



Pacific
Community
Communauté
du Pacifique

PACIFIC FISHERIES AND AQUACULTURE ADAPTATION TO CLIMATE CHANGE

SPC FISHERIES AQUACULTURE AND MARINE ECOSYSTEMS (FAME) DIVISION

WORKSHOP “INCORPORATING THE OCEAN IN NDCs” 6 MAY 2019

OUTLINE

- Key threats from climate change to Pacific fisheries and aquaculture
- Opportunities for Pacific fisheries/aquaculture sectors to reduce national emissions and adapt to the impacts of climate change
- SPC role: science-based advice about fisheries/aquaculture & climate change

Tuna in the Western and Central Pacific Ocean



Tuna catch by Ocean basin (2016)

- 2 355 000 t
- 553 700 t
- 992 000 t
- 651 800 t

Source: ISSF 2018

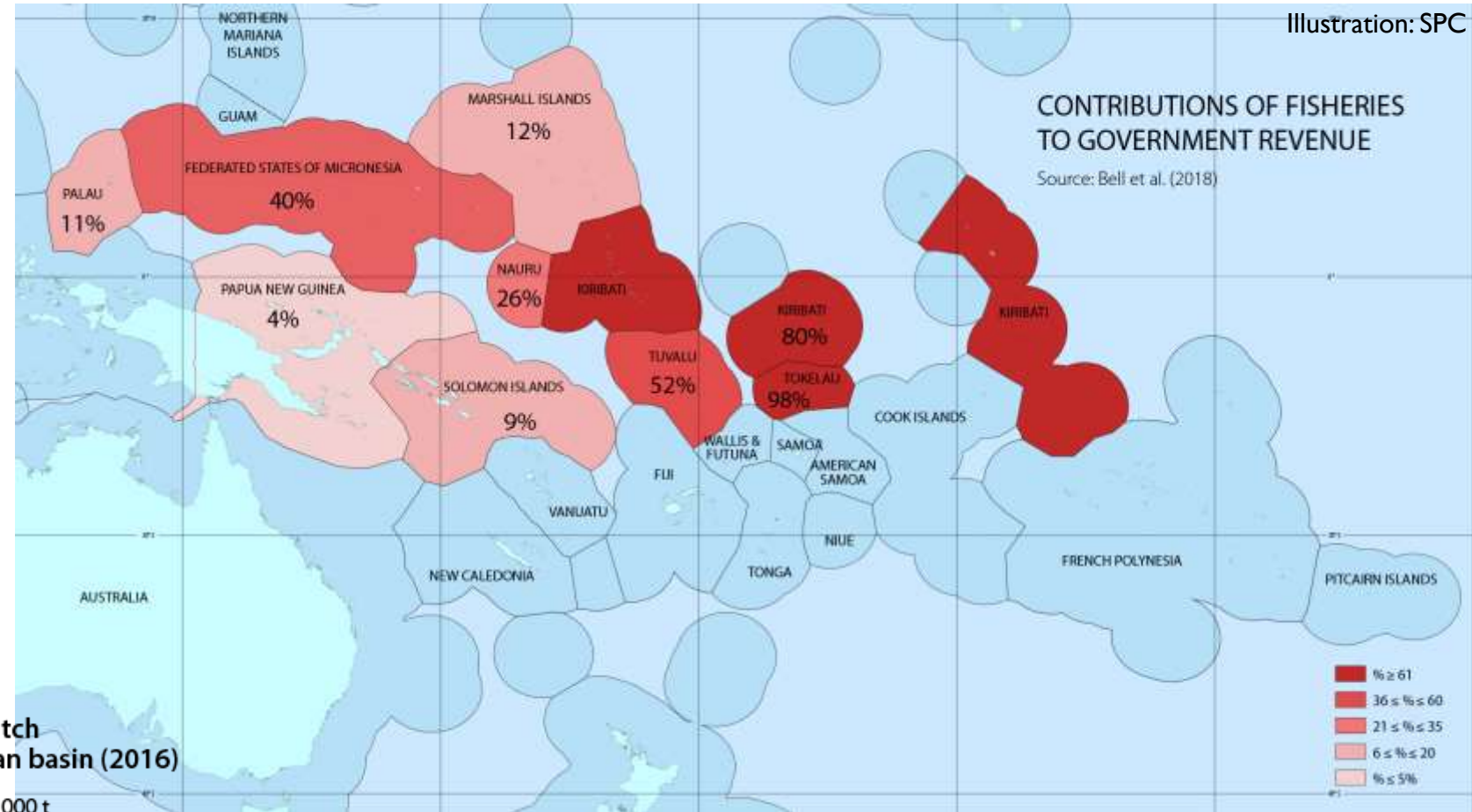
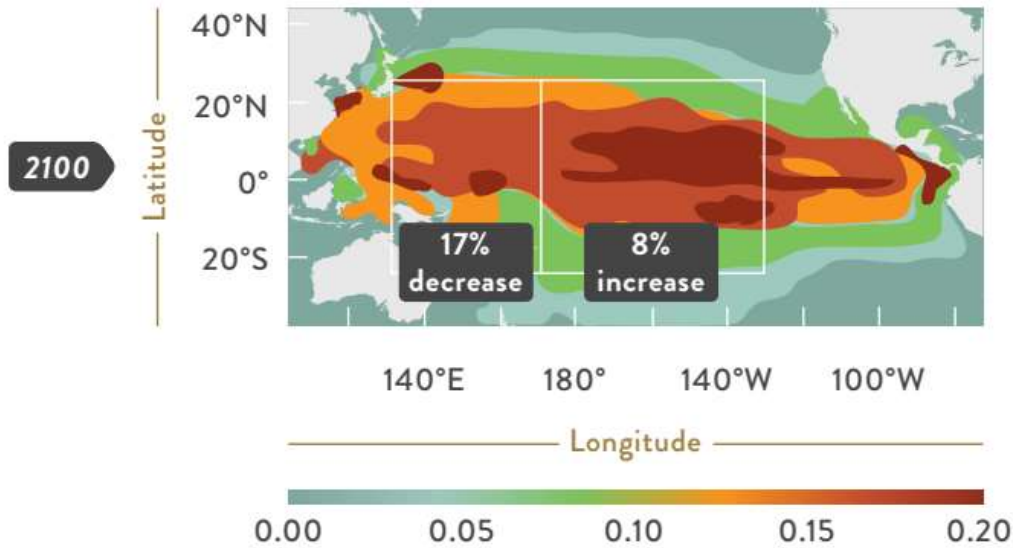
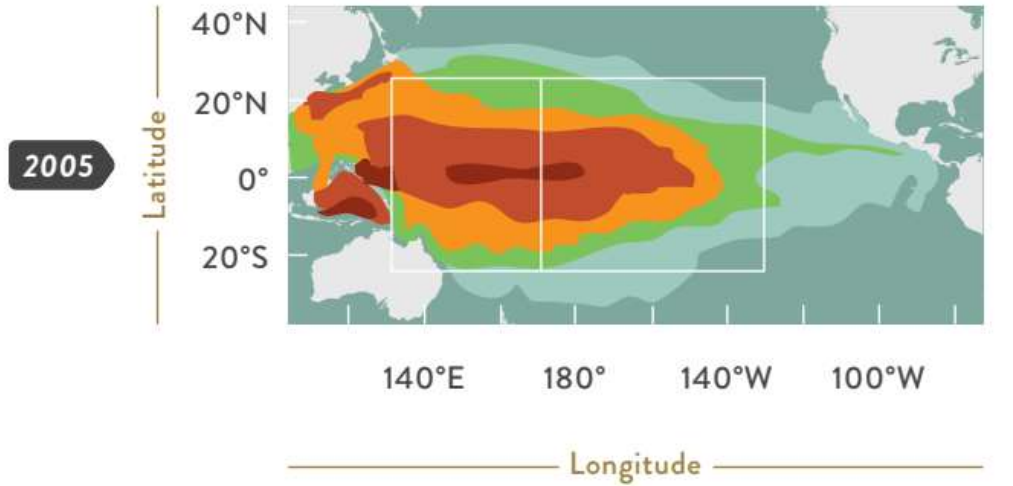


