

Marine Ecosystem Climate Services

How can we develop climate-services
in knowledge-poor systems?

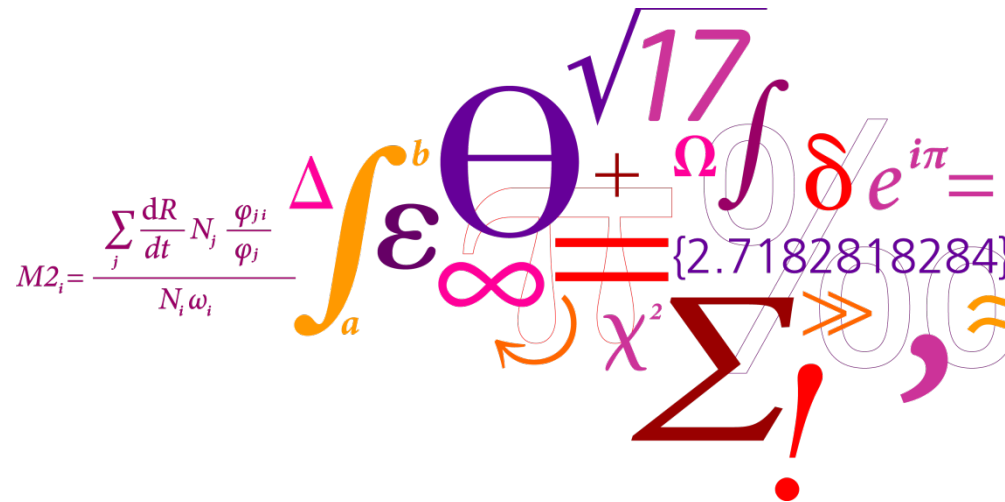
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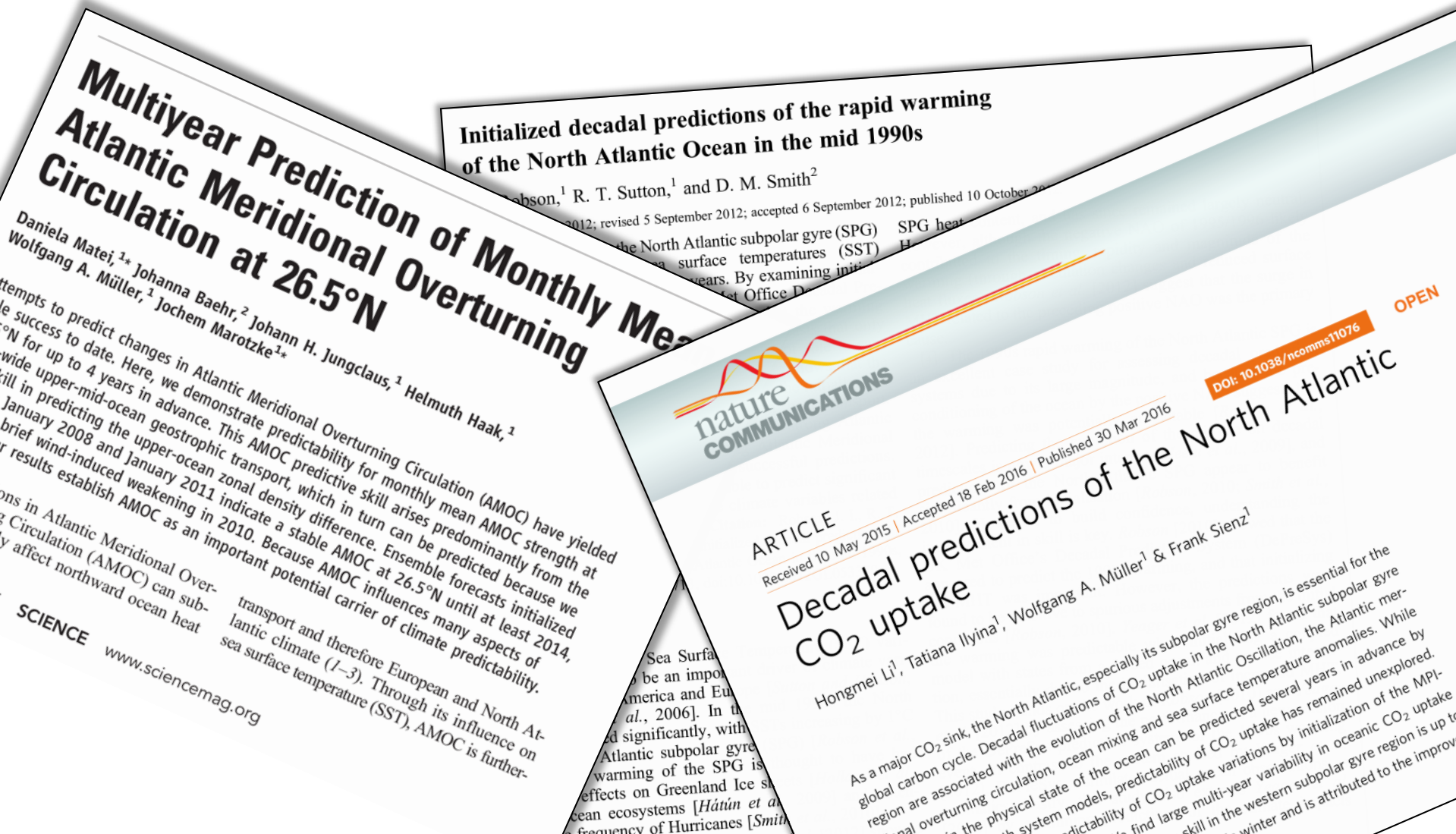
 @MarkPayneAtWork

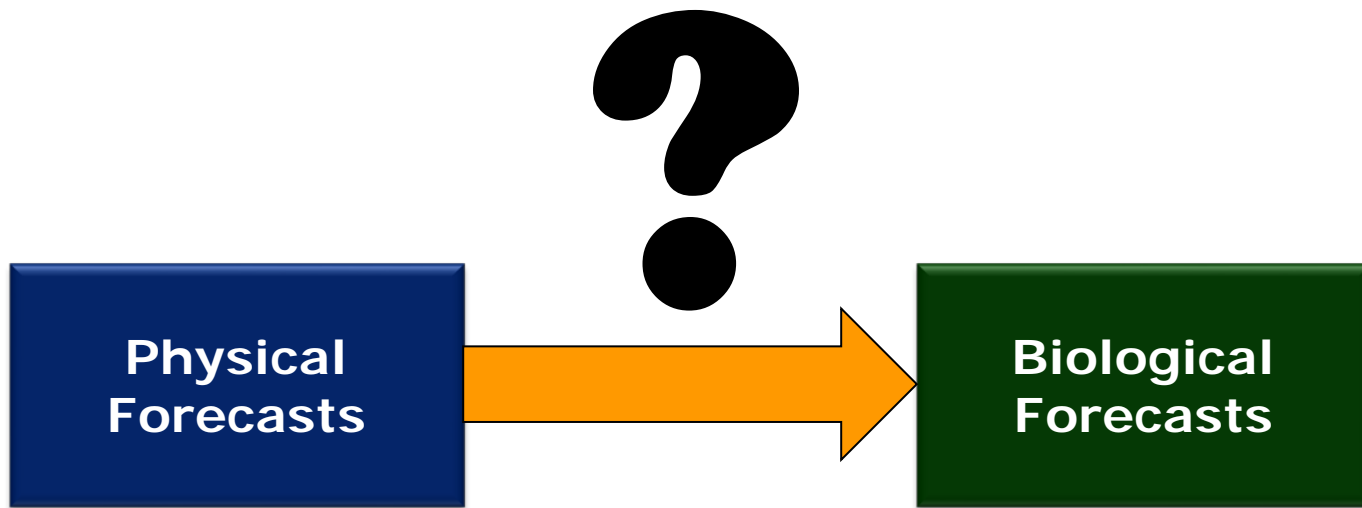
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National Institute of Aquatic Resources



