Data Collection and Modelling for Climate Scenarios

Recap: Three Focal Areas of Science Support

Observation

- Baselines
  - Quantify change
- Robust Indicators
  - Biology
  - Distributions
  - Oceanography
- Vulnerability analyses
  - Prioritise

Attribution

- Separation of climate change impacts
  - UNFCCC Loss & Damage
  - UNFCCC Negotiation
  - Insurance
- Identify masking & synergistic effects

Response

- Tools & Information to support:
1. Strategic Decisions
   - Resource and Economic Projection
   - WCPFC Harvest Strategies
2. Tactical Decisions
   - Resource and Economic Outlooks & Forecasts
   - Access

Member Needs

Needs Analyses	Capability
Transition from Basin to EEZ scale analyses • Facilitate Economic Impacts Analyses • Quantify refuge habitats • Robust projection • Loss & Damage	• Increase resolution of ocean models • Model future fleet dynamics and effort • Estimates of connectivity • Scaler for biomass • Keep pace with IPCC (CMIP6 & CMIP7)
Forecasting capability • Guide actions towards strategic adaptations	Dependent on accurate description of current conditions • ocean observation • speed of fisheries observation (ER/EM)
Baselines for food security species • Shifting baselines (distribution, life history) • Ocean variables • Vulnerabilities	• Practical and efficient means of estimation and monitoring

# Climate Science to Ensure Pacific Tuna Access (CSEPTA)

- **NZ25M to lay the foundations for downscaling projection models from Basin to EEZ scale**

- Make the region ready for GCF Tuna Project (USD55M)

- Develops Climate Intelligence Systems and Networks for proactive integration of climate impacts into tuna fisheries management and planning

- **Fast tracks the establishment of Baselines**

- Absolute Abundances

- Population structures & baselines

- Monitoring Indicators

- Exceptional circumstances

- Upskills for national and regional autonomy

- **Scales up e-reporting and Ocean Monitoring**

- Remove lags in catch reporting

- Develop options for filling the ocean data gaps

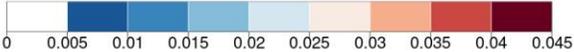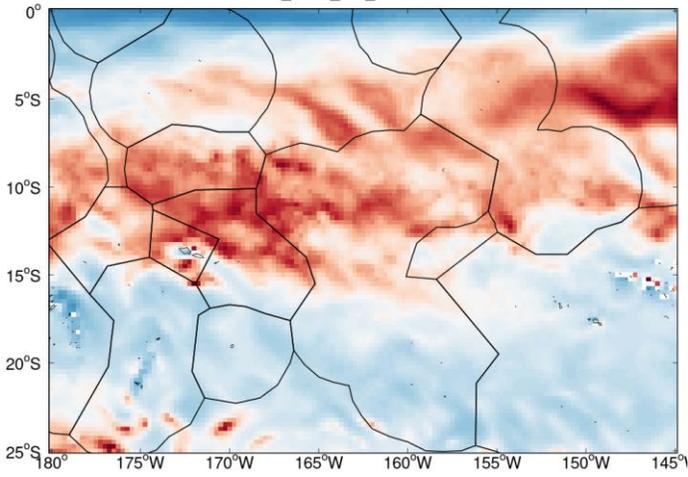- Establish partnerships to fill the gaps

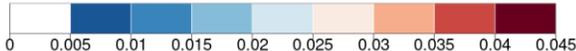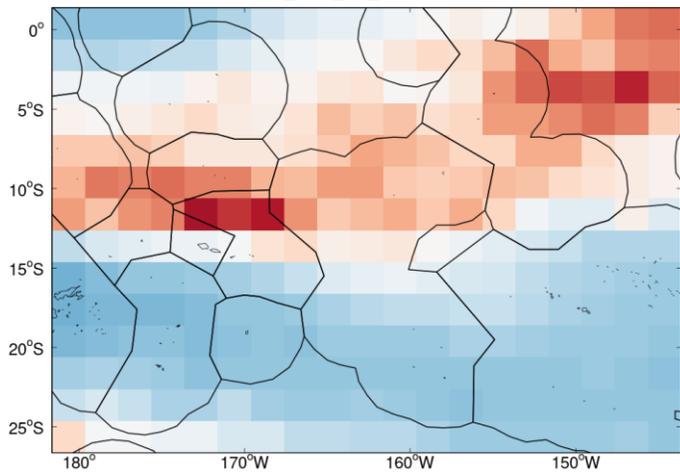# Downscaling

BRAN2020 reanalysis
upper 300m currents
Jun climatology
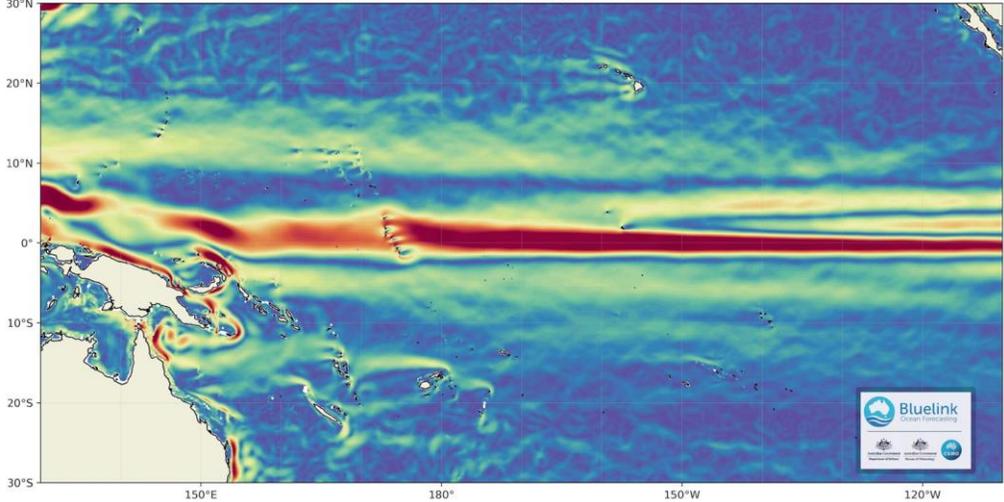
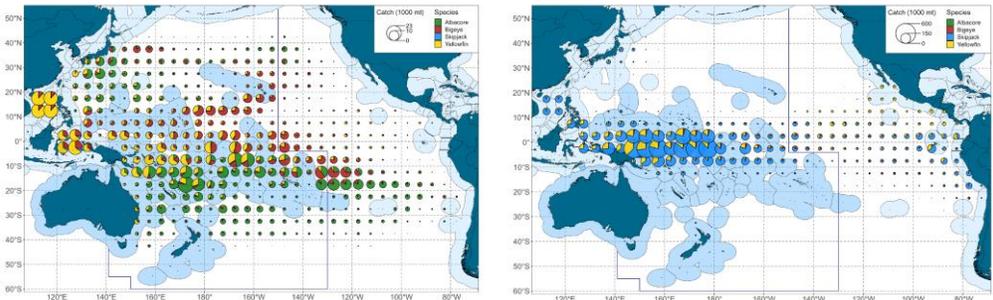ACCESS-OM2 1deg
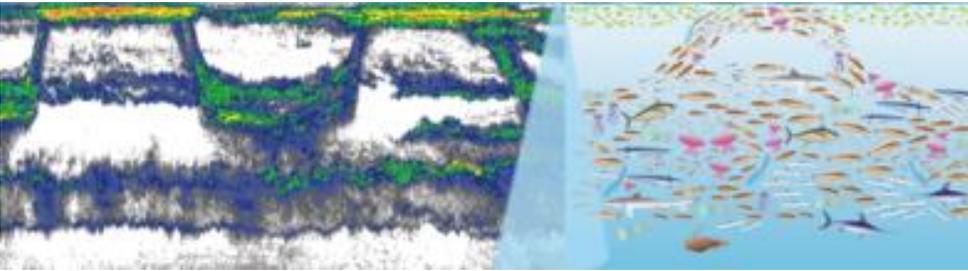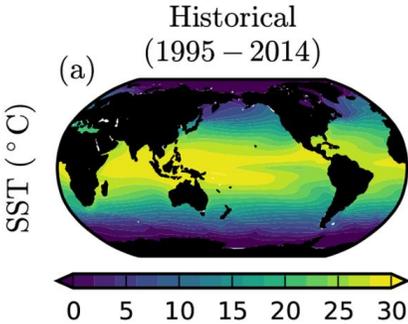upper 300m currents
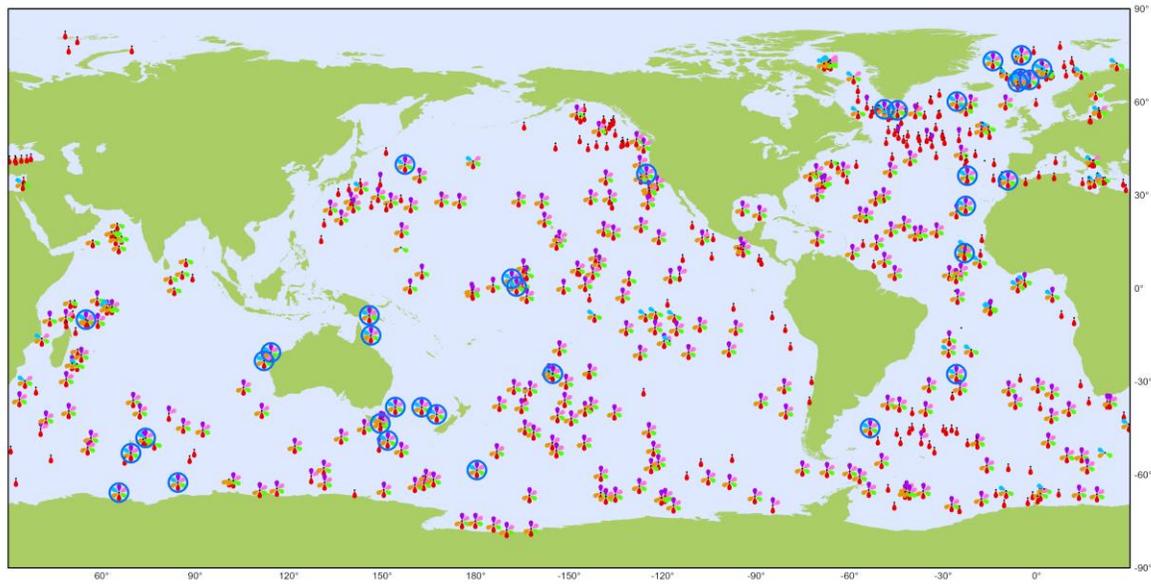Jun climatology
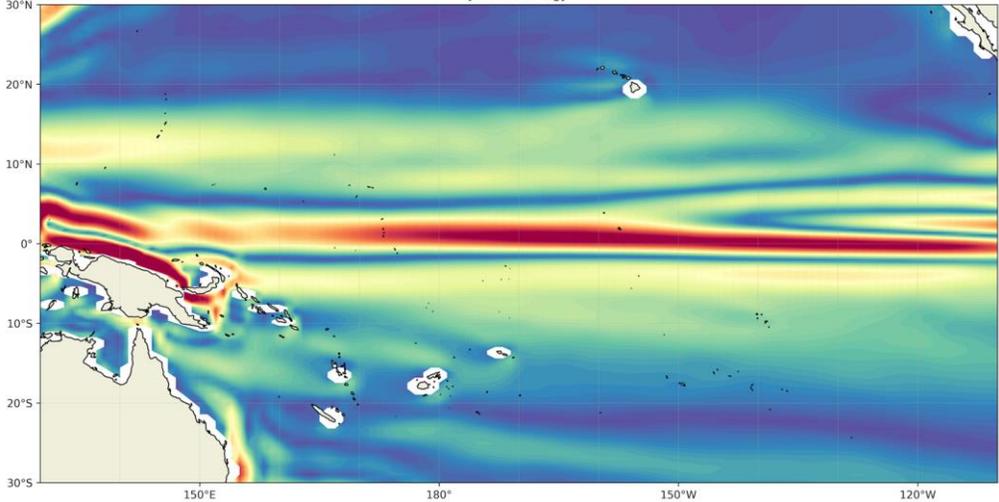
bet_adult_eez_19992-19992

bet_adult_eez_19992-19992

Scaling Ocean Monitoring
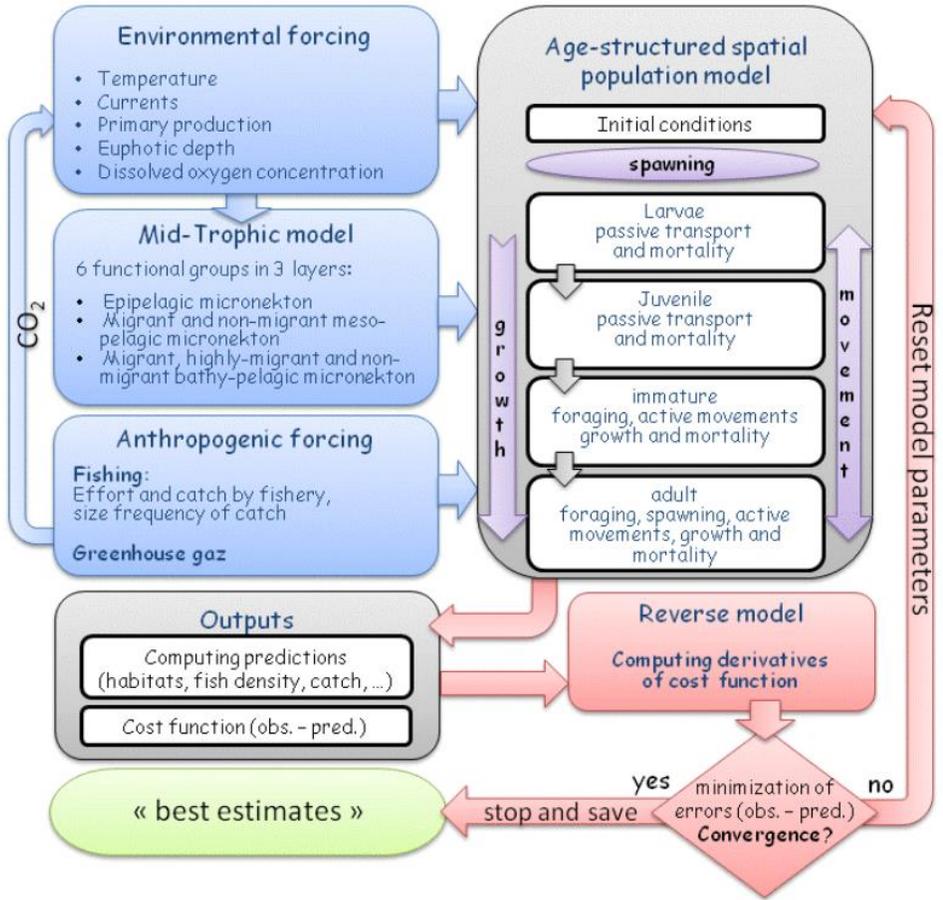
Scaling Ocean Monitoring

Biogeochemical Argo — Sensor Types — April 2023
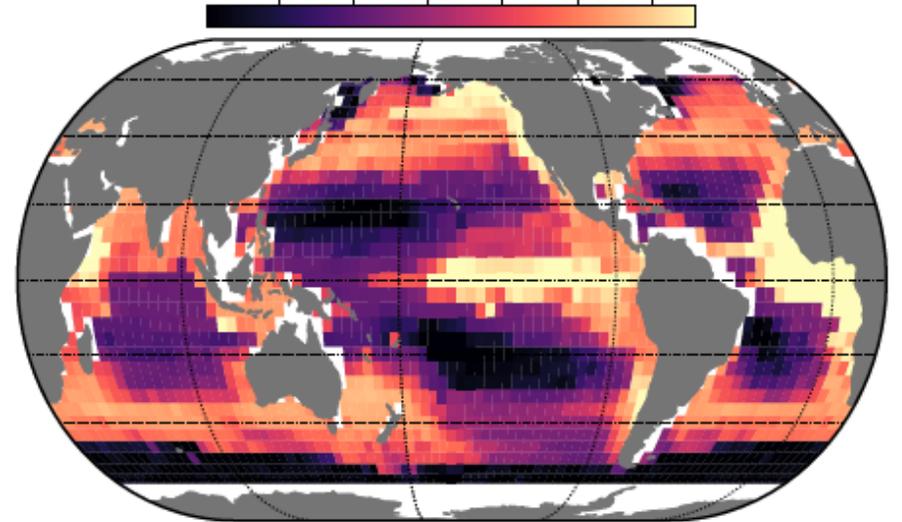Latest location of operational floats (data distributed within the last 30 days)

- · Operational Floats (524)
- Suspended particles (313)
- Downwelling irradiance (81)
- pH (268)
- Nitrate (252)
- Chlorophyll a (313)
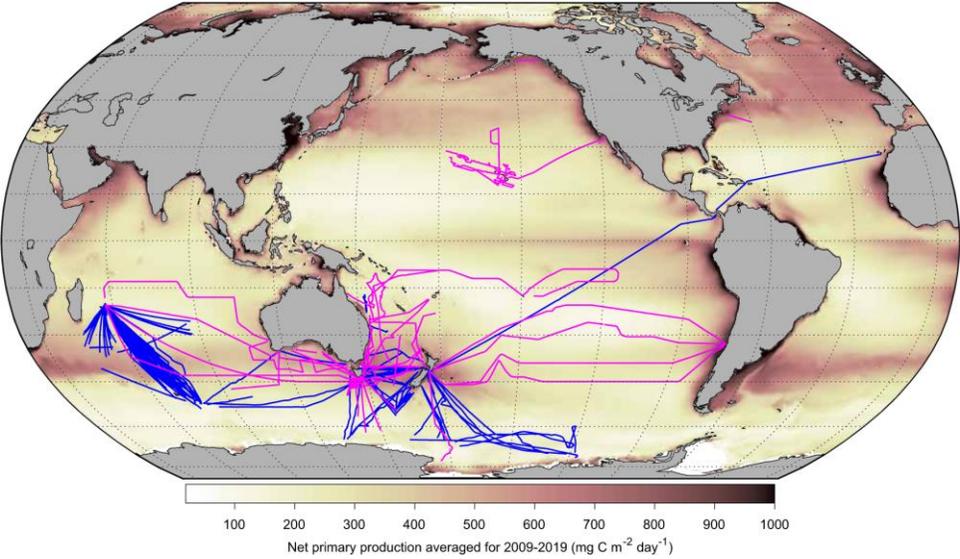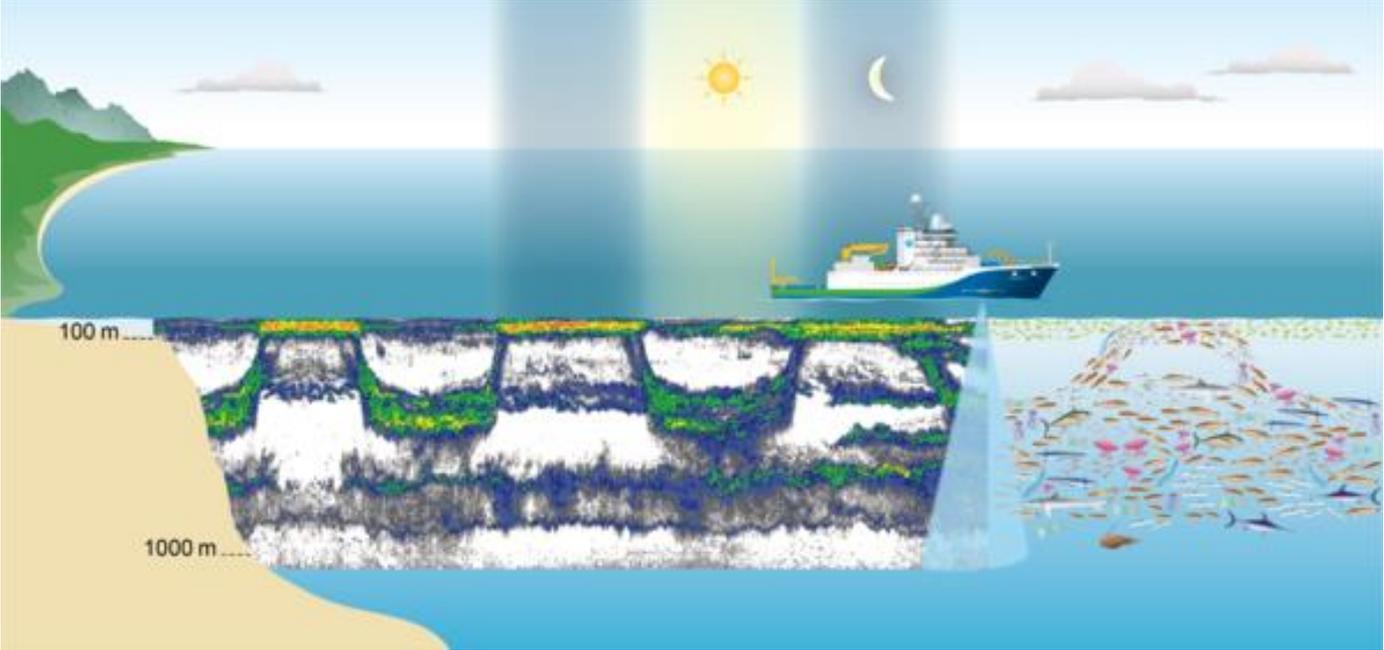- Oxygen (516)
- ◯ Full BGC Floats (35)

