CSIRO

Climate change makes policy and community decisions all the more important and urgent

Beth Fulton, Rodrigo Bustamante, Corrine Condie, Michael Fuller, Joanna Strzelecki, Piers Dunstan, Fabio Boschetti, Catherine Bulman, **Scott Spillias**, Rowan Trebilco, Javier Porobic, Linda Thomas, Aysha Fleming, Roshni Subramaniam

FUTURES of SEAFOOD

FRDC FISHERIES RESEARCH & DEVELOPMENT CORPORATION

SEA CHANGE AUSTRALIA

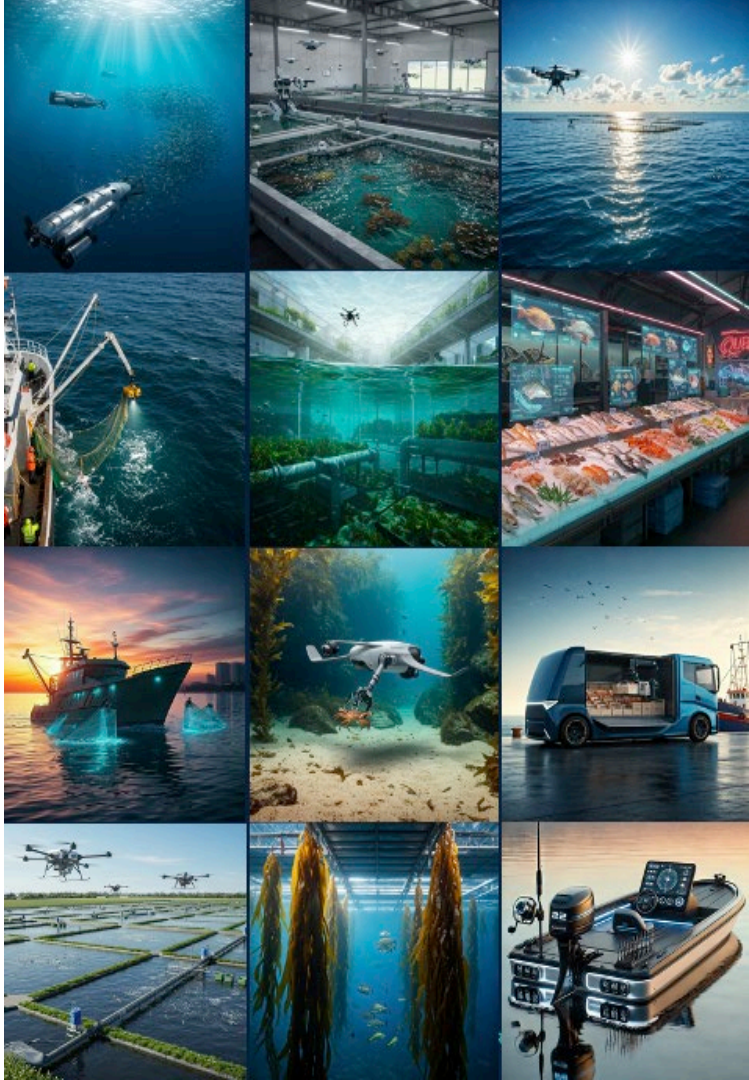
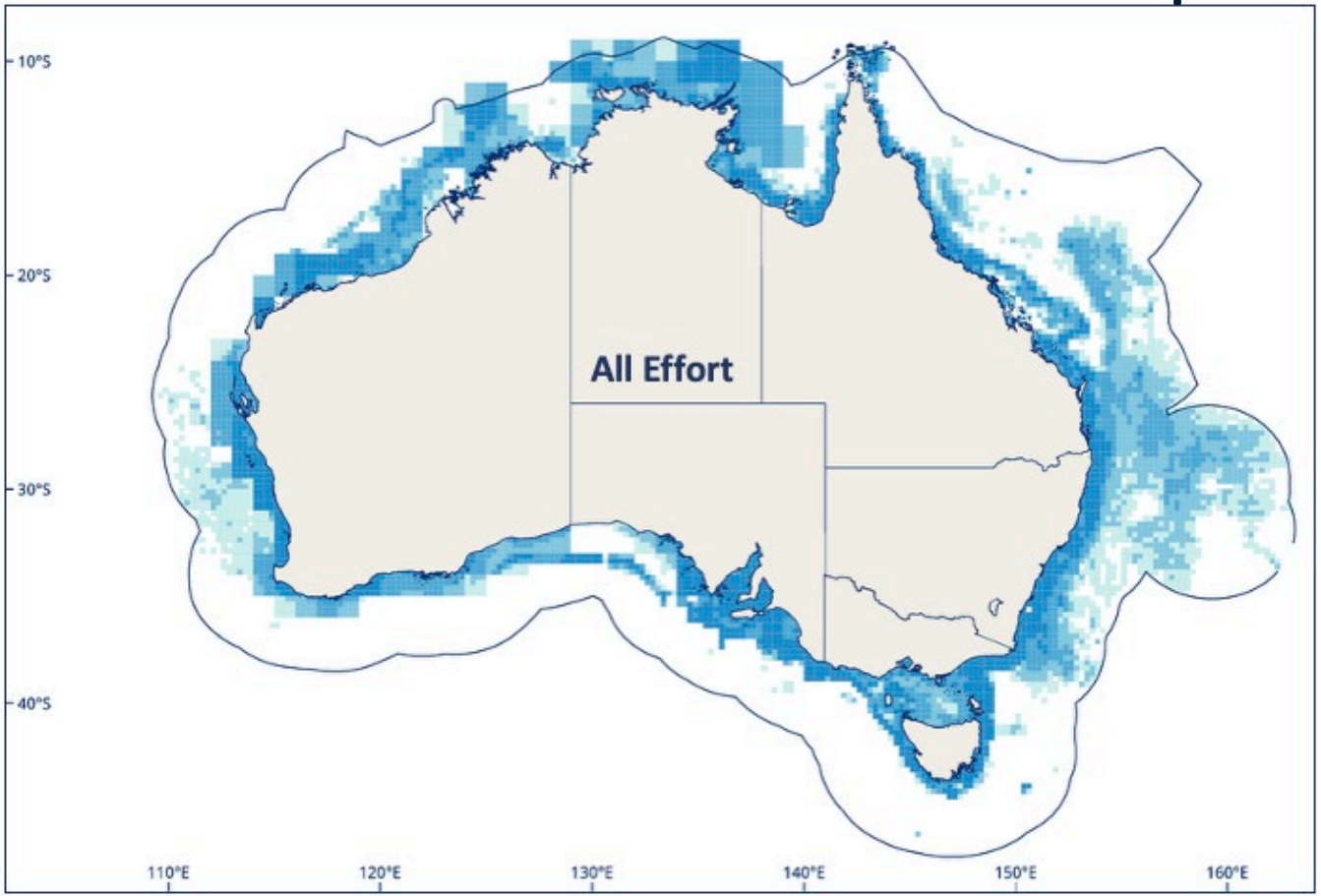