Decadal-scale forecasting of the ocean is a reality

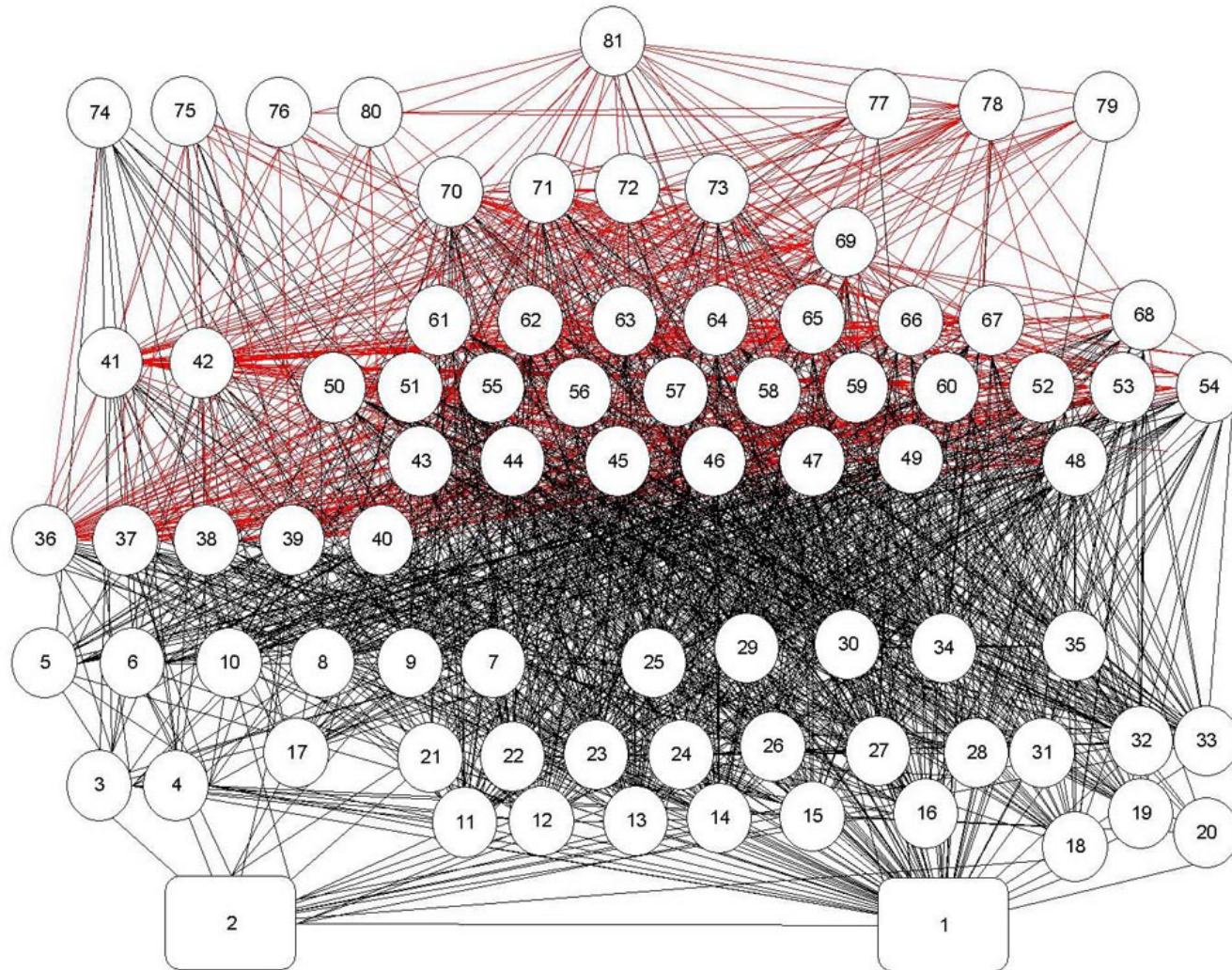




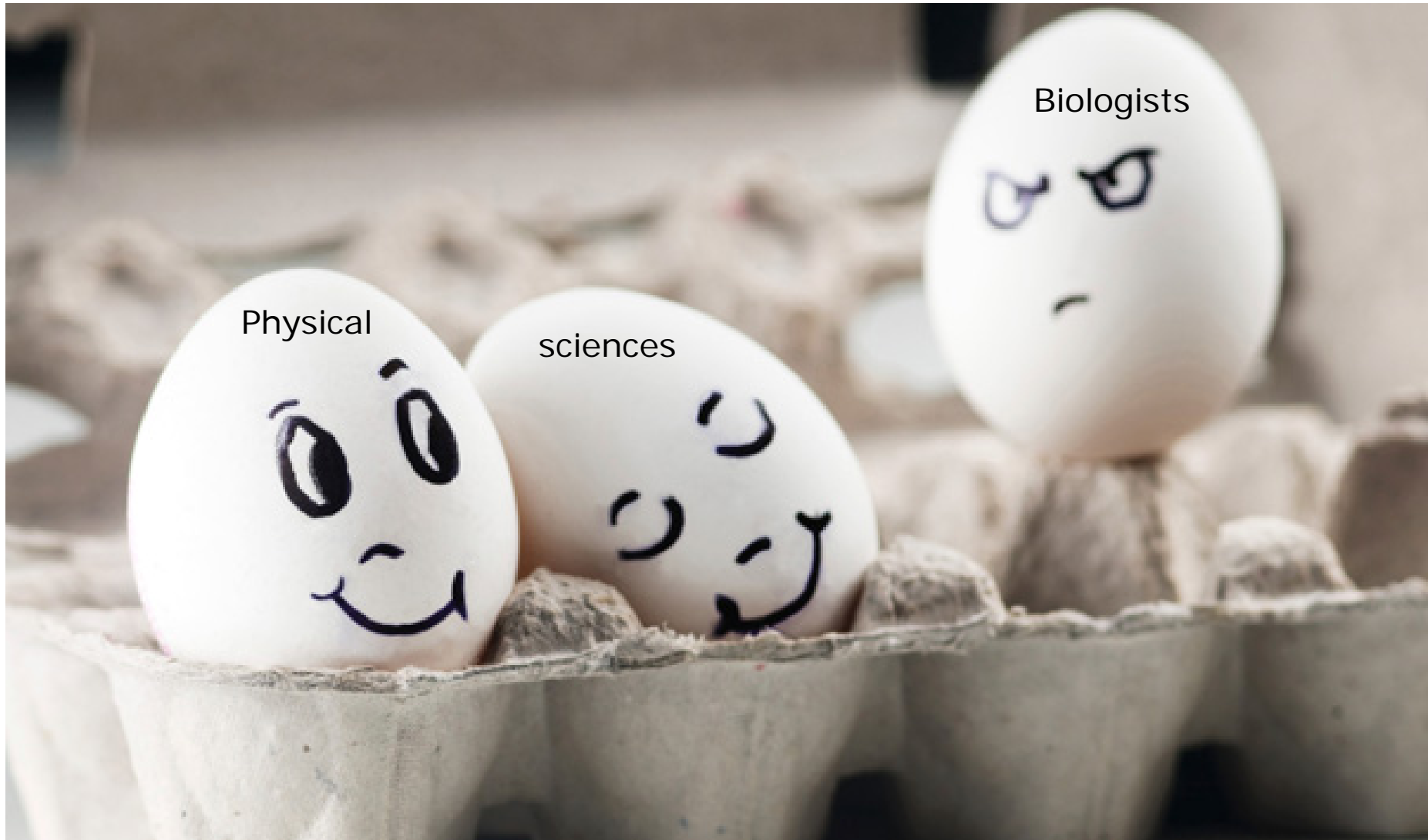
Can we translate physical predictions into biological predictions?

