Juggling biodiversity & food security – keeping all the balls in the air

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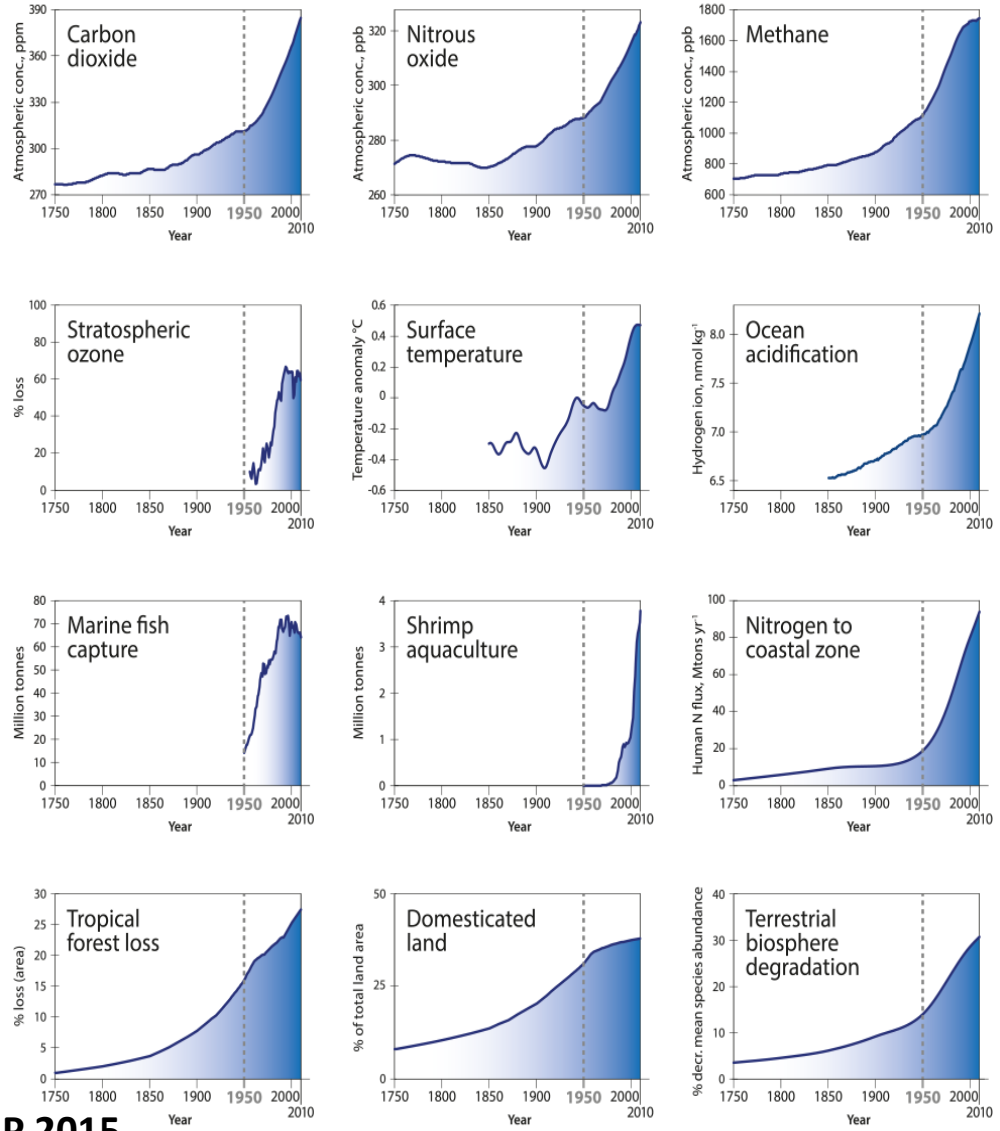
Session 2
Panel 2.1

International Symposium on Fisheries Sustainability:
Strengthening the Policy-Science Nexus

