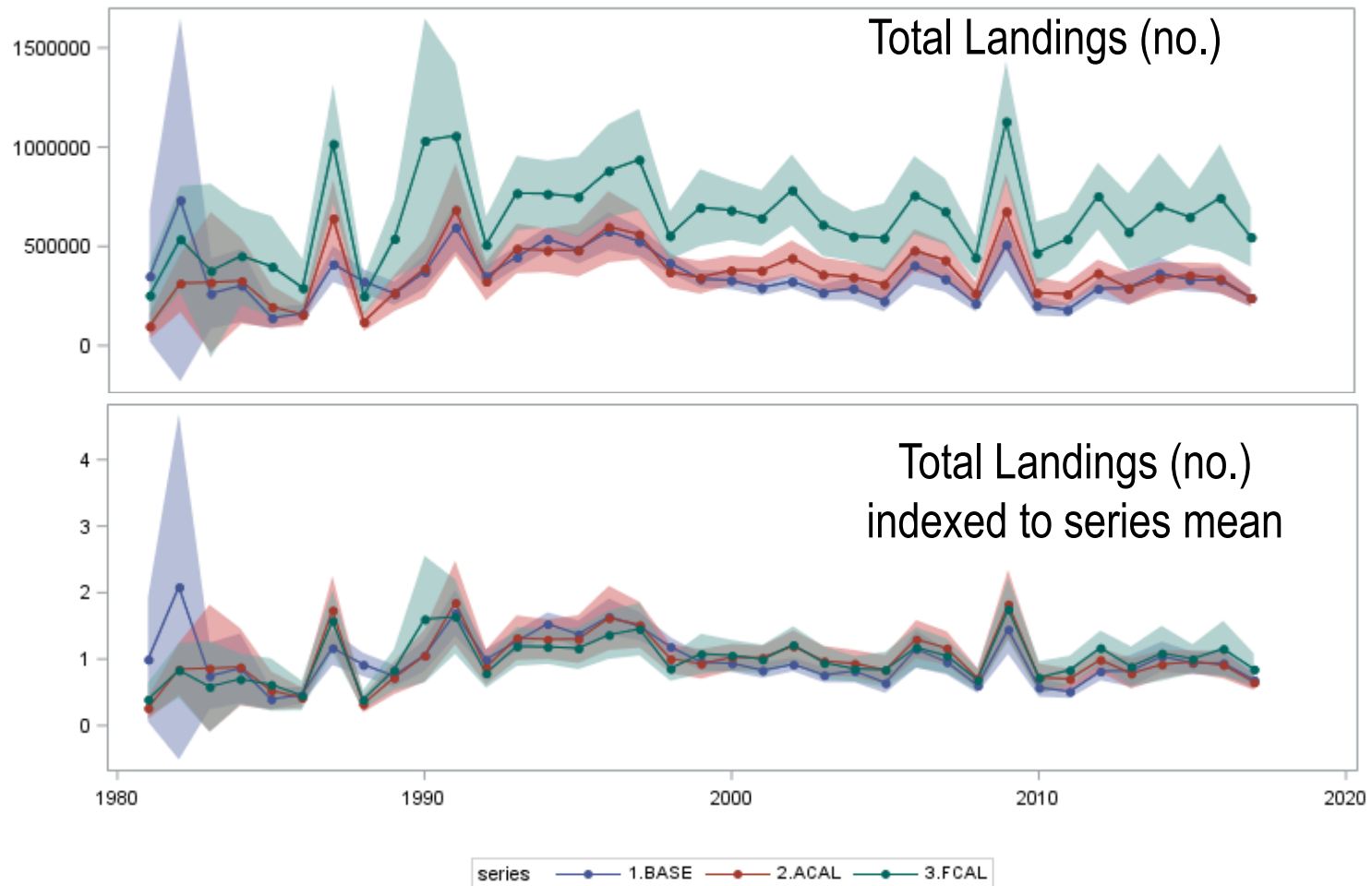


# King Mackerel



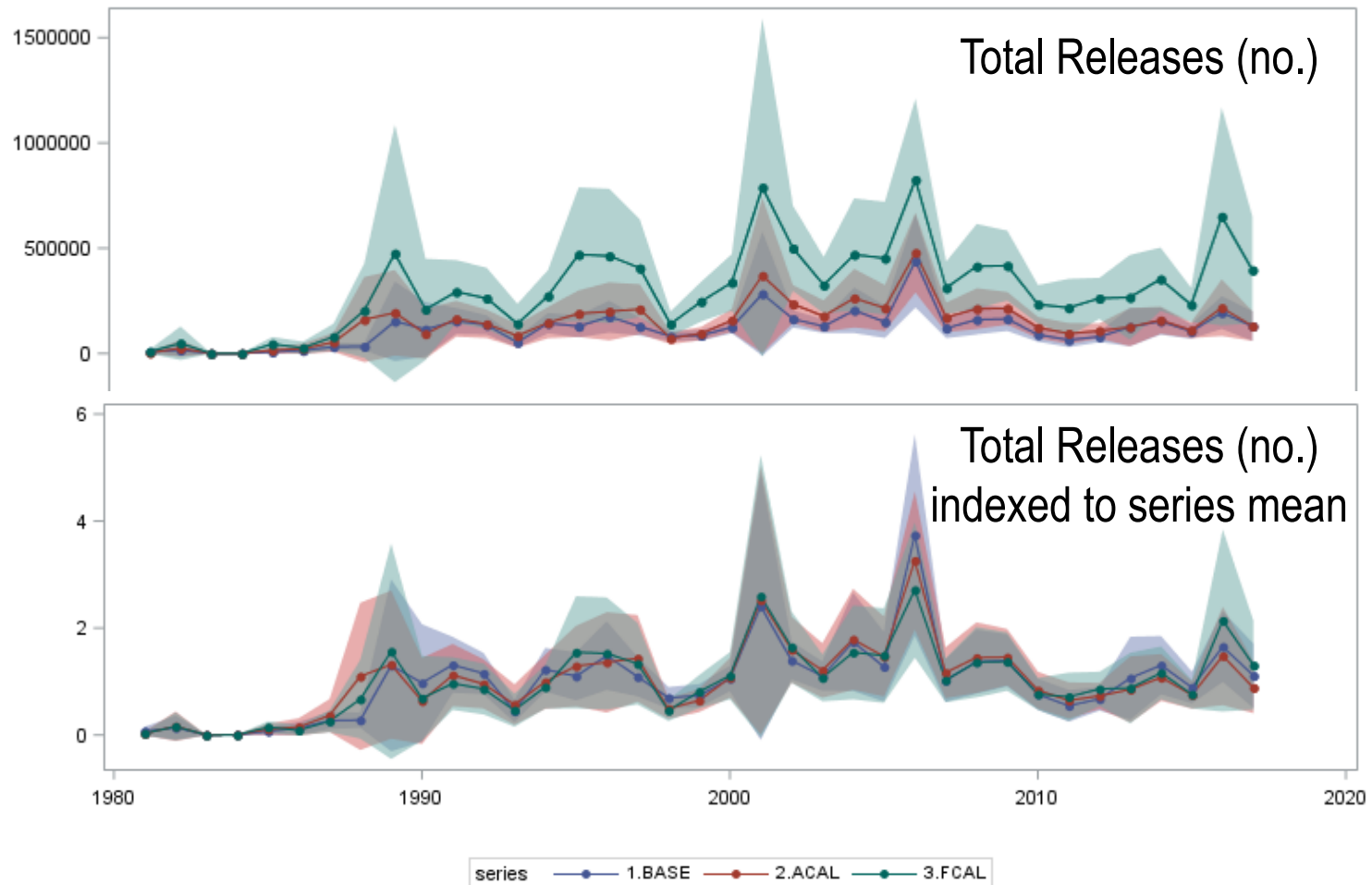
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# MRIP Gulf King Mackerel Total Annual Landings - LA



Overall decline and inter-annual changes similar among all estimate series, change in FCAL series in recent years. Shaded regions indicate 95% confidence interval.

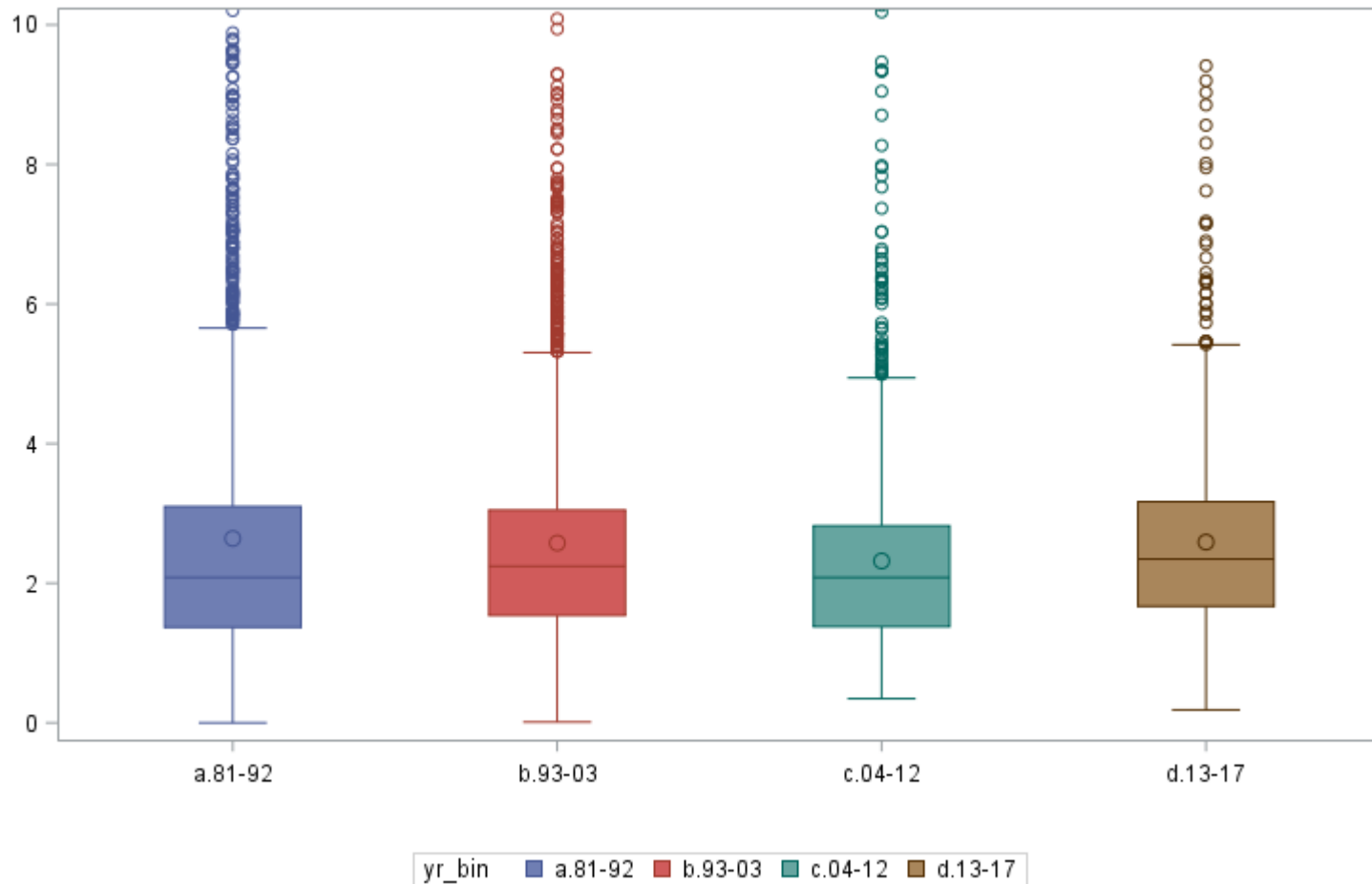
# MRIP Gulf King Mackerel Total Annual Releases - LA



Overall decline and inter-annual changes similar among all estimate series, change in FCAL series in recent years. Shaded regions indicate 95% confidence interval.

# MRIP Gulf Landings Change Ratios – King Mackerel

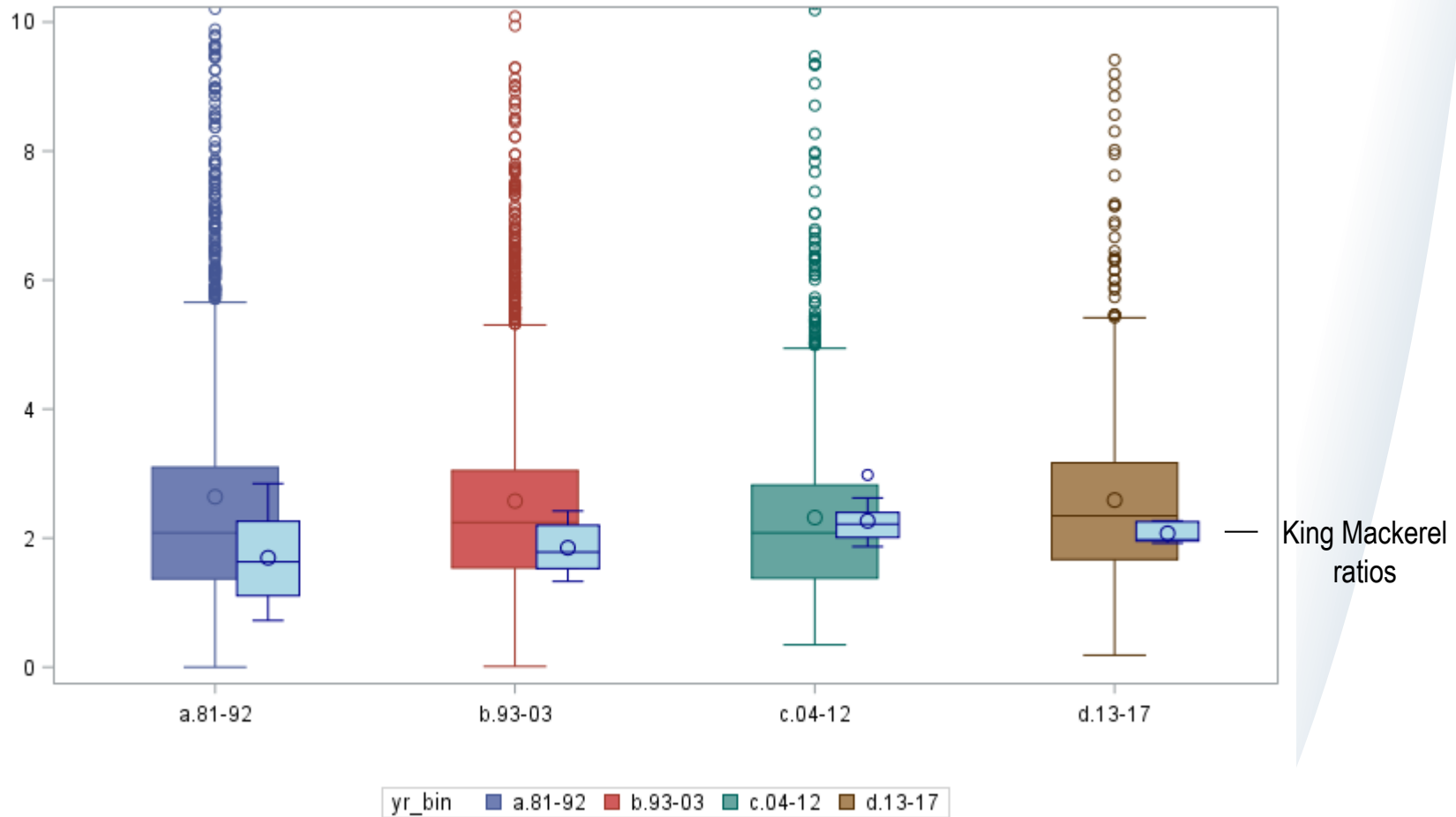
FCAL : BASE



Box plot summaries of FCAL : BASE for annual total landings (all species, king mackerel) and mean ratios for SH and PR effort by year groups.

# MRIP Gulf Landings Change Ratios – King Mackerel

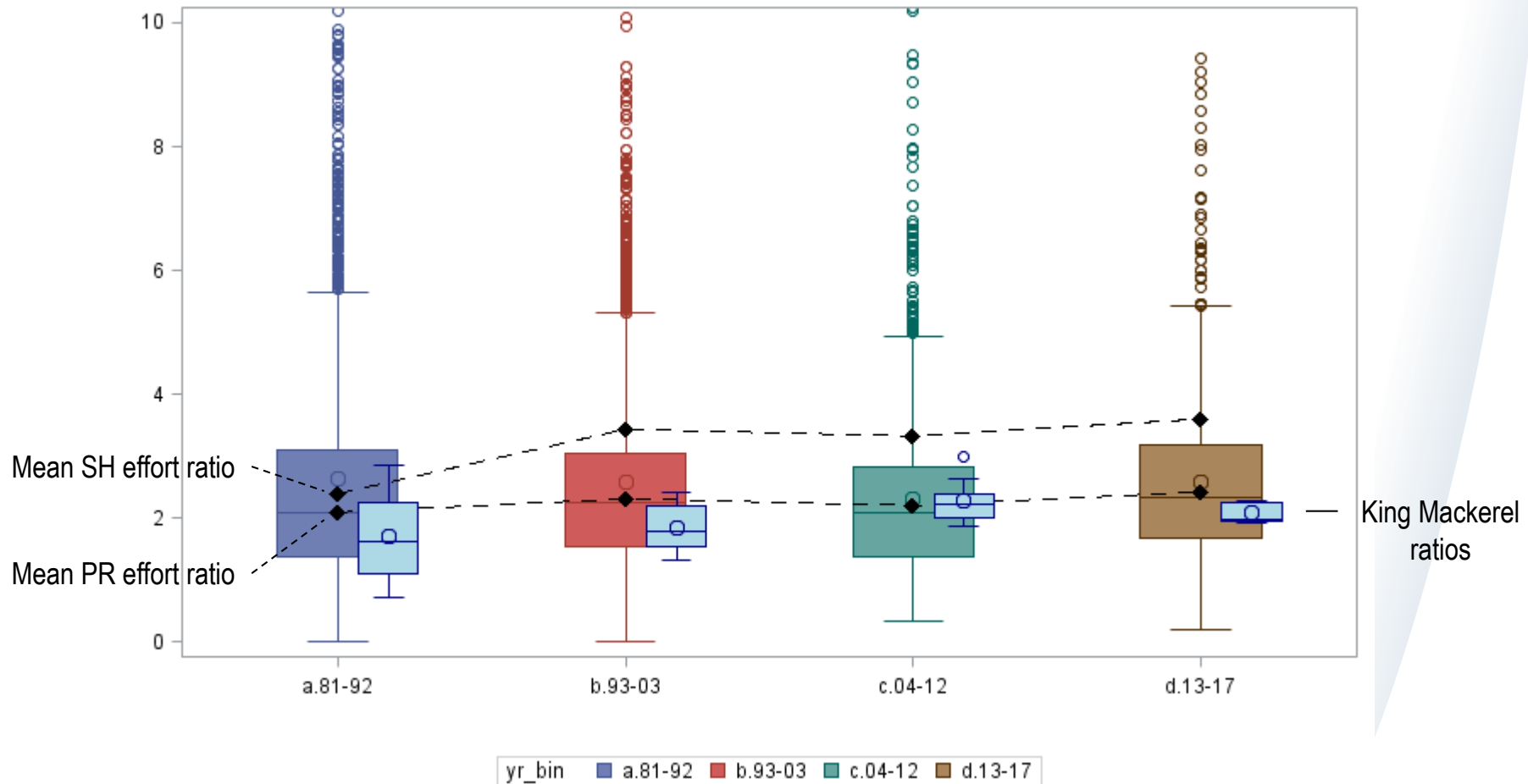
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Box plot summaries of FCAL : BASE for annual total landings (all species, king mackerel) and mean ratios for SH and PR effort by year groups.

# MRIP Gulf Landings Change Ratios – King Mackerel

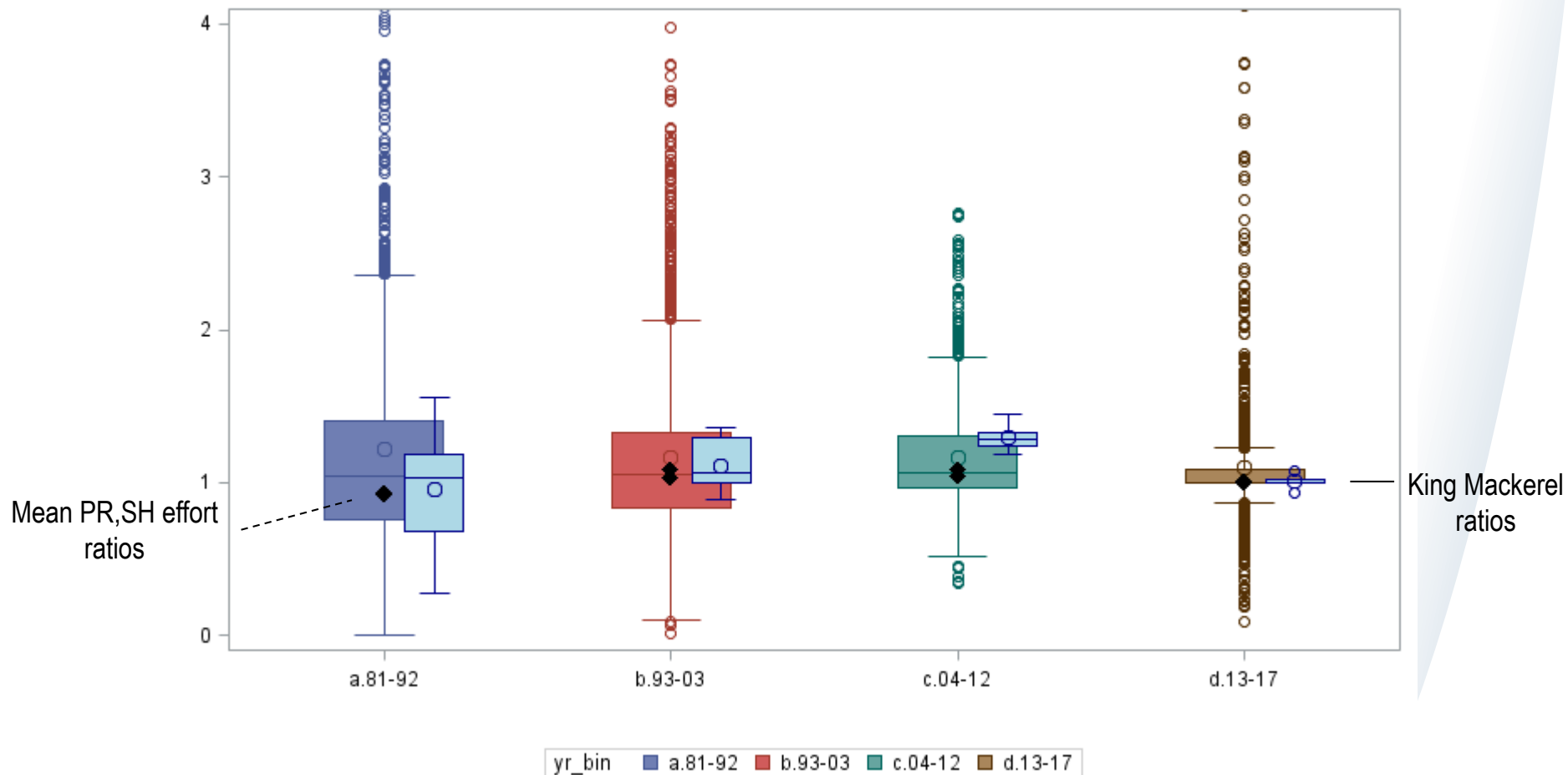
FCAL : BASE



Box plot summaries of FCAL : BASE for annual total landings (all species, king mackerel) and mean ratios for SH and PR effort by year groups.