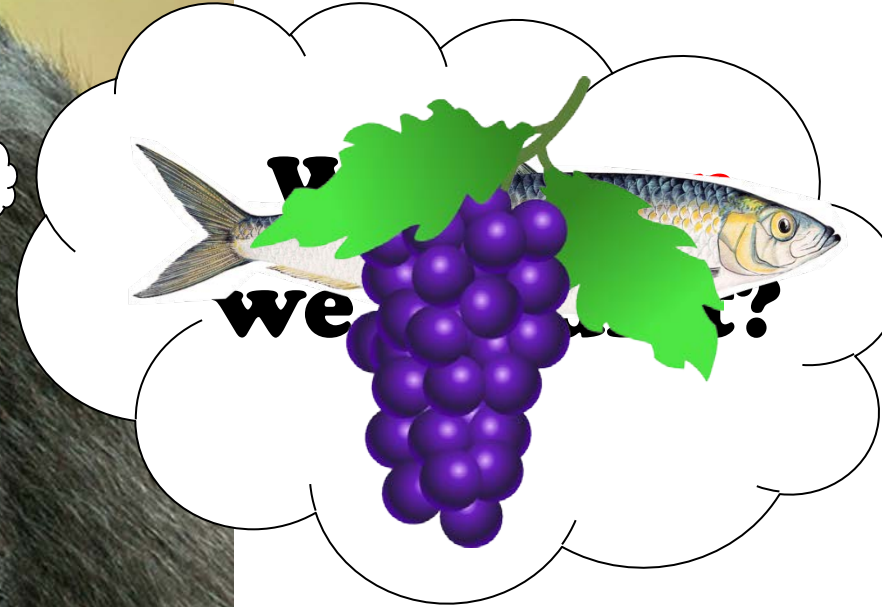
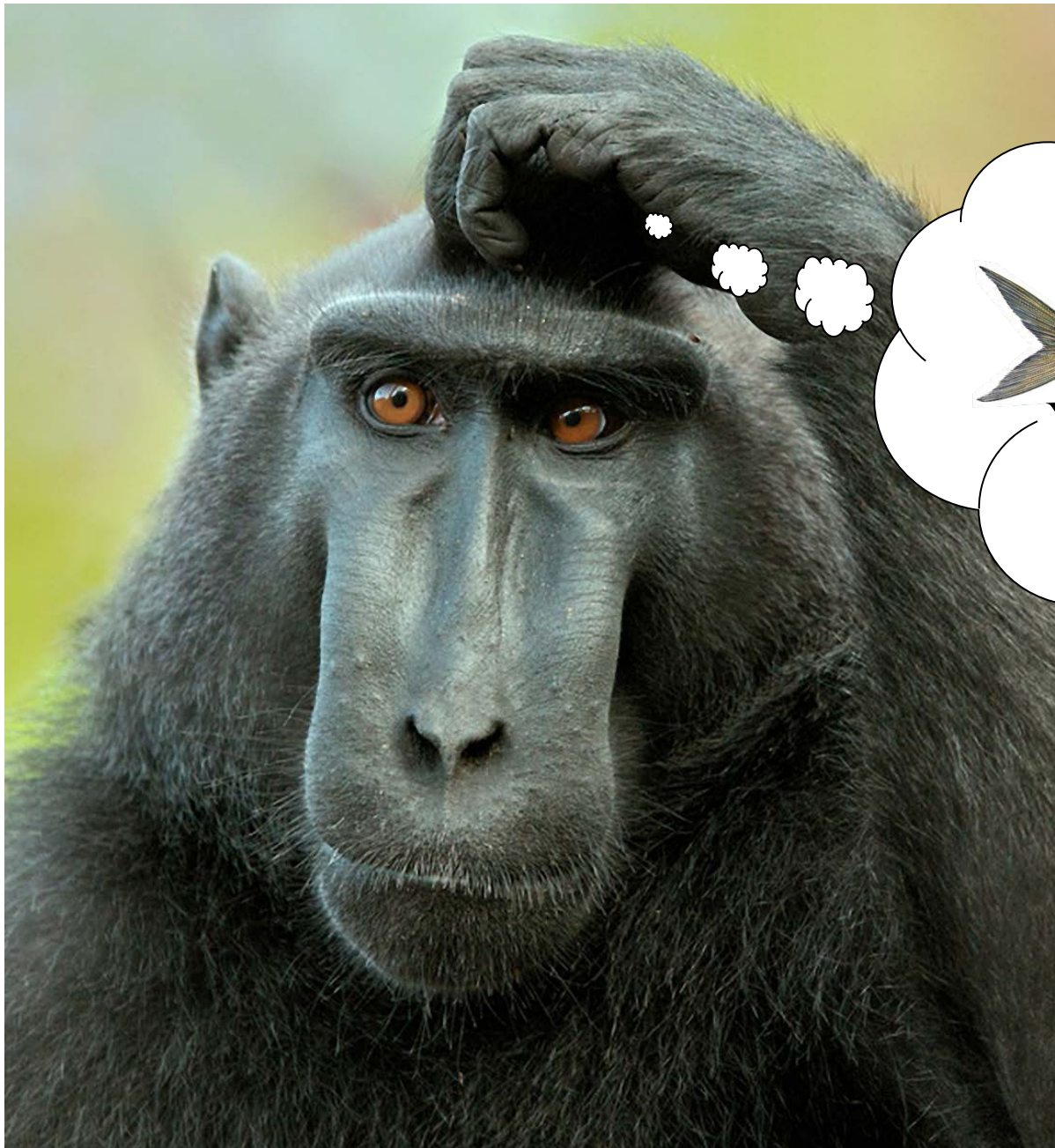
But biology is complex....