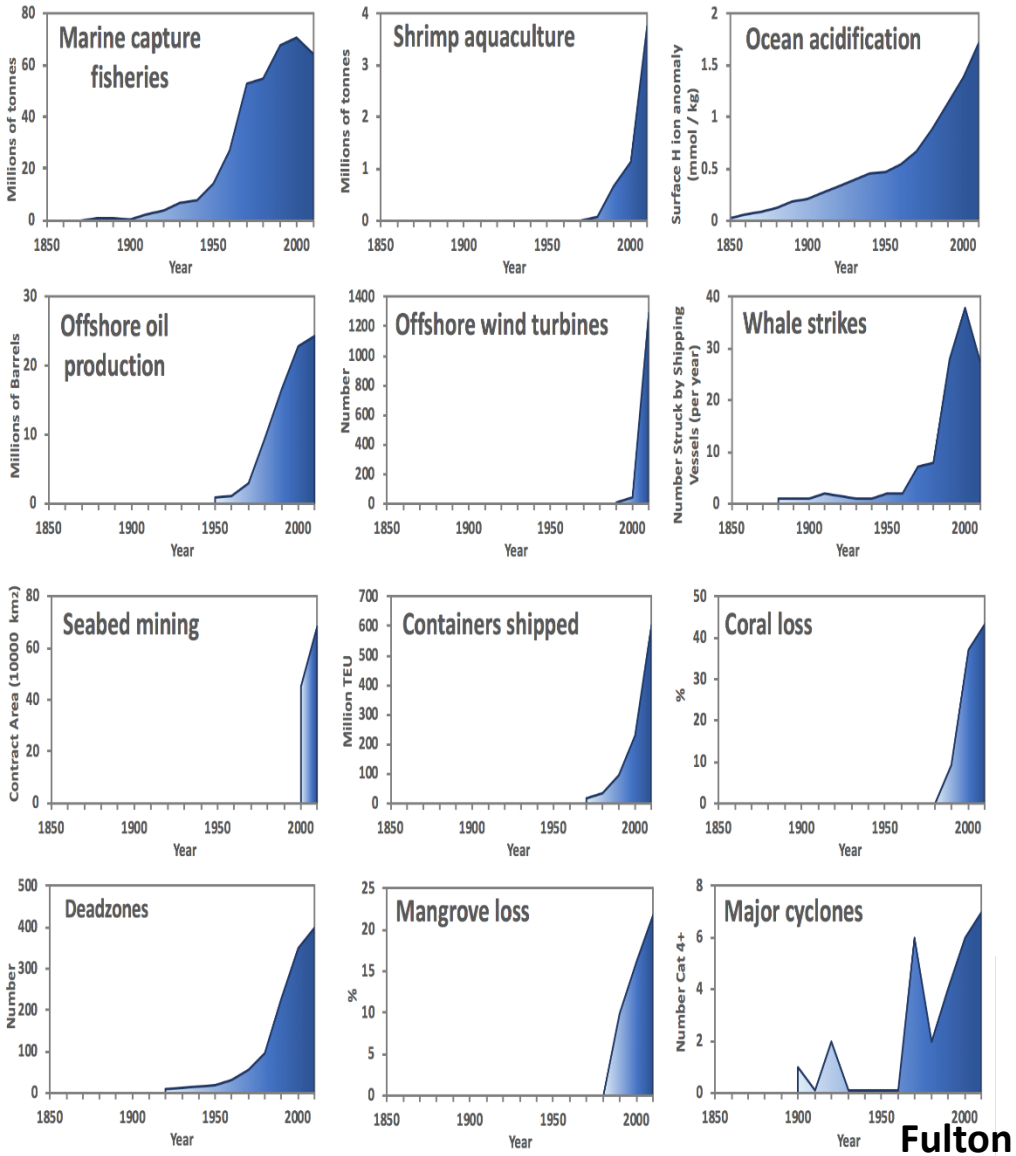
OCEANS & THE GREAT ACCELERATION

Earth system trends



IGBP 2015

Ocean system trends

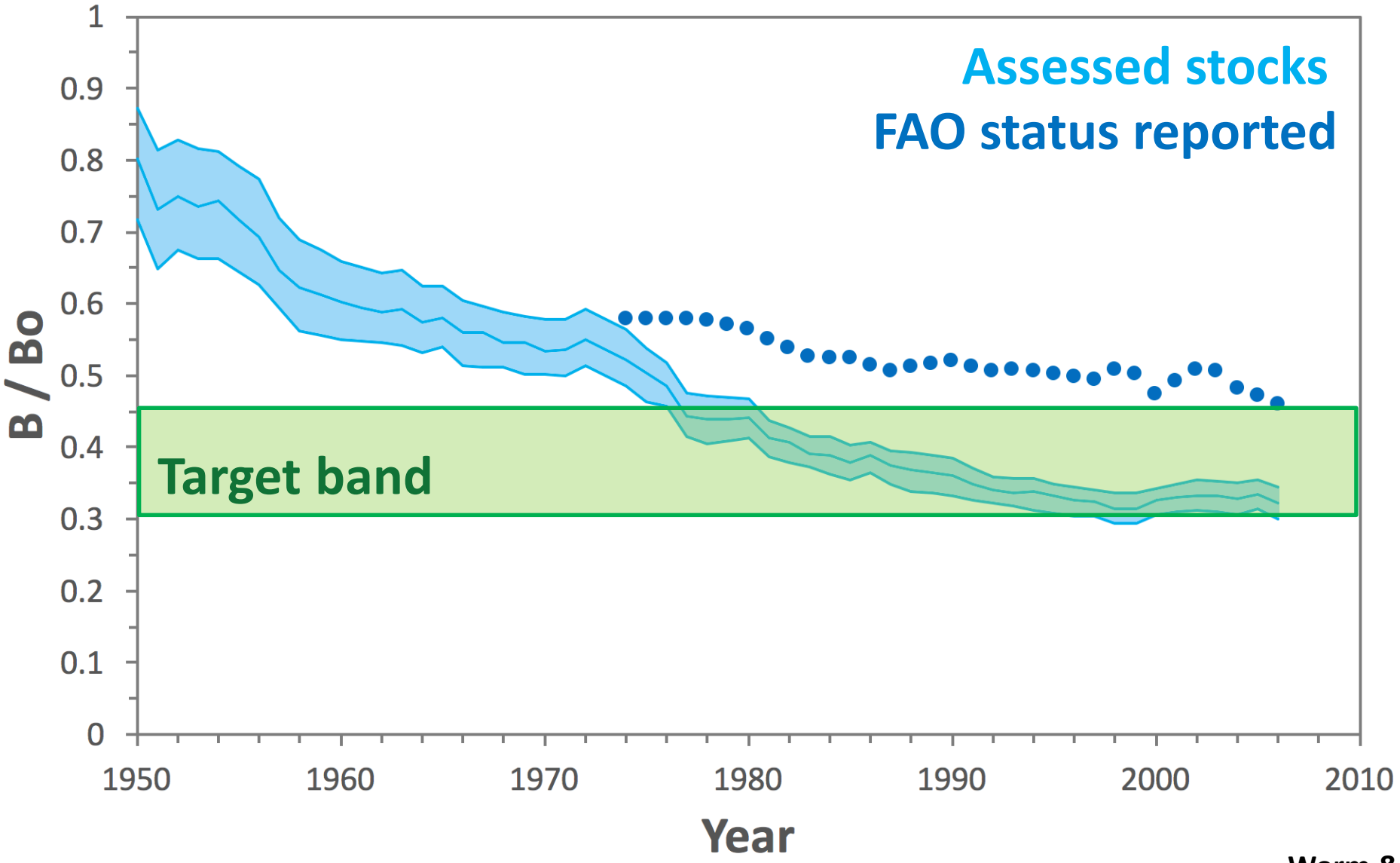


Fulton et al 2018

OCEANS ARE CHANGING

Images: alamy, shutterstock

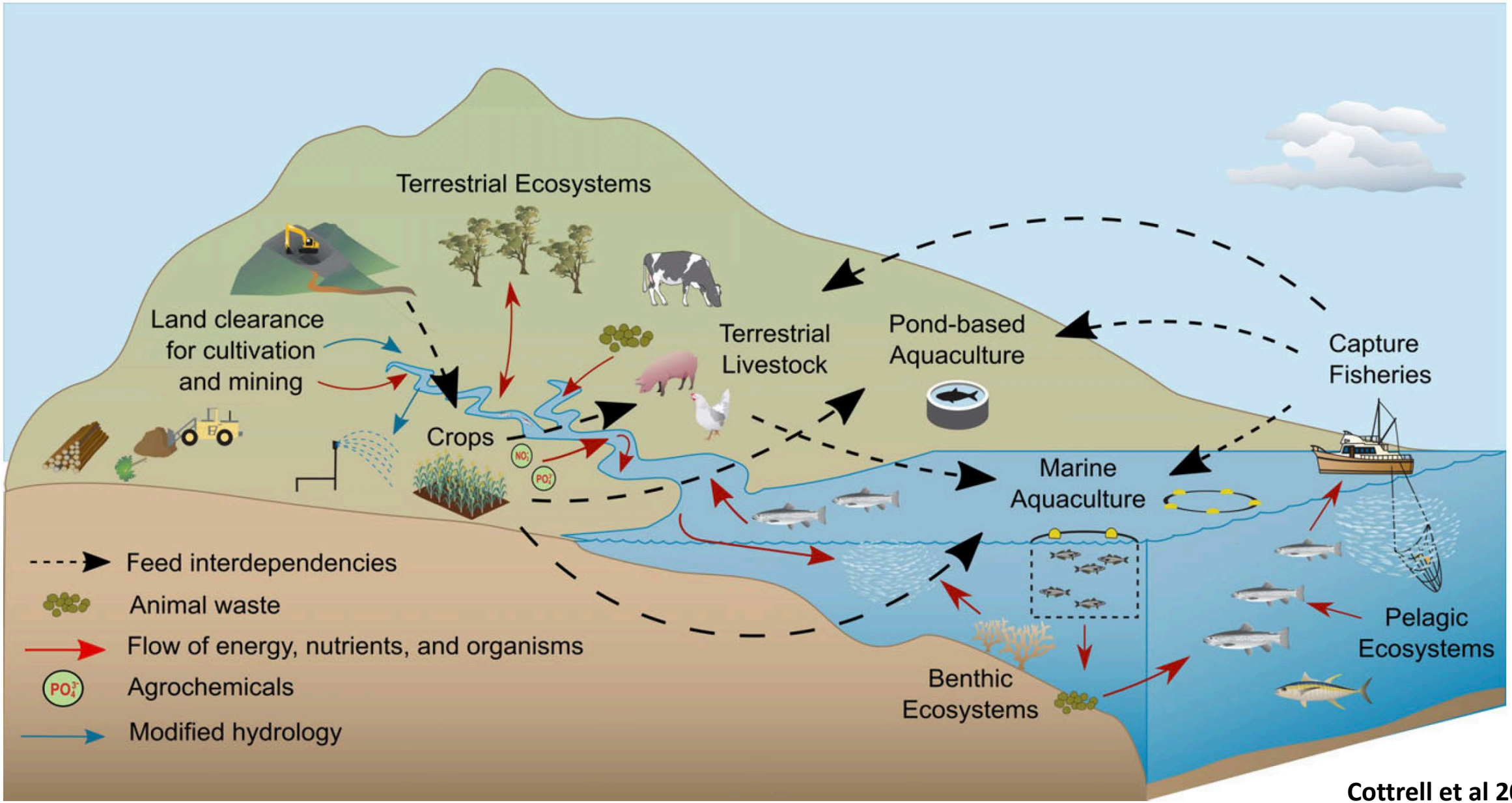
HISTORICALLY = COMPETING OBJECTIVES



Undesirable loss or on target?

Worm & Branch (2012)

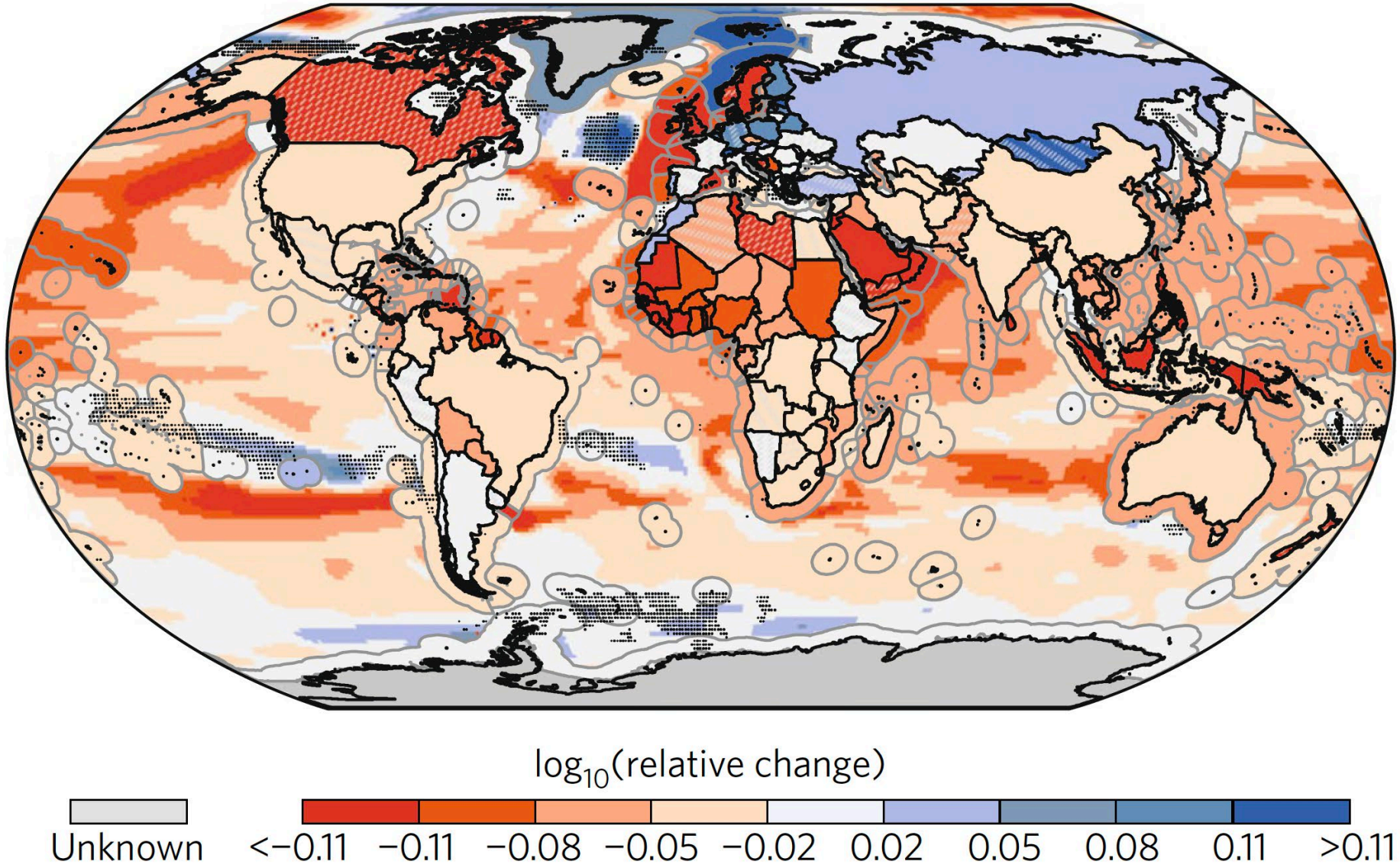
RECOGNISING INTERCONNECTIONS & DEPENDENCIES



