

Comisión Interamericana del Atún Tropical  
Inter-American Tropical Tuna Commission



INVESTIGATION OF THE SUBSTANTIAL CHANGE IN THE ESTIMATED F MULTIPLIER  
FOR BIGEYE TUNA IN THE EASTERN PACIFIC OCEAN  
Mark Maunder, Haikun Xu, Carolina Minte-Vera, and Alexandre Aires-da-Silva

## Slide 1

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**A1** You can use the generic pic for landing page  
Author, 2/27/2018

# Outline



- Change in estimated F multiplier
  - Reasons for the change
- Uncertainty in the estimate of F multiplier
  - Parameter uncertainty
  - Model assumption uncertainty
- Conclusions

# Years used to calculate recent fishing mortality

- The  $F$  multipliers are used as a basis for management recommendations
- $F$  multiplier =  $F_{MSY} / F_{current}$
- Bigeye  $F$  multiplier
  - SAC-09 = 0.87
  - SAC-08 = 1.15
  - 24% lower
- Largest inter-annual difference in the  $F$  multiplier seen in an update assessment

# Years used to calculate recent fishing mortality

- SAC-09: 2015 - 2017
- SAC-08: 2014 – 2016
- Difference: 2014 dropped and 2017 added
- Somewhere between 7% and 36% of the change

		Resulting F multiplier based on:	
	Description	2015-2017	2014-2016
	SAC-09 assessment	0.87	0.97
	SAC-08 assessment	N/A	1.15
<b>(1)</b>	SAC-08 + 2017 catch from SAC-09	1.13	1.15

# New and updated data

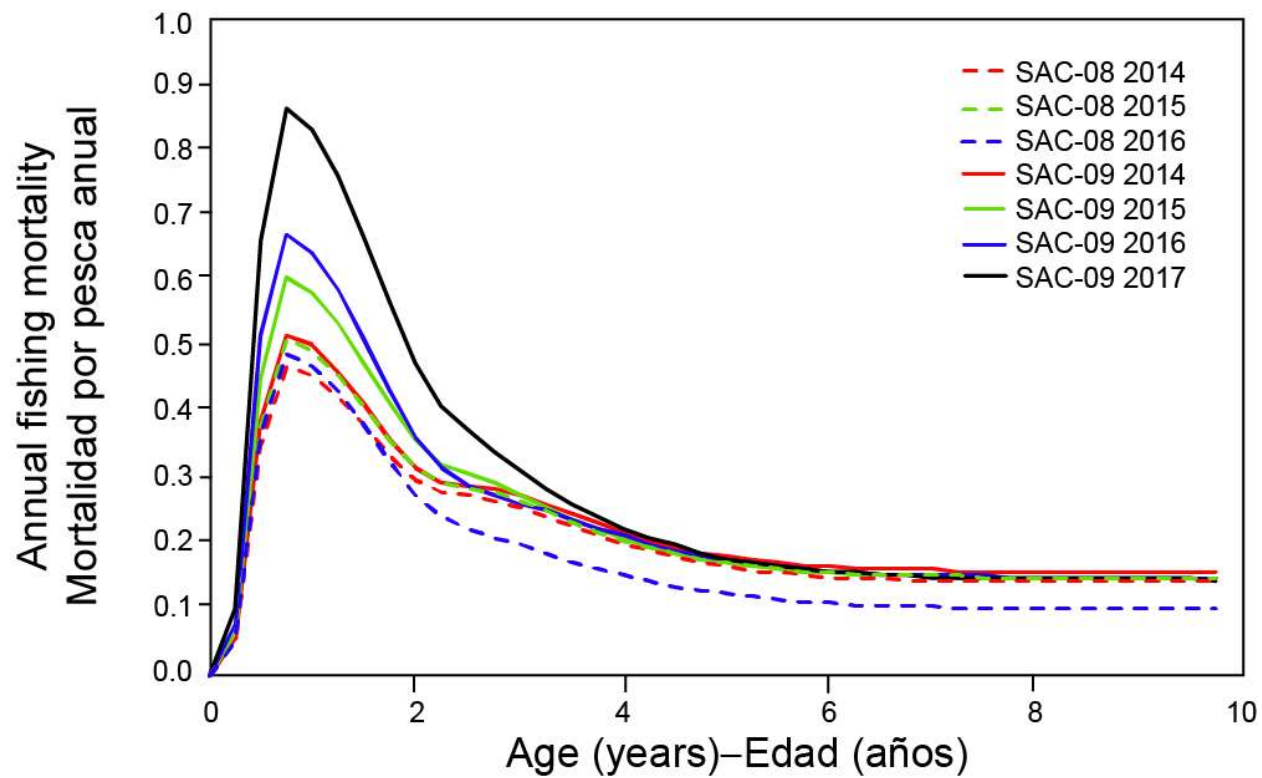
- **New data**
  - Purse-seine catch and length composition (LF) data for 2017
  - Longline catch data for 2017
  - Longline CPUE data for the last quarter of 2016 (Q4) and the first three quarters of 2017
- **Updated data**
  - A variety of catch data for both the purse-seine and longline fisheries
  - Length-composition data for the purse-seine (last quarter of 2016) and longline (2014-2015) fisheries
  - Longline CPUE data for the first three quarters of 2016



# New and updated data

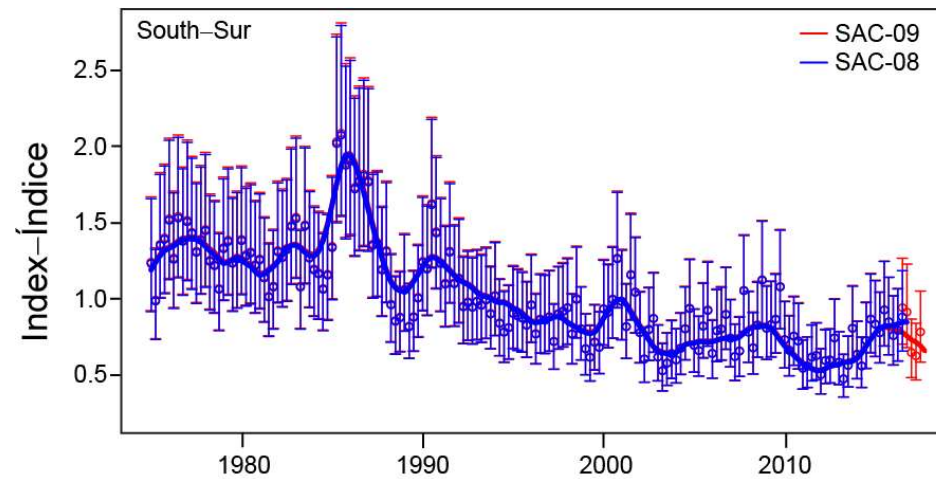
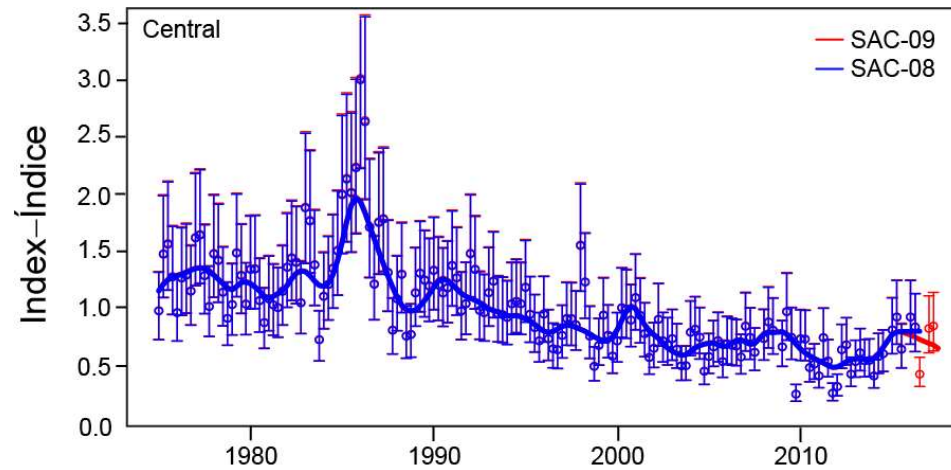
		Resulting F multiplier based on:	
	Description	2015-2017	2014-2016
	SAC-09 assessment	0.87	0.97
	SAC-08 assessment	N/A	1.15
<b>(1)</b>	SAC-09 without 2017 LF or CPUE $\geq$ Q4 2016	1.05	1.09
<b>(2)</b>	SAC-09 without CPUE $\geq$ Q4 2016	0.96	1.03
<b>(3)</b>	SAC-09 without 2017 LF	0.91	0.99