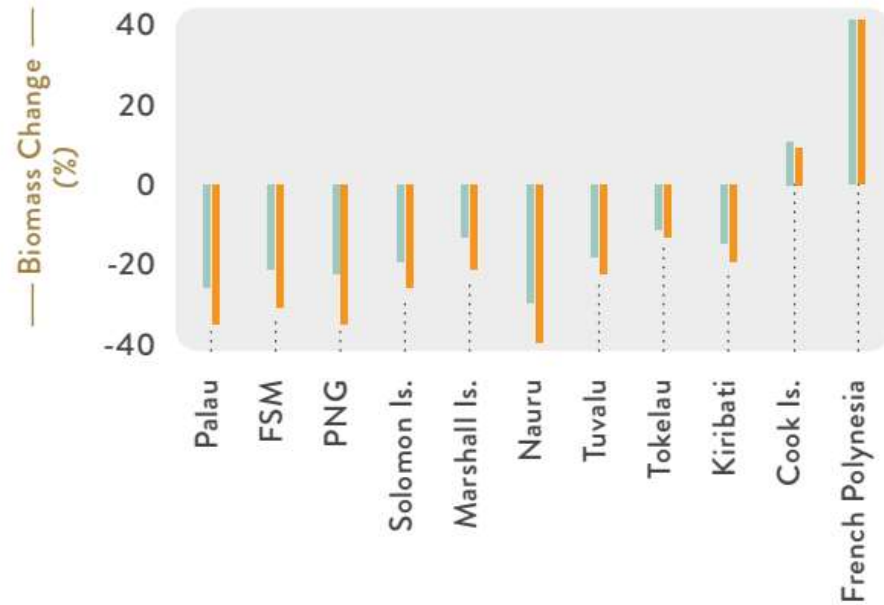
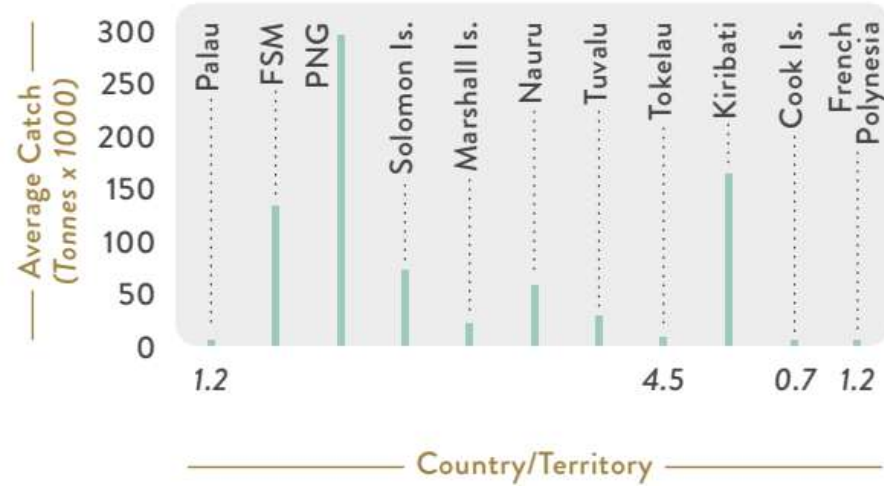
Illustration: SPC

Effects of climate change on tuna

Tuna likely to move east due to warming waters



Catches projected to decline in many places



Indirect impact of ocean acidification on tuna



Impact of increasing acidification on the calcareous phytoplankton and zooplankton at the base of the food web is impacting indirectly tuna

The calcifying microalga *Calcidiscus leptoporus* – these tiny cells each about 0.01mm diameter represent a key component at the base of the marine food web. Inset: *Calcidiscus leptoporus* after experimental exposure to a CO₂ level of 700 ppm as projected for the year 2100.

