

Global meta-analysis of tuna and billfish stocks



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The tuna status debate

letters to nature

2003

.....

Rapid worldwide depletion of predatory fish communities

Ransom A. Myers & Boris Worm

*Biology Department, Dalhousie University, Halifax, Nova Scotia, Canada
B3H 4J1*

.....

“...we estimate that large predatory fish biomass today is only about 10% of pre-industrial levels.”

SCIENCE VOL 314 15 DECEMBER 2006

Biomass, Size, and Trophic Status of Top Predators in the Pacific Ocean

John Sibert,^{1*} John Hampton,² Pierre Kleiber,³ Mark Maunder⁴

“Current biomass ranges among species from 36 to 91% of the biomass predicted in the absence of fishing...”

The New York Times Magazine
JUNE 27, 2010

Joseph E. Stiglitz
IMAGINING A
LIBERAL COURT
Wigner Mason
A SUMMER READ FOR
DEEP READERS



TUNA'S END

The fate of the bluefin, the oceans and us. BY PAUL GREENBERG

- How badly overfished are tuna and billfish?
- How much yield are we losing from overfishing?
- How are different RFMOs performing in their management of tuna and billfish?

NCEAS working group: Finding common ground in marine conservation and management

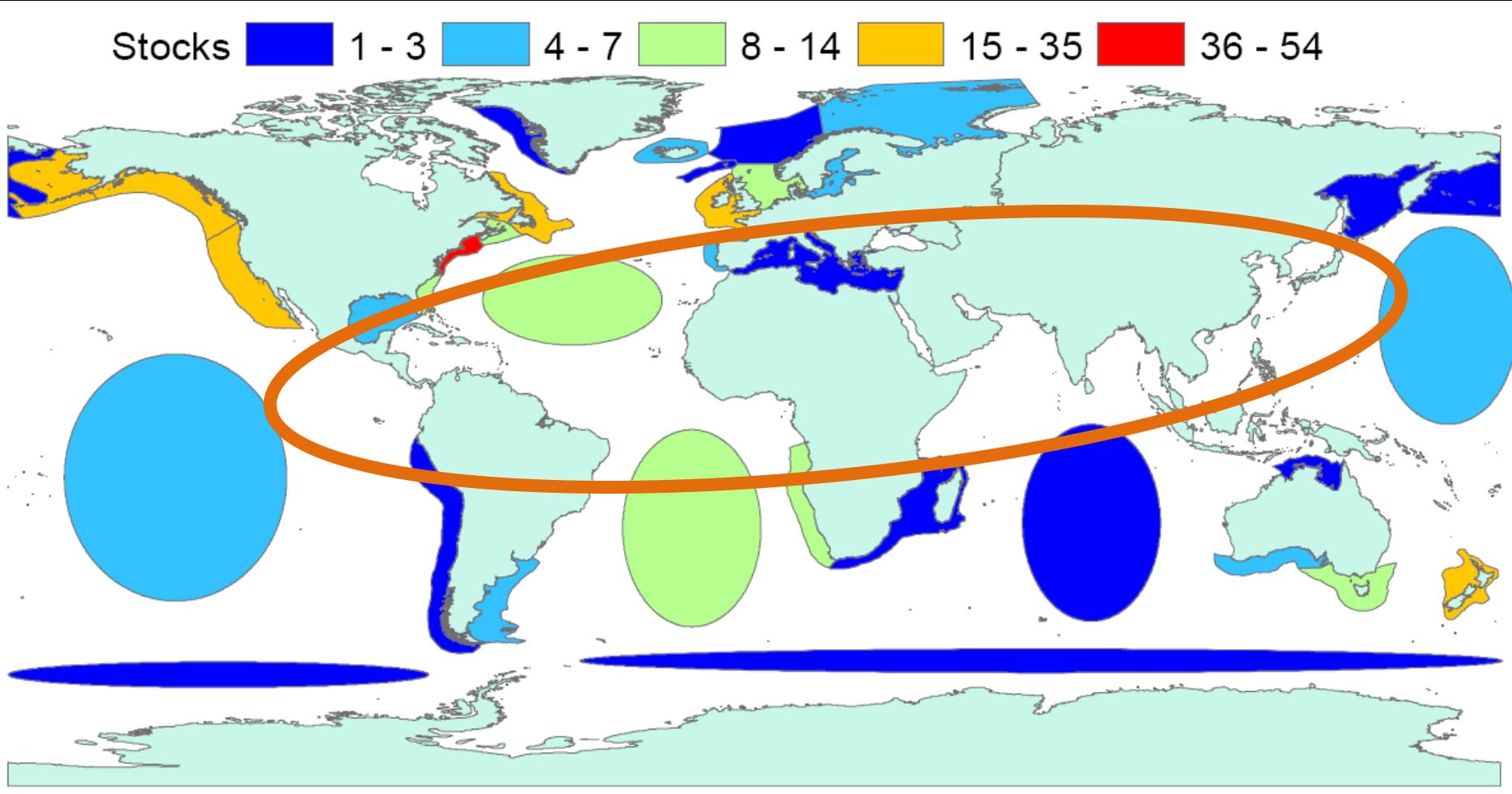


Rebuilding Global Fisheries

Boris Worm,^{1*} Ray Hilborn,^{2*} Julia K. Baum,³ Trevor A. Branch,² Jeremy S. Collie,⁴
Christopher Costello,⁵ Michael J. Fogarty,⁶ Elizabeth A. Fulton,⁷ Jeffrey A. Hutchings,¹
Simon Jennings,^{8,9} Olaf P. Jensen,² Heike K. Lotze,¹ Pamela M. Mace,¹⁰ Tim R. McClanahan,¹¹
Cólín Minto,¹ Stephen R. Palumbi,¹² Ana M. Parma,¹³ Daniel Ricard,¹ Andrew A. Rosenberg,¹⁴
Reg Watson,¹⁵ Dirk Zeller¹⁵