Food Web of the Northeast US Continental Shelf*

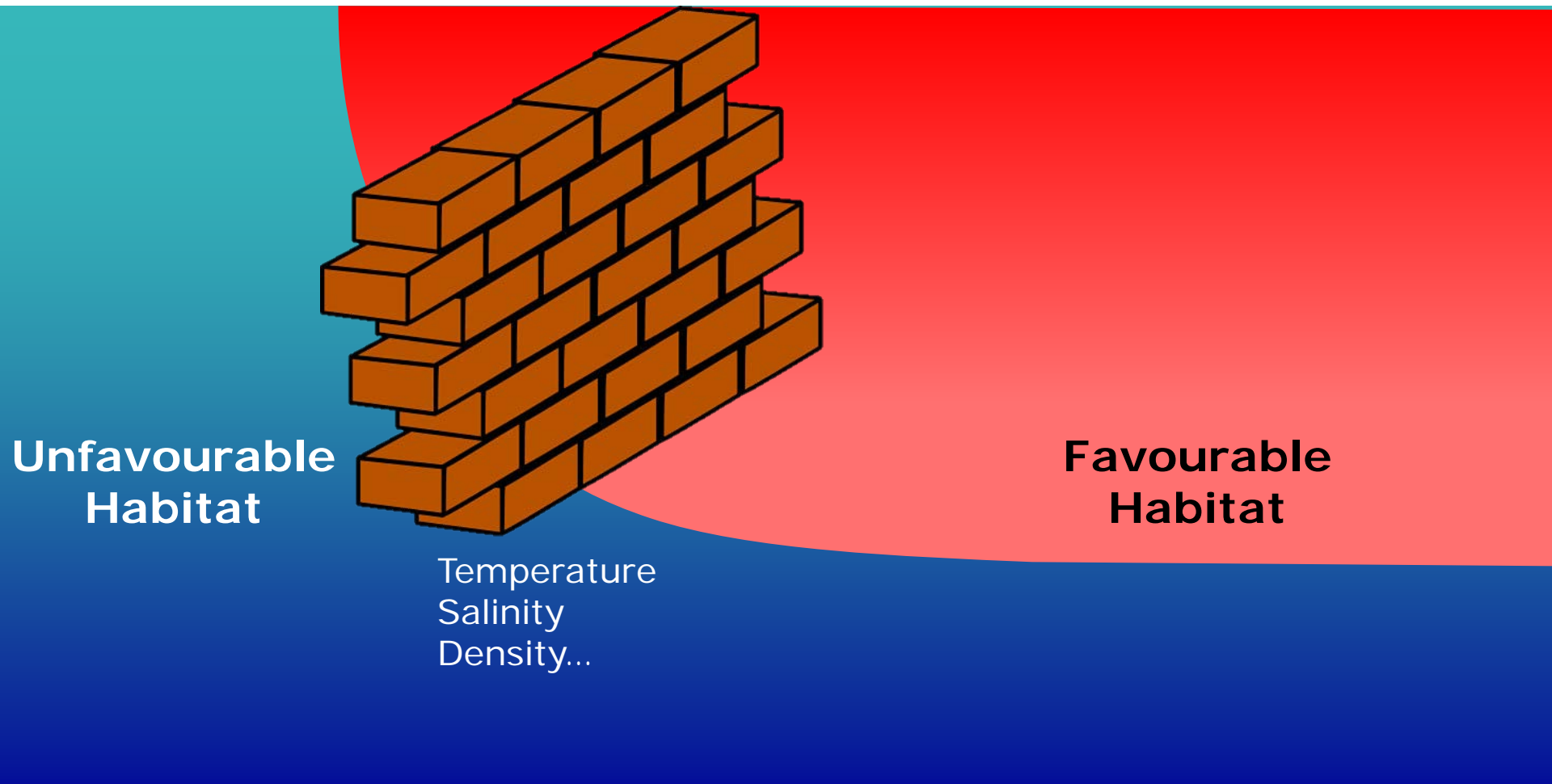


Prediction envy...






Physiological constraints in the ocean



Case Study 1 - Bluefin Tuna






The IUCN Red List of Threatened Species™ 2016-2

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Thunnus thynnus

<http://dx.doi.org/10.2305/IUCN.UK.2011-2.RLTS.T21860A9331546.en>

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Download supplement

NOT EVALUATED	DATA DEFICIENT	LEAST CONCERN	NEAR THREATENED	VULNERABLE	<ENDANGERED>	CRITICALLY ENDANGERED	EXTINCT IN THE WILD
NE	DD	LC	NT	VU	EN	CR	EW

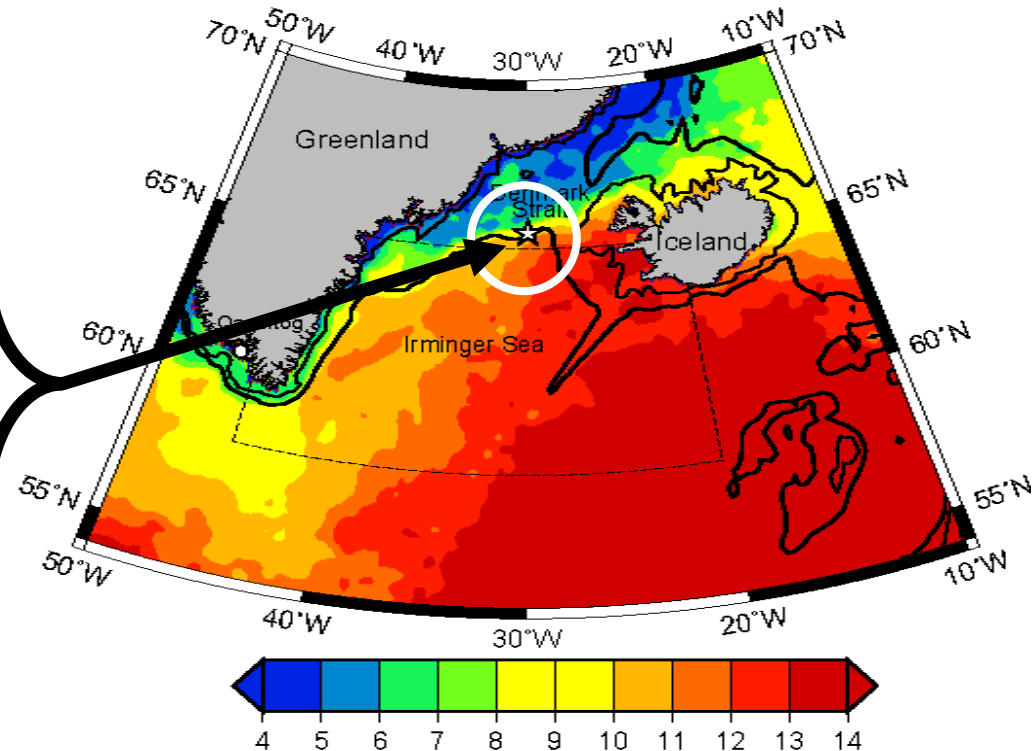
Catches of Bluefin Tuna in Denmark Strait and Irminger Sea



