Analyzing spatial structure of recreational coastal reef fisheries in New Caledonia for management purposes

Isabelle Jollit
PhD student

Pacific Science Intercongress, March 2\textsuperscript{nd}-7\textsuperscript{th}, 2009

Under the scientific direction of: Jocelyne Ferraris, IRD (UR128 CoRéUs) and Jean-Michel Lebigre, UNC (CNEP)
1. Localization of NC
2. Why focusing on recreational fisheries in NC?

- Total catches from recreational and subsistence fisheries = 2.5 x local commercial fisheries
- 70% private boats concentrated in the south west coast
- Growing number of private boats
  - 15,000 = 1 boat for 9 inhab.
- 75% private boats owners practice recreational fishing
3. Objective and question

1. Objective:
   - Evaluate what are the most fished areas
   - What motivates the fishers to go fishing to a certain fishing ground

2. Central issue: Which factors structure the recreational fisheries and their spatial distribution, for an optimization of the management of the activity?
What is a fishery Geo-System?

“It is an eco-socio-system, a composite and complex space, where interactions between physical, biological and human components take place” (Corlay, 1995)

Spatial distribution depends on 3 systems:

- Social and economical systems
- Natural system
- Management system

Spatial distribution of the fishing activity
4. Method

1. Exploratory approach based on:
   - Socio-economic
   - Spatial data
   - Fisheries

2. Hypothesis: ways of life are a good integrative element

Fishing activity
   - Means and annual estimations calculated for every WOL: fishing effort, catches, boat characteristics...

Spatial distribution
   - Calculated / ha for every WOL

-> Understand the way the recreational fishery geo-system functions
4. Material and methods

Data collection:

• 72 days for enquiry, ~500 questionnaires, maps Nov 2004 -> Oct 2005

• 43 aerial flights Nov 2005 -> Oct 2006
Presentation of the study area

5 communes = ~150 000 inhabitants; lagoon = 4800 km²

urban: Nouméa
periurban: Païta, Dumbéa, Mont Dore
rural: Boulouparis

3 coral reef ecosystems: supply of targeted resources

Other ecosyst.: mangrove

17 MPAs
5. Statistical results

- **Active fishing fleet**: 3942 boats
- **Annual total catch**: ~1141 tons / year
5. Statistical results

- Active fishing fleet: 3942 boats
- Annual total catch: ~1141 tons/year
5. Statistical results

- Active fishing fleet: 3942 boats
- Annual total catch: ~1141 tons/year
5. Statistical results

Annual catch by fish family and by way of life

- Serranidae: 115.44 t
- Lutjanidae: 67.35 t
- Lethrinidae: 56.55 t
- Acanthuridae: 51.50 t
- Scaridae: 46.15 t
- Siganidae: 43.78 t
- Mugilidae: 46.15 t
- Siganidae: 46.15 t
- Carangidae: 29.99 t
- Haemulidae: 25.67 t

Categories:
- **rural**
- **peri urban**
- **urban**
Discussion

The fishing behaviour is a result of both:

- the social groups’ history (ways of life)
- individual choices within these groups: representation of one’s own fishing activity and expectations.
• The WOL is determined (and not limited to) by the history of the settlement of the country and its economic growth (nickel “boom” : 1960s)

  – Rural are mostly descendants of European settlers or convicts = fishing has become a part of their cultural identity for more than a century. High yields = subsistence, and until 1980s possibility to sell their catches

  – Periurban are formerly rural who took part in the rural exodus in the 1960s => transition from rural to urban : better salaries with relatively high yields due to their rural origins + recent migrants

  – Urban : a great part of urban are recent migrants with no fishing tradition -> small yields, and practice many other marine leisure activities
6. Spatial results

What is the spatial distribution for each way of life?
Is there a specificity?
Annual catches for urban:

- A global coverage of the whole lagoon = boats characteristics
- Important catches within 10 to 15km from Noumea
- Important catches on intermediate coral reefs, passes, south barrier
- Creation of the MPA on the barrier: shift of the activity mostly to the south
- Little activity on soft bottoms and the far south
- No activity on mangroves

Spatial distribution of total catches: urban fishers
Spatial distribution of total catches: periurban fishers

- A wider coverage than the urban
- Important catches on intermediate reefs and the barrier
- Important catches within 20km around wharfs: looking for fishes with bigger sizes?
- A small activity on soft bottoms far from wharfs

Annual catches for periurban:

**kg/ha**

- <= 8.1
- 8.1 - 18.6
- 18.6 - 29
- 29 - 173

- Marine Protected Area
- Mangrove
- Reef flats
All kinds of habitats are utilized

Important catches on intermediate reefs, passes and mangroves

distance to fishing sites <15km

Little activity on the reef barrier

Spatial distribution of total catches: rural fishers

Annual catches for rural:

kg/ha

- <= 10.5
- 10.5 - 24.4
- 24.4 - 38.4
- 38.4 - 153

AMP
Mangrove
Récifs

0 10 20 km
7. Conclusion

Natural resources → Management of a natural area → Angler’s own preference/choice representation of his activity

WOL have distinct spatial preferences/spatial behaviors → Each WOL have its own history and expectations → Identification to a social group: WOL
8. What are the perspectives?

Transfer of research results

The analysis of fishery geosystems gives useful keys to anticipate/plan the management of the lagoon area that could experience a similar evolution.

↑ Population

↑ Economy
Thank you for your attention

Special acknowledgements to the organisms who financed my research:

And to other financial organisms: