

Punta Allen, Quintana Roo, Mexico: Community-based ecosystem conservation – The spiny lobster fishery

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Key Messages

- Through a combination of community-based co-management and territorial user rights, the Vigía Chico Cooperative in Punta Allen has had great success in supporting resource conservation and management, and providing a stable livelihood for fishers and their community, in part through fishery harvest strategies used by small-scale fishers to help maintain stable profits.
- Fishers are building their understanding of the environmental and biological factors which affect the abundance, spatial availability of the spiny lobster resource and fishery profitability, and are exchanging knowledge about the possible effects of climate change and measures that can be taken by the community for adaptation and resilience.

Community Profile

The Punta Allen community is located at the tip of a narrow peninsula (Figure 14), and is estimated to be less than one metre above sea level, with a population of around 600 persons. The major economic activities are the spiny lobster (*Panulirus argus*) fishery and eco-tourism. The Vigía Chico Cooperative runs this fishery, which operates in Ascensión Bay, located in the Sian Ka'an UNESCO Biosphere Reserve (Miller, 1989; Orensanz & Seijo, 2013; Seijo, 1993; Sosa-Cordero et al., 2008).

The bay covers an area of 850 km² and includes a variety of habitats, such as mangroves, corals, sponges, seagrass and macro-algae. For fishing and management purposes, the bay has been divided up by the fishers into individual fishing grounds, locally known as '*campos*', numbering 115 (Orensanz & Seijo, 2013).

In each '*campo*', fishers deploy artificial shelters, from which spiny lobsters are harvested, by free diving using a small hand-held net, which allows females with eggs and undersized individuals to be replaced (Figure 2).

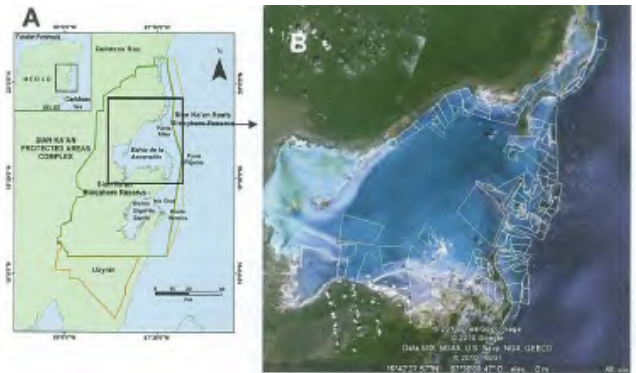


Figure 1: A-Boundaries of Sian Ka'an Reserve (Source: From R. Borges, O. Guzman and K.L. Cooper in Orensanz and Seijo, 2013); B-Ascension Bay and the individual fishing areas known as "*campos*" (Source: Orensanz and Seijo, 2013).

There are 41 '*campo*' owners, and each owner has exclusive fishing rights within their fishing ground. These rights are supported by internal working rules of their cooperative and respected amongst the fishers. The individual fishing grounds where artificial shelters have been introduced are located in 25 major fishing areas, which are characterised by different habitat and bottom types, and environmental parameters such as salinity and temperature.





Figure 2: Handheld net used to capture spiny lobsters
Photo: Maren Headley

The fishers have many incentives for a co-management approach, including high lobster catches, high prices and the cohesive group structure of the cooperative. Co-management has helped the fishery to develop in a sustainable manner such that in 2012, it received Marine Stewardship Council Certification. Most of the rules and regulations are set by the fishers themselves. Although the government has set regulations, the fishers support the co-management approach and there is good cooperation between the government and the fishers.



Figure 3: Recently constructed artificial shelters on the beach
Photo Credit: Maren Headley

Conservation and Livelihood Challenges

Lobster stocks are a valuable resource to many fishing communities worldwide, and daily changes in catch rates and profits make it difficult for fishers to make the best decisions throughout the fishing

season. Factors which can affect the abundance of the spiny lobster include habitat quality, reproduction, and environmental conditions such as marine currents, hurricanes and climate change. In addition to the complexity of the fishery, the spiny lobster has a five-stage life cycle consisting of: (i) adults; (ii) eggs; (iii) larvae; (iv) post-larvae and (v) juveniles – with each stage occupying different habitats (Lipcius & Eggleston, 2000). Larvae develop over an estimated period of six to eight months in the ocean, drifting with the currents and forming connections among wider Caribbean spiny lobster populations. Regions with populations which produce their own larvae (sources), and others which receive more larvae than they produce (sinks), have been identified (Kough et al, 2013).

In many cases, these uncertainties lead to resource over-harvesting. These types of populations are known as meta-populations and require resource management at the local, national and international levels. It is therefore important that fishers and coastal communities have a good understanding of these factors.

Community initiatives

Being situated in a Biosphere Reserve, the Vigía Chico Cooperative has a long history of learning about their local ecosystem and engaging in conservation initiatives, through partnerships with research institutions and universities such as the University of Marista-Mérida. This has helped the community to build knowledge about:

- factors affecting the productivity and profitability of the fishery and its management implications;
- environmental and biological factors which affect the abundance of the spiny lobster resource;
- possible effects of climate change on the community and fishery, and measures that can be undertaken for adaptation and resilience; and



- relationships among catches of spiny lobster, density of artificial shelters, profitability and fishing area.