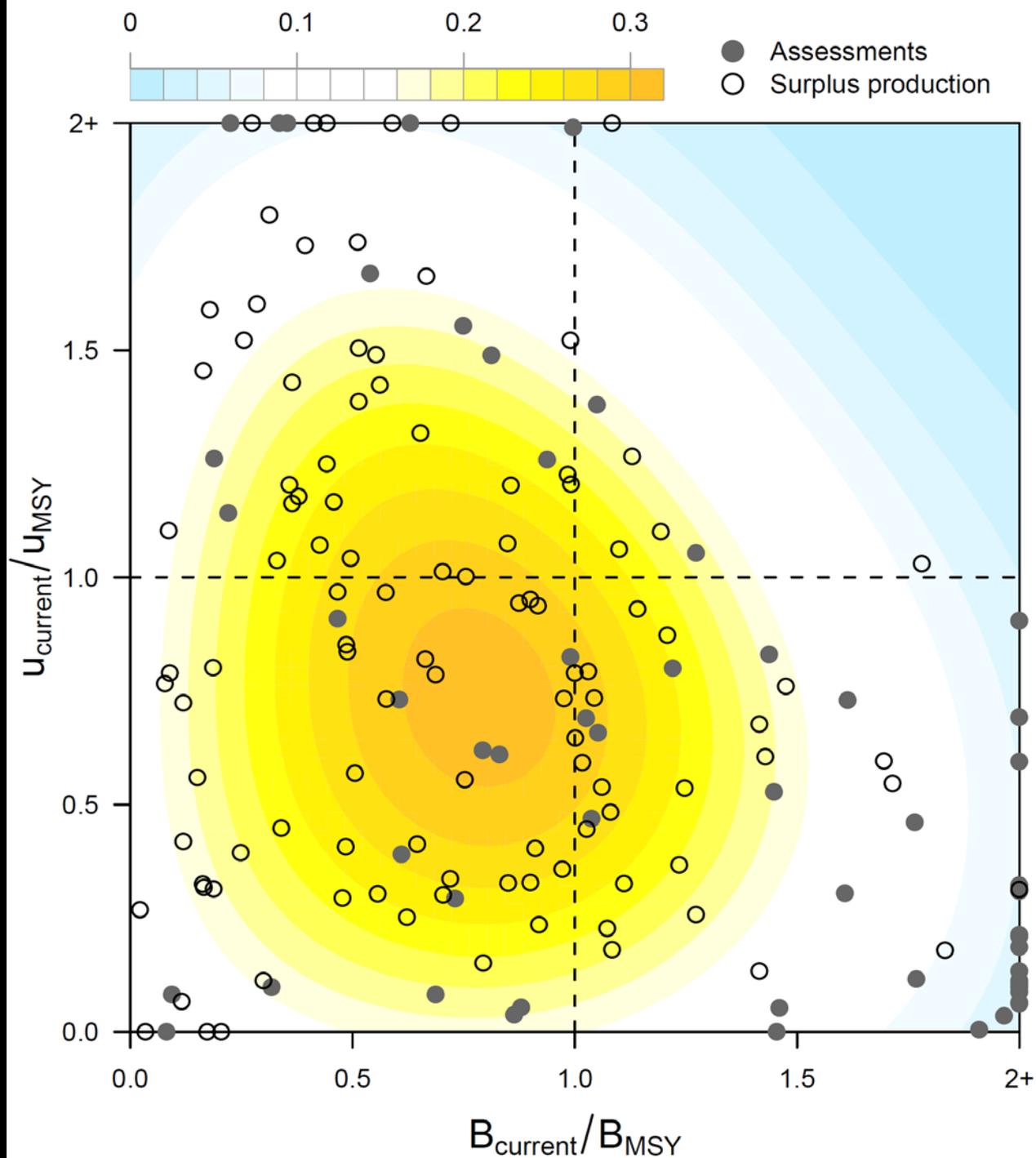
A global stock assessment database

currently > 350 stocks (147 fish, 16 invertebrate species)