Cottrell et al 2019

RECOGNISING INTERCONNECTIONS & DEPENDENCIES

- ISI-MIP projected relative change in potential crops & fish production

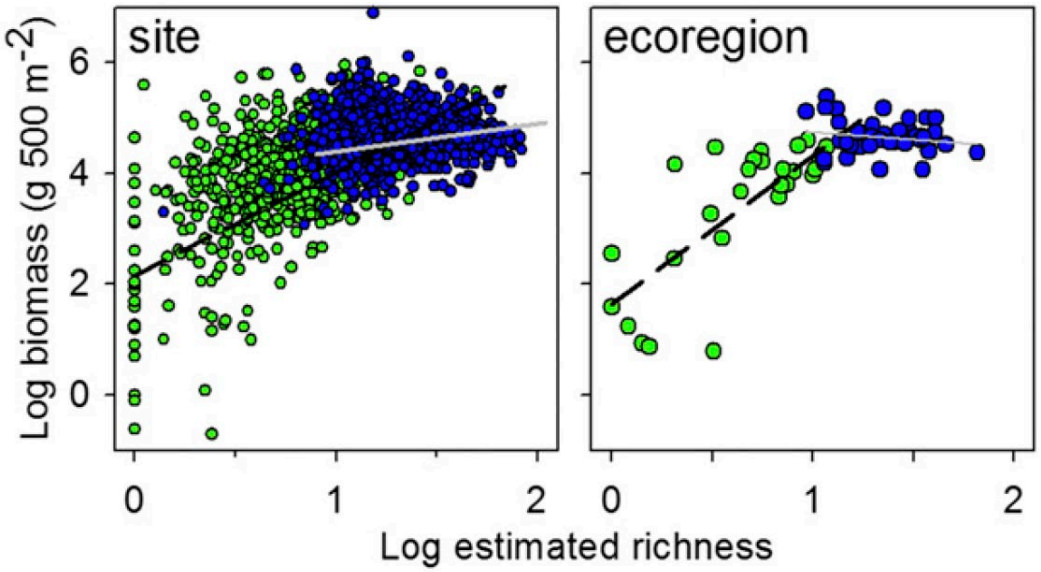


Blanchard et al 2017

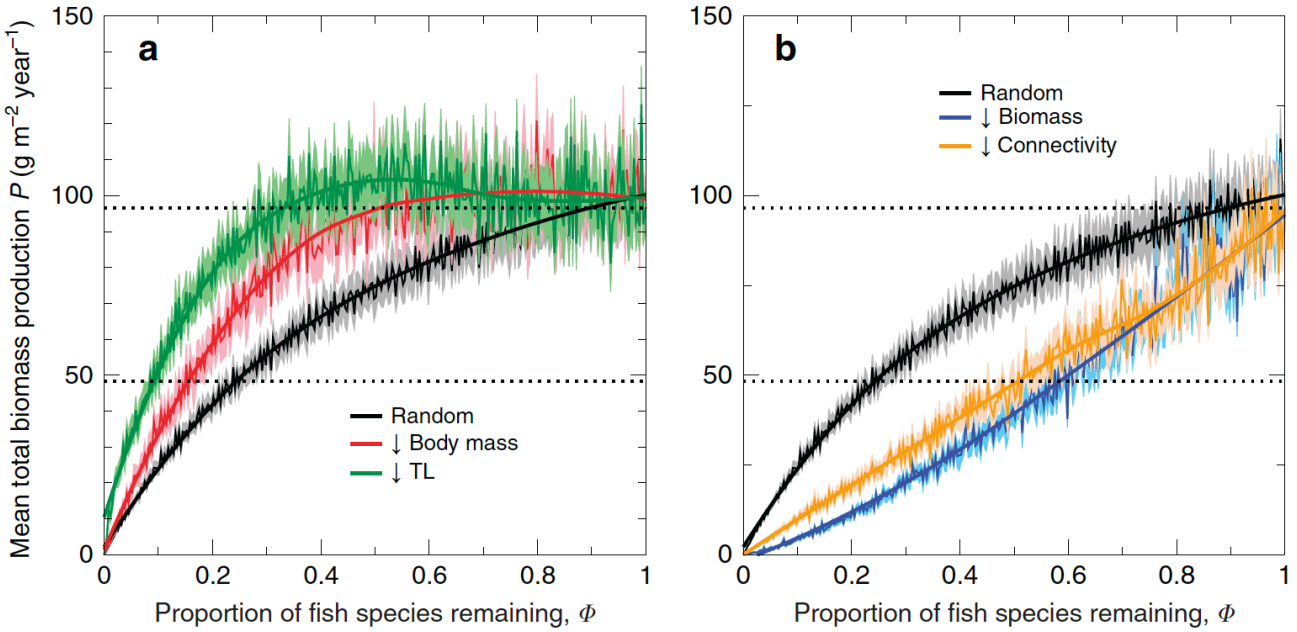
RECOGNISING INTERCONNECTIONS & DEPENDENCIES

- Data sets & modelling show relationship between biodiversity & production

Data

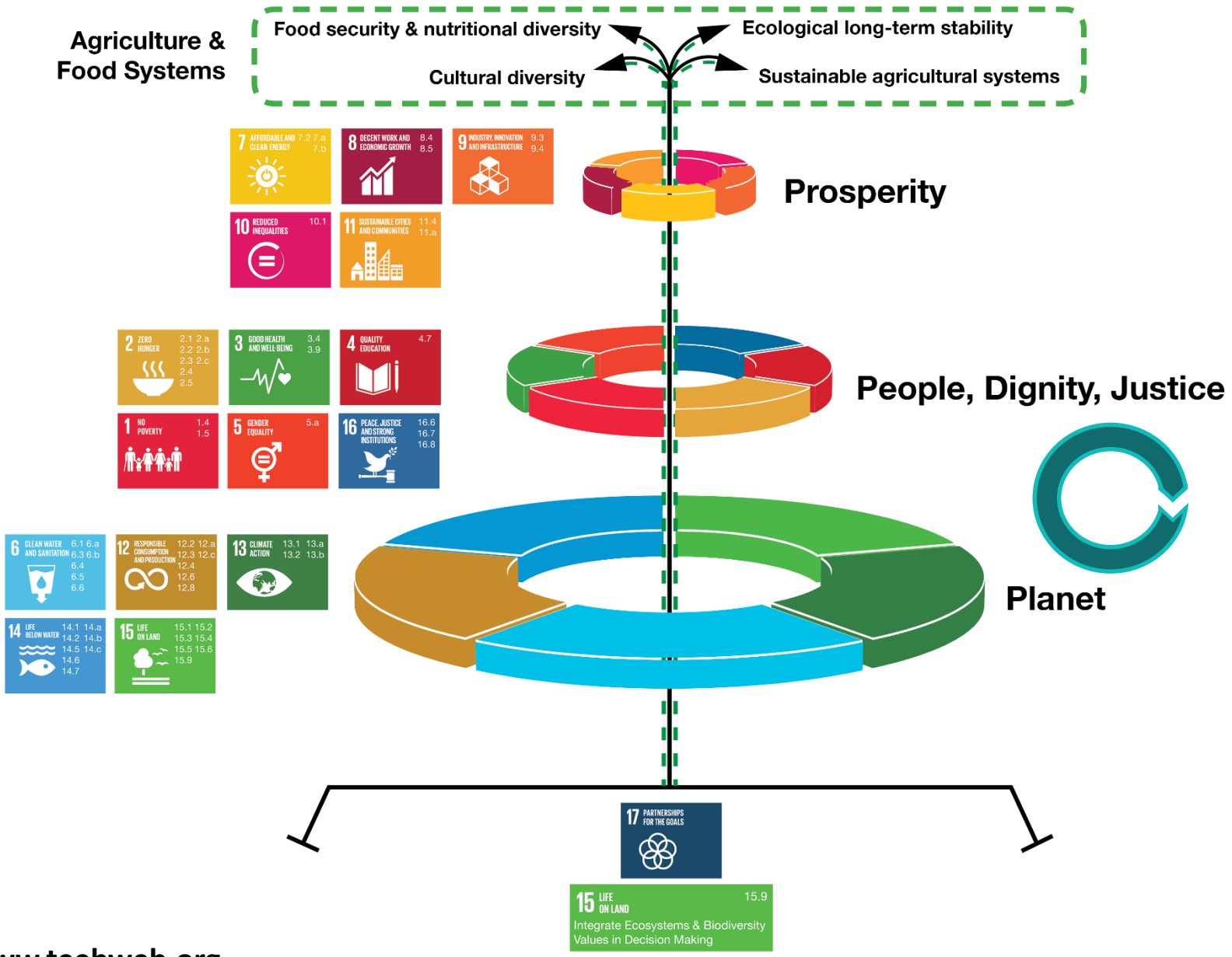


Model



Data example: Duffy et al 2016
Model example: Fung et al 2015

RECOGNISING INTERCONNECTIONS & DEPENDENCIES



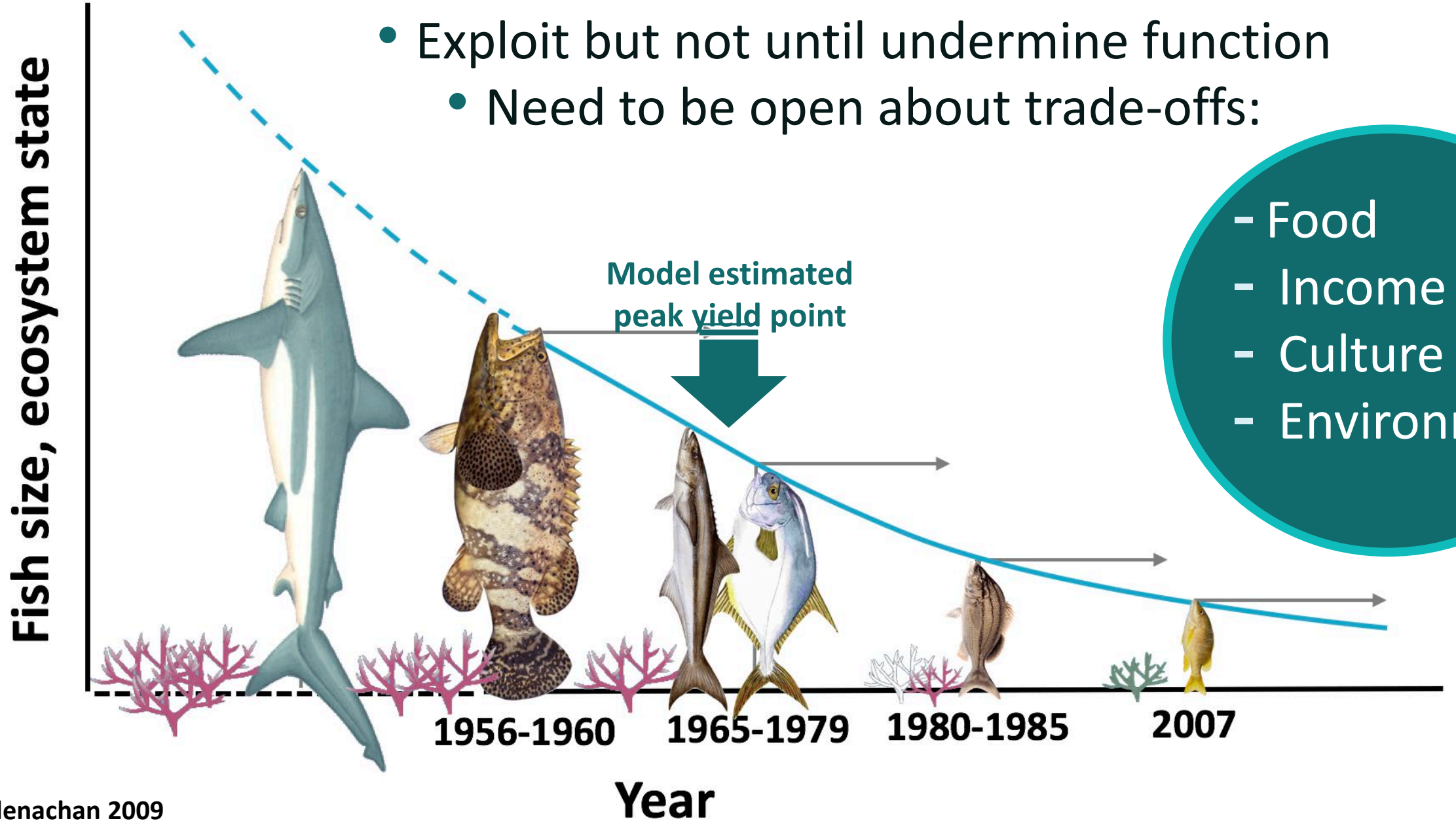
- A healthy ocean is needed for healthy people
- Recognising human needs helps deliver healthy oceans