# MRIP Gulf Landings Change Ratios – King Mackerel

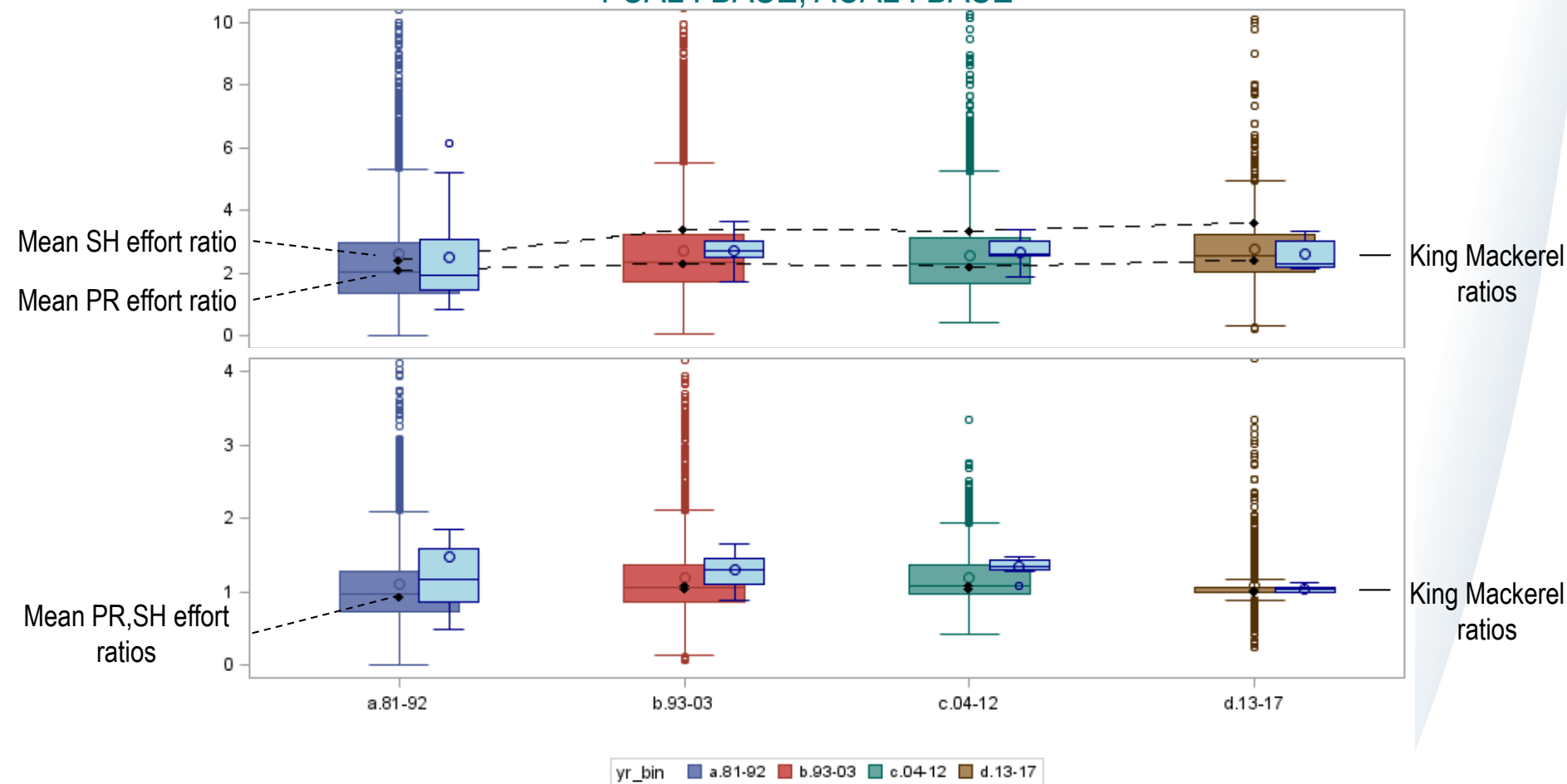
ACAL : BASE



Box plot summaries of ACAL : BASE for annual total landings (all species, king mackerel) and mean ratios for SH and PR effort by year groups.

# MRIP Gulf Releases Change Ratios – King Mackerel

FCAL : BASE, ACAL : BASE



Box plot summaries of FCAL : BASE, ACAL : BASE for annual total releases (all species, king mackerel) and mean ratios for SH and PR effort by year groups.



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# King Mackerel Point Estimates

- Exploring drivers for large changes or unusual estimates
- Landings
  - 1982, 2009
- Releases
  - 1989, 2016

# King Mackerel – Landings 2009

- Large changes in 2009 landings due to FES calibration primarily in Florida private boat and shore modes

Estimate	Total BASE	Total ACAL	Total FCAL	Total Change	% Change APAIS	% Change FES
Landings	509,489	676,875	1,129,397	619,908	27	73
Landings – WFL,PR	236,810	347,604	593,497	356,687	31	69
Landings – WFL,SH	49,536	80,578	177,836	128,301	24	76

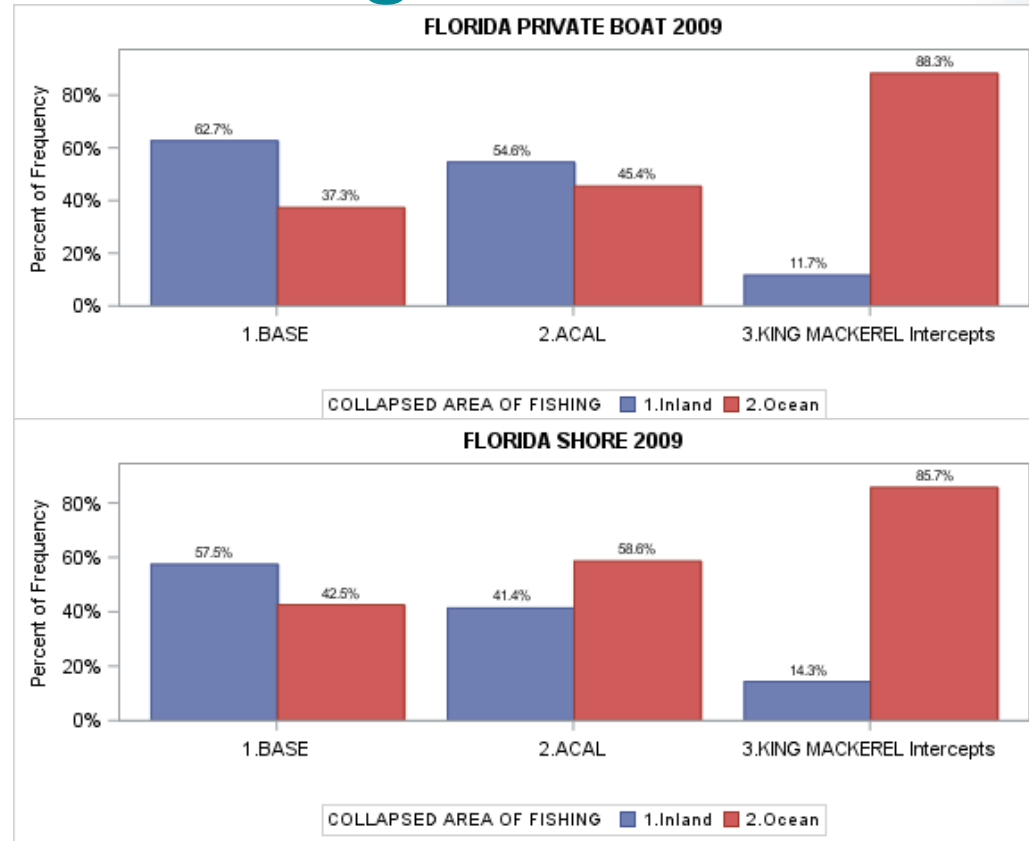
Estimate	Total ACAL	Total FCAL	Change Ratio
Landings – WFL,PR	347,604	593,497	1.7
Effort – WFL,PR	9,088,233	19,828,125	2.2
Landings – WFL,SH	80,578	177,836	2.2
Effort – WFL,SH	7,049,557	15,804,137	2.2



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# King Mackerel – Landings 2009

- APAIS calibration effect due to changes in sample weighting by area fished
- Area fished was included as raking variable
- Changes in area fished distributions observed with APAIS design change
- King mackerel trips in Ocean areas upweighted in APAIS calibration



