To: Kristen Yarincik

Consortium for Ocean Leadership

From: Patricia Miloslavich

Date: August 2, 2019

Subject: Training Workshop #1 Report (Project code: TRAINING-DUKE19)

Capacity building in US and Venezuelan young scientists for the analysis of marine biodiversity patterns

Project information

PIs: Patrick Halpin (Duke University) and Eduardo Klein (Universidad Simón Bolívar, Venezuela)

Logistics/coordination: Patricia Miloslavich – Global Ocean Observing System

Administrator of funds: Consortium for Ocean Leadership, Washington DC

Project Information: Capacity building in US and Venezuelan young scientists for the analysis of marine biodiversity patterns

Goal: to build capacity in analysis, mapping, and interpretation of patterns in different marine ecosystems that can improve ecosystem management and identify gaps in knowledge.
The idea is to have a full exercise in which biodiversity data is collected in the field using standardized protocols in key marine ecosystems, QC the data and upload it into OBIS. Training would also include further analysis of the data along with other environmental variables derived from global databases (e.g. SST, Chla, MPAs, etc). This plan would also be aligned with the Marine Biodiversity Observation Network (MBON), the Global Ocean Observing System (GOOS) and the Partnership for the Observation of the Global Ocean (POGO) frameworks with whom we envision engaging these students.

Terms of reference:

- To organize two training workshops in 2019 to support and strengthen 10-12 Venezuelan students and early career scientists in research in collaboration with US professionals at the facilities of the INVEMAR in Colombia and the CENPAT in Argentina. At each of the workshops, local students would also be invited to participate, promoting the establishment of regional links and strengthening local capacity.
- To involve the students in regionally relevant activities and under global coordination such as the Global Ocean Observing System (GOOS Biology and Ecosystems), the Marine Biodiversity Observation Network (MBON), and training projects such as the Reef Life Survey and the Smithsonian's MarineGEO.
- To contribute to the MBON Pole-to-Pole (http://www.marinebon.org/pole-to-pole.html) that builds on the South American Research Group in Coastal Ecosystems (SARCE) network, a legacy of the Census of Marine Life Nagisa project.
- To train in collecting, processing and QA/QC of data of biological Essential Ocean Variables or EOVs (e.g. seagrass, coral, macroalgae, fish) that will help support regional monitoring activities to inform policy.

- To bring highly qualified training to the region through the Reef Life Survey program (https://reeflifesurvey.com/) and through the SquidPops of the Smithsonian's MarineGEO (https://marinegeo.github.io/).
- To train in the uploading of the collected data into OBIS and on it's use for a variety of products (e.g. maps)

Report of Workshop #1 – INVEMAR, Santa Marta Colombia, 13-17th of May 2019

Research and monitoring methods in seagrasses

Participants:

- Venezuela: Alfredo Ascanio, Gloria Mariño, Ana Carolina Peralta, Adriana López, Emy Miyazawa, Daniela Sánchez, Laura Milano, Aldo Croquer, and Juan Pablo Rodríguez. Students came from Universidad Simón Bolívar in Caracas and from Universidad de Carabobo in Valencia, Carabobo Sate.
- Colombia: Stephania Rojas and María del Pilar Parrado from the Universidad del Valle and from INVEMAR respectively.

Instructors: Eduardo Klein (USB, Venezuela; AIMS, Australia), Enrique Montes (USF, USA), Jonathan Lefcheck (Smithsonian Institution, USA), Diana Gómez (INVEMAR, Colombia), Juan David González (INVEMAR, Colombia), Patricia Miloslavich (GOOS, Australia; USB, Venezuela).

Agenda: see appendix to this report (in Spanish)

Activities: The course consisted on lectures, field and lab activities, data QA/QC to learn on standard and innovation methods to: (1) assess cover and biomass of seagrasses, (2) assess abundance and composition of fish associated to seagrasses, (3) assess fish predation rates, (4) extract satellite data on sea surface temperature and chlorophyll, and (5) quality assess and control data and register in OBIS. Students had lectures on day 1, field and lab work on days 2 and 3, lab and data work on day 4, and final (oral) presentations of their results on day 5. Field activities took place at the Tayrona National Park (Chengue Bay) and all samples and lab and data work were carried out at the INVEMAR facilities. Students also made comparisons between seagrasses located closer to mangrove versus seagrasses located closer to the coral reef for points (1), (2) and (3).

Lectures, photos, data, and presentations are all uploaded in a shared Google Drive, accessible to the course participants. Students also received information about the courses available through the Ocean Teacher Global Academy on-line platform (OTGA: https://classroom.oceanteacher.org/). The INVEMAR is the Regional Training Center for the OTGA in South America and the Caribbean.