www.teebweb.org

CHOICES STILL HAVE TO BE MADE

- Exploit but not until undermine function
  - Need to be open about trade-offs:

- Food
- Income
- Culture
- Environment

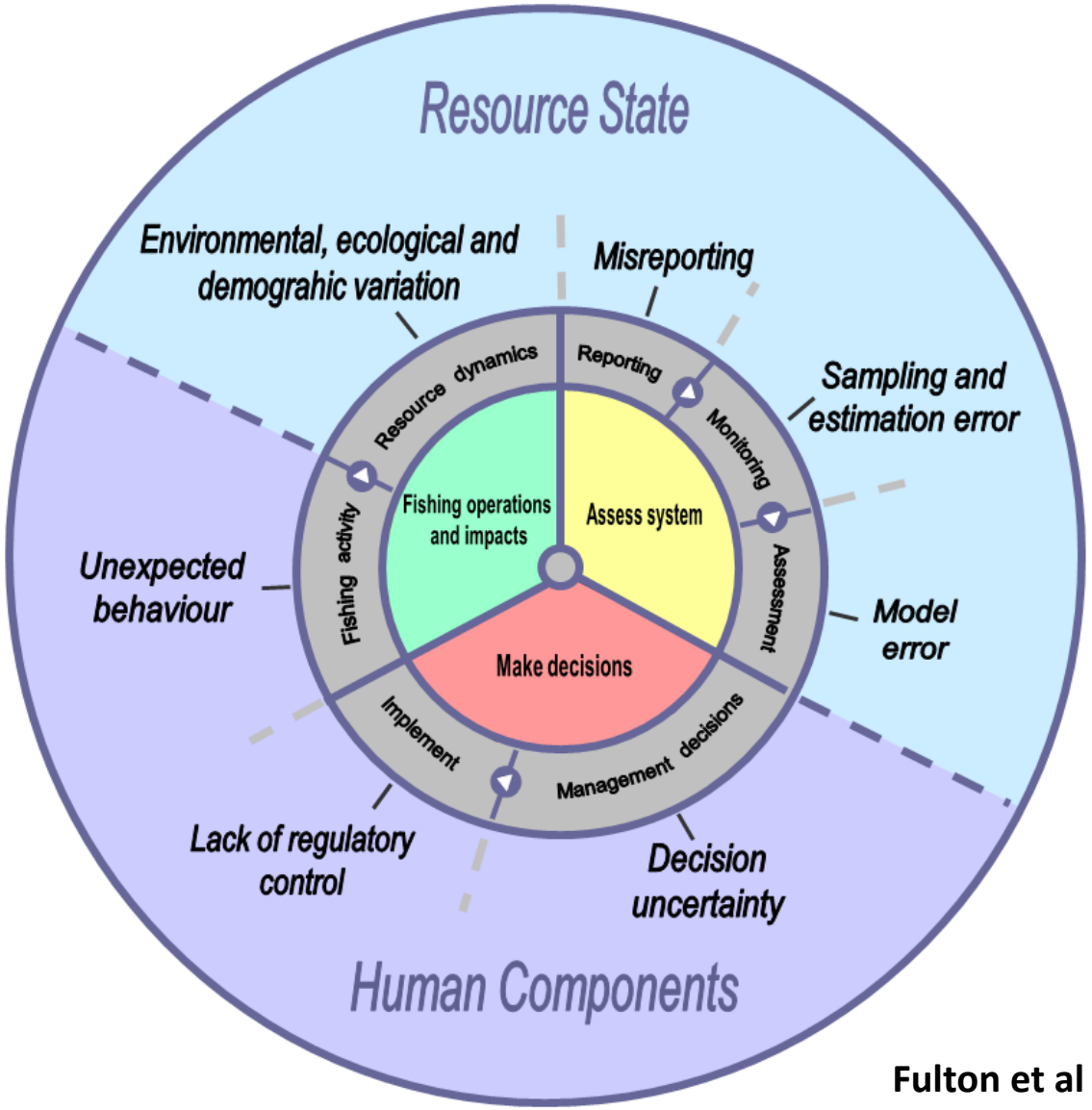


McClenachan 2009

REALIGNING INTENT & OUTCOME

- To minimise uncertainty of outcome consider responses, so intent of management & human response align

Sources of uncertainty for management outcomes



Fulton et al 2011

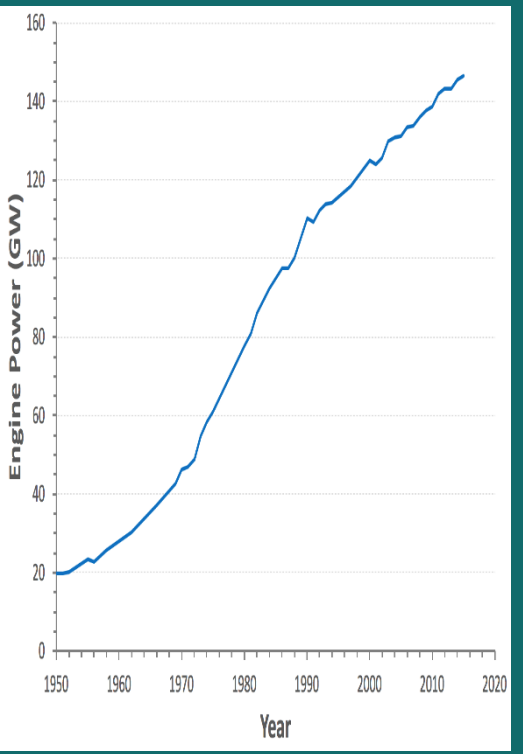
SYSTEM DIVERSITY DEMANDS DIVERSE SOLUTIONS

- Achieving sustainable exploitation is important (respects biodiversity and production)
- However, resist push for single solutions (embrace diversity)

Images: Shutterstock, Nansen legacy

LIVING IN ‘EXCITING’ TIMES - TRANSITIONS

- Fishing = technological progress & transitions



- Not just fishing power, but observations & assessments too

Images: Shutterstock

Rousseau et al (2019)