APAIS sample weight and king mackerel intercept percentages by area fished

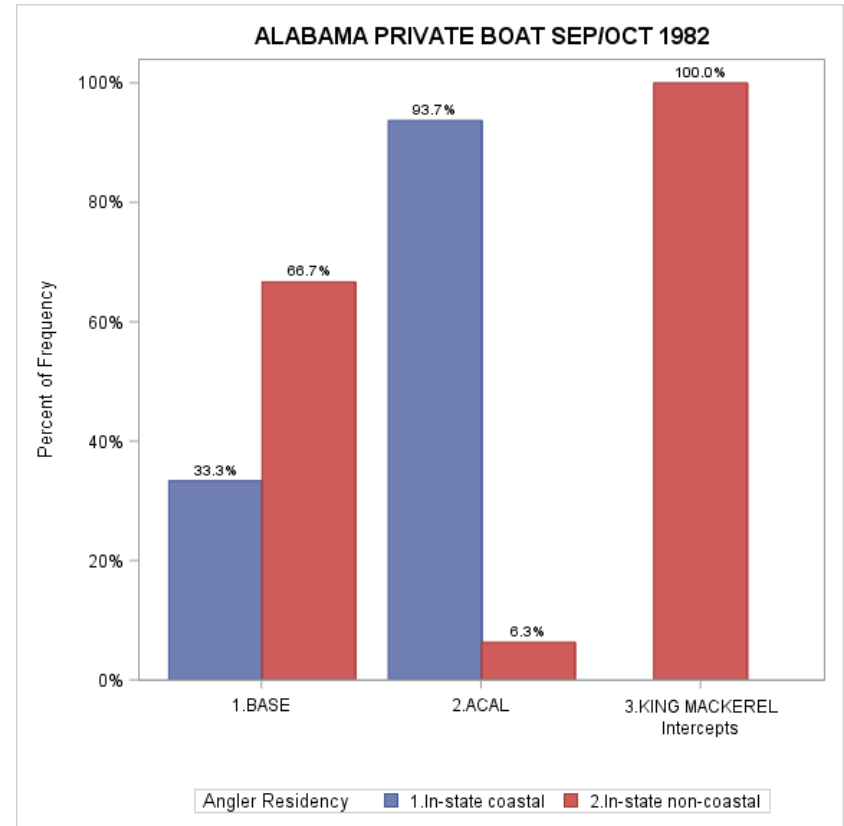
# King Mackerel – Landings 1982

- Large changes in 1982 landings due to APAIS calibration primarily in Alabama private boat mode

Estimate	Total BASE	Total ACAL	Total FCAL	Total Change	% Change APAIS	% Change FES
Landings	733,984	314,367	537,676	-196,308	214	-114
Landings – AL,PR	595,597	148,963	130,510	-465,087	96	4
Effort – AL,PR	596,248	401,843	512,494	-83,754	232	-132

# King Mackerel – Landings 1982

- APAIS angler resident type proportions used to account for effort by anglers not covered by effort surveys
- APAIS calibration effect due to changes in angler resident type proportions and down-weighting of king mackerel intercepts when calibration weights applied
- Original BASE estimates substantially under-represented coastal angler-trips and over-represented king mackerel trips



APAIS sample weight and king mackerel intercept percentages by resident type

# King Mackerel – Releases 2016

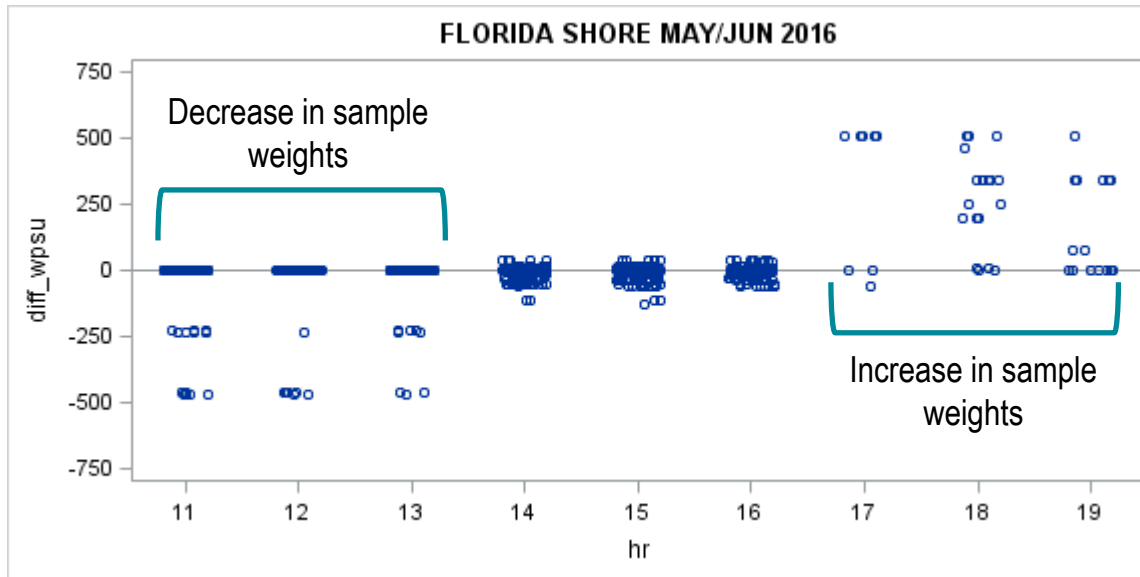
- Large changes in 2016 releases due to FES calibration primarily in Florida shore mode

Estimate	Total BASE	Total ACAL	Total FCAL	Total Change	% Change APAIS	% Change FES
Releases	194,484	217,401	651,010	456,527	5	95
Releases – WFL,SH,W3	18,854	67,894	268,943	250,089	20	80

Estimate	Total ACAL	Total FCAL	Change Ratio
Release – WFL,SH,W3	67,894	268,943	4
Effort – WFL,SH,W3	535,256	4,980,334	4

# King Mackerel – Releases 2016

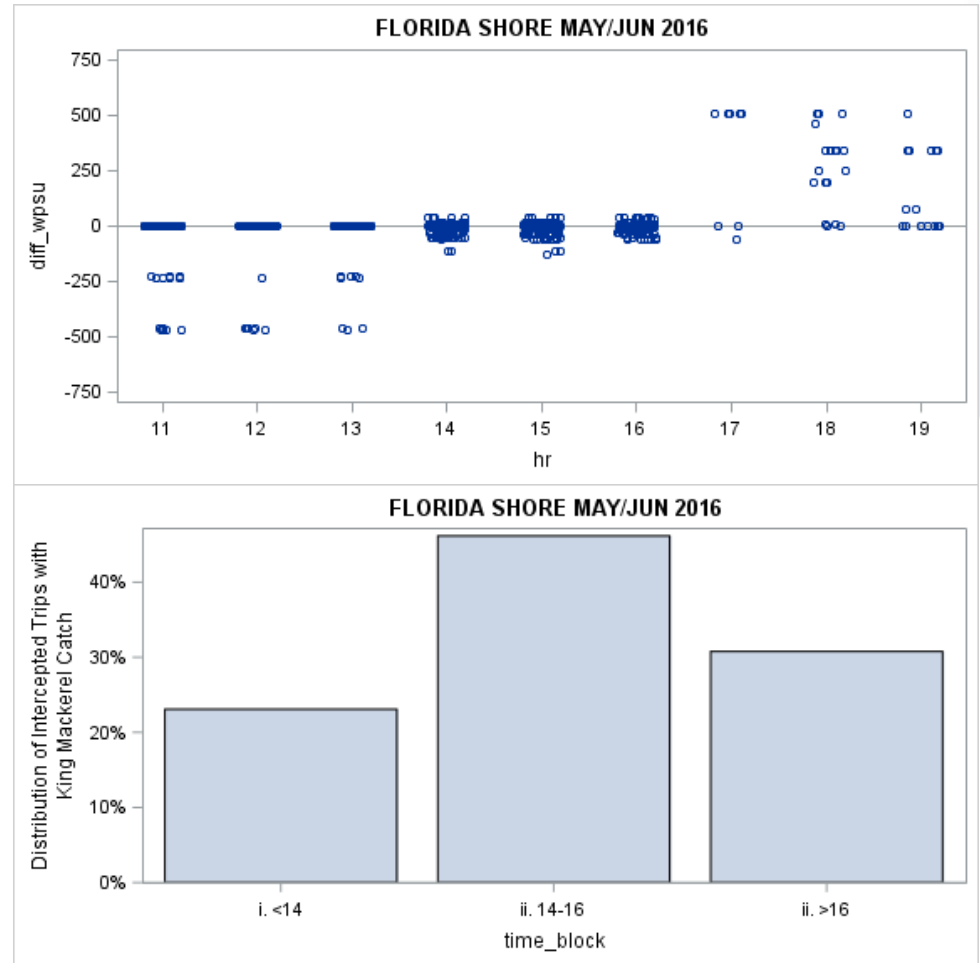
- APAIS calibration effects
  - Adjust sample weights to account for overlapping sample time intervals implemented in 2014