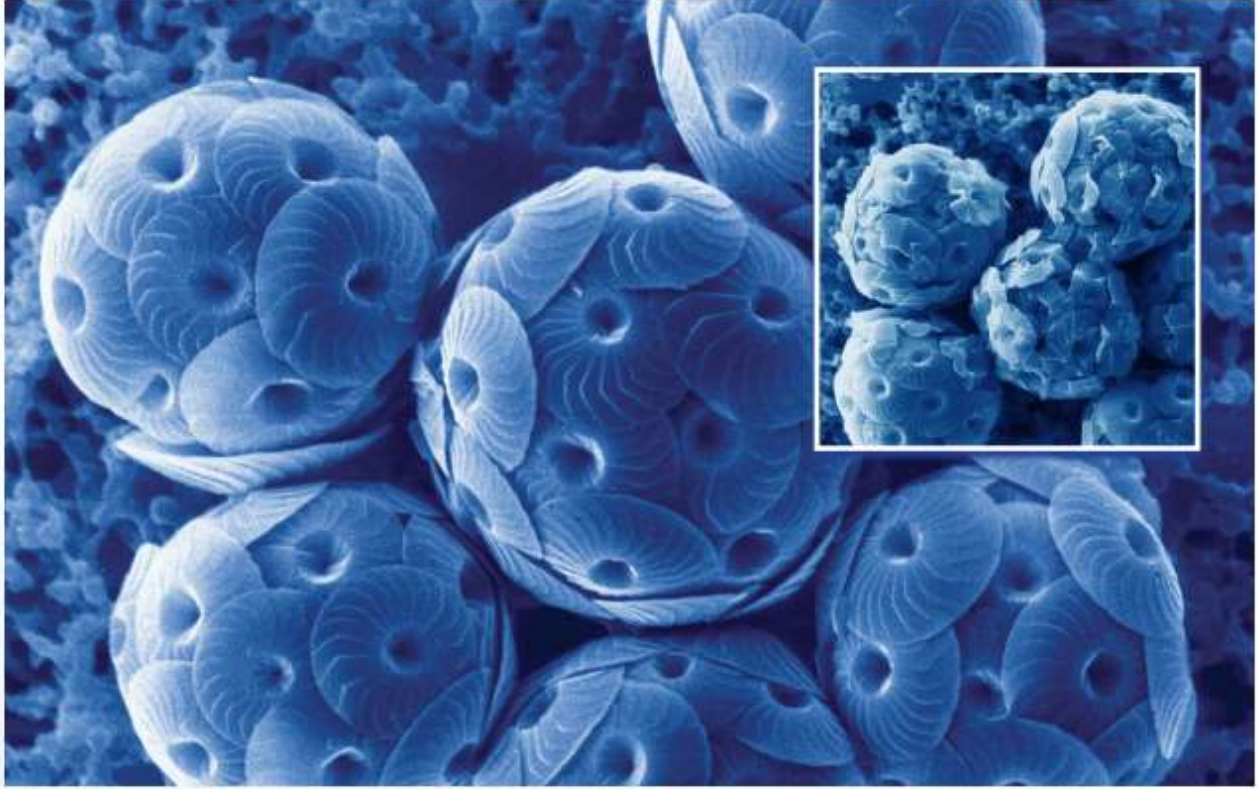


Photo © LM Sidesell, EPA-CROMAR

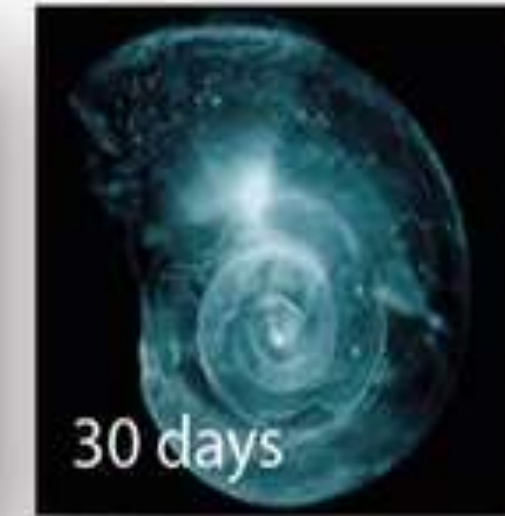
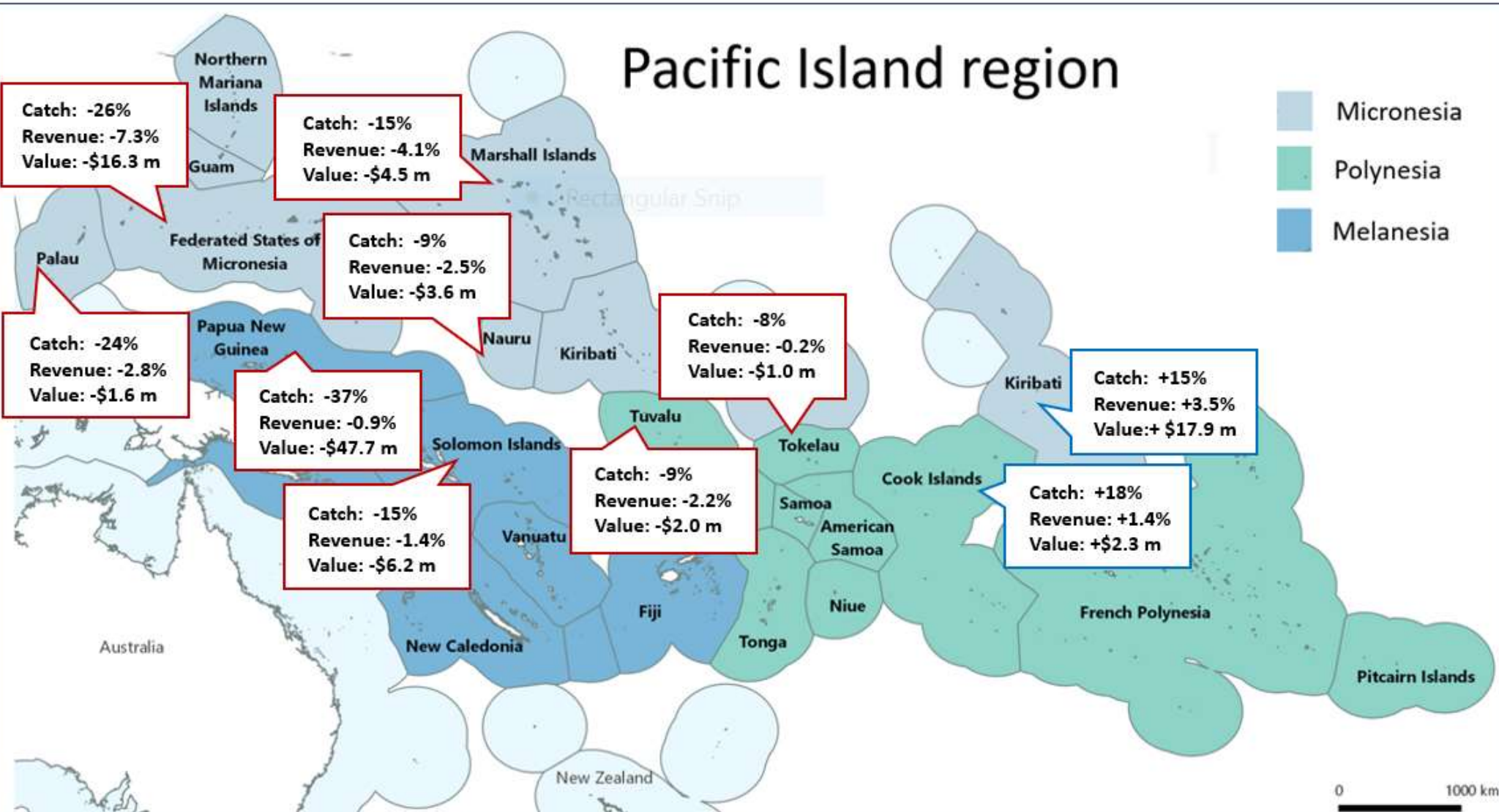
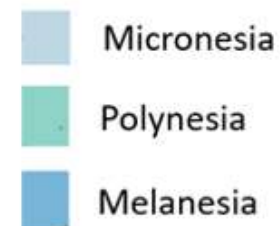


Photo credit: David Littschwager/National Geographic Stock, National Geographic

Pacific Island region



Projected change by 2050 in tuna catch, contribution of tuna license fees to total government revenue and value of licence revenue