PRACTICAL SOLUTIONS & PATHWAYS: OBSERVATIONS

- Expanding toolbox of options

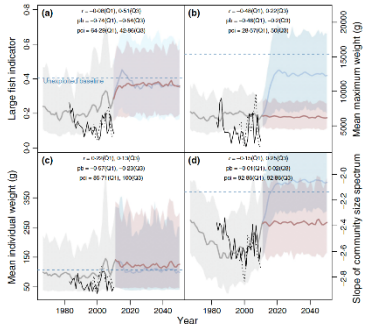
Technology Continuum

EXISTING

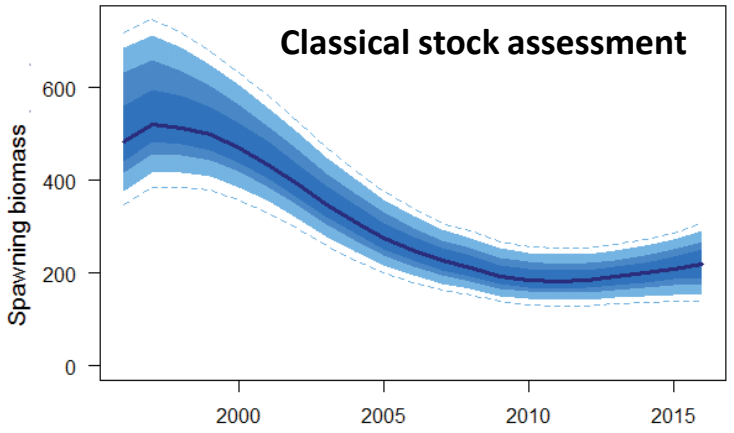
Other assessment methods

FISHPATH

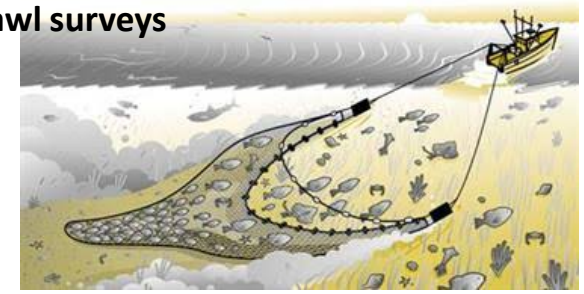
Indicators



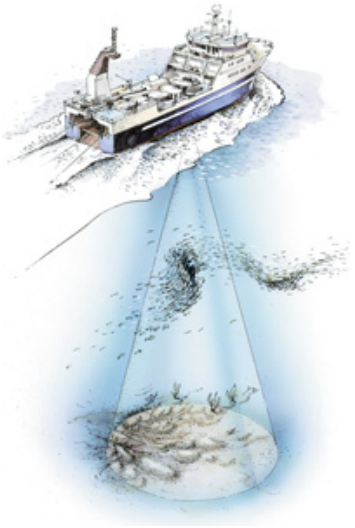
Classical stock assessment



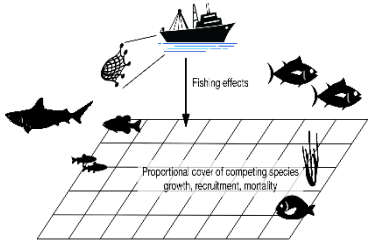
Trawl surveys



Acoustic surveys

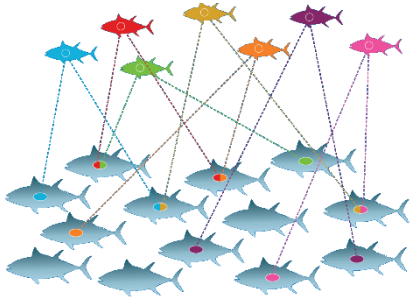


Tactical ecosystem models



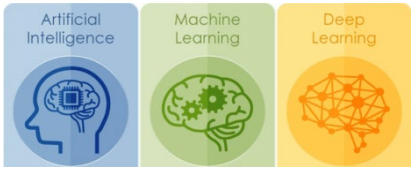
NEW

Close-kin assessment



Blockchain

AI & Machine & Deep Learning



eDNA & more

Blanchard et al (2014), Dowling et al (2016), Bravington et al (2016)

Images: ICES, SIMRAD, Leanworthy, CSIRO

FORECAST SKILL

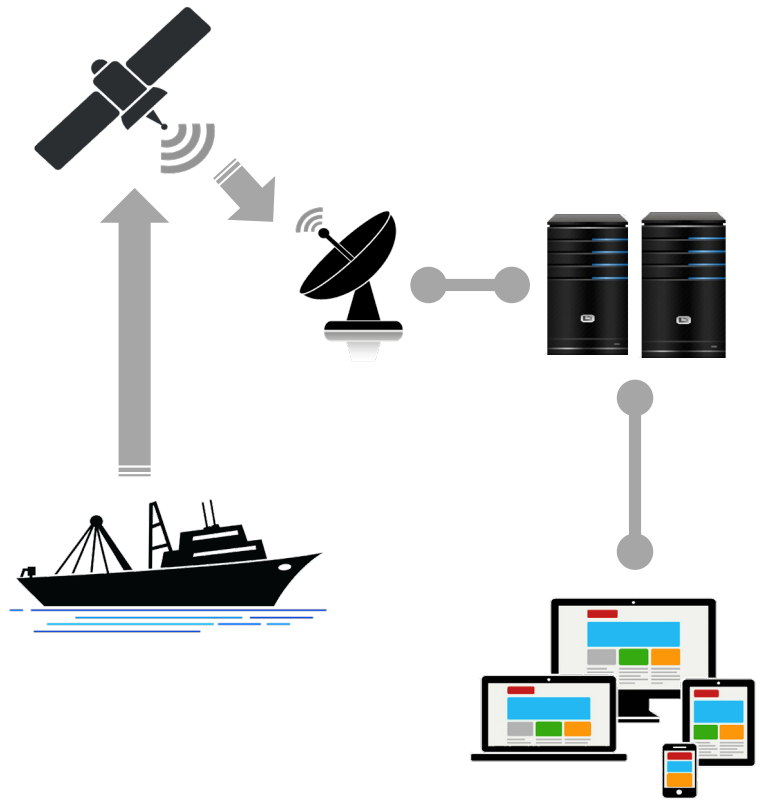
- Multiple roles of forecasts (& planning)

Increase fishing efficiency | **Planning & Investment**

Aerators, Feed | Synchronization, Operations, Jobs | Equipment, Location, Closures | Infrastructure, Change species (target or culture)