Jittered differences between adjusted and original APAIS sample weights by trip end hour for all intercepted trips in the Florida Shore Mode Wave 3 (MAY/JUN) 2016

# King Mackerel – Releases 2016

- Larger percentage of king mackerel intercepts were obtained in the later afternoon hours (sample weights increased) compared to mid-day hours (sample weights decreased)



# King Mackerel – Releases 1989

- Large changes in 1989 releases due to FES calibration primarily in Florida shore mode

Estimate	Total BASE	Total ACAL	Total FCAL	Total Change	% Change APAIS	% Change FES
Releases	153,060	193,512	475,623	322,562	13	87
Releases – WFL,SH	95,855	100,476	316,042	220,187	2	98

Estimate	Total ACAL	Total FCAL	Change Ratio
Release – WFL,SH	100,476	316,042	3.1
Effort – WFL,SH	5,453,151	17,642,531	3.2



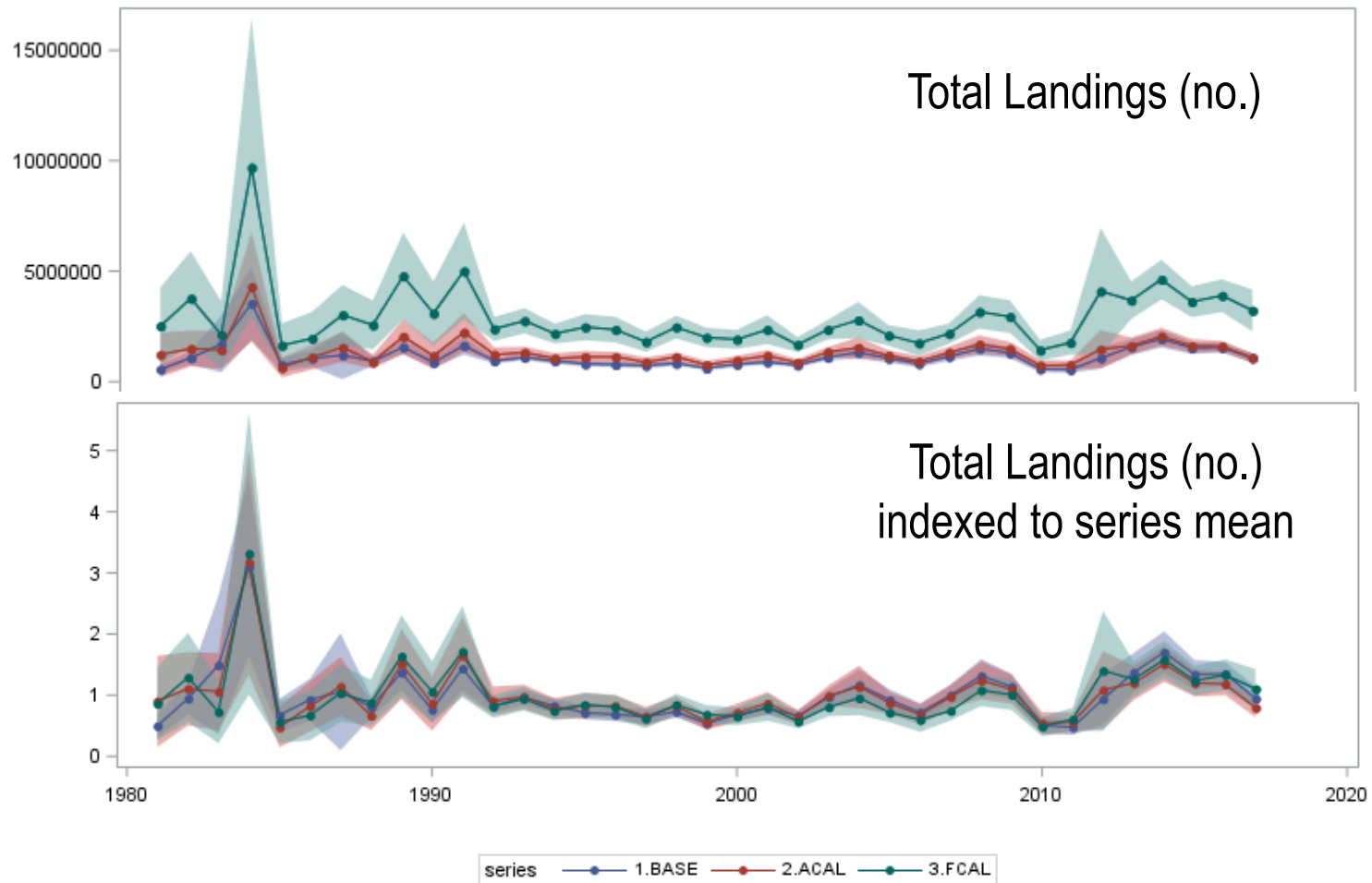
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# Gray Snapper



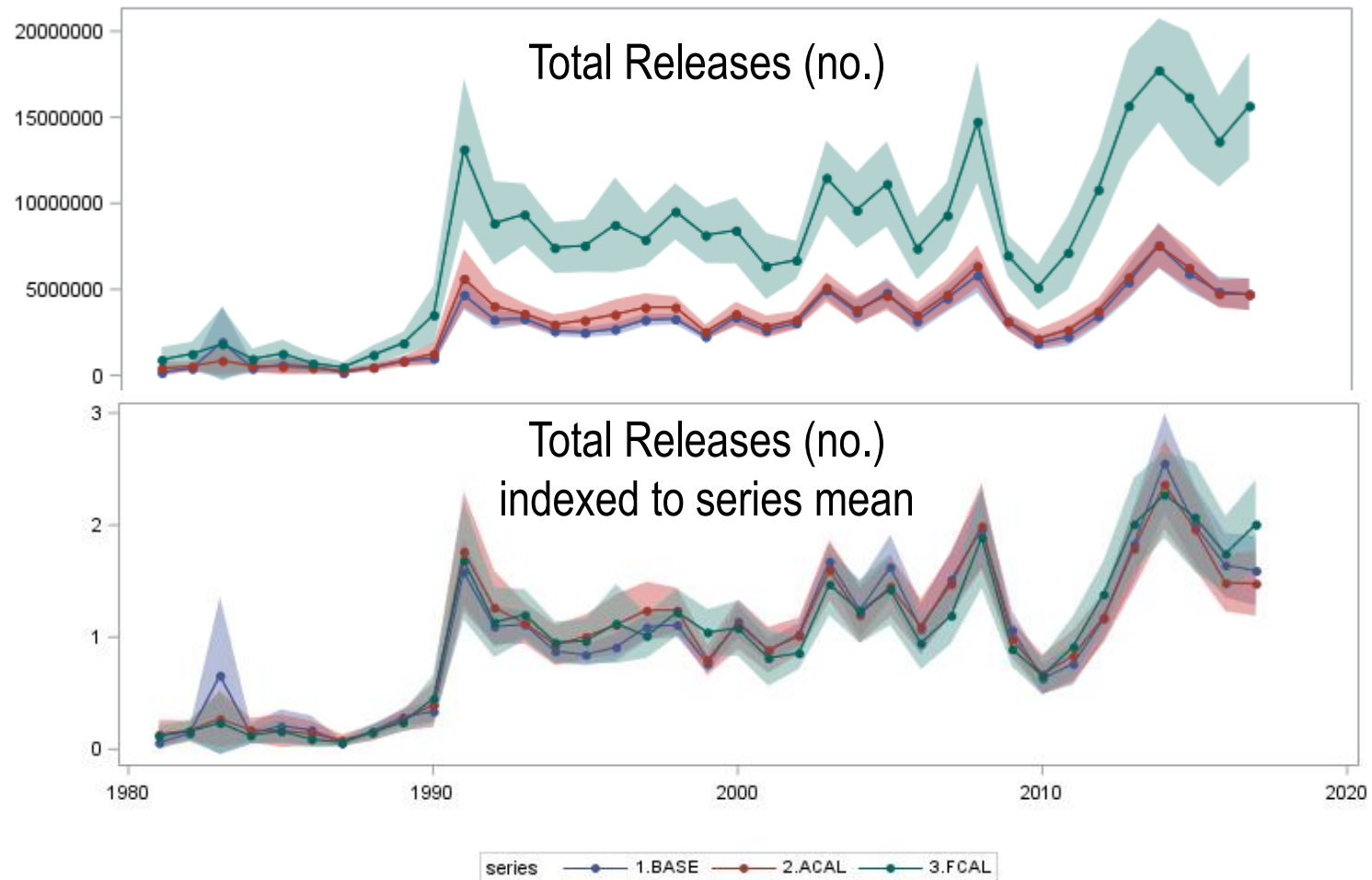
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# MRIP Gulf Gray Snapper Total Annual Landings - LA



Overall decline and inter-annual changes similar among all estimate series, change in FCAL series in recent years. Shaded regions indicate 95% confidence interval.

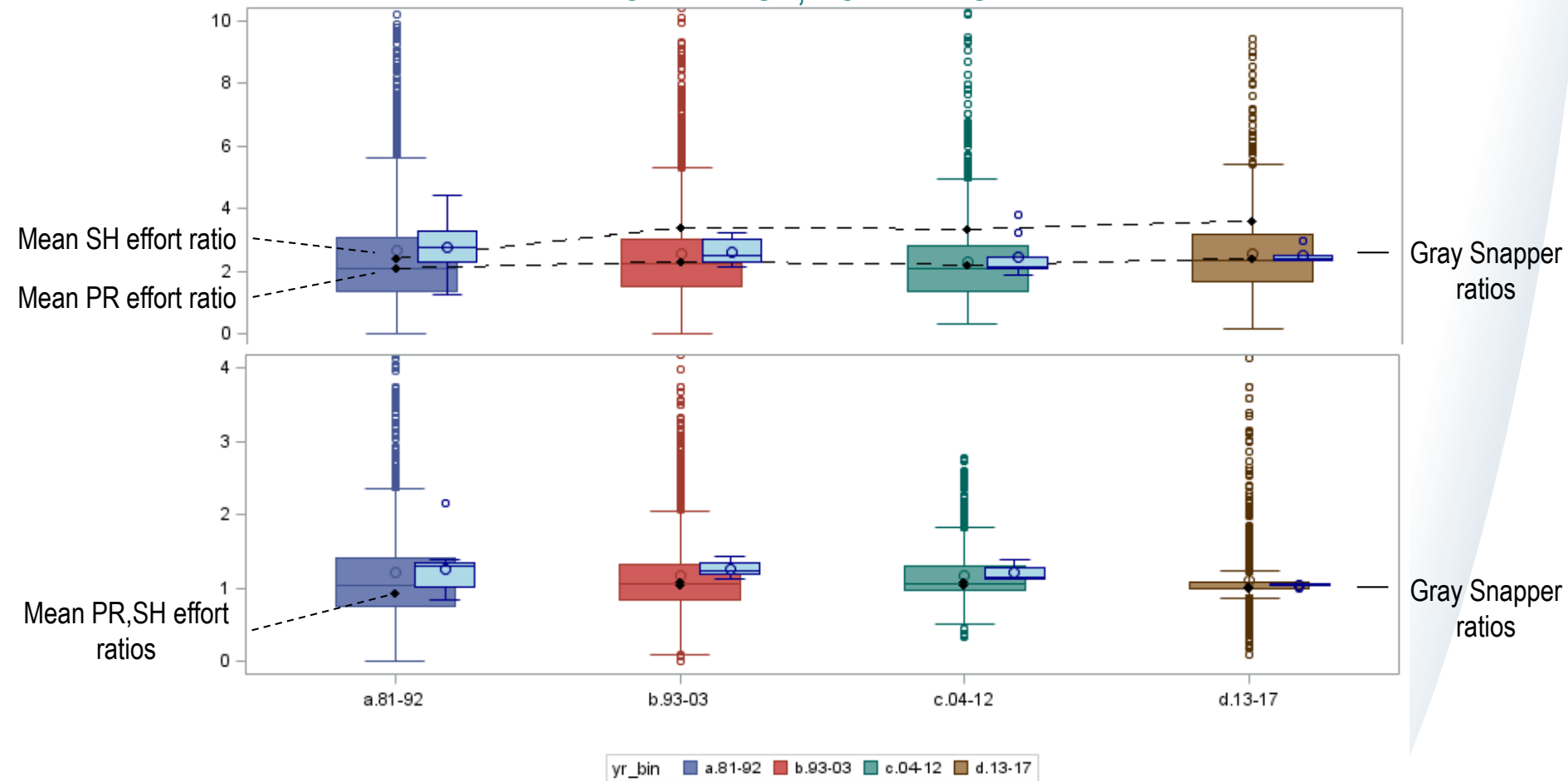
# MRIP Gulf Gray Snapper Total Annual Releases - LA



Overall decline and inter-annual changes similar among all estimate series, change in FCAL series in recent years. Shaded regions indicate 95% confidence interval.

# MRIP Gulf Landings Change Ratios – Gray Snapper

FCAL : BASE, ACAL : BASE



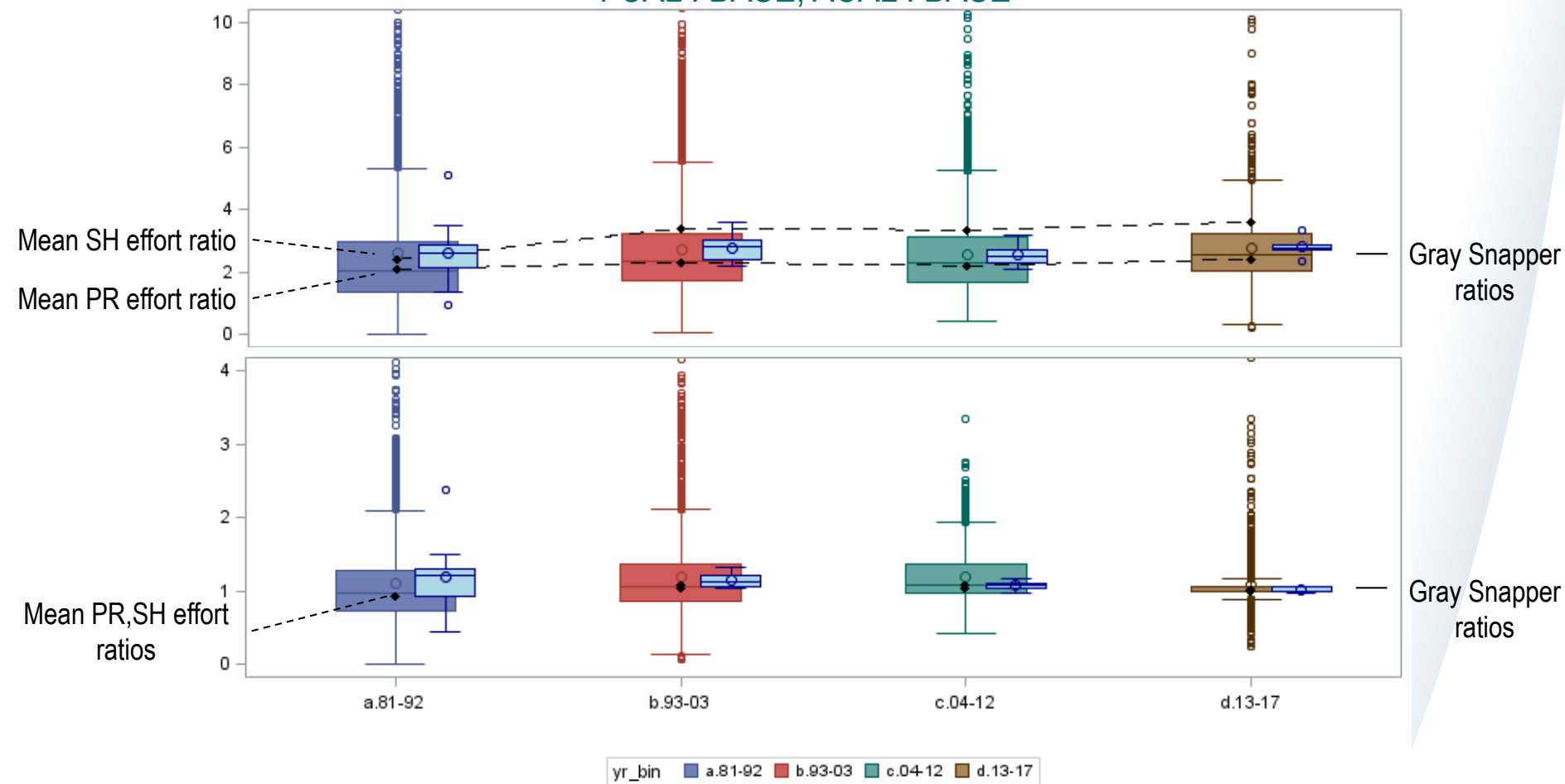
Box plot summaries of FCAL : BASE, ACAL : BASE for annual total landings (all species, gray snapper) and mean ratios for SH and PR effort by year groups.



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# MRIP Gulf Releases Change Ratios – Gray Snapper

FCAL : BASE, ACAL : BASE



Box plot summaries of FCAL : BASE, ACAL : BASE for annual total releases (all species, gray snapper) and mean ratios for SH and PR effort by year groups.



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# Gray Snapper Point Estimates

- Exploring drivers for large changes or unusual estimates
- Landings
  - 1984, 2012
- Releases
  - 2008, 2017

# Gray Snapper – Landings 2012

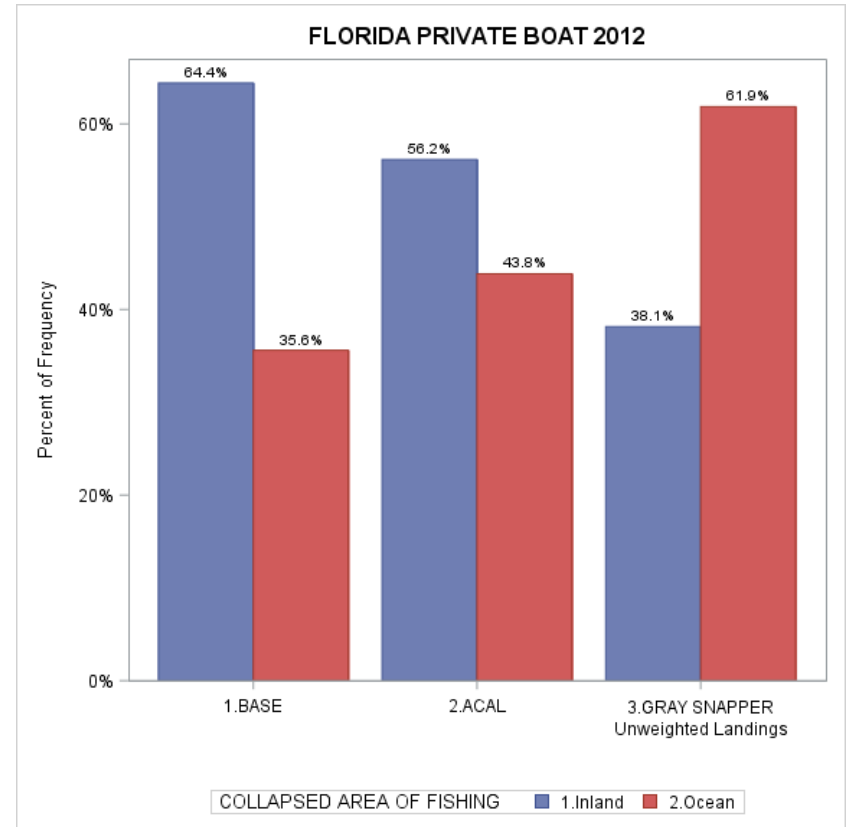
- Large changes in 2012 landings due to FES calibration primarily in Florida private boat mode

Estimate	Total BASE	Total ACAL	Total FCAL	Total Change	% Change APAIS	% Change FES
Landings	1,068,924	1,470,554	4,089,711	3,020,787	13	87
Landings – WFL,PR	840,553	1,153,240	3,411,889	2,571,336	12	88

Estimate	Total ACAL	Total FCAL	Change Ratio
Landings – WFL,PR	1,153,240	3,411,889	2.95
Effort – WFL,PR	8,207,719	23,305,672	2.84

# Gray Snapper – Landings 2012

- APAIS calibration effect due to changes in sample weighting by area fished
- Area fished was included as raking variable
- Changes in area fished distributions observed with APAIS design change
- Gray snapper landings in Ocean areas upweighted in APAIS calibration



APAIS sample weight and gray snapper unweighted landings percentages by area fished

# Gray Snapper – Landings 1984

- Large changes in 1984 landings due to FES calibration primarily in Florida private boat mode

Estimate	Total BASE	Total ACAL	Total FCAL	Total Change	% Change APAIS	% Change FES
Landings	3,542,987	4,294,202	9,698,940	6,155,953	12	88
Landings – WFL,PR,W6	1,806,980	1,798,682	6,160,704	4,353,724	0	100

Estimate	Total ACAL	Total FCAL	Change Ratio
Landings – WFL,PR,W6	1,798,682	6,160,704	3.4
Effort – WFL,PR,W6	971,121	3,326,209	3.4



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# Gray Snapper – Releases 2017

- Large changes in 2017 release due to FES calibration primarily in Florida private boat and shore modes

Estimate	Total BASE	Total ACAL	Total FCAL	Total Change	% Change APAIS	% Change FES
Releases	4,722,196	4,722,196	15,668,133	10,945,937	0	100
Releases–WFL,PR	2,249,111	2,249,111	6,470,941	4,221,830	0	100
Releases-WFL,SH	1,649,072	1,649,072	7,258,949	5,609,877	0	100

Estimate	Total ACAL	Total FCAL	Change Ratio
Releases – WFL,PR	2,249,111	6,470,941	2.9
Effort – WFL,PR	6,463,845	18,025,116	2.8
Releases – WFL,SH	1,649,072	7,258,949	4.4
Effort – WFL,SH	5,735,048	23,042,831	4



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# Gray Snapper – Releases 2008

- Large changes in 2008 release due to FES calibration primarily in Florida private boat and shore modes

Estimate	Total BASE	Total ACAL	Total FCAL	Total Change	% Change APAIS	% Change FES
Releases	5,815,685	6,361,687	14,749,956	8,934,271	6	94
Releases–WFL,PR	3,371,218	3,438,172	7,134,038	3,762,819	2	98
Releases-WFL,SH	2,180,942	2,647,909	7,258,014	5,077,072	9	91

Estimate	Total ACAL	Total FCAL	Change Ratio
Releases – WFL,PR	3,438,172	7,134,038	2.1
Effort – WFL,PR	7,612,481	17,971,393	2.4
Releases – WFL,SH	2,647,909	7,258,014	2.7
Effort – WFL,SH	10,569,559	22,324,061	2.1



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# Summary

- Systematic increase in landings and releases over time series due to FES calibration
- Trends and relative year-to-year fluctuations in estimates generally very similar among series with some deviations
- Changes for king mackerel and gray snapper catch estimates generally in line with overall results
- Drivers for large changes to individual point estimates are case-specific but often result from FES calibration alone or in combination with changes in weighting of APAIS data related to particular variables such as area fished



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