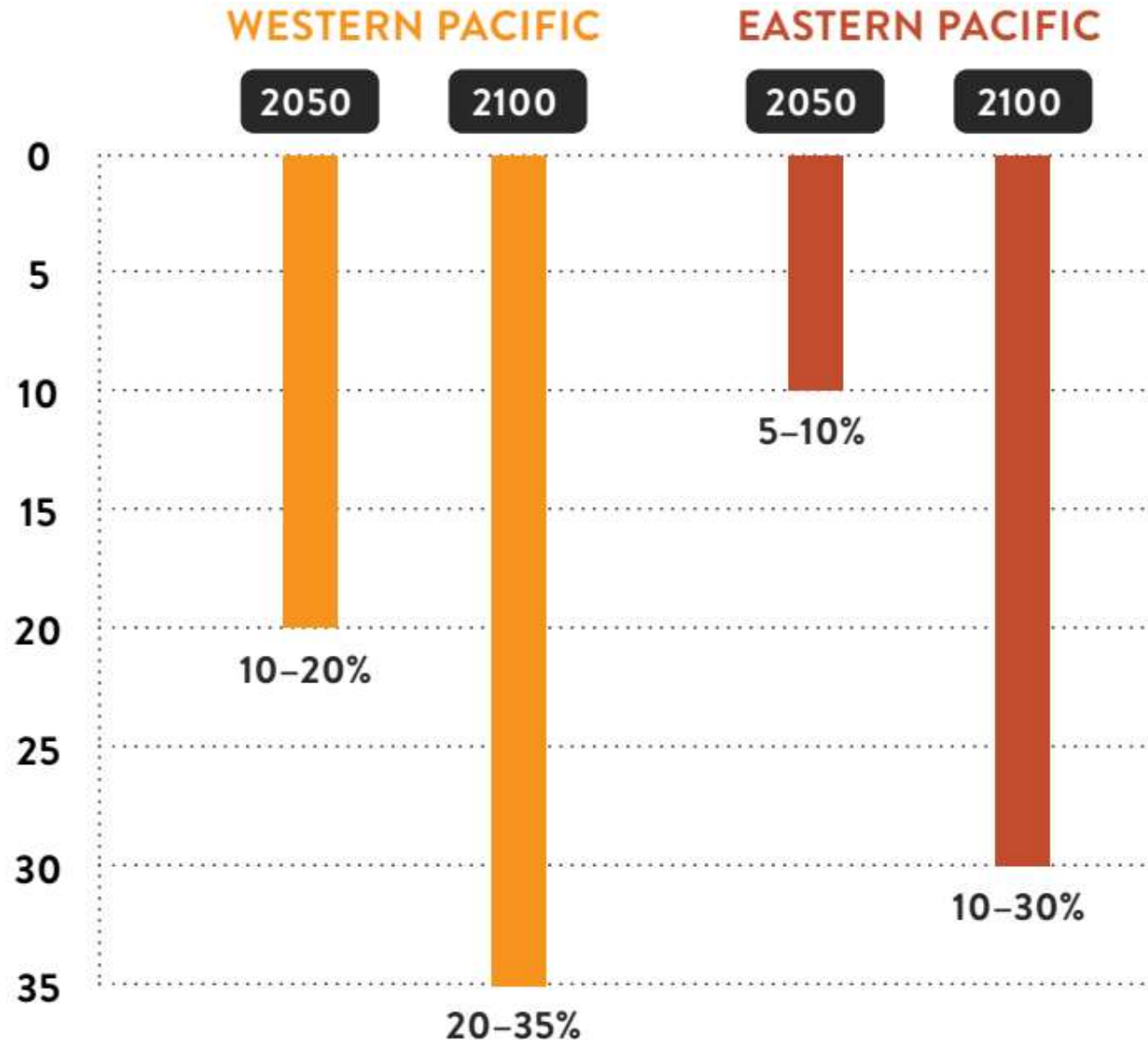
More of catch will be from high seas areas – longer steaming times

Implications for coastal states under transboundary management arrangements?