Aug 2012

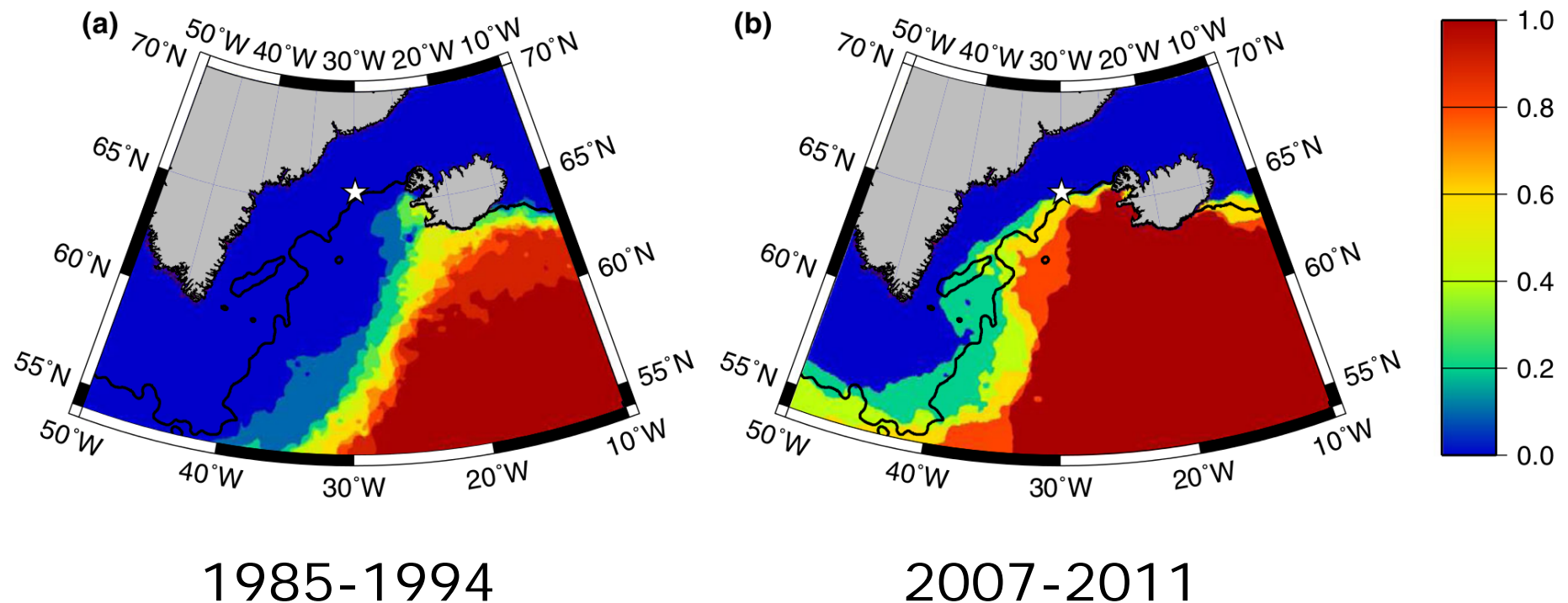


Aug 2014



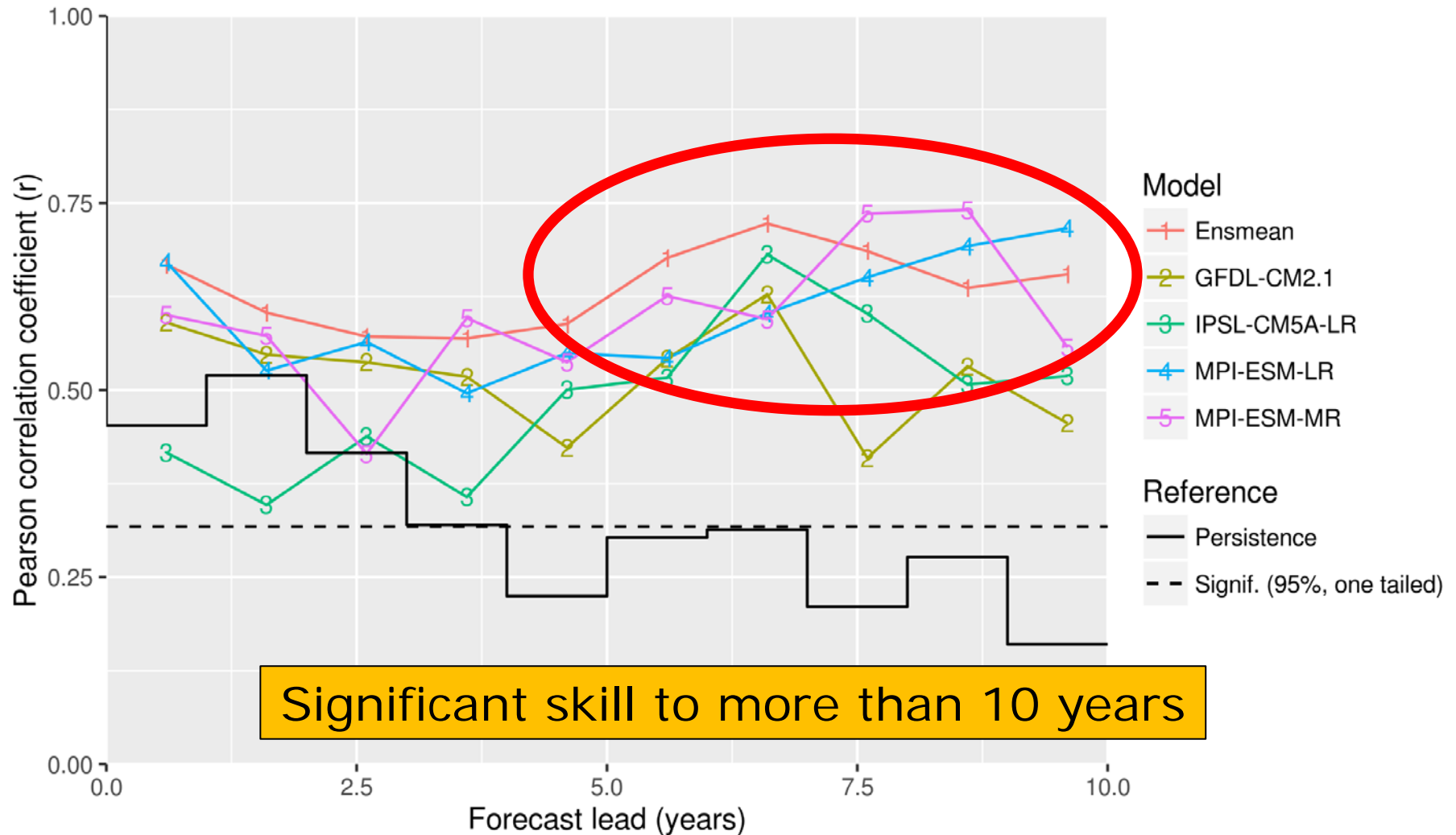
First report of tuna in this area in at least 370 years