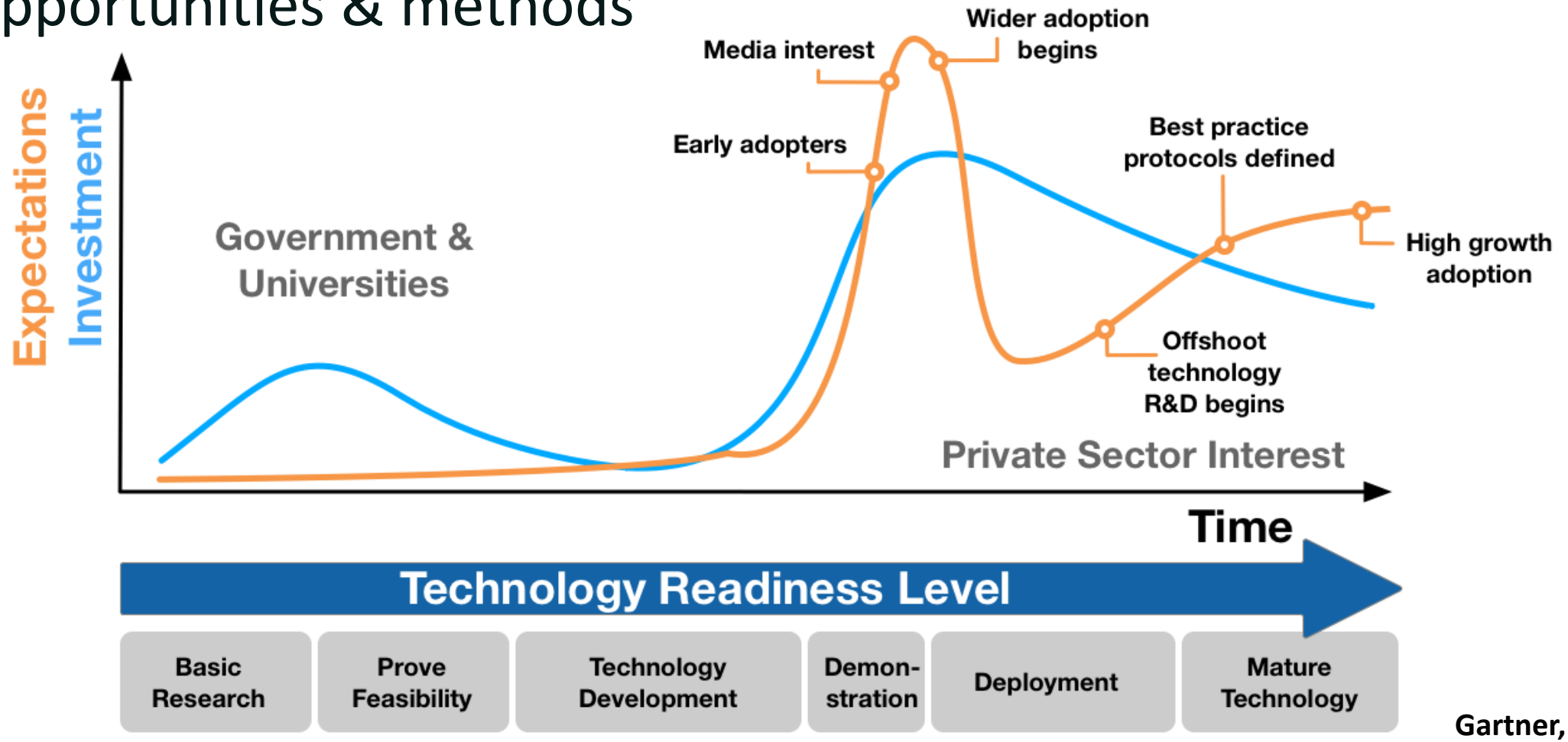
Days | **Weeks** | **Months** | **Years**

Reactive | **Seasonal** | **New methods & Projections**



OPTIONS NOW & INTO THE FUTURE

- Do not prescribe methods (flexibility allows for adaptation)
- Maturing technology reduces costs & increases learning opportunities & methods



