



IOTC WPNT Mahe 7-11<sup>th</sup> July 2025

## Importance of connectivity in stock assessment



# What is a stock?

- Fundamental unit of fisheries management

Fish stock  $\neq$  Population

- Population: a group of individuals that belong to the same species and live in the same area and breed together
- Fish stock: unit defined by management, commonly implies a degree of reproductive isolation...but

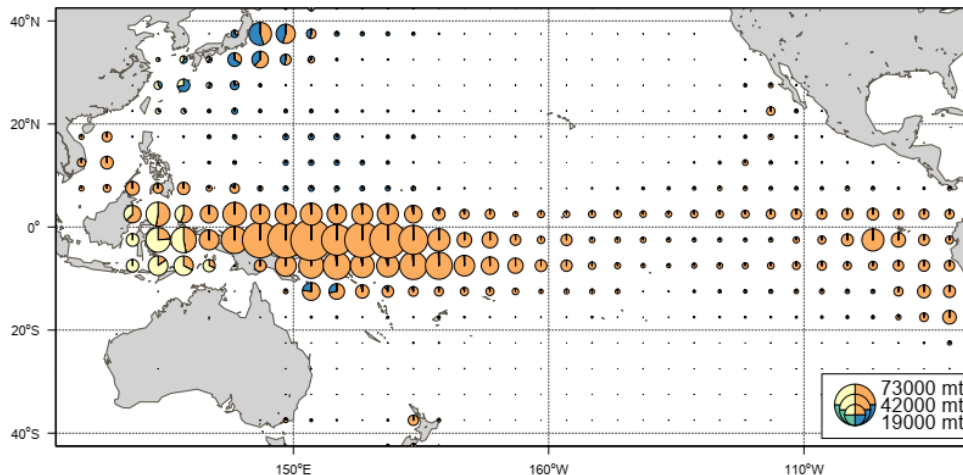


# What is a stock?

- Multiple definitions, depending on management:
  - Marr 1957: a population or portion of a population, of which all members are characterised by similarities which are not heritable, but are induced by the environment. May include members of several different subpopulations
  - Ihssen 1981: an intraspecific group of randomly mating individuals with temporal or spatial integrity
  - Welch et al. 2015: post-juvenile populations of fish that remain discrete and non-mixing (i.e. independent) and therefore comprise a functional management unit
  - Begg and Waldman 1999: a semi-discrete group of fish with some definable attribute of interest to fisheries managers
    - stock = group of fish that share same demographics
    - stock = group of fish that share same otolith chemistry
    - stock = genetically discrete group

# Stock structure / connectivity in tuna fisheries

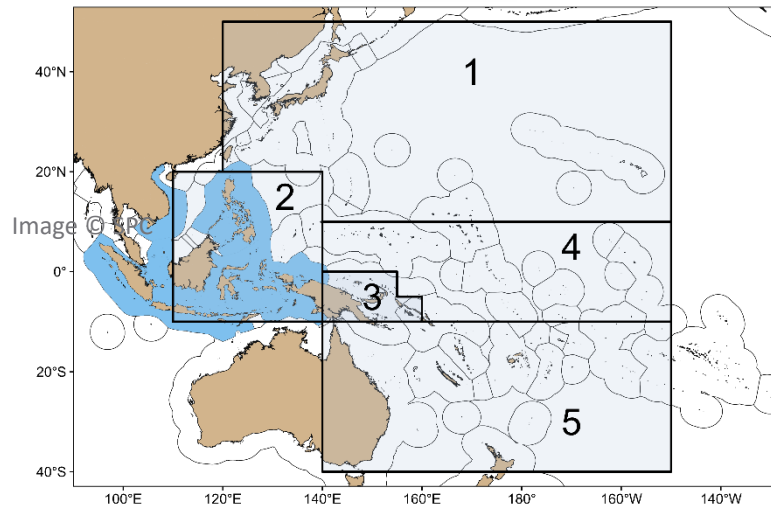
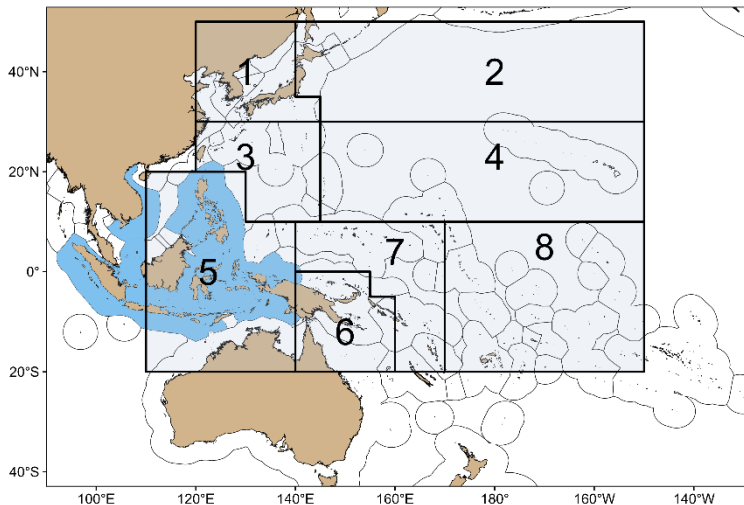
- When it comes to stock structure, transboundary fishery managers are primarily concerned with the question: Will fishing in *this* jurisdiction impact fishing in *that* jurisdiction?