# Fishing mortality at age

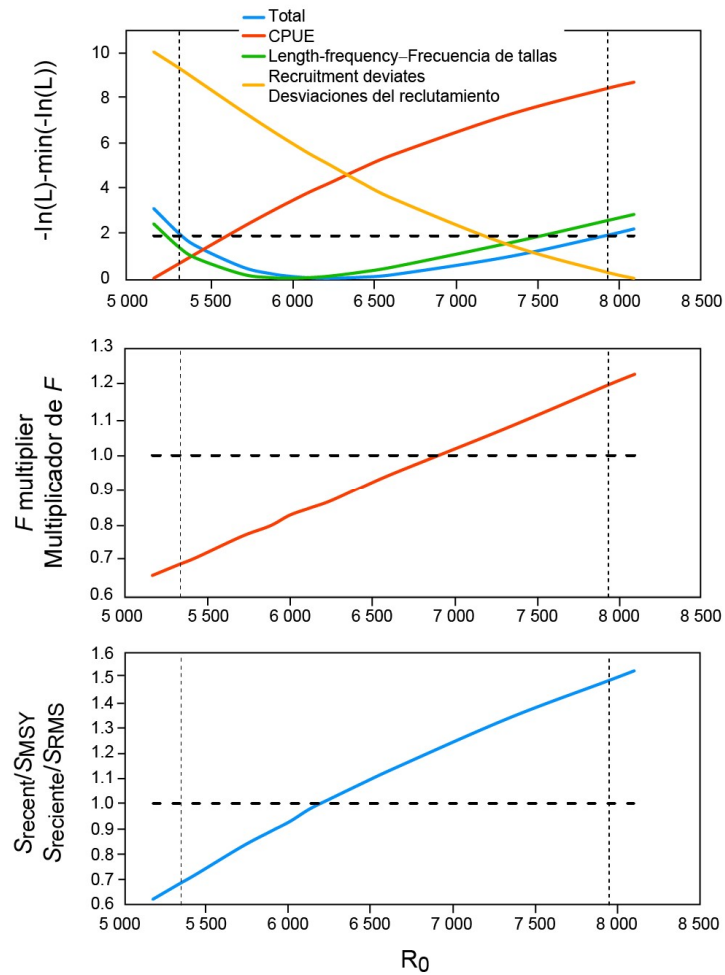




# CPUE based index of abundance

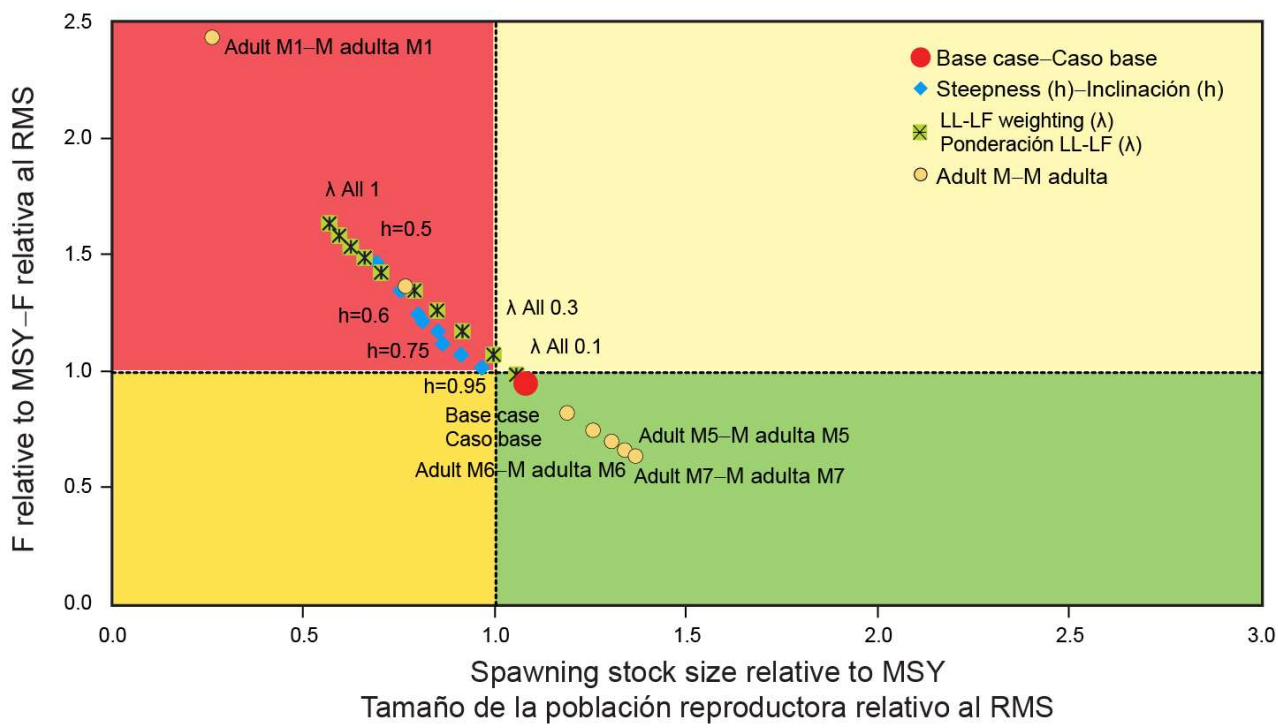


# Uncertainty in F multiplier

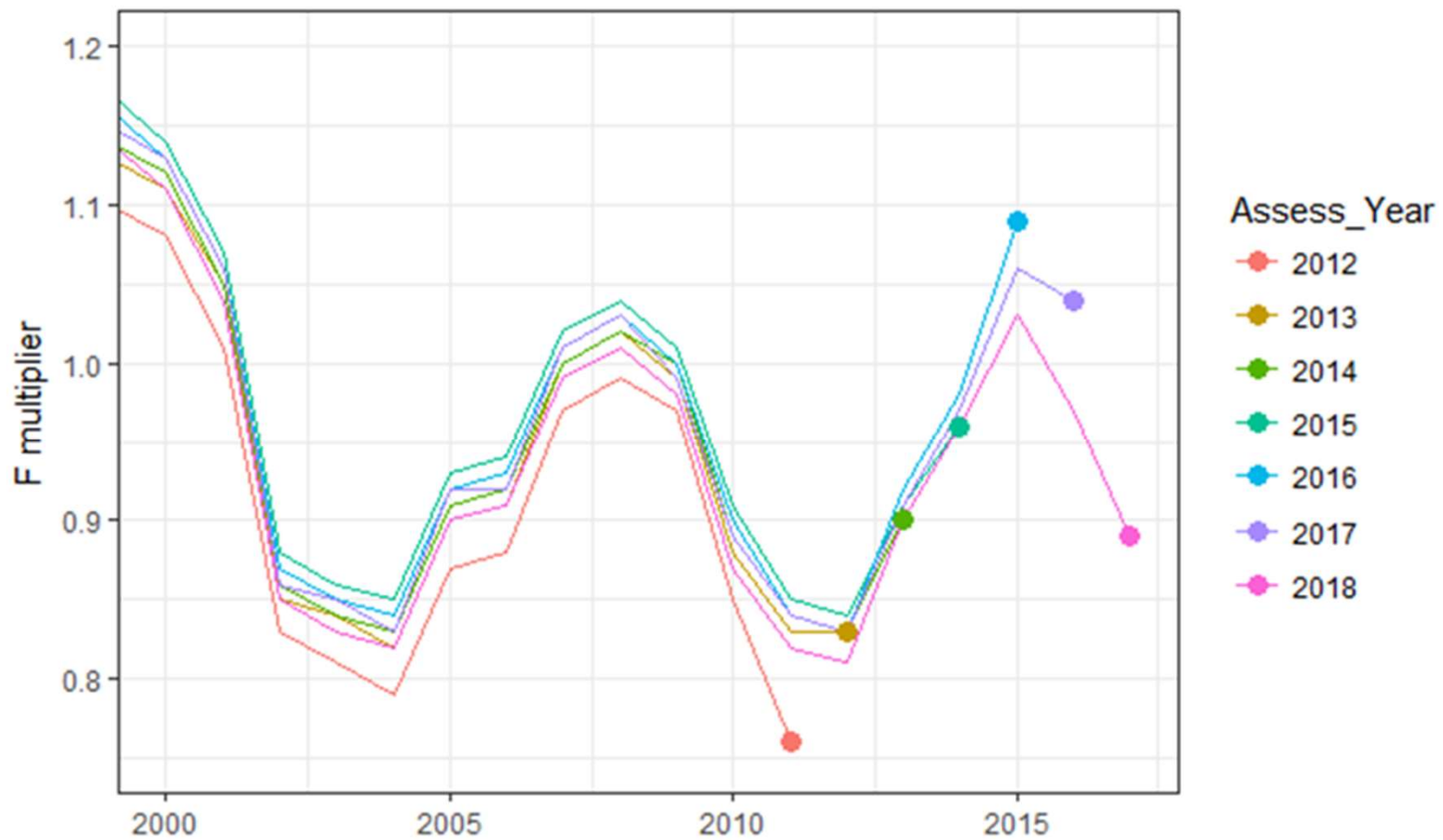


0.69 to 1.2

# Uncertainty in F multiplier



# Retrospective Pattern (corrected base case)



# Bigeye workplan

<b>October 2017</b>	<b><u>CAPAM workshop on recruitment: theory, estimation, and application in fishery stock assessment models</u></b>	
<b>2017</b>	Collaboration with Japanese scientists on identifying targeting changes	Presentation at SAC-09