0 1000 km
Source of map: C. Wabnitz

Effects of climate change on coastal fisheries

Projected % decline in total coastal fisheries production compared to the present. Total coastal fisheries production is made up of coral reef fish, nearshore pelagic fish (mainly tuna) and shellfish



Total coastal fisheries production is projected to decline at different rates in the eastern and western Pacific

Drivers of reduction in coastal fisheries



- **Overfishing** due to population increase
- Impacts on coral reefs of **climate change.**

Mariculture (marine + brackish aquaculture)

- **Mariculture** will be adversely affected over next 100yrs by
 - seawater acidification
 - warmer seawater temperatures
 - increased storminess
 - less flat coastal land for saltwater ponds (sea level rise)
- PICT mariculture can adapt (to an extent), but economic margins will be reduced



Inland (freshwater) aquaculture

- **Freshwater aquaculture** among high-island PICTs will be a “winner” of climate change, due to projected warming and increased rainfall in SW Pacific
- Freshwater aquaculture for food security and livelihoods can itself be an **adaptation** to the effects of climate change on coastal fisheries



OPPORTUNITIES TO REDUCE NATIONAL EMISSIONS AND ADAPT TO THE IMPACTS OF CLIMATE CHANGE:

TUNA FISHERIES

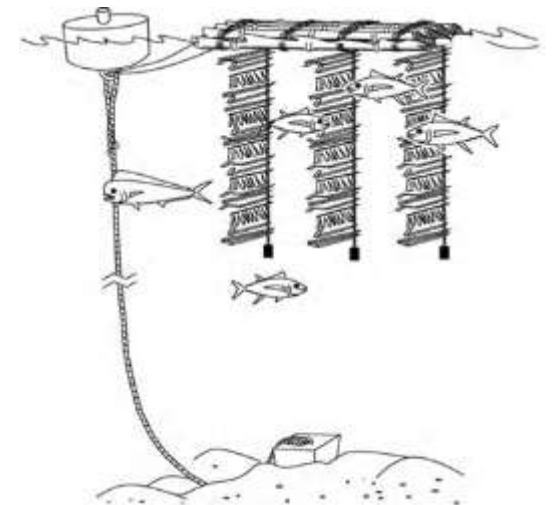
- More of tuna and by-catch from industrial fleets landed nationally and distributed to urban areas
- Offset longer steaming times via energy audits to increase fuel efficiency of tuna fleets
- Plan for reduced viability of on-shore tuna facilities in western locations, and need to develop new facilities in eastern locations
- For transboundary tuna management, anticipate that a greater proportion of catches will fall under high seas jurisdiction rather than national jurisdictions



OPPORTUNITIES TO REDUCE NATIONAL EMISSIONS AND ADAPT TO THE IMPACTS OF CLIMATE CHANGE:

COASTAL FISHERIES

- Restore and sustain coastal fisheries through better and more inclusive fisheries management
- Increase access to tuna for subsistence fishers with low-cost, inshore Fish Aggregating Devices (FADs)
- Develop inland aquaculture in ponds



OPPORTUNITIES TO REDUCE NATIONAL EMISSIONS AND ADAPT TO THE IMPACTS OF CLIMATE CHANGE:

AQUACULTURE

- Small-pond aquaculture of low trophic level freshwater fish
- Invest in mariculture of species that sequester carbon and/or nitrogen (seaweeds, giant clams, pearl oysters, edible oysters) => REDD financing, carbon offsets?



SPC - providing science-based advice to Pacific governments and administrations about fisheries/aquaculture & CC

- Major studies on *Vulnerability of Tropical Pacific Fisheries and Aquaculture to Climate Change*, and *Pacific Island Food Systems*
- On-going research on tuna environments to predict future tuna stock levels and distributions, and find ways to maintain socio-economic benefits and increase resilience
- Research to test the direct impact of ocean acidification on tuna larvae
- Working with countries to develop sustainable FAD programmes (a focus of GCF tuna project proposal by CI and SPC)
- Innovation in governance arrangements for coastal fisheries science and management (New Song for Coastal Fisheries, Report Card, Regional Roadmap for Sustainable Pacific Fisheries, Framework for Action for Food Security, Heads of Fisheries, Regional Technical Meeting Coastal Fisheries)
- Assisting members to mainstream CC into national fisheries policies, plans
- Supporting the development of sustainable and businesslike aquaculture



MAY FISH BE WITH YOU!



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