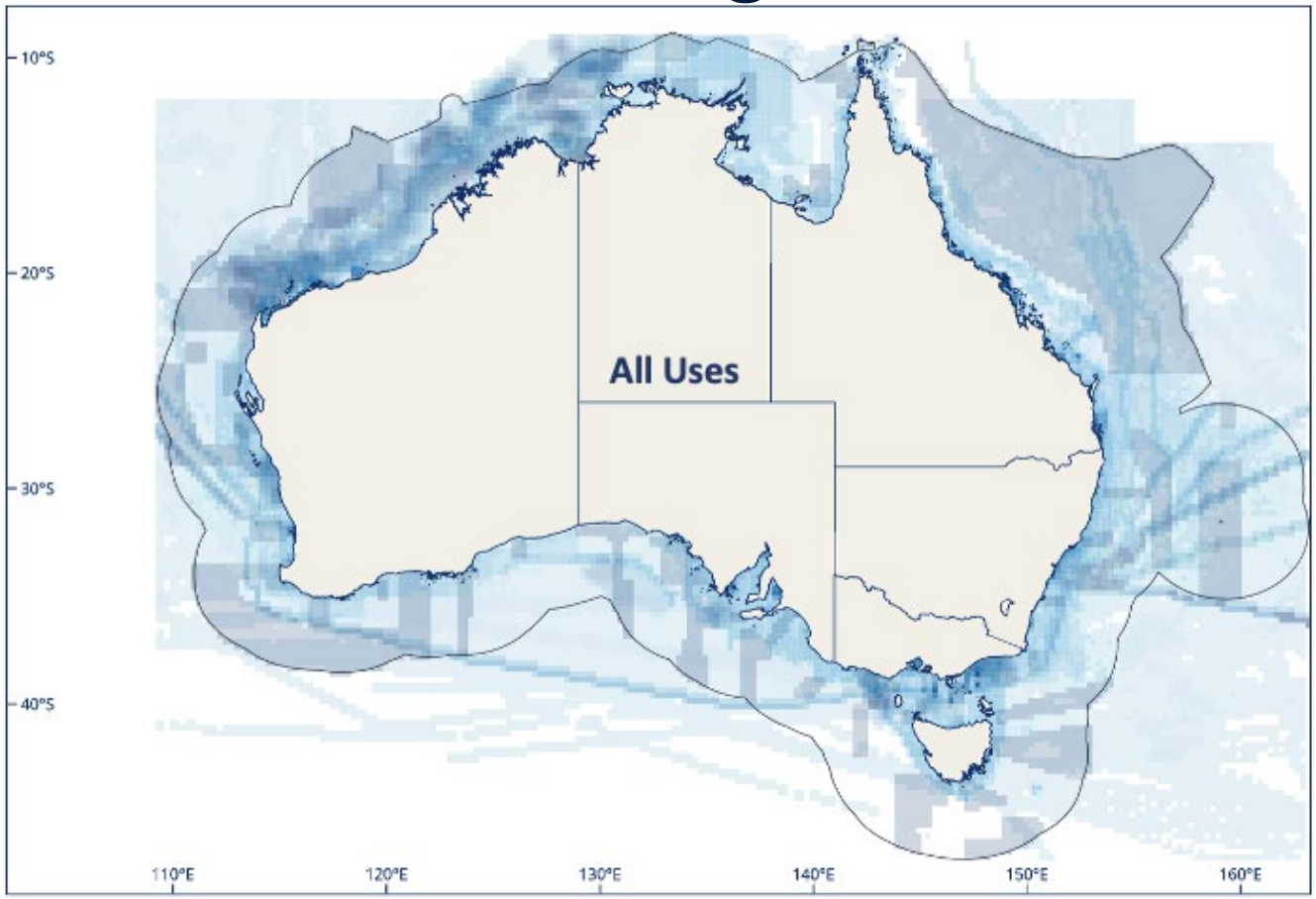
Photo: Nathan Dobbie

Australia's Seafood Footprint



- Some footprint in each State
- <3% trawled
- Commercial closed/reduced (WA, Vic, Qld, NT)
- Recreational continues… ~IUU and SSF