Outcomes: The course was successful in providing training on seagrass and fish data collection methods, as well as in data QA/QC and upload into open access databases. A sampling "kit" including a GoPro camera, mount and memory card, along with a GPS and other sampling materials (fiberglass poles, electrical tape, fishing line, cork borer and needles) was distributed for each of the two Venezuelan participating institutions. Material to assemble the Squid Pops was also donated to the INVEMAR.

The course generated marine biodiversity data which has been already uploaded both into OBIS and into GBIF (Figure 1 shows how the data were organized for upload into OBIS). Data include seagrass

Thalassia testudinum density, cover and biomass (estimated using standard protocols) along with fish predation rate and occurrence using the "squidpops" protocol by MarineGEO.

GBIF: https://www.gbif.org/dataset/94111134-ee88-449f-a86f-e940943b5516

OBIS: https://obis.org/dataset/7e9d478e-16cd-4afa-831e-55c23f7fc723

Peralta A C, Klein E, Croquer A (2019): seagrasssurvey_colombia. v1.1. Caribbean OBIS Node. Dataset/Samplingevent.
http://ipt.iobis.org/caribbeanobis/resource?r=seagrasssurvey_colombia&v=1.1

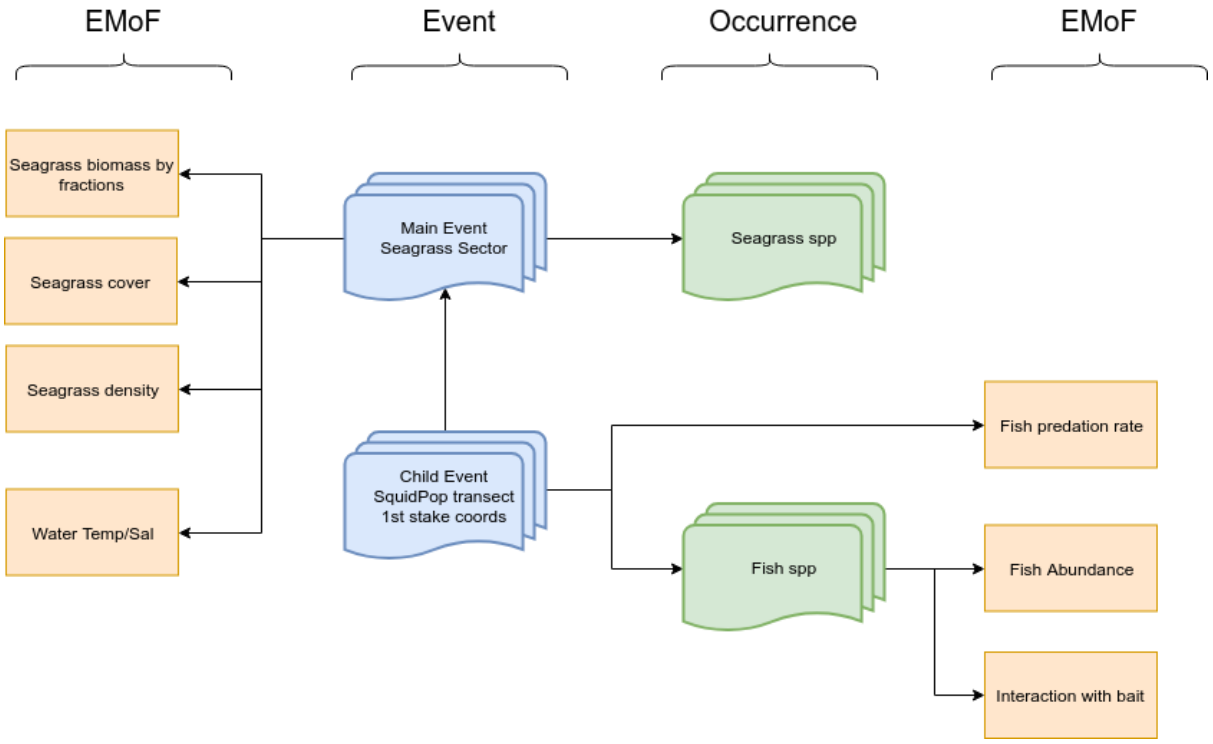
A data paper is in preparation by the course participants, both students and instructors, to be led by Carolina Peralta.

Another major outcome is that students were able to establish links and a communication channel for collaboration with researchers from the US, and plans are underway for the students to continue to sample in Venezuela and contribute to the Marine Biodiversity Observation Network - Pole to Pole (MBON P2P) and to the global research network of the Smithsonian's MarineGEO.

Background information, agenda and other course material including presentations and photos is publicly available at: https://diodon.github.io/seagrassWorkshop/workshopProgram.html

A survey was also developed to have the feedback from the students about the quality, organization and usefulness of the course:
https://docs.google.com/forms/d/e/1FAIpQLSezIg_peKzME_7fHJXVTU6pxDcsTzGX_Jg8vxHCyn_6IdcsIQ/viewform

Figure 1. Data architecture for upload into OBIS



Selected photos of the course activities.

