Progress Report – July 2025

Project Title: *Meta-Ecosystems: Connectivity and Energy Flow between Marine-Coastal Ecosystems in the Honduran Caribbean*
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This project aims to assess how land-use change in coastal watersheds affects water quality and marine biodiversity, using innovative tools such as stable isotope analysis and otolith microchemistry to understand energy flow and ecological connectivity within a marine-coastal meta-ecosystem.

In May 2025, the first dry season field campaign on water quality monitoring was conducted across four major watersheds on the North Coast of Honduras: Ulúa, Lis Lis, Cuero–San Juan, and Los Micos. Water samples were collected at marine sites, river mouths, and coastal lagoons. These data will serve as a baseline to evaluate the potential impacts of land-use change on water quality and reef health.

Additionally, we collected **195 fish samples** (common snook and lane snapper), **105 coral samples** (*Agaricia tenuifolia*), and **182 baseline samples** from primary producers and consumers. These samples will support stable isotope analyses (C, N, and S) to study trophic structure and energy flow between ecosystems. Otoliths were also extracted from fish to assess microchemical signatures and track the movement patterns of amphidromous and reef-associated fish species. All biological samples have been processed and sent to specialized laboratories for analysis.

Next steps include:

1. Conducting the second field campaign during the rainy season (October 2025).
2. Performing correlation analyses between land-use change, water quality, and marine biodiversity using data spanning the last 10 years.
3. Running stable isotope analyses to understand trophic connections.
4. Completing otolith microchemistry analyses to map fish connectivity.
5. Presenting results to protected area co-managers and decision-makers and engaging the public through outreach campaigns and media dissemination.

Challenges and Lessons Learned:

The first field campaign was originally scheduled for April but had to be postponed due to poor weather conditions. This delay highlighted the importance of having flexible logistical plans and contingency dates for fieldwork in coastal areas, especially during transitional climate periods.

Acknowledgements:

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Annexes

Annex 1. Photographs from the first water quality campaign