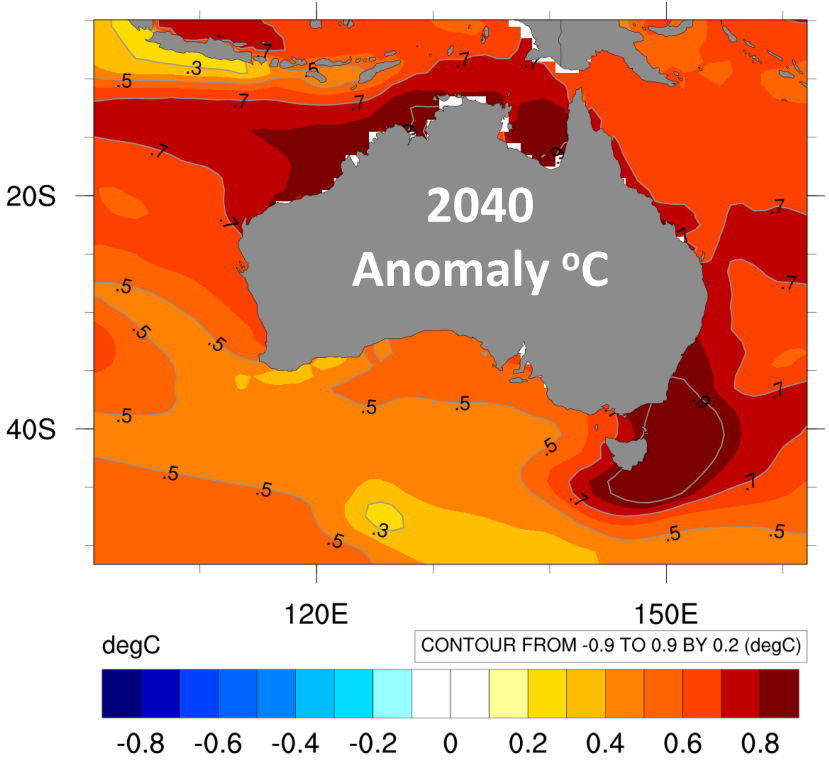
Broader Usage



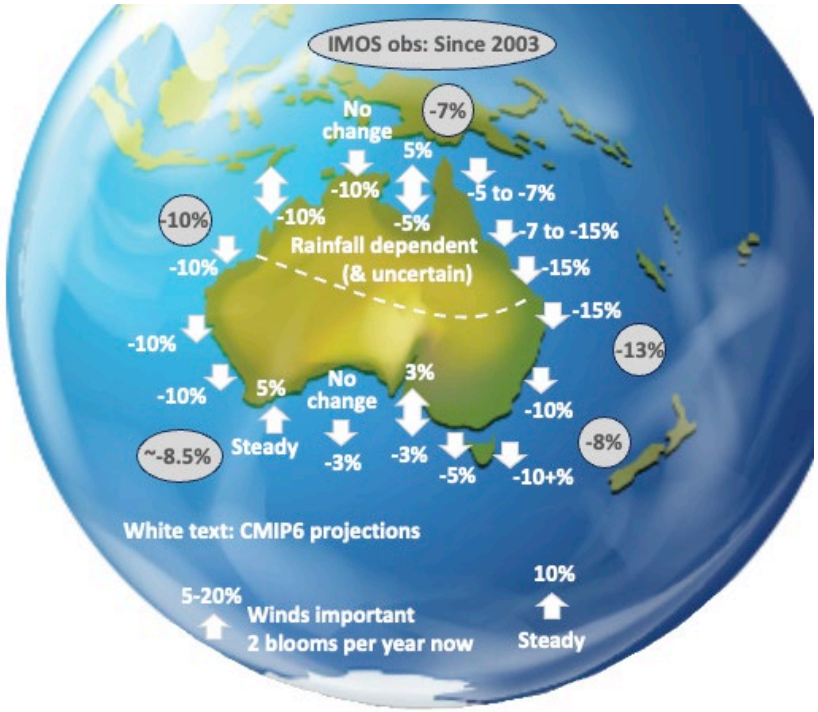
- Spatial squeeze
- Something everywhere and often acting to exclude fishing

Broader Context - Climate

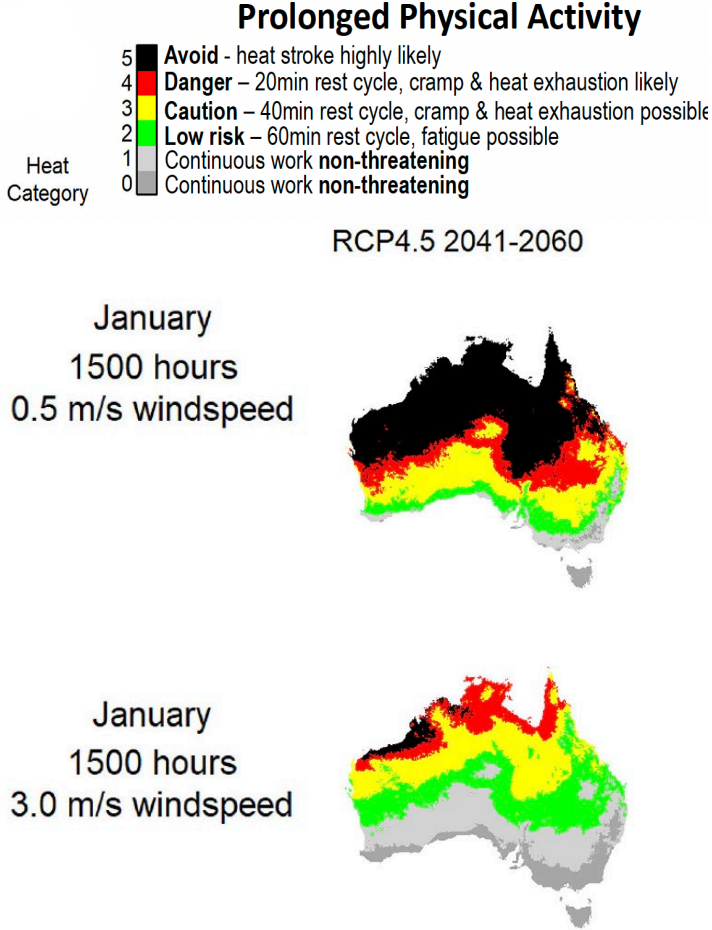
- Warming since 1950 matches additional warming by 2040



- Primary production drop since 2000 matches additional loss by 2040



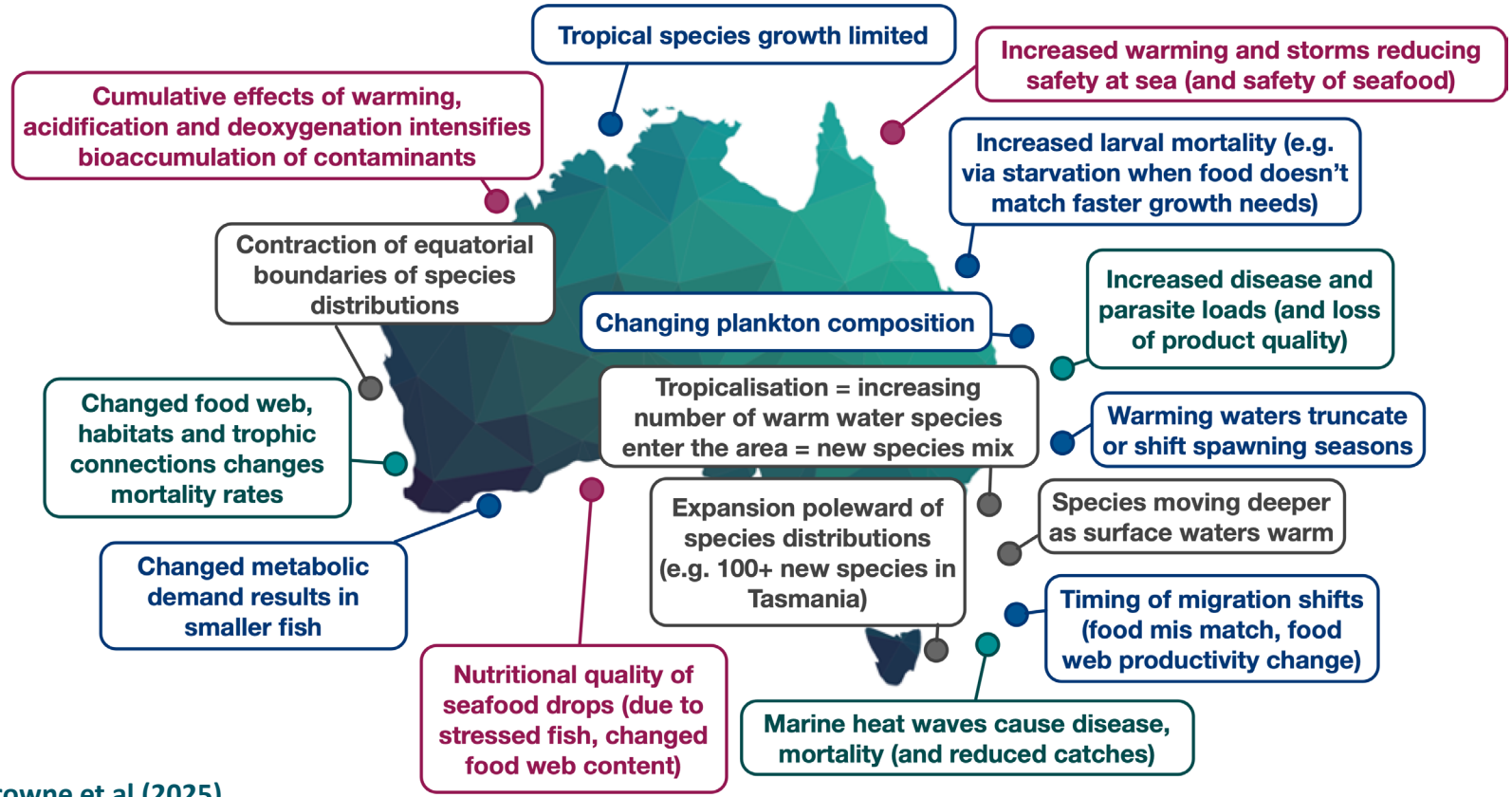
Broader Context – Climate Impacts People