Generated by ocean-ops.org, 2023-05-01
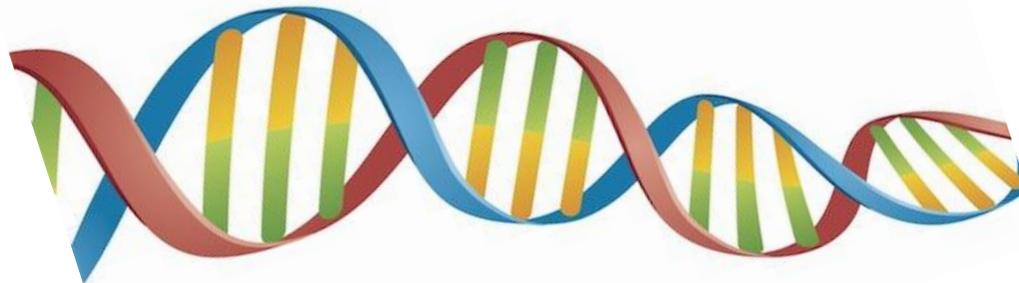Projection: Plate Carree (-150,0000)

b Water-column backscatter (m² nmi⁻²)
600 800 1,000 1,200 1,400 1,600

Scaling Ocean Monitoring

Net primary production averaged for 2009-2019 (mg C m^{-2} day^{-1})

# Scaling Tuna Fisheries Monitoring

- Transition our fisheries monitoring to include molecular capabilities (Fisheries Genomics)
  - Absolute Abundance (CKMR)
  - Spawning Potential (CKMR)
  - Species ID
  - Epigenetic Age
 - Sex
  - Connectivity

Tuna Forecasting

- It's much easier to predict tomorrow's condition if you know today's conditions
- Forecast tuna
  - = know where the tuna are today
  - = know what the ocean conditions are today
- E-Reporting speeds the process to know where tuna are today
- Need to determine if the current ocean condition models are sufficiently reliable for forecasting

Coastal Fisheries

- Little capacity to tune tools to Pacific Coastal Fisheries
    - Poor catch data
    - Little to know knowledge on population parameters that are climate sensitive
    - Results in highly uncertain or unreliable scientific advice