Stock status worldwide

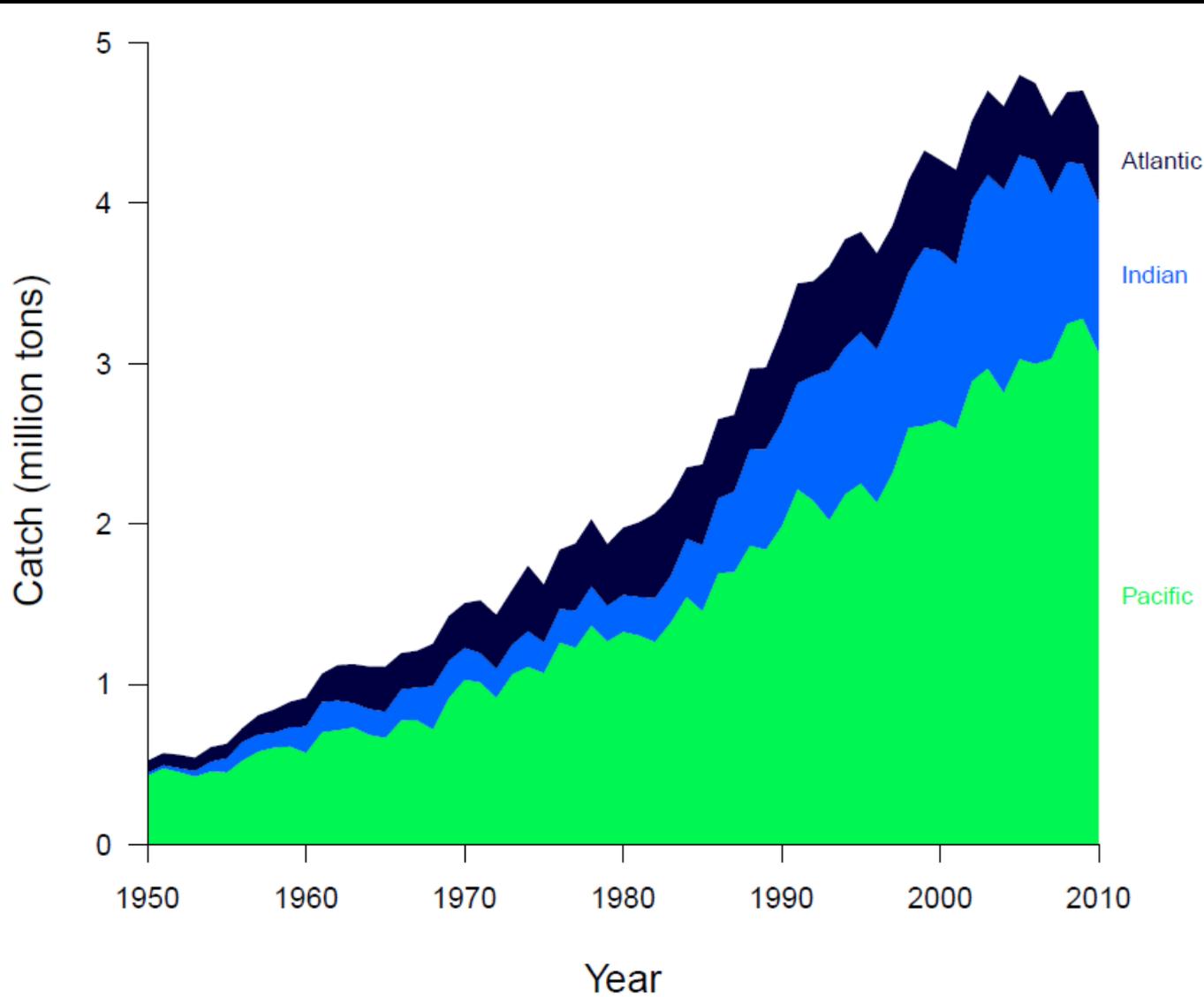
- 166 stocks
- 63% below MSY target
- 65% fished at rates below U_{MSY}