- Too hot to work
- Significant wave heights 10% higher (dangerous in some sites)
- Coastal infrastructure at risk from inundation (storm surges)
- Road/rail disruption and at-sea state increases freight costs
- Air freight – carry less and at different times of day
- Product quality & shelf life decline

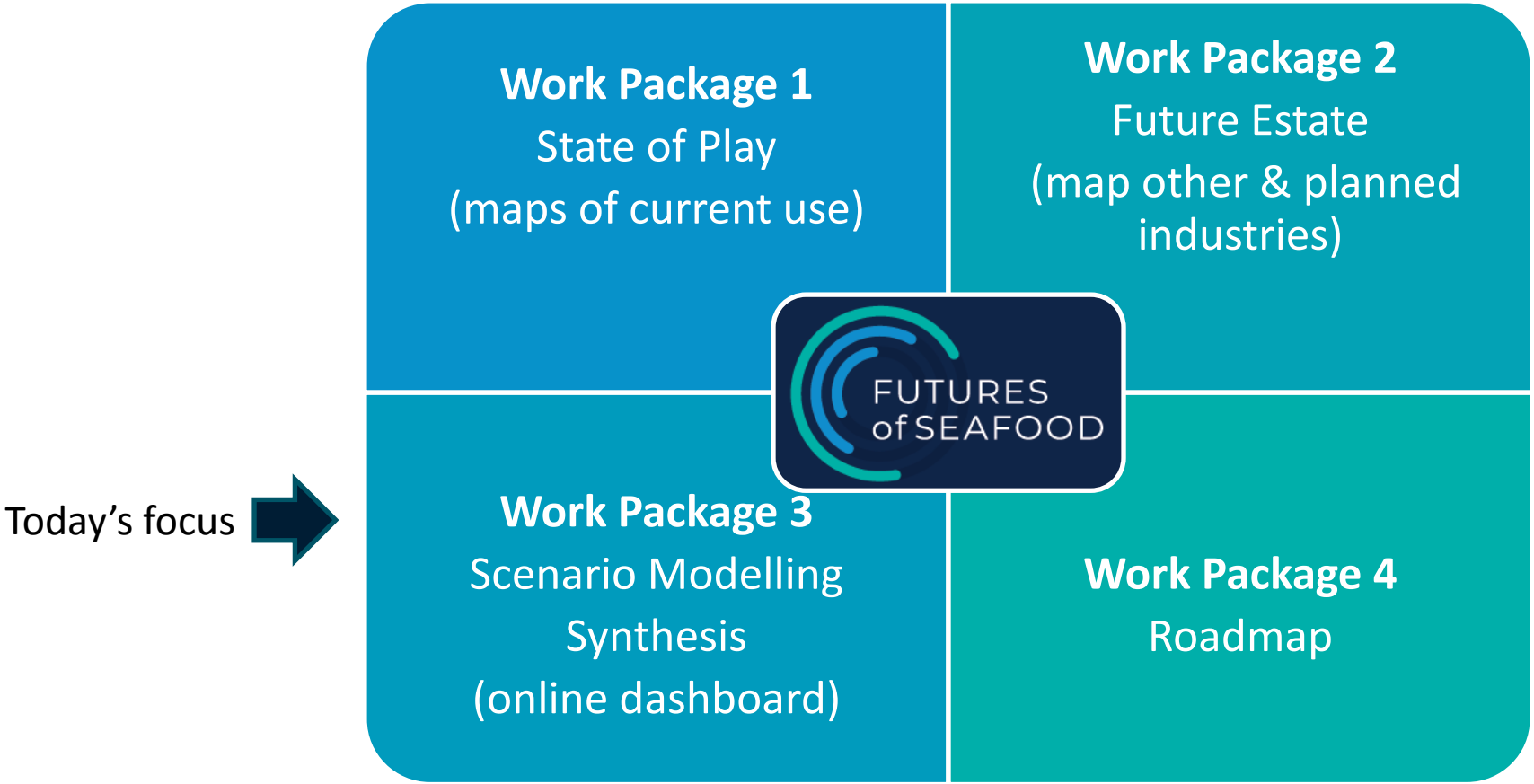
Climate Complicates Management

Range shifts | Productivity | Abundance | Condition



Bessell-Browne et al (2025)

Government Funded 2 Year Focus



Scenarios to Explore the Future



Lack of access (spatial squeeze), poor market/ government support sees Seafood Industry decline. Governance burdensome & fragmented. Contracting workforce. Little restoration.



Seafood production initially holds steady before growing (especially via aquaculture). Business differentiation strengthens. International ownership of fishing fleet. Siloed MSP. Some restoration.

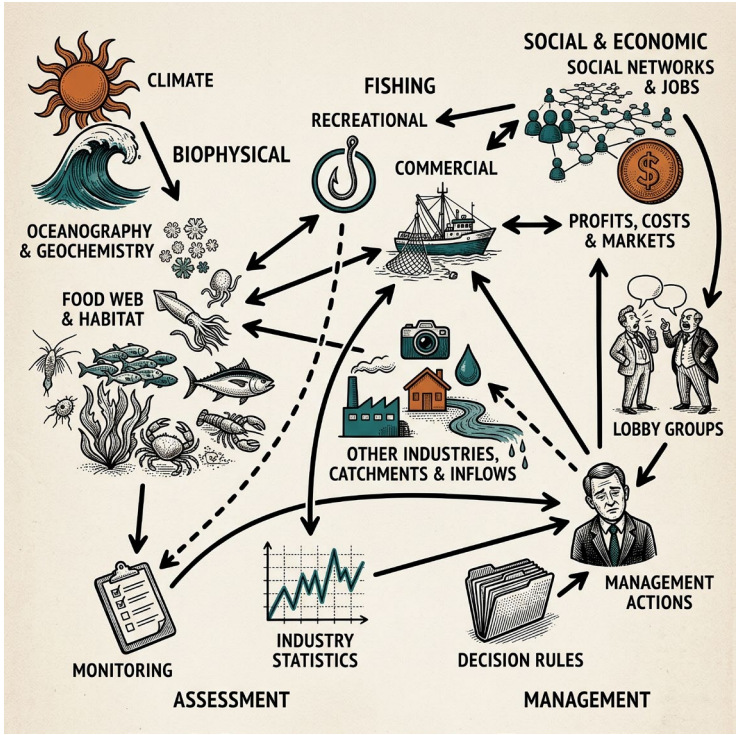


Seafood production grows (health benefits, C footprint). Industry flourishing - trained, decarbonised, sustainable, regenerative. Integrated planning & management (consultative & evidenced based). Streamlined reporting. Supports communities. Restoration at scale