Proportion of years with suitable habitat

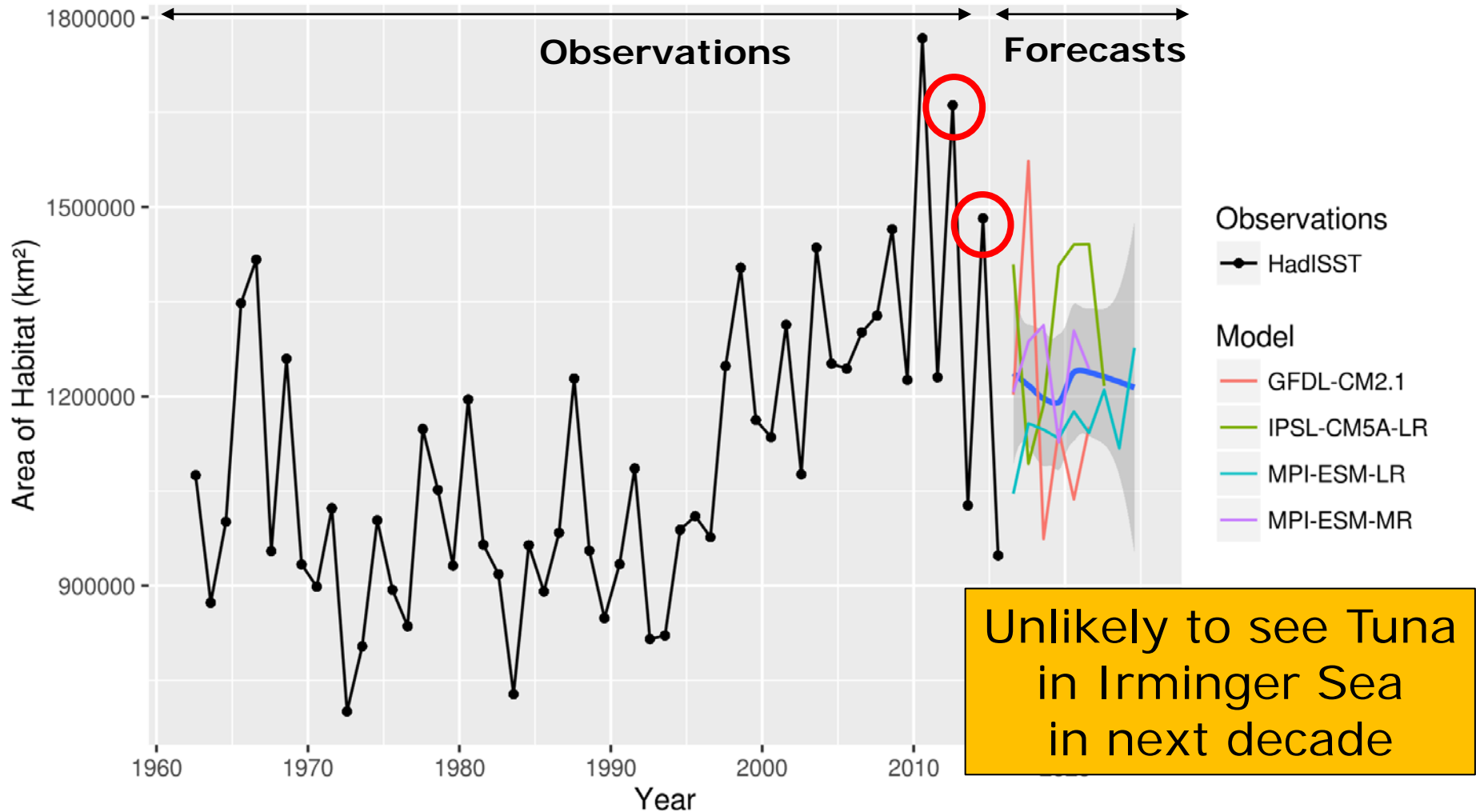


Can we forecast habitat?

Retrospective Forecast (Hindcast) Skill - Area of Potential Bluefin Tuna Habitat



Bluefin Tuna Habitat Forecasts



Case Study 2 - Blue whiting



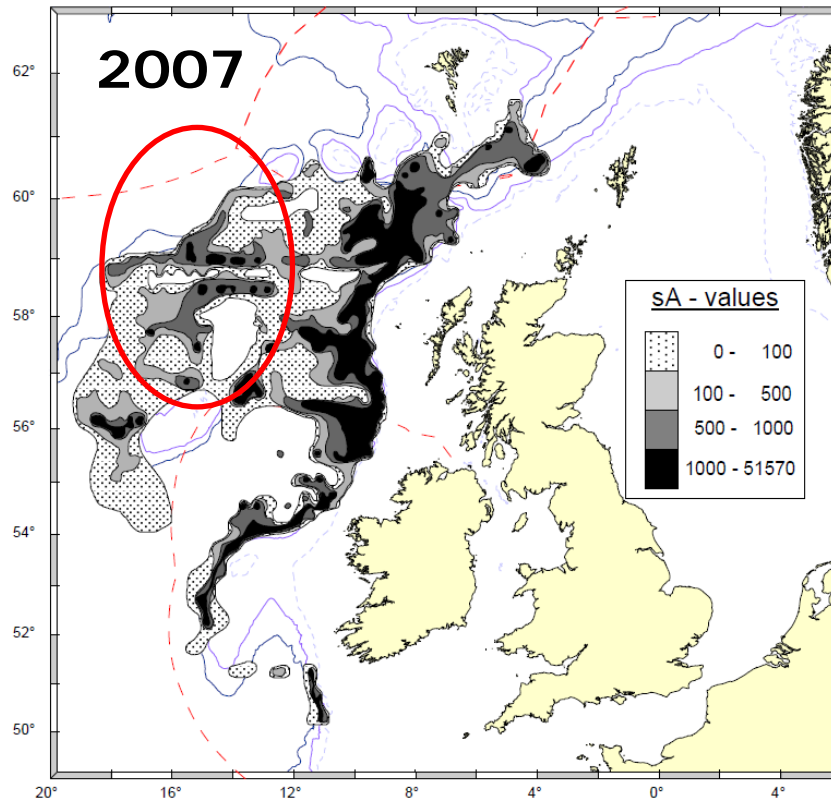
Spawning region



- Important feed for aquaculture
- Third largest fishery in the world in 2004.