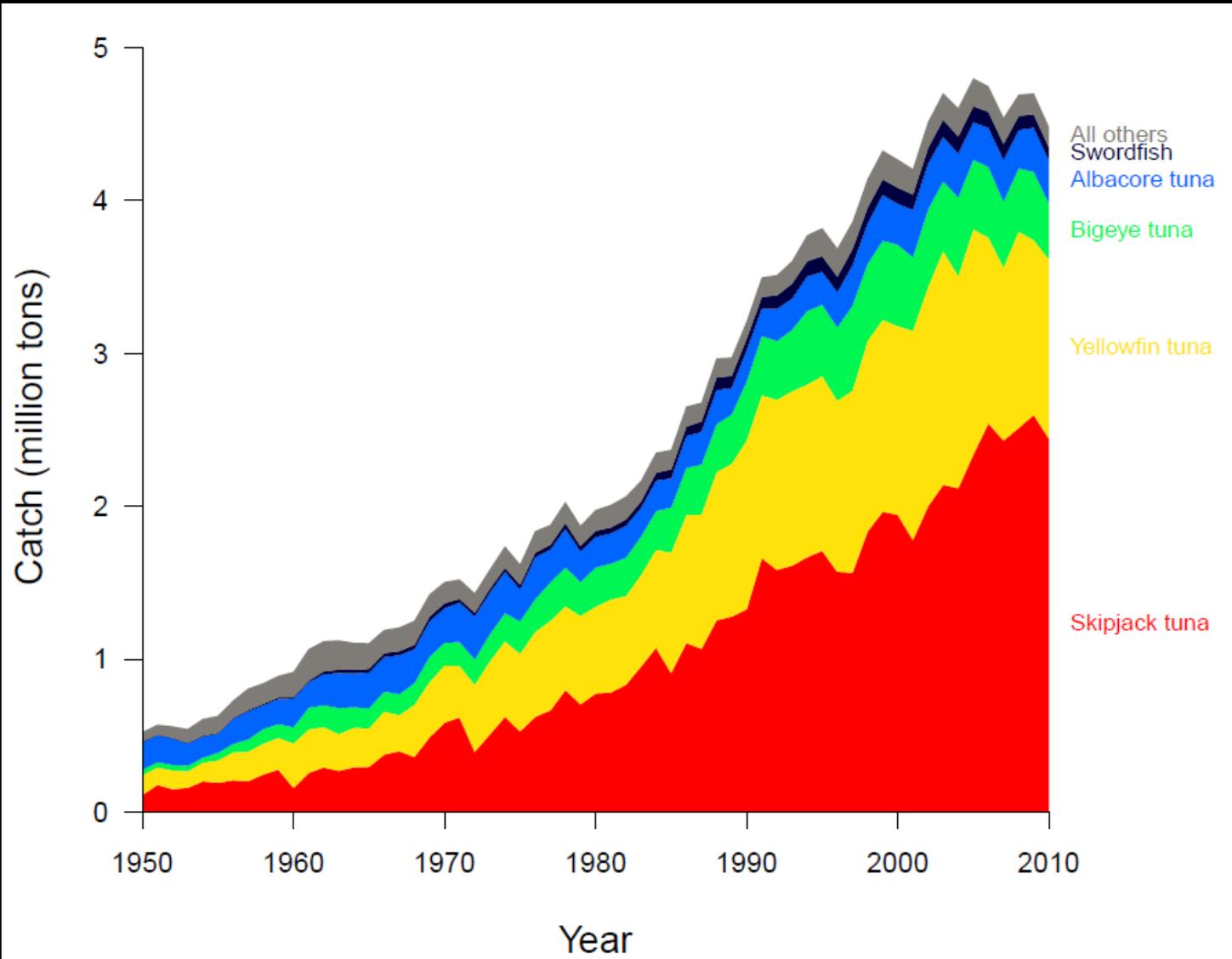
Data

- 37 stock assessments of tunas (22), swordfish (6), and istiophorid billfishes (9)
- Catch
- Biomass
- Exploitation rates
- MSY reference points
- Price data (in progress)