Models to explore feasibility & nuance

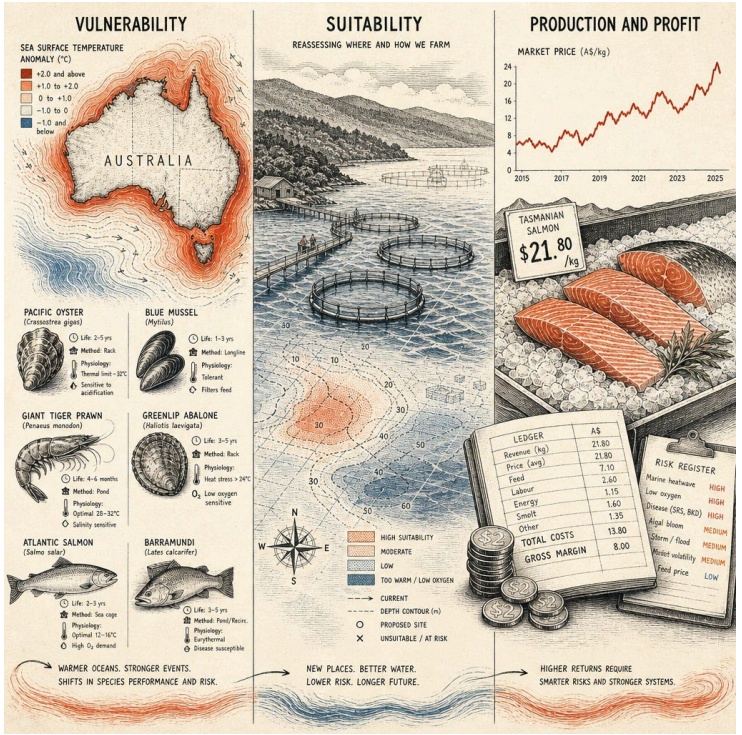
Fisheries

EEZ scale = 27 marine system models
(in aggregate: all ocean uses, 1000s species)



Aquaculture

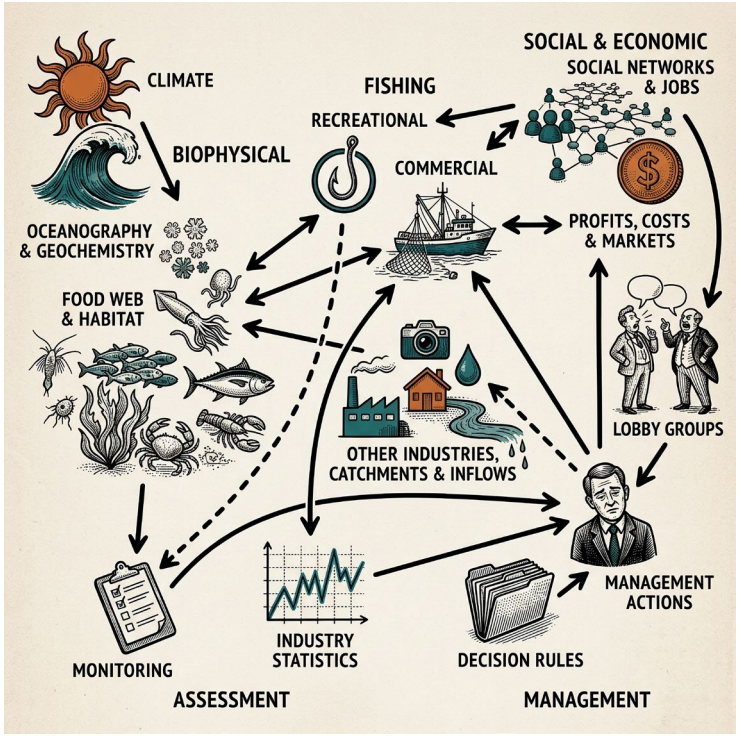
Assess species vulnerability & site suitability,
plus bioeconomic models of farm operations



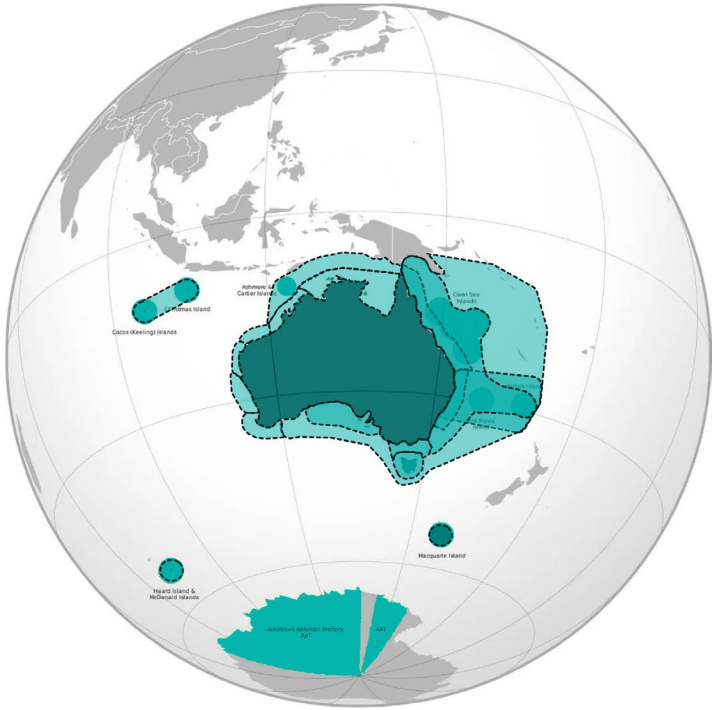
Models to explore feasibility & nuance

Fisheries

EEZ scale = 27 marine system models
(in aggregate: all ocean uses, 1000s species)