<b>February 2018</b>	<u>CAPAM workshop on the development of spatio-temporal models of fishery catch-per-unit-effort data to derive indices of relative abundance</u>	For example, SAC-09-09
<b>2018</b>	Investigation of the relationship between fishing mortality and fleet capacity	<u>CAF-05-04, Project 2</u>
<b>2018</b>	Developing a spatially structured stock assessment for bigeye tuna and other model improvements	<u>CAF-05-04, Project 1</u>
<b>October 2018</b>	CAPAM workshop on spatial stock assessment models focusing on bigeye tuna	<u>CAF-05-04, Project 3</u>
<b>January/February 2019</b>	Proposed longline CPUE workshop	See proposal in SAC-09-02
<b>March 2019</b>	Proposed bigeye tuna assessment independent review	See proposal in SAC-09-02
<b>May 2019</b>	Exploratory bigeye tuna assessment	Presentation at SAC-10
<b>January 2020</b>	CAPAM workshop on Natural mortality	
<b>May 2020</b>	Benchmark bigeye tuna assessment	Presentation at SAC-11
<b>July-August 2021</b>	Adopt resolution for new management measures	



# Conclusions

- F multiplier from SAC-09 (0.87) is substantially lower than that from SAC-08 (1.15)
- Due mainly to new longline CPUE, which resulted in lower estimates of recent biomass.
- New length-composition data also contribute
- Substantial uncertainty in the estimates of the F multiplier and in the model assumptions
- Comprehensive work plan to address uncertainty and model misspecification