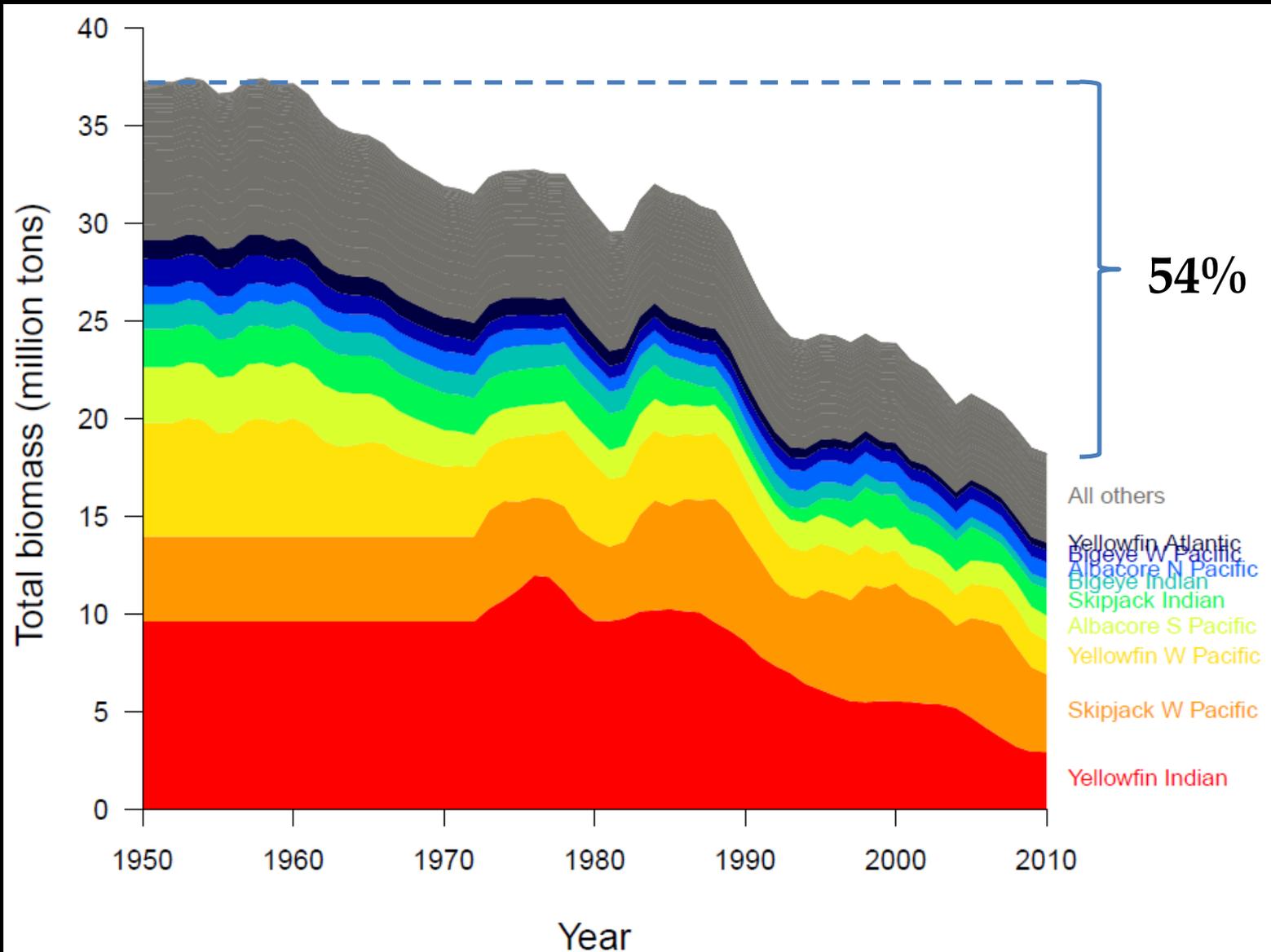
Catch



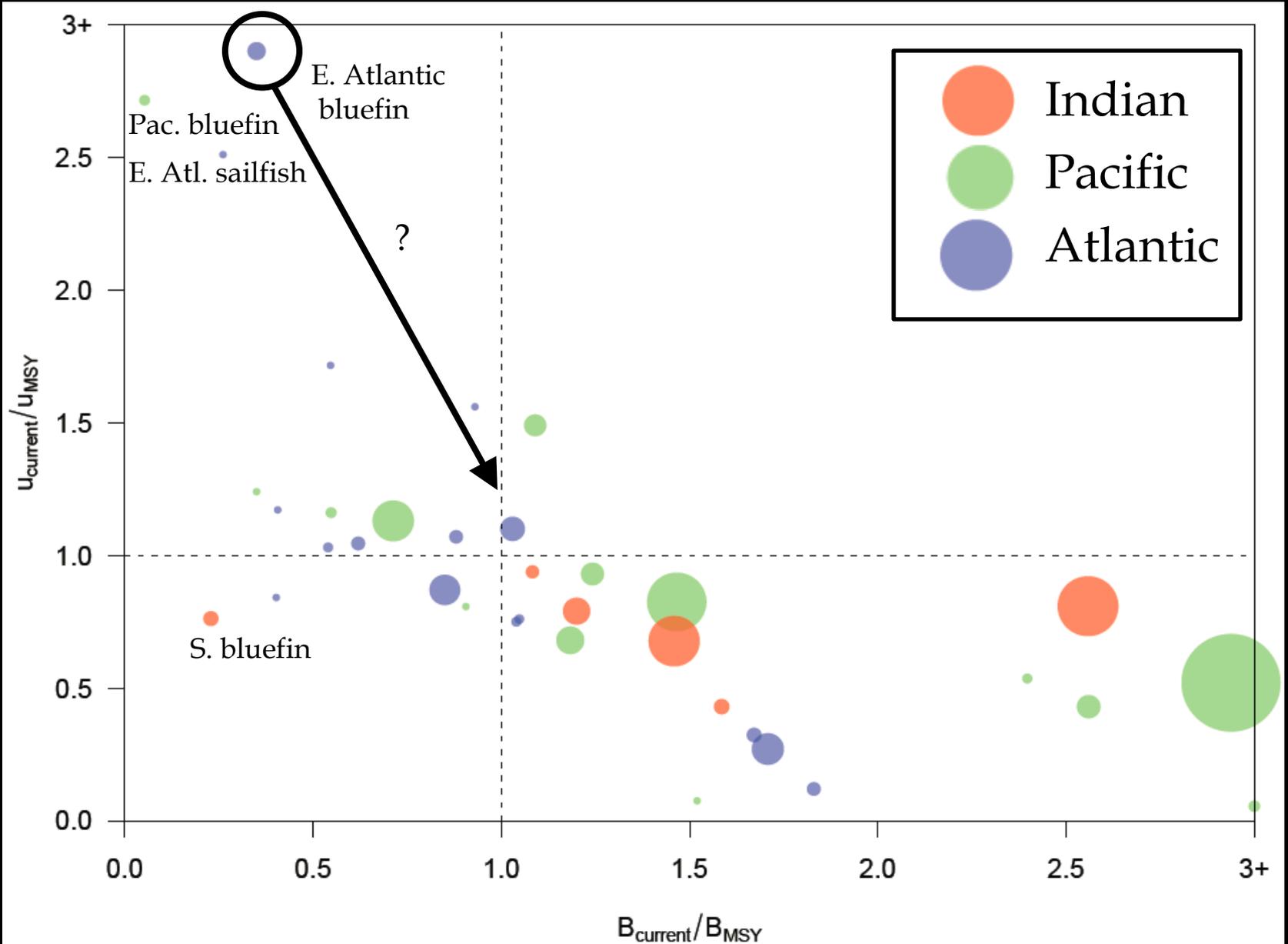
Catch



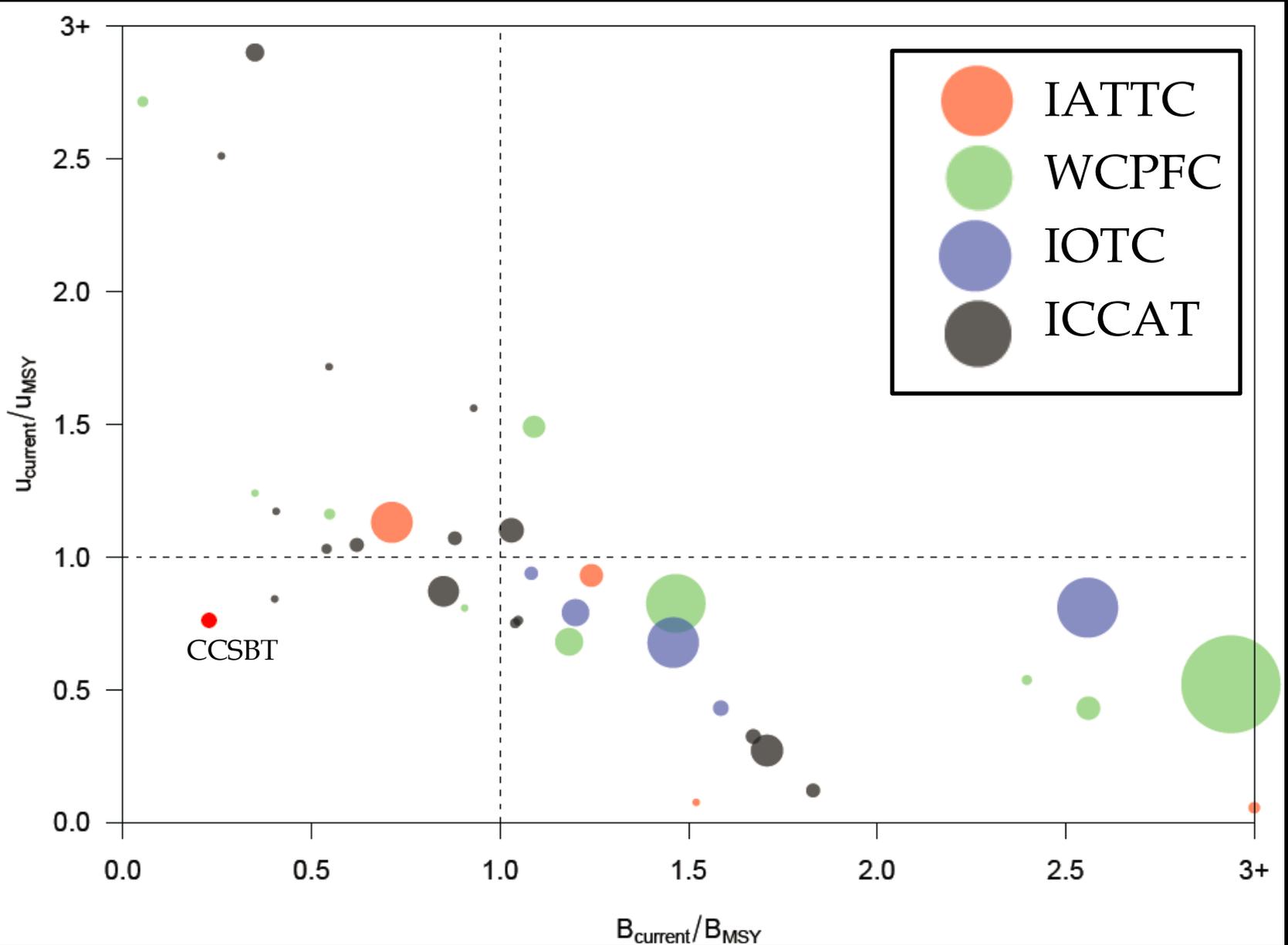
Biomass



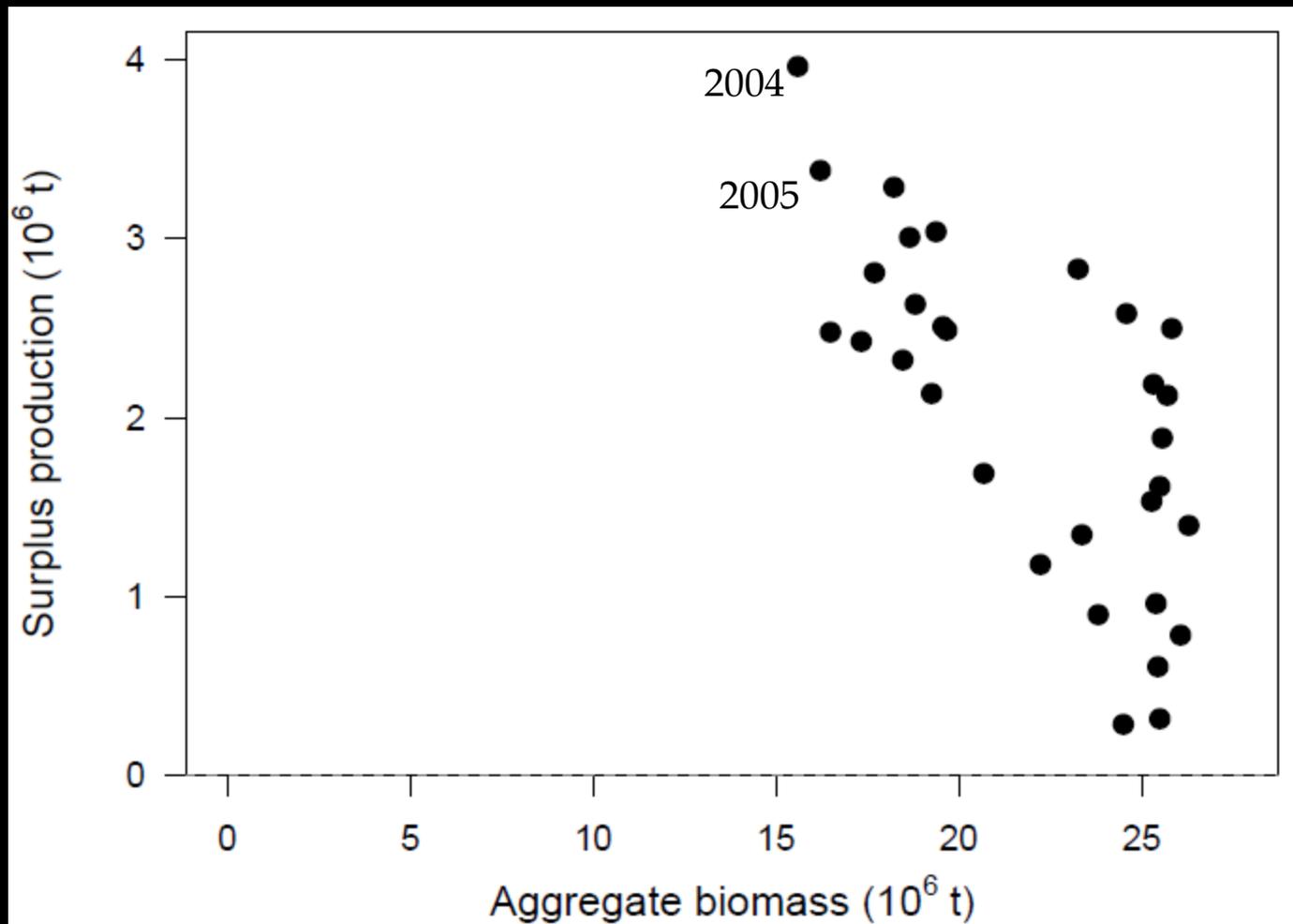
Stock status by ocean



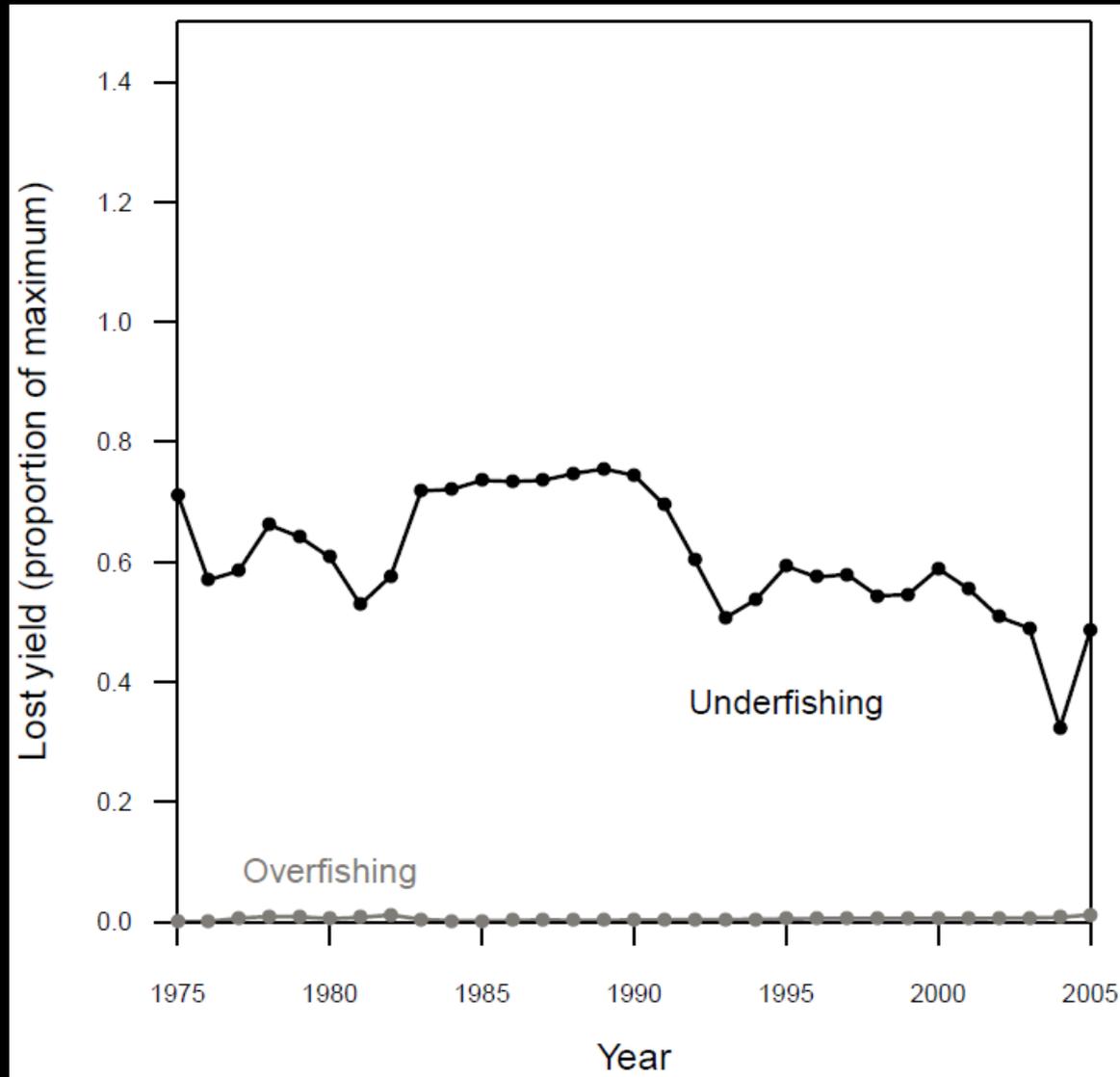
Stock status by RFMO



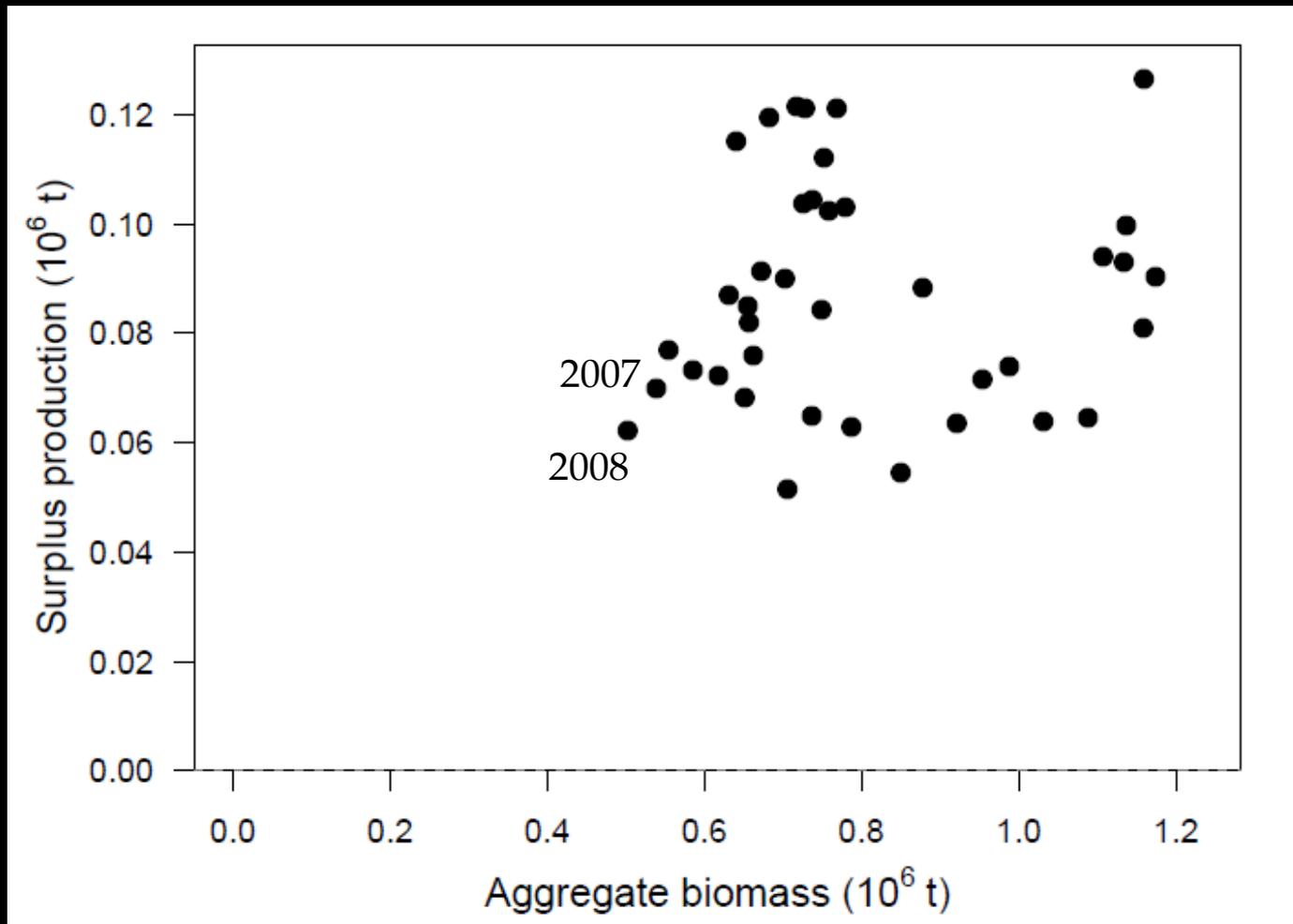
No sign of lost productivity (in aggregate)