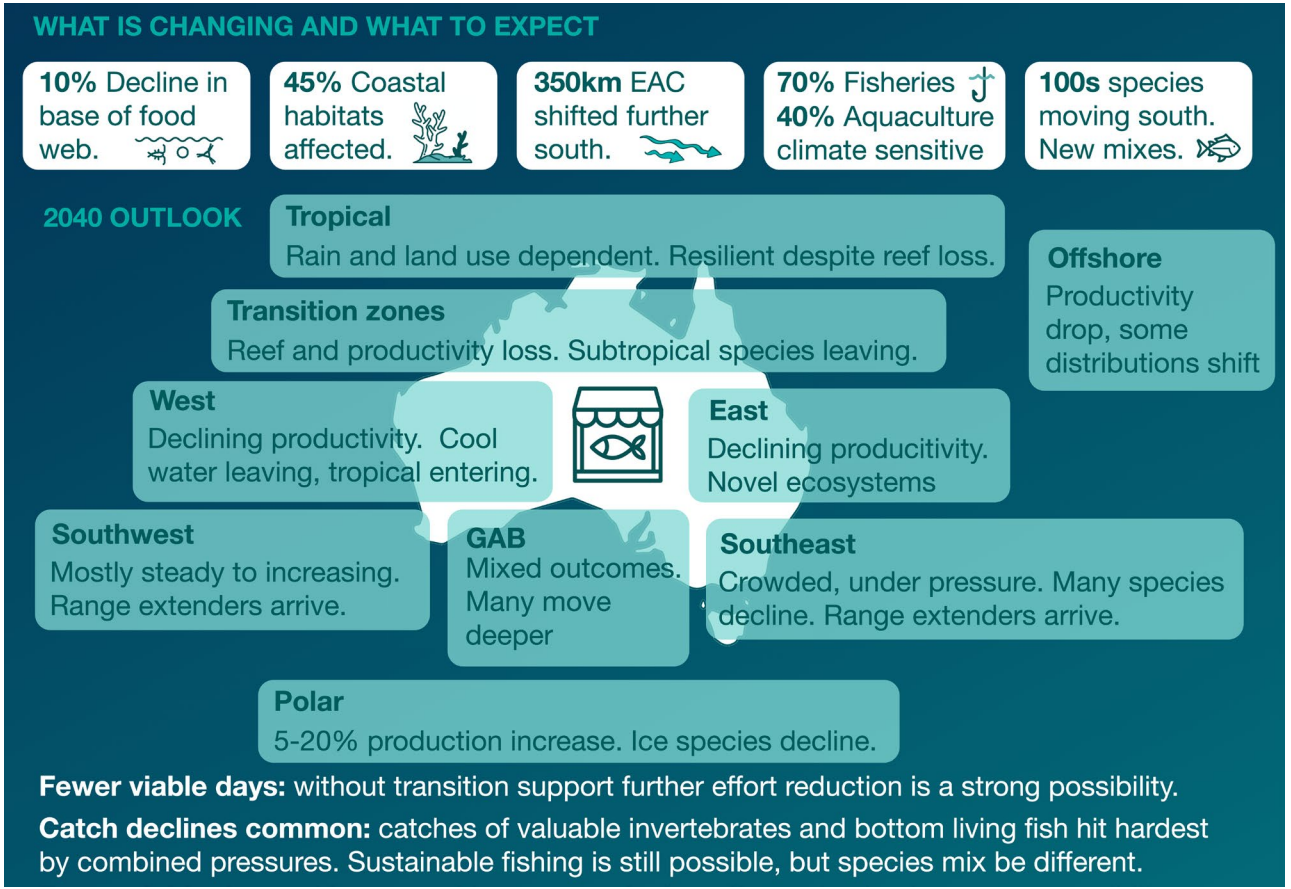


Coupled EwE with systems model of non-fishing sectors. Projected to 2040



Fisheries Change Is Underway

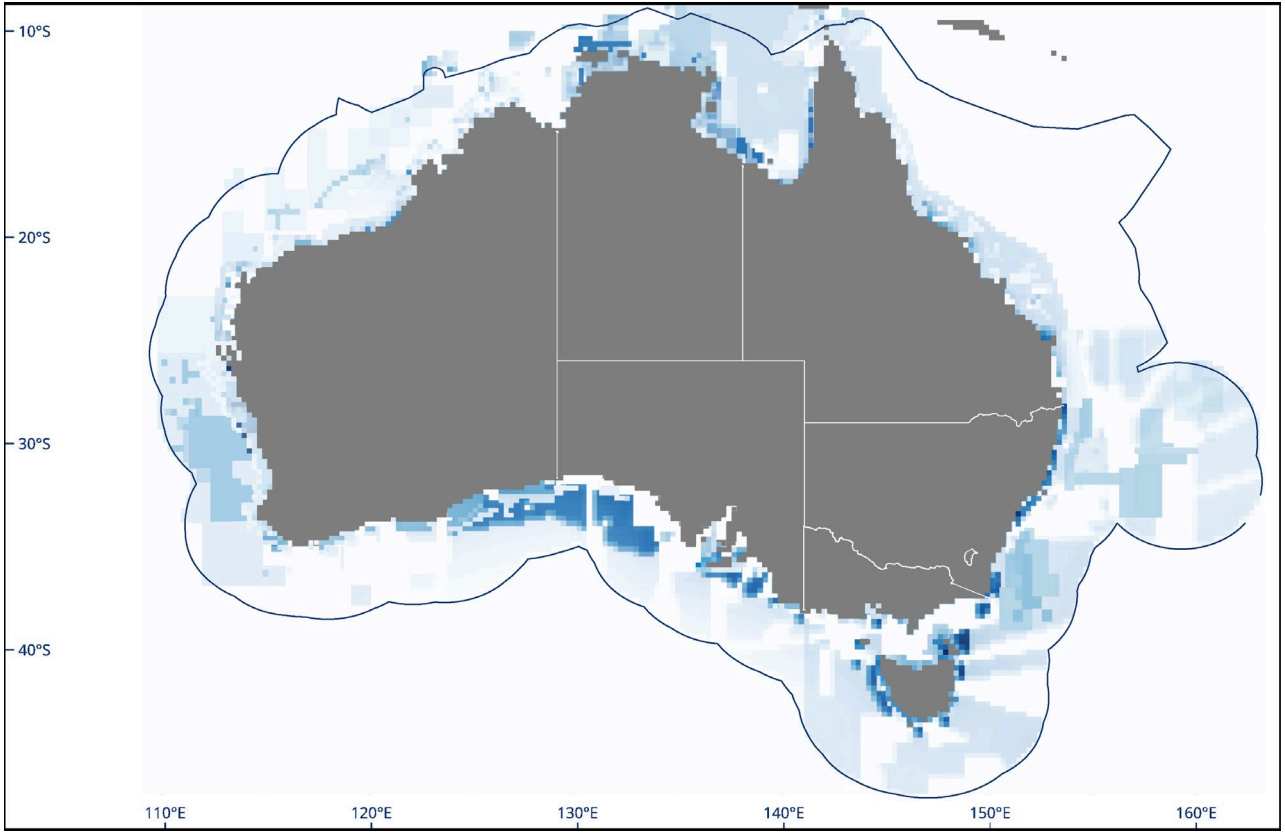
- Outcomes depend on where you are
- Up to 10% decline in base of food web
- Mixed responses across species, some can benefit (best if can move)
- Reef dependent species decline (10-50+% decline in corals)
- (Sub)tropical transition zones impacted most strongly