Further studies will help the fishers understand the relationship among catches of spiny lobster, density of artificial shelters and profitability in the various fishing areas, and how they can adapt to varying resource abundance and profitability throughout the fishing seasons.

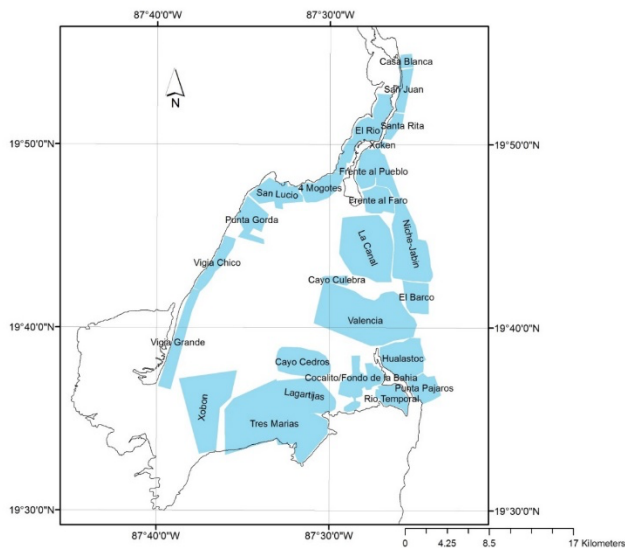


Figure 4: Twenty five (25) spiny lobster fishing areas in Ascension Bay.

Practical Outcomes

Research partnerships have led to an understanding in the fishing community of seasonal and spatial differences in the catches and profitability within the fishing areas. These differences were attributed to the following factors: i) how the lobster is distributed, over space and time, across the Bay, and how its abundance changes; ii) the distance of the fishing area from the port and its location in relation to the mouth of the bay; iii) the density of artificial shelters; and iv) the fishing strategies, such as the choice of fishing intensity (number of artificial shelters harvested per trip) and trip frequency, according to resource abundance, to maintain stable profits throughout the season.

In terms of the state of the fishery itself, transparent and strong leadership has resulted in a unified effort to conserve the spiny lobsters and ensure a sustainable fishery. The rights-based system has eliminated the race to fish since each fisher has exclusive access to lobsters in their fishing ground. This has also allowed fishers to develop a unique harvesting method highly suitable to the area and the resource.

Another key outcome is in terms of social capital. There is a strong sense of community cooperation, with fishers working together for the well-being of each other, particularly in times when fishing areas are affected by heavy rainfall which results in lobster migration away from these areas. In these instances, fishers with fishing grounds in affected areas are invited to form a partnership with other fishing teams. Self-monitoring and self-policing within their community has been quite successful. This stems from an increased sense of fishing ground ownership, as well as the influence of cultural heritage since the majority of the fishers are third generation, community founding members with strong family ties.

References

- Kough, A.S., Paris, C.B. and Butler IV, M.J. (2013). 'Larval Connectivity and the International Management of Fisheries'. *PLoS ONE* 8(6): e64970. Available at: <https://doi.org/10.1371/journal.pone.0064970>
- Lipcius, R.N. and Eggleston, D.B. (2000). 'Ecology and Fishery Biology of Spiny Lobsters'. In: B.F. Phillips and J. Kittaka (eds.), *Spiny Lobsters: Fisheries and Culture*, Second Edition, pp. 1–41. Oxford, UK: Fishing News Book-Blackwell. Available at: <https://doi.org/10.1002/9780470698808.ch>
- Miller, D.L. (1989). 'The evolution of Mexico's Caribbean spiny lobster fishery'. In: F. Berkes (ed.), *Common property resources: ecology and community-based*



sustainable development, pp. 185–198. London, UK: Belhaven Press.

Orensanz, J.M. and Seijo, J.C. (2013). *Rights-based management in Latin American fisheries*. FAO Fisheries and Aquaculture Technical Paper No. 582. Rome, Italy: Food and Agricultural Organization of the United Nations. Available at: <http://www.fao.org/3/a-i3418e.pdf>

Seijo, J.C. (1993). 'Individual Transferable Grounds in a Community Managed Artisanal Fishery'. *Marine Resource Economics* 8: 78–81.

Sosa-Cordero, E., Liceaga-Correa, M.A. and Seijo, J.C. (2008). The Punta Allen lobster fishery: current status and recent trends. In: R. Townsend, R. Shotton and H. Uchida (eds.), *Case studies in fisheries self-governance*, pp. 149–162. FAO Fisheries Technical Paper No. 504. Rome, Italy: Food and Agricultural Organization of the United Nations. Available at: <https://www.fao.org/4/a1497e/a1497e00.htm>

Acknowledgements



This report was produced by the Community Conservation Research Network (CCRN), a global partnership of Indigenous, academic, community, governmental and non-governmental partners. It contributes to a larger body of work which focuses on the linkages of environmental stewardship and sustainable livelihoods at a local community level. The CCRN is grateful for the support of Saint Mary's University, Canada, and the Social Sciences and Humanities Research Council of Canada (SSHRC).

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'Communities, Conservation and Livelihoods'

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