More yield lost to “underfishing”



Historically low productivity in overfished stocks



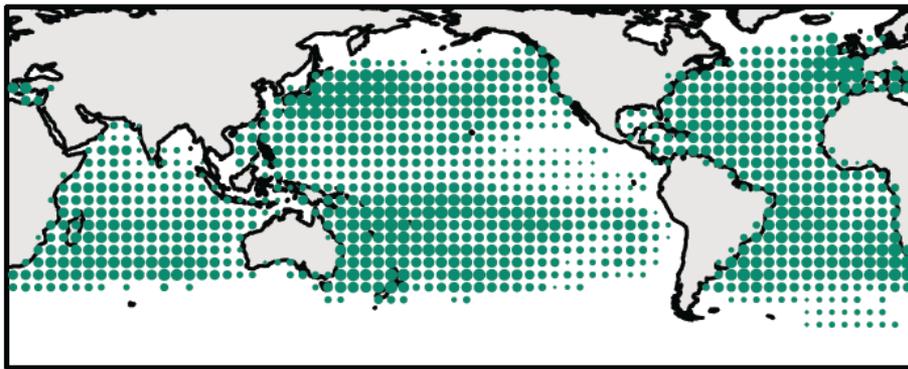
Conclusions

- As a group, tuna and billfishes are not overfished *in terms of yield*.
- Substantially more yield is lost from underfishing than from overfishing.
- 46% of stocks are below Bmsy (22% below half of Bmsy) and 40% are experiencing overfishing.