Plate 1. A and B) Preparing the “Squid-Pops”, D) Squid Pops ready for deployment, D and E) arriving with the INVEMAR boats to Chengue Bay at Tayrona National Park, F) sea urchin Lytechinus variegatus on seagrass Thalassia testudinum, G) fish of the species *Thalassoma bifasciatum* biting the bait from the Squid Pop, H) extracting cores at the seagrass.

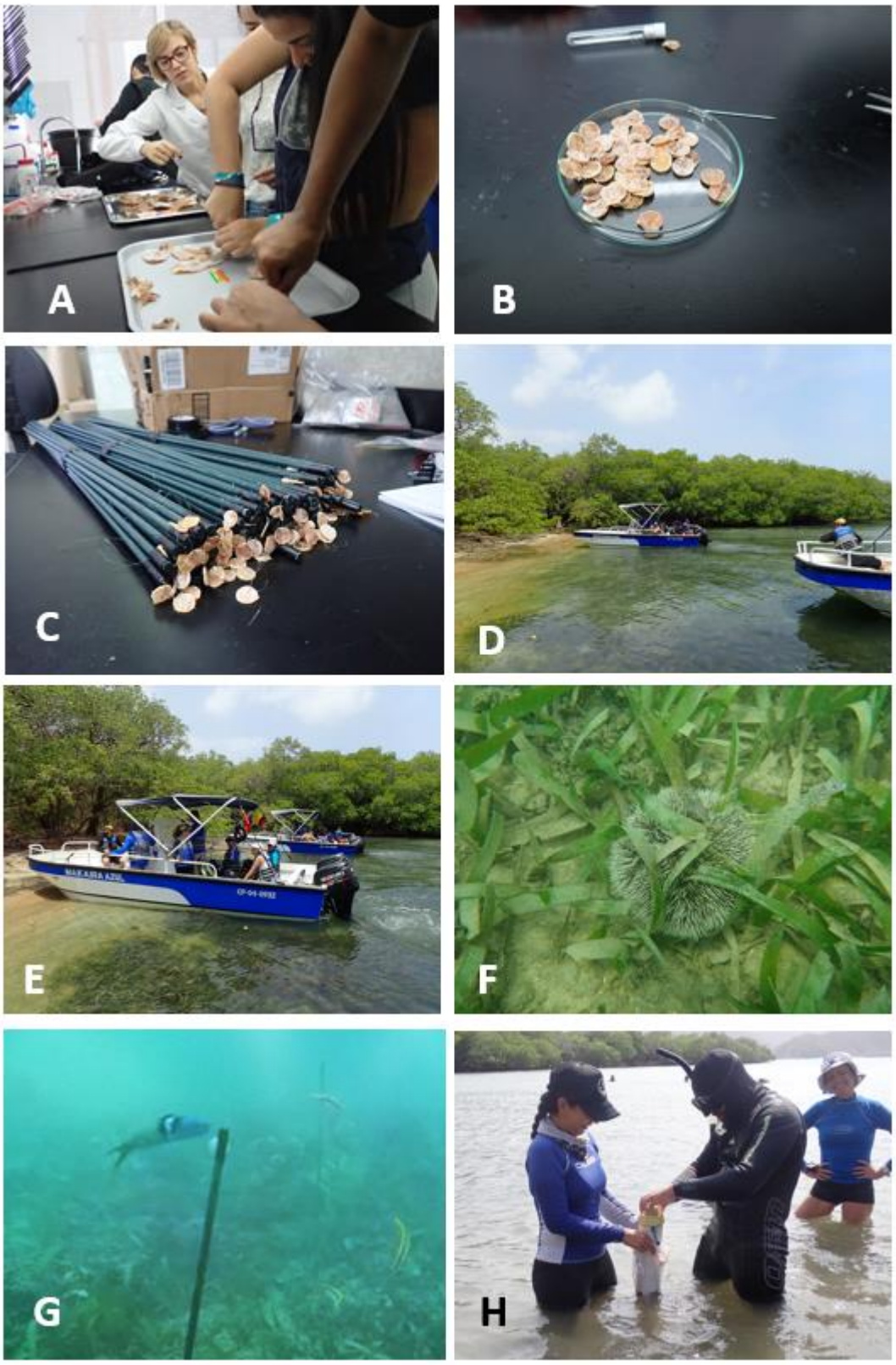


Plate 2. A) Explaining the different components of the *Thalassia testudinum* seagrass plant, B) washing the sediment from a core sample, C) group photo at Chengue Bay, D) looking at hours of GoPro footage of fish predation on the Squid-Pops, E) students presenting their results.