**Skipjack  
catches since  
1994**

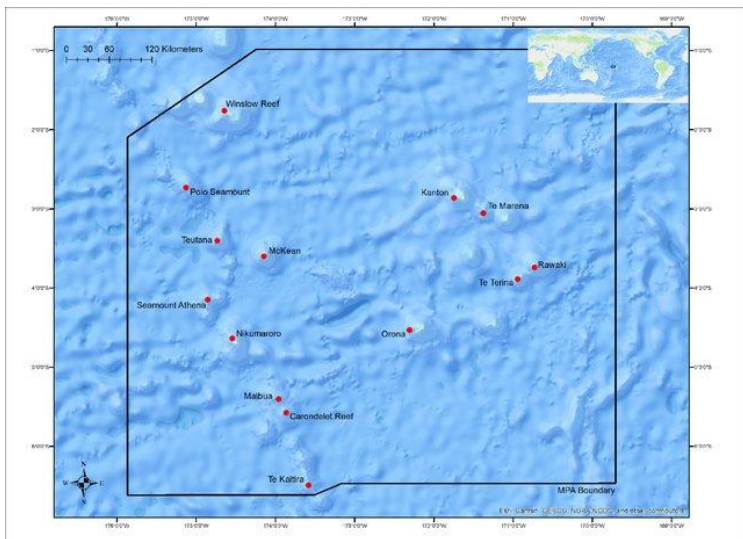
# Stock structure / connectivity in tuna fisheries

- Understanding connectivity critically important for reducing uncertainty in stock assessments



# Stock structure / connectivity in tuna fisheries

- Understanding connectivity important for evaluating spatial management e.g. protection spawning areas



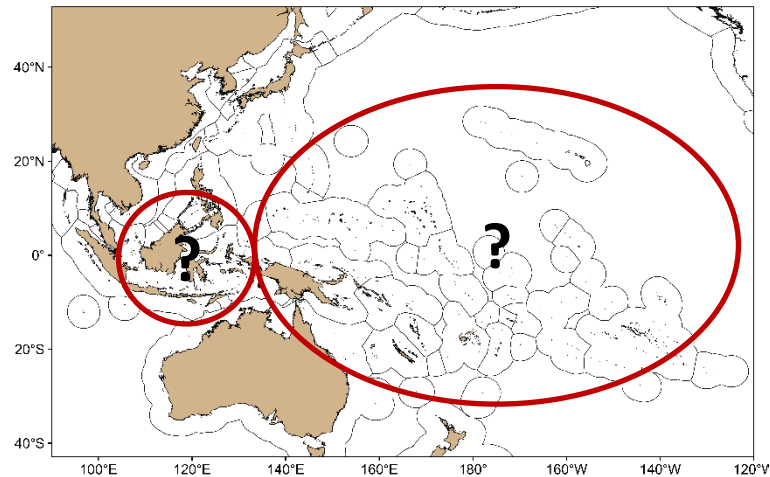
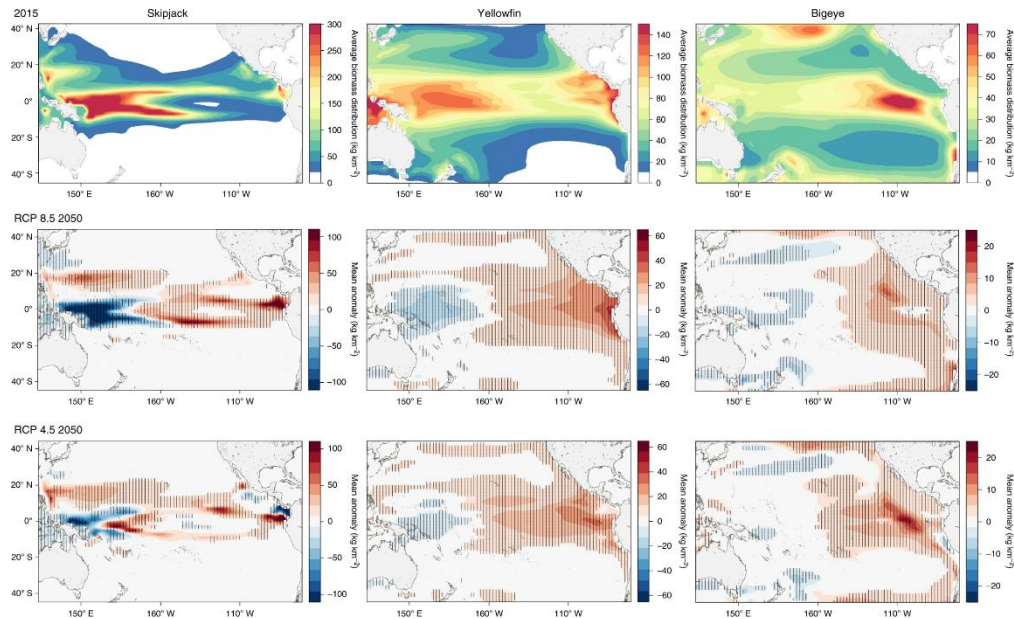
## Limited conservation efficacy of large-scale marine protected areas for Pacific skipjack and bigeye tunas

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# Stock structure / connectivity in tuna fisheries

- Understanding connectivity important for modelling impacts of climate change on tuna species





## Conclusions

- Connectivity is a cornerstone of stock assessment
- Important to consider movements across all life stages
- Ideally, stocks are demographically independent units, if stocks are connected, connectivity rates need to be estimated