Gartner, Lott, NAMII

NO NEED TO REPEAT THE PAST

- Watch for leapfrog opportunities

For example, multispecies fisheries

Historical Management Pathway

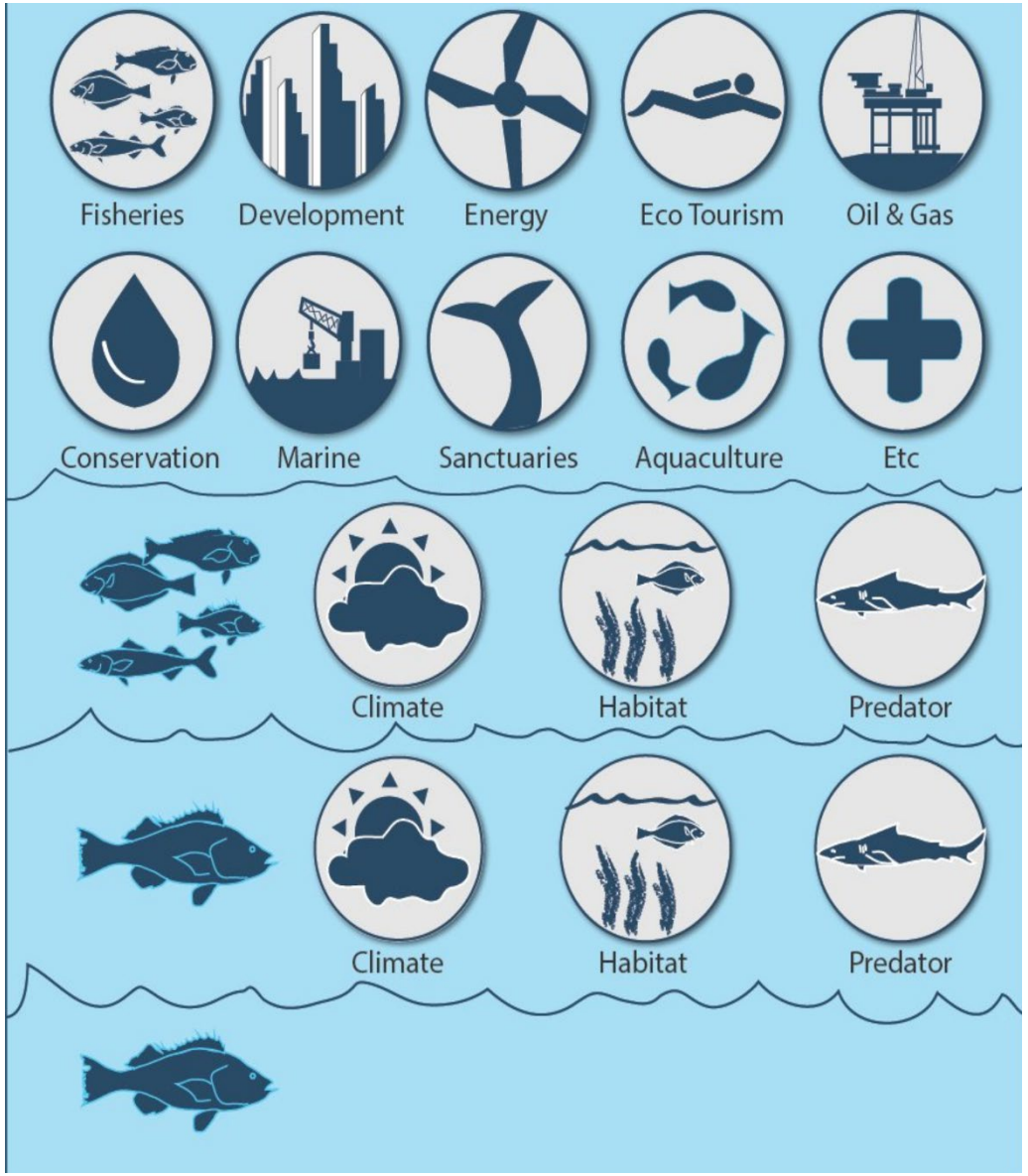
New Entry Points

Ecosystem Based Management

Ecosystem Based Fisheries Management

Ecosystem Approach to Fisheries Management

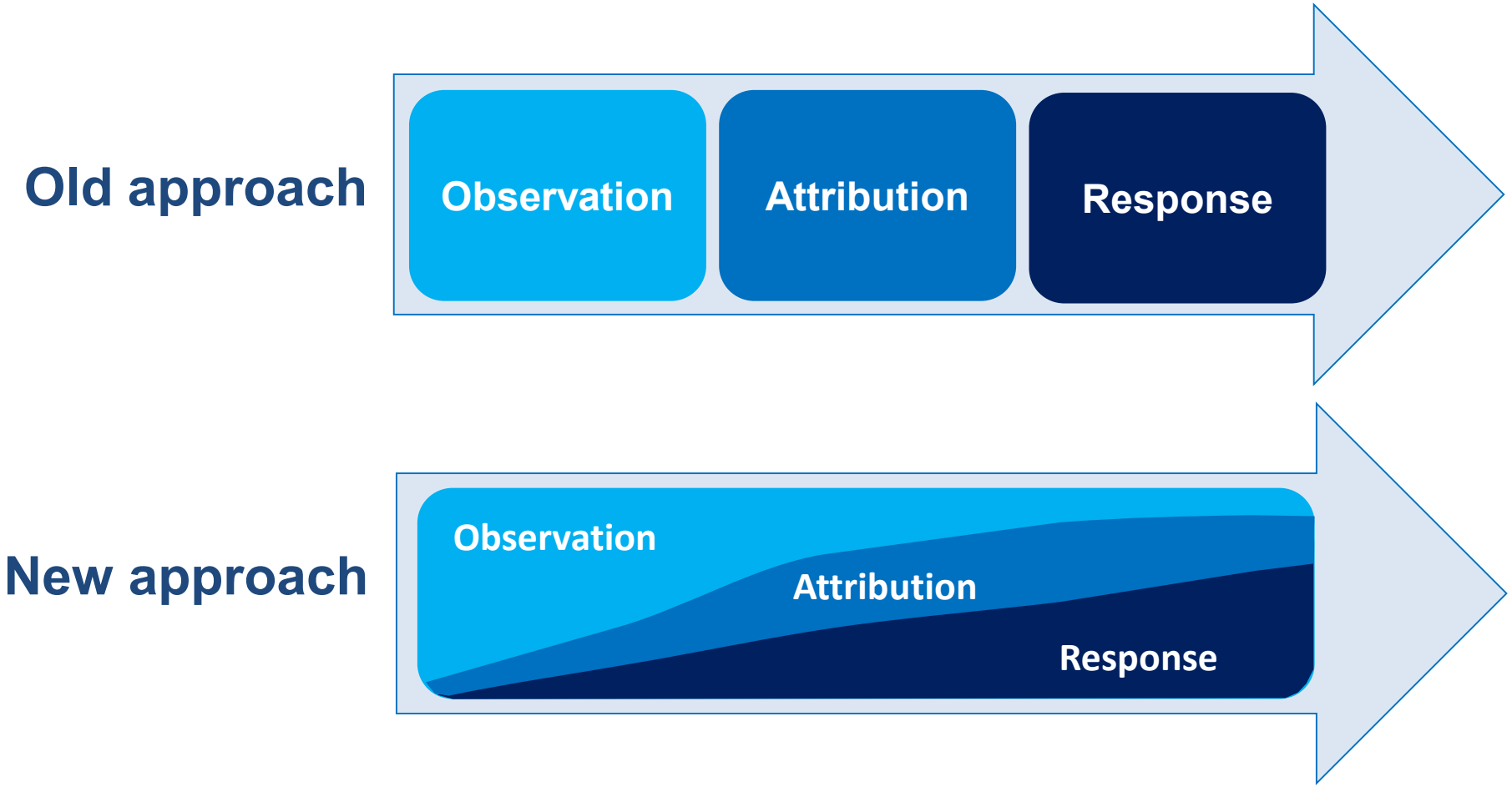
Single Species Fisheries Management



Base Image: NOAA

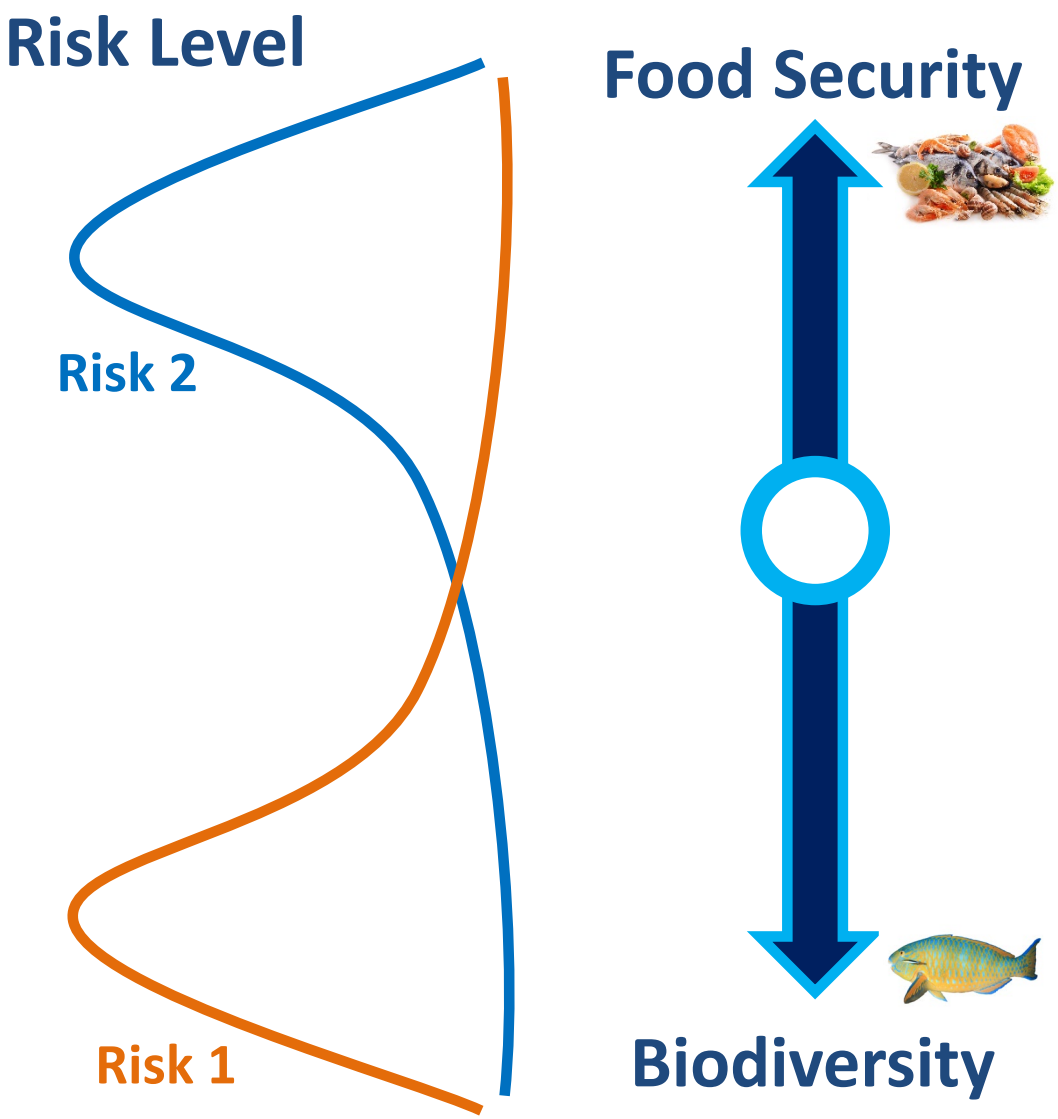
DO NOT WAIT FOR INDEFINITELY A DEFINITIVE ANSWER

- Pace of change rapid – one step at a time no longer effective
- Instead make no regret decisions & acknowledge change will be needed (as system change continues & knowledge grows)



Hobday

FUNDAMENTAL STEPS



- Different systems will have specific mixes of desired biodiversity and food security outcomes
- Sustainability still possible so long as respect internal thresholds (requiring pragmatic means of tracking position vs threshold)
- Solutions & options will change through time

Thank you

Beth Fulton
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Food and Agriculture Organization of the United Nations

SUSTAINABLE DEVELOPMENT GOALS

Partnering with FAO to make fisheries sustainable

Working for #ZeroHunger