- Forensic sciences allow us to look into the past to predict the future
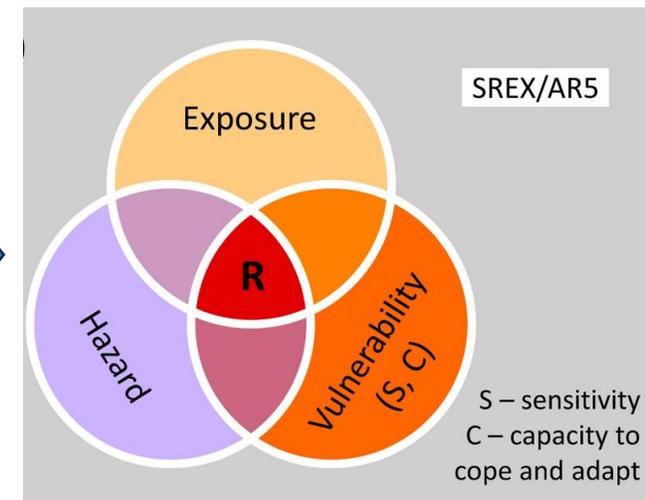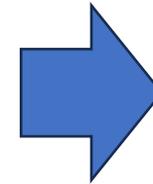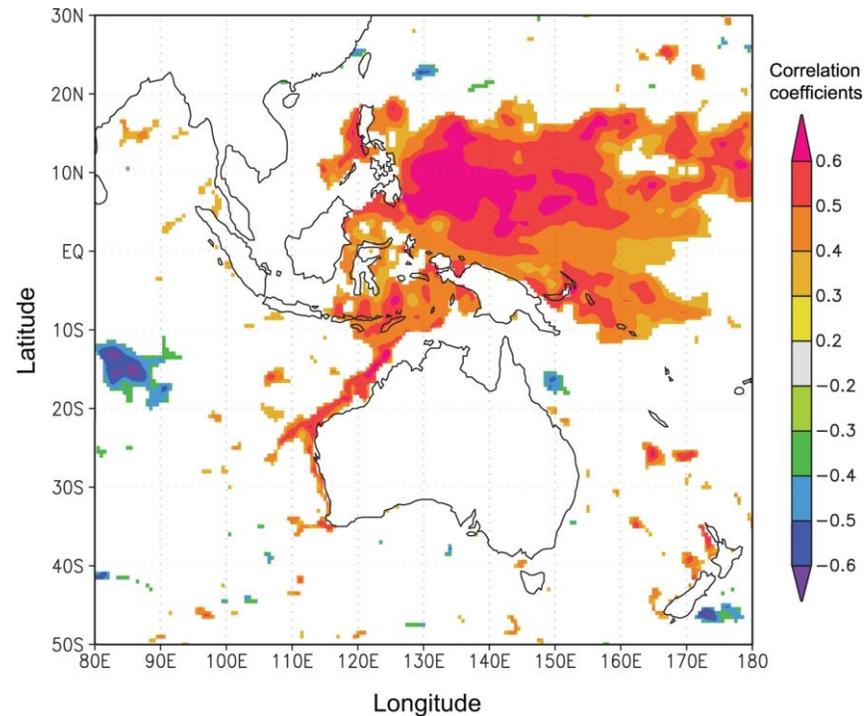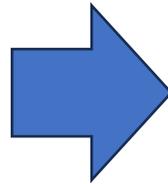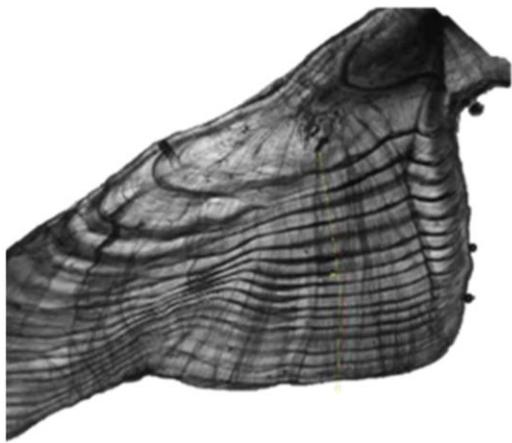
Coastal Fisheries
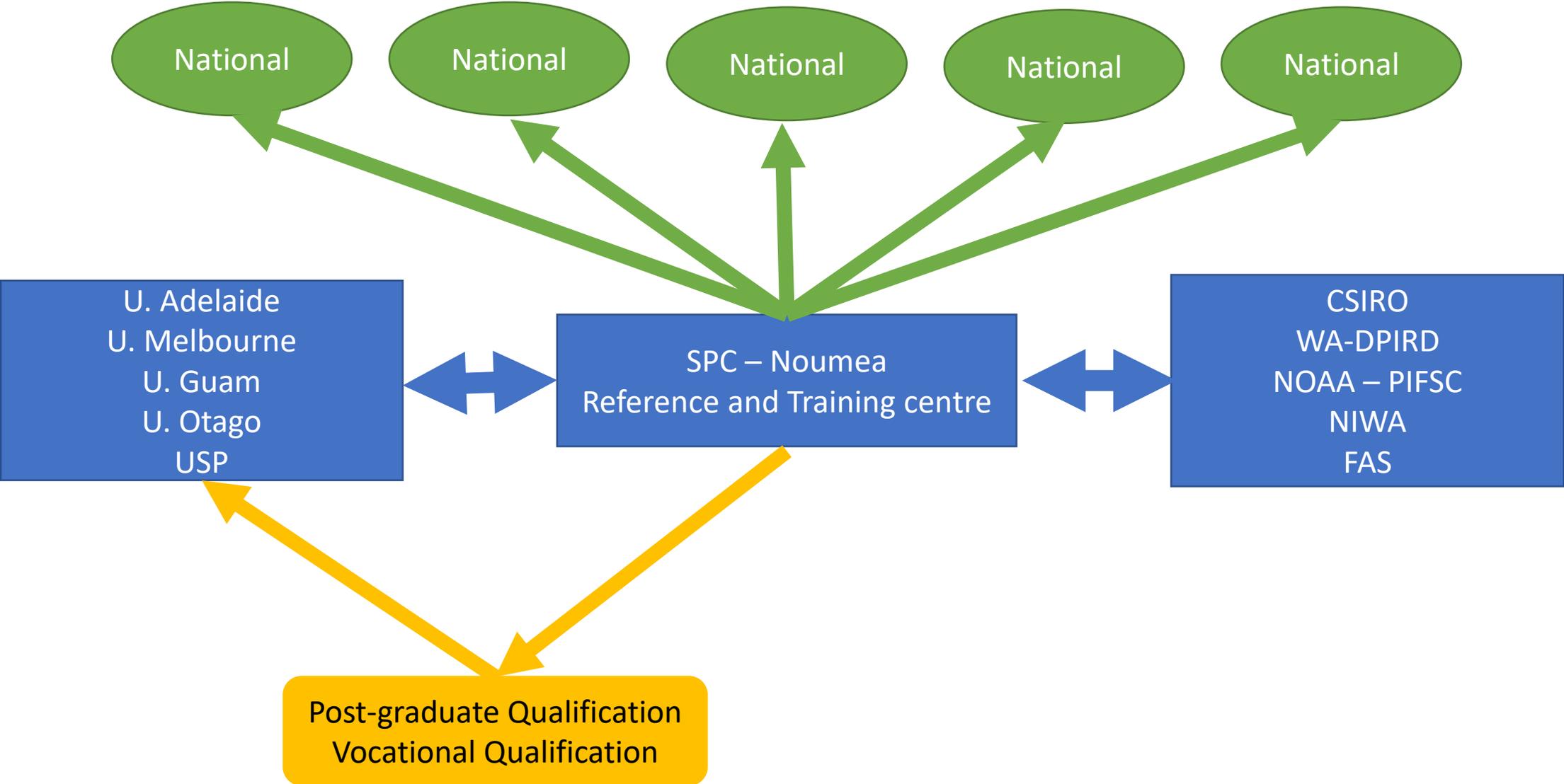
Key Messages

- Pathways for Downscaling from Basin to EEZ scale products
- Industry and National Administration support required to fill the most significant data gap.
- Skill of forecasting skills (ie to provide the desired resource and economic outlooks) is dependent on the capacity to know today's conditions.

- Coastal Fisheries data remains nascent
- Need to consider alternate approaches to support
  - Fish Forensics
  - Expansion of the Pacific Marine Specimen BAnk