Fish value chains in Palau: Potential socioeconomic impacts of a new, large-scale MPA

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Rachel Dacks, Department of Biology, UHM
Kirsten Oleson, NREM, UHM
Staci Lewis, Stanford University

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Importance of fish for Pacific Islands

- Food security
- Economic
- Social networks
- Culture
Pacific Island reef fish consumption

43-145 kg/year/person*

Majority of region will not be able to supply demand by 2030

(Bell et al. 2009)

* Inshore fish, including reef
Suggested methods to maintain fish supply

- Aquaculture
- Sustainable management of the nearshore
- Development of pelagic fisheries for domestic consumption
Coral Reefs
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ORIGINAL PAPER

Working with, not against, coral-reef fisheries

Charles Birkeland¹
Pelagic fish grow faster than reef fish.
Lakshadweep case study
Palau National Marine Sanctuary (PNMS)


By 2020 500 thousand km$^2$ of ocean

80% of Palau’s exclusive economic zone will be **closed to fishing**

20% (85 thousand km$^2$) dedicated to **domestic open ocean fishing**

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Large-scale marine protected areas
What impacts will the PNMS will have?

- Ecological
- Economic
- Socio-Cultural
Potential economic impacts of the PNMS

- Change in fish supply to domestic and international markets.
- Local benefits from new domestic fishing sector (jobs, high grade fish, …).
- Increase in Palau’s brand value for tourism market.
- Potential change in revenue from fishing license fees from international vessels.
- Cost of protection, but influx of conservation funds.
- Others…
Potential economic impacts of the PNMS

• Change in fish supply to domestic and international markets.

• Local benefits from new domestic fishing sector (jobs, high grade fish, …).

• Increase in Palau’s brand value for tourism market.

• Potential change in revenue from fishing license fees from international vessels.

• Cost of protection, but influx of conservation funds.

• Others…

But to know the impacts, we need good baseline data!
Project Funding/Collaborations

Partners:
- PNMS
- PICRC
- National Geographic Pristine Seas
- University of Hawai‘i

Collaborators:
- SPC; TNC; U Wollongong

Funding:
- National Geographic Pristine Seas Campaign

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Research questions

1. What is the structure of the fisheries value chain?

2. What is the current and future market demand for reef and pelagic (open ocean) fish?

3. How important is the PNMS to tourists?

4. What is current government revenue from the international pelagic fishery and how might that change?
**Approach**

1. What is the structure of the fisheries value chain?

2. What is the current and future market demand for reef and pelagic (open ocean) fish?

3. How important is the PNMS to tourists?

4. What is current government revenue from the international pelagic fishery and how might that change?
1. What is the structure of the fisheries value chain?

Value chain analysis

Fisher → Markets → Restaurants → Consumer
Value Chain Analyses in Fisheries

• Understand distribution of benefits/inequalities (Bjørndal et al., 2015; Kabu and Tira, 2015)
• Identify market opportunities (Brewer, 2011; Fabinyi, 2016)
• Identify market inefficiencies (e.g., variability in supply)
• Understand potential/realized impacts of policy (Adhuri et al., 2016; Knútsson et al., 2016)
• Better understand relational ties between suppliers and buyers
• Understand preferences (size, species) (Thyresson et al., 2013)
Structure of the fisheries value chain

Who is buying/selling what fish at what price?

**Interviews:**
- 2 pelagic fishing companies
- Main fish market
- 2 grocery stores
- 2 convenience stores
- 10 restaurants

**Information gathered:**
- Source and types of fish/seafood
- Purchase and selling prices
- Availability
- Business volume and revenue
- Customer base/seasons/preferences
- Fish seasonality
Fisher

Intermediary

Fish market

Co-op

Grocery store

Convenience store

Restaurants/Caterers

Processor

Schools

Palau resident (purchased)

Export

Palau resident (subsistence, sharing)

Nearshore

Foreign worker

Tourist

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Palau resident (subsistence, sharing)

Nearshore

Fisher

Intermediary

Fish market

Co-op

Schools

Grocery store

Convenience store

Restaurants/Caterers

Processor

Export

Palau resident (purchased)

Foreign worker

Tourist
Network:
- **Nearshore**
  - Fisher
  - Intermediary
  - Processor
  - Palau resident (subsistence, sharing)
  - Fish market
  - Co-op
  - Schools
  - Grocery store
  - Convenience store
  - Restaurants/Caterers
  - Foreign worker
  - Tourist
  - Export
  - Palau resident (purchased)

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Fisher

Nearshore

- Fisher
- Intermediary
- Processor
- Palau resident (subsistence, sharing)

Export

- Fish market
- Co-op
- Schools
- Grocery store
- Convenience store
- Restaurants/Caterers
- Palau resident (purchased)
- Tourist

100 tonnes

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Pelagic

Locally-owned vessel

Locally-based, Foreign-owned vessels

Japanese vessels

Co-Op

Grocery

Fish markets

Convenience store

Intermediary

Restaurants/Caterers

Export

Schools

Palauan residents

Tourist
Locally-based, Foreign-owned vessel

90%

Local

Japanese vessels

? Export
Pelagic

Locally-based offshore vessel

Locally-based, Foreign-owned vessel

Other pelagics (mahi mahi, wahoo, etc.)

Low-grade tuna

High-grade tuna

Local

Export

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Value chain contributions

1) Provide a baseline to assess outcomes of the PNMS

2) Identify opportunities for enhancing positive benefits of fish in the economy

3) Sheds light on informal “relational ties” that are highly influential to the supply chain
Approach

2. What is the current and future market demand for reef and pelagic (open ocean) fish?

Surveys of tourists & residents
Demand for fish

• How much are people willing to pay for fish?
  • Different for different fish/fish products?
  • Tourists and residents

• What is the total market demand for fish?
  • Pelagic and reef
  • Tourists and residents

• Will people eat pelagic fish instead of reef fish?
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How much are people willing to pay for fish?

Reef fish
Pelagic fish
Locally caught/sustainable

Choice Experiment

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Choice experiment

Round 1: Tourists
Round 2: Residents
What do the demand curves get us?

But we also want to know when people will switch from one fish to another as prices change...
Seafood meals consumed by tourists

- Chinese
- English
- Japanese

Categories:
- Whole Reef Fish
- Raw Tuna
- Cooked tuna
- Other fish fillet
- Non-fish seafood

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Seafood meals consumed by tourists

- Whole Reef Fish
- Raw Tuna
- Cooked tuna
- Other fish fillet
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Seafood meals consumed by tourists (% of seafood meals)
100% of tourists said they are willing to come to Palau even if they cannot eat reef fish
Timeline

**2016:**
Project launch, data gap analysis

**2017:**
Value chain analysis: restaurants, markets, etc.
Tourism survey
Revenue analysis

**2018:**
Resident survey
Acknowledgements

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Mahalo!
Questions?

Rachel Dacks  rdacks@hawaii.edu
Kirsten Oleson  koleson@hawaii.edu