Effort reshaped (vs 2022)

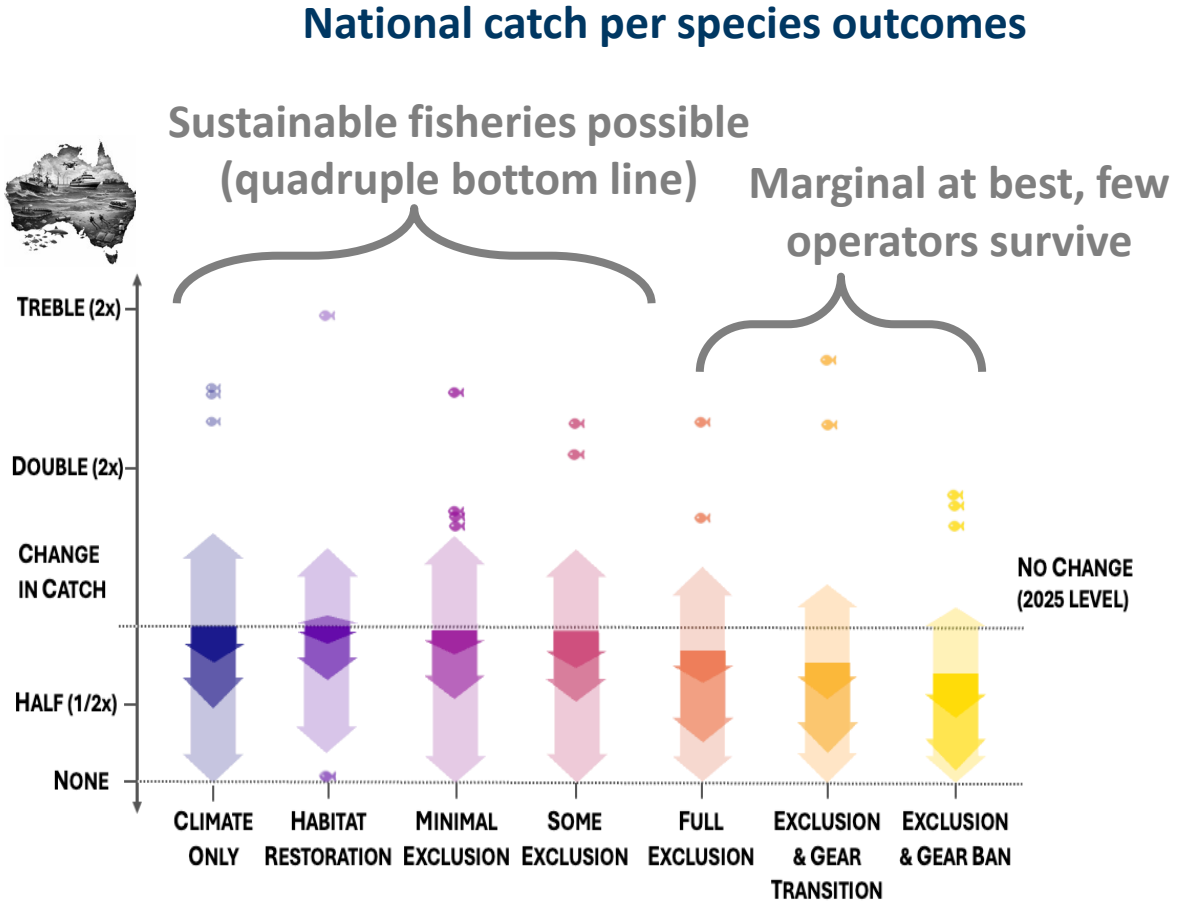
- Effort reductions common
- Pushing deeper
  - as species move
  - access displaced, especially inshore in southeast
- Spatial contraction where fuel or access is an issue
- Without shared spaces access is fragmented (communities and supply network would be reshaped)
- Need transition support