- Bluefin tuna and billfish stocks are more depleted.

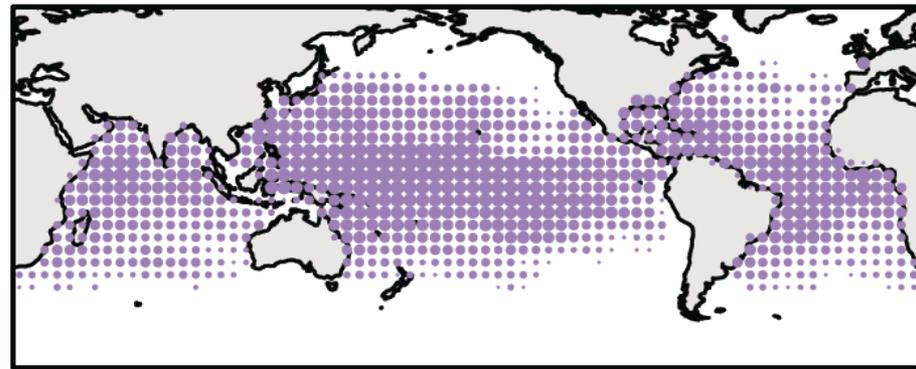
Next steps

- Add economic analysis to investigate stock status with respect to MEY and subsidies.
- Compare geographic distribution of tuna yields to net primary productivity.

Albacore Tuna



Blue Marlin



Acknowledgments

- **RFMO collaborators:** Jean-Marc Fromentin, Shelton Harley, Laurie Kell, Mark Maunder, John Walter
- **Stock assessment authors and data contributors:** Elizabeth Babcock, Jon Brodziak, David Die, Miguel Herrera, Richard Hillary, Michael Hinton, Simon Hoyle, Dale Kolody, Adam Langley, Alec MacCall, John Neilson, Tom Nishida, Mauricio Ortiz, Kevin Piner, Alex da Silva, Michael Schirripa, Paolo Travassos, Sheng-Ping Wang
- **Funding from PFRP**