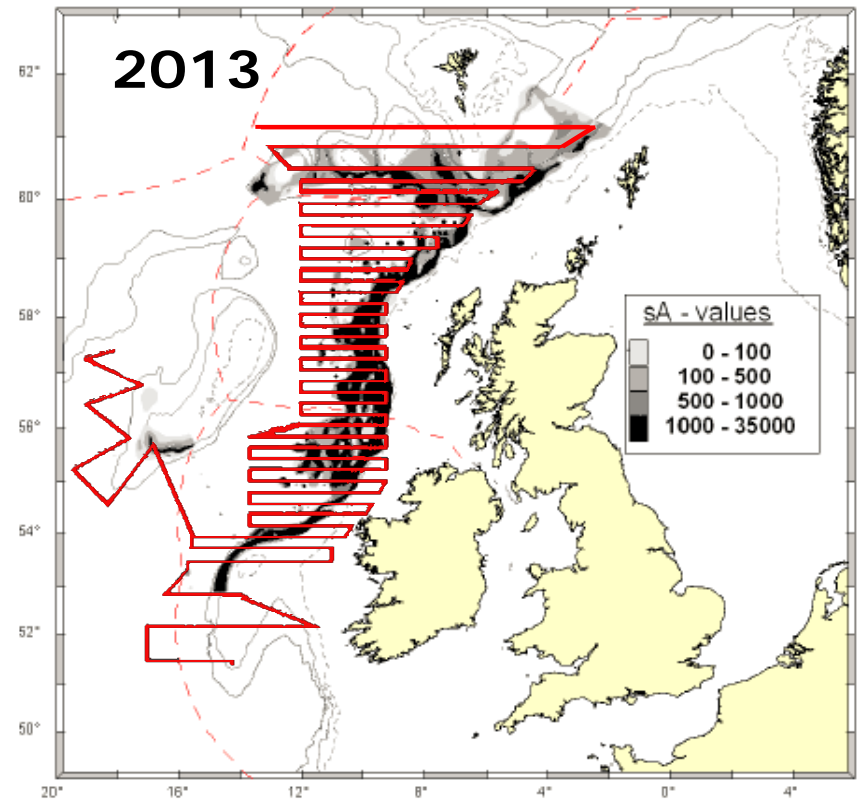
Observed distribution of blue whiting

Expanded distribution



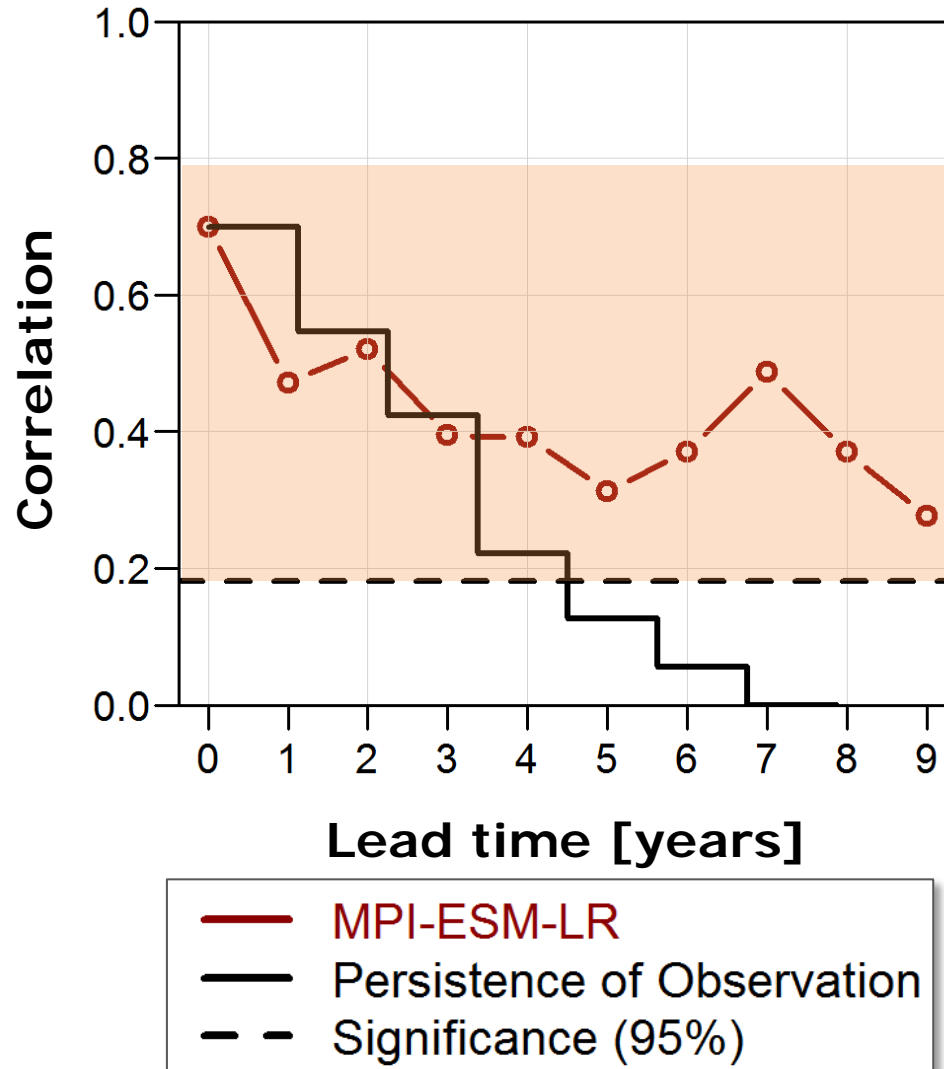
Warm & Saline

Compacted distribution

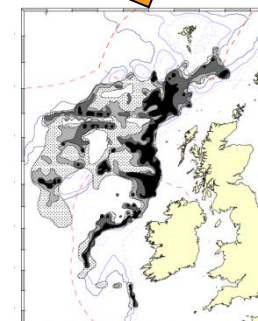
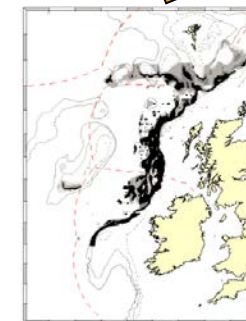


Cold & Fresh

Blue Whiting habitat forecast system

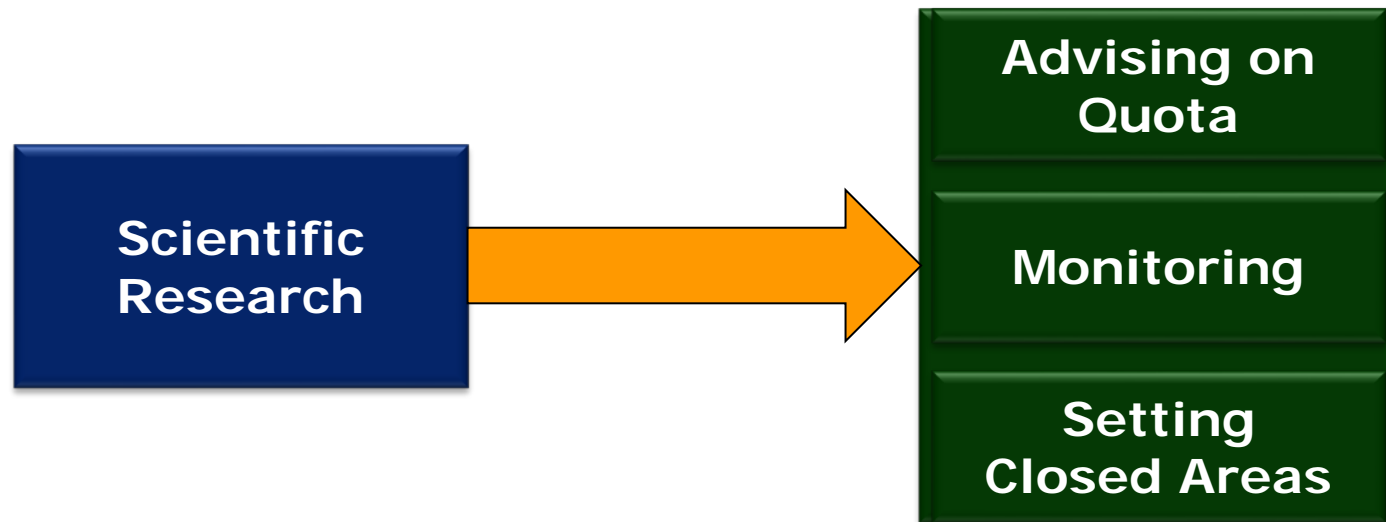


Basis for decadal forecasts of distribution



Design of monitoring programme

Who are the end-users?



End-users are our scientific peers

Marine Ecosystem Climate Services


Ask not "how do I predict <my pet thing>?"

Ask "what can I predict?"

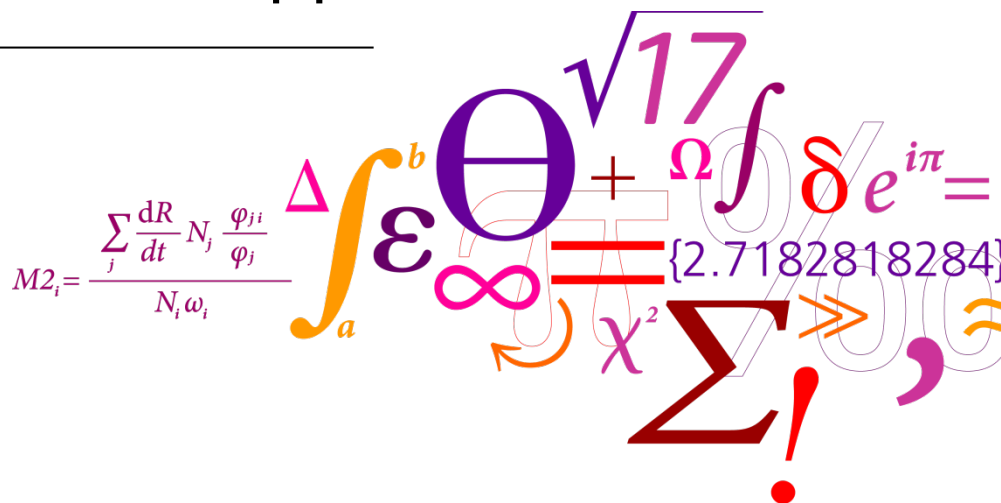
Decadal prediction of
marine ecosystems is possible

Direct route to management applications

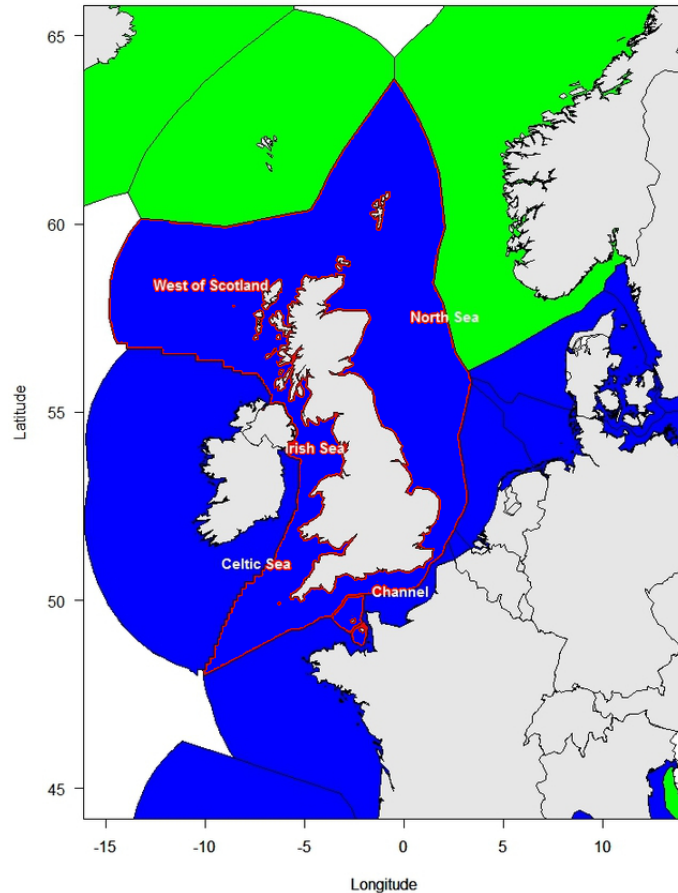
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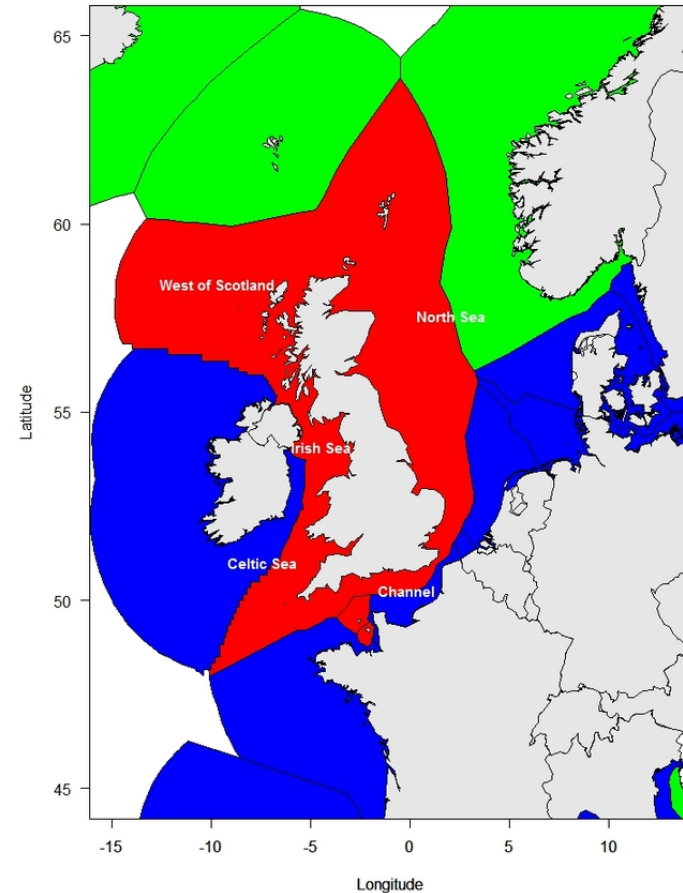


The New North Sea Landscape



Now

Marine Ecosystem Climate Services



2020

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