Struggling Future



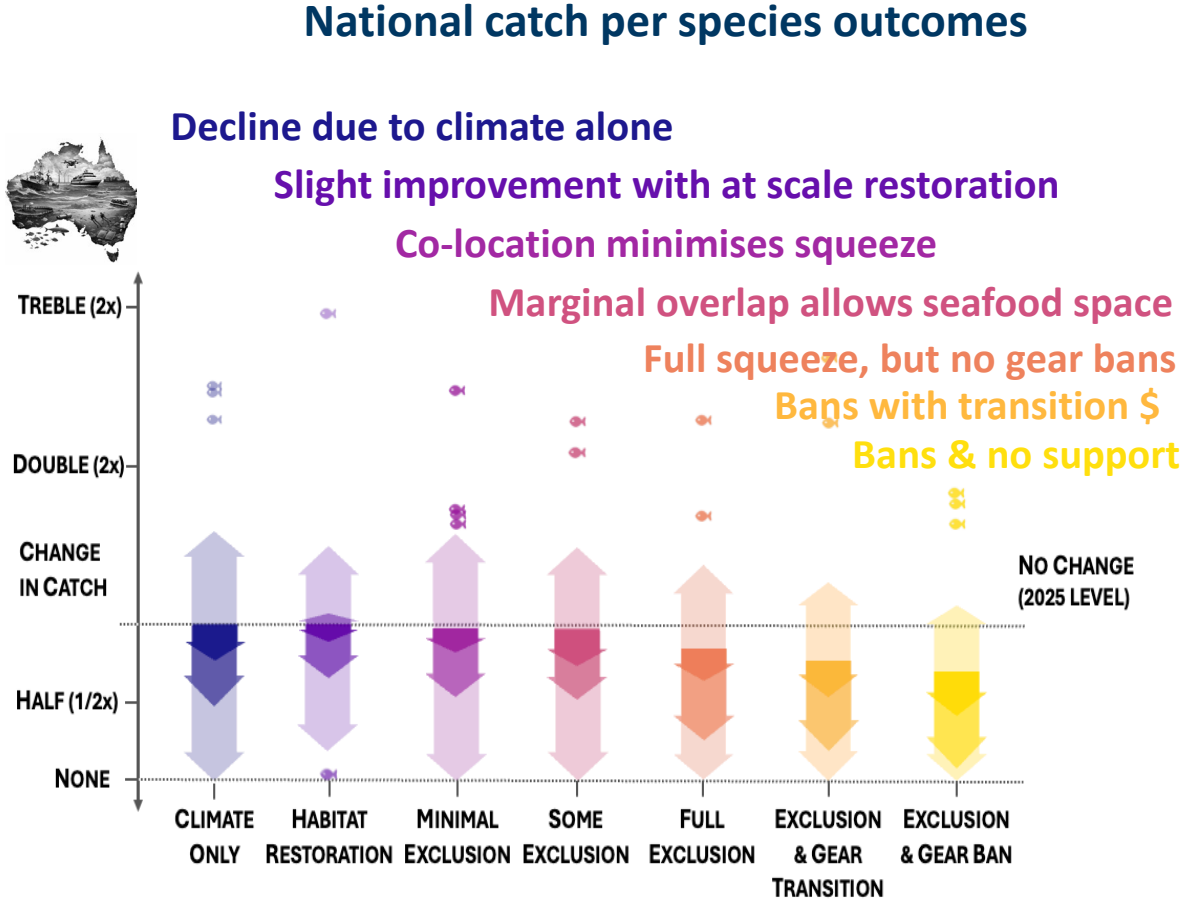
Cumulative Pressure & Policy Count

- Variability across species
- Climate change causes drop in base productivity + causes safety & economic issues
- Targeted restoration helps
- Society and policy choices are dominant (best if can reduce fragmentation, coordinate across industries)



Cumulative Pressure & Policy Count

- Variability across species
- Climate change causes drop in base productivity + causes safety & economic issues
- Targeted restoration helps
- Society and policy choices are dominant (best if can reduce fragmentation, coordinate across industries)



CSIRO



Workforce challenges

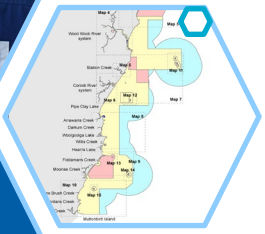


Seafood production

Regulation

Access





Tech change





Social perception

Economics & operations



Markets & trade

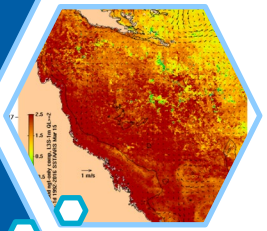
Spatial squeeze





Capital & investment







Govern-ance & planning

Enviro, climate & extremes

Challenges

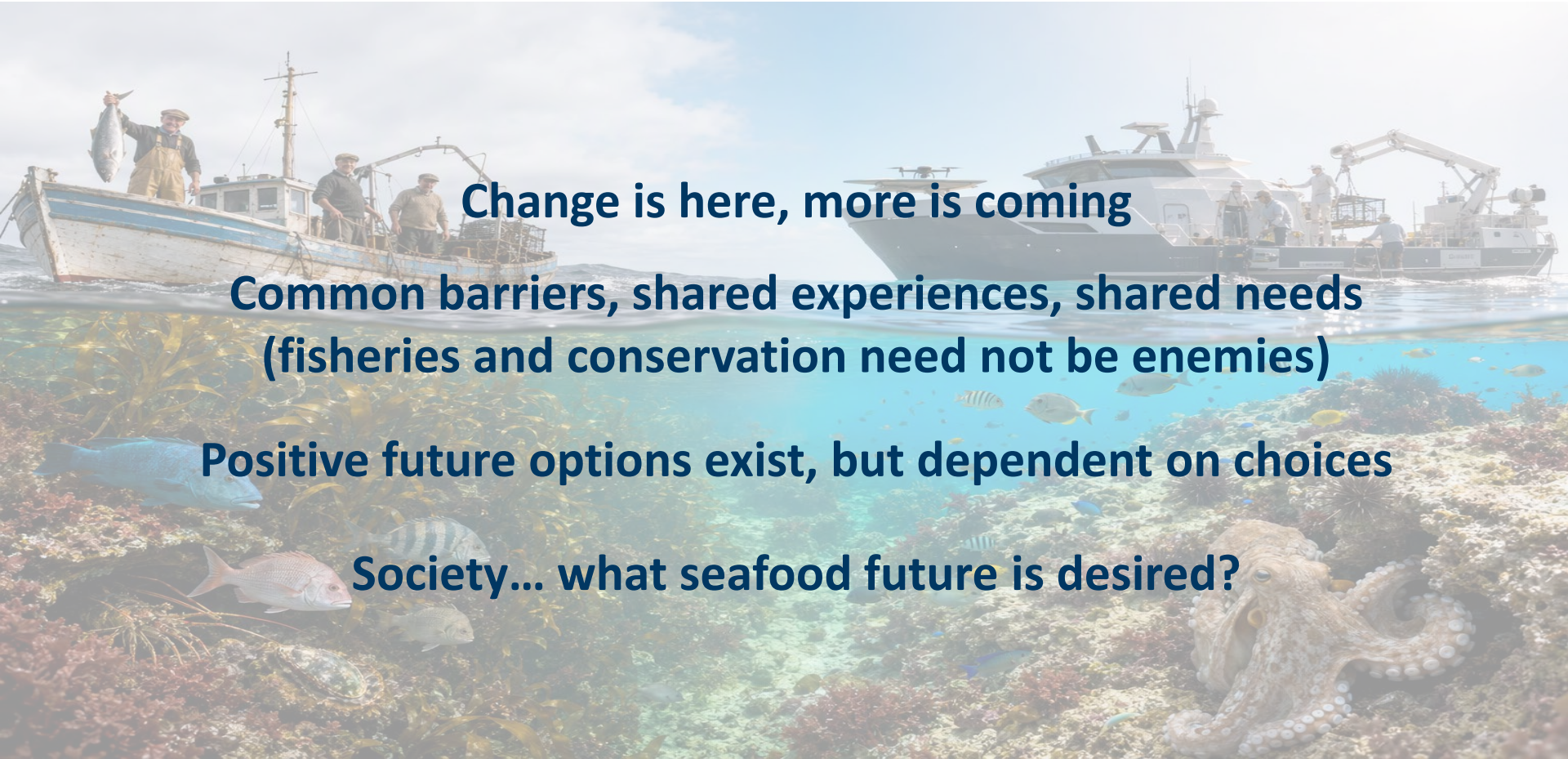
- Many shared across fisheries, aquaculture, restoration as sector

Successful Adaptation

- Opportunities
  - Changing palate
  - Partnerships (training, technological change, investment)
  - R&D (new fuels, new approaches, new species)
  - Alternative income streams (bioproducts, circular use, experiences, supply chain approaches)
  - Policy change
- Stronger
  - Communication
  - Coordination
  - Knowledge exchange across sectors



Concluding thoughts



Change is here, more is coming

Common barriers, shared experiences, shared needs (fisheries and conservation need not be enemies)

Positive future options exist, but dependent on choices

Society… what seafood future is desired?



Thank you

CSIRO Environment
Scott Spillias and Beth Fulton

Scott.Spillias@csiro.au
beth.fulton@csiro.au
csiro.au



CSIRO