

**Building capacity to mitigate climate change through adaptive marine management: linking science and tradition in the Yap neighboring Islands: One People One Reef Project  
Yap Government: Environment Sector Funding**

**Yap Outer Islands 2017 One People One Reef Field Trip: 20 May – 18 June 2017  
Executive Summary of Activities, Prepared by One People One Reef Science team**

**Field Trip Participants:**

US Participants:

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Ulithi Participants:

John Rumal Jr (Magul), Falalop Ulithi  
Rancy Taigumal, MogMog Ulithi  
Milo Tasopulu, Falalop Ulithi  
Mario Dohmai, MogMog Ulithi

**Justification for Expedition:**

Many island communities are experiencing sharp declines in their subsistence fisheries and in overall health of the reefs that support them, threatening food security and livelihoods. Declines in abundance and size of targeted fishes have increased dependence on imported and canned foods contributing to human health problems. There is a lack of information and baseline data on the current ecological state of the reefs, resiliency of the system in the face of climate change, and the current impact of resource extraction activities (including associated fish and other food resources). These data are critical for local communities to be able to develop and implement effective adaptive management planning and ensure food security while maintaining culturally and historically relevant methods and knowledge. The status of reef health and fish resources can be quantified, and this information is critical to local management.

**Objective**

Our objective is to build capacity for adaptive management of reef resources in the Yap outer islands. Our approach is to combine scientific assessments of reefs and fisheries, traditional

management, and community education to provide support for development and refinement of management plans by each island community.

**Specific Outputs:**

We visited 8 atolls/Islands at which we surveyed a total of 33 sites.

Atoll or Island	# of reef sites surveyed
Piserach, (Namonuito Atoll, Chuuk State)	2
Satawal	5
Lamotrek	6
Elato	4
Ifaluk	7
Woleai (Falalop, Wotegai, Motohsow)	7
Eauripik (ship grounding survey)	1
Sorol	1
<b>Total</b>	<b>33</b>

**1. Reef Surveys**

Reef surveys were done to characterize reefs, assess resources and to inform management. We surveyed a total of 33 sites on 7 different atolls/islands in Yap State and 1 atoll in Chuuk State.

*Fish Surveys:*

At each site, we conducted 2 fish transects (50 m x 5 m) on the shallow reef (3-20 ft.) and when present, 2 fish transects on deeper reef habitat (40 ft.). All individual fish were identified to species, counted, and their size estimated following published protocols (Crane et al 2017). A total of 111 fish transects were conducted across all sites, thus accounting for a total of 62,411 individual fish.

*Benthic Surveys:*

Along each fish transect, 20 quadrats (0.25M<sup>2</sup>) were used to assess percent cover of reef-building corals, algae, and benthic invertebrates. Data were taken per coral colony on relative size (% cover) and health (degree of paling, bleaching, disease). A total of 1,485 quadrats were conducted across all sites. Measures of rugosity (topographical complexity) were conducted at most of the sites.

*Aerial surveys:*

Reefs were surveyed with a DJI Phantom 3 Drone to help characterize reef types.

**2. Local knowledge & Traditional Management**

At each island community, we conducted community interviews to gather information about community concerns, current management techniques and strategies, and observations of changes on reefs and land. To obtain perspectives from different view-

points we conducted community interviews, individual interviews, and meetings specifically with leaders, women, and youth.

### **3. Education & Outreach**

#### *Distributed materials:*

Printed educational & informational materials created by One People One Reef were distributed to each community. These included the following:

- a) Educational booklets on coral reef ecology tailored to Yap Outer Islands.
- b) Findings and summary from our 2014 Outer Islands reef management workshop on Ulithi (the genesis of this expedition)
- c) our assessment of Ulithi Atoll after Typhoon Maysak
- d) 2016 One People One Reef Project results from Ulithi Atoll
- e) Summary of scientific findings from each island (PowerPoints)
- f) Ulithi fisheries (landings data) summary (PowerPoint)
- g) Photographs of community members taken by a professional photographer.
- h) Underwater camera (1 per community) for photographing fisheries catches
- i) Fishes of Micronesia book for fish ID

#### *Educational leadership meetings:*

We met with high school principals and teachers to discuss their needs and assist in providing ideas on integrating coral reef ecology and marine biology into curriculum.

#### *Youth workshops*

At each community (6), the Ulithi youth team conducted youth discussions and interviews to listen to the concerns and perspectives of youth. They discussed drug-free lifestyles, leadership, reef management and compliance, among other issues.

#### *Community meetings:*

At each community (6 populated atolls), we conducted a final community meeting to share our findings and assessments from each atoll/island.

#### *Additional meetings and interviews:*

We conducted meetings separately with women, men and with individuals to get as much feedback as possible on the following issues: changes over time in resources (reef and land), fishing techniques, management and technology, and leadership structure. We asked community members to articulate issues, challenges, potential solutions, and things they were proud of and positive about.

### **4. Fisheries workshops**

At each community (6), we conducted a fishery landings training on data collection using local catches. Each community identified at least 2 individuals to serve as local scientists in charge of data collection (a total of 21 local scientists have been identified with more being sought). Seafood consumption calendars (100 total) were distributed to

households to track local vs. imported foods. We also conducted FAD (Fish Attracting Devices) workshops at 5 communities.

#### **5. Genetics (connectivity) & Isotopes**

Non-lethal genetic samples were taken from 170 different fish and 93 sea cucumbers to evaluate population connectivity within atolls and regionally. At 2 sites of each of 5 islands, samples of skin tissue from 10 sea cucumbers were taken and preserved for stable isotope analysis. The analysis may allow us to see the degree of nutrient run-off coming from human waste.

#### **6. Eauripik: Evaluation of the site of April 2017 ship 'hit' on the reef**

Part way through the trip we were requested by the Lt Governor of Yap and the community of Eauripik to evaluate the site of the April 2017 ship strike on the western edge of Eauripik Atoll. We were able to divert our trip, taking a day from our planned visit to Sorol to evaluate the site. We conducted the following:

- The horizontal spatial extent of the ship strike scars were mapped using GPS
- Fish were counted and biomass estimated inside and outside of scar areas (1 50x5 m transect in each area)
- Photo quadrats to evaluate benthic cover were taken (twenty 0.25M<sup>2</sup> quadrats randomly placed within two areas: scars and undamaged)
- Drone flight to document total spatial extent aerially
- Video transects in scarred and unscarred areas, both shallow and deep
- Deep dives along debris falls to document total depth extent (note: safety constraints limited these to 95 ft.)
- Photographs of debris from ship
- Photographs of specific corals damaged
- Collection of paint chips from ship

#### **Concluding remarks and future directions**

We accomplished what we had planned and more. Initially we had hoped to visit 3 or 4 atolls (at their request). We received requests from all populated islands, and were able to visit with 7 atolls in Yap State (one briefly in Chuuk State). Given the time we had to work with, we were unable to visit other (although we visited the majority of outer islands in Yap state). With the collaboration of local communities, we surveyed reefs, conducted workshops and gathered vital information. Our next step is to analyze the data. Once completed, we will provide a full report of the analyses and our assessment of it along with a summary of what we have learned about traditional management, changes in management and practices, and potential implications for reef resources. These will also be combined with work from Ulithi Atoll, and 'best practices' learned there. We will follow up with the fishery landings to support communities as they implement that aspect of the work. In the coming year, we will be re-visiting the islands to follow up with educational plans, implementation of seafood calendars and landings data collection, and additional site assessments and surveys as needed.