# Questions



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Photo: Jeff Muir

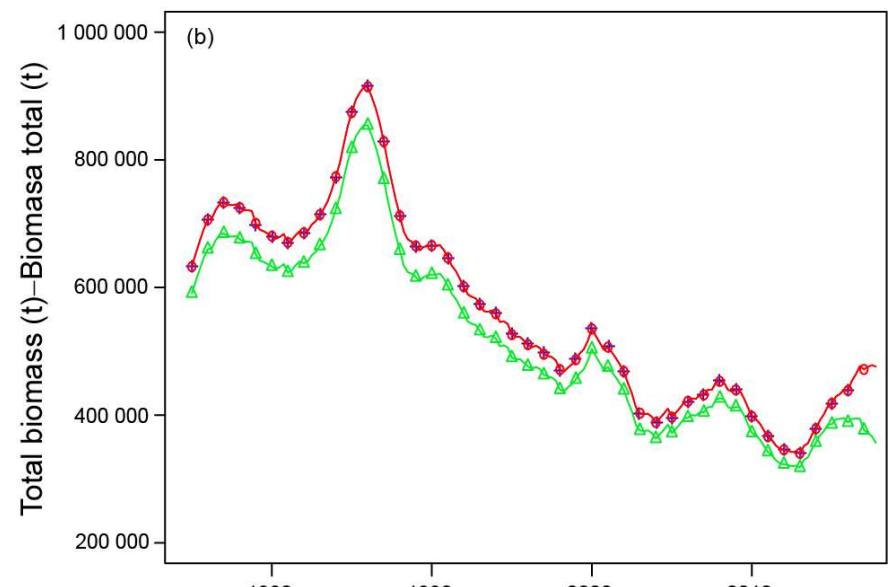
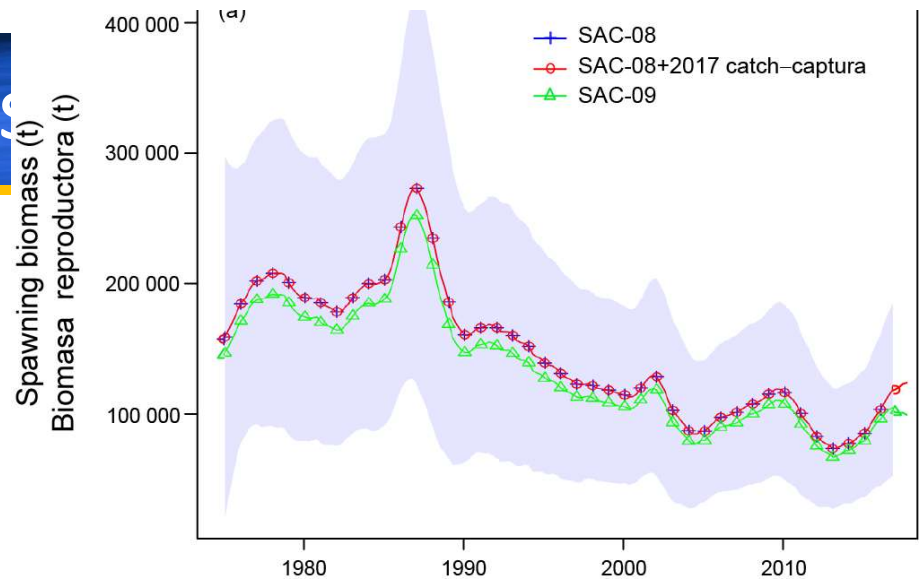




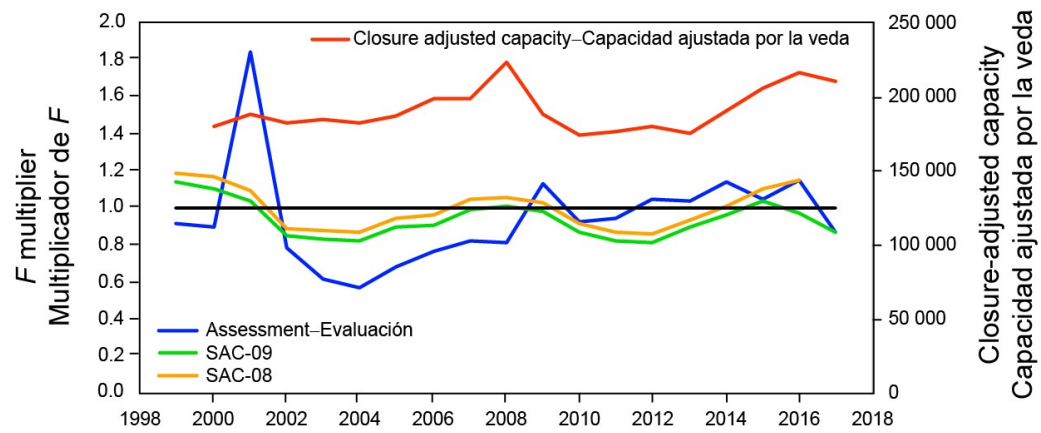
# Number of sets

Description- Descripción	F multiplier based on - Multiplicador de F basado en	
	2015-2017	2014-2016
Assessment- Evaluación SAC-09	0.87	0.97
Assessment- Evaluación SAC-08	n/a	1.15
SAC-08 + catch-captura 2017 from-de SAC-09	1.13	1.15
SAC-09 without-sin 2017 LF or CPUE >= Q4 2016	1.05	1.09
SAC-09 without-sin CPUE >= Q4 2016	0.96	1.03
SAC-09 without-sin 2017 LF	0.91	0.99

# Number of sets



# Number of sets



# Retrospective Pattern (corrected base case)

