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Tenth Meeting of the Scientific and Technical Advisory Committee (STAC) to the Protocol Concerning Specially Protected Areas and Wildlife (SPAW) in the Wider Caribbean Region

CALL FOR PROPOSALS SHORT-TERM SMALL GRANTS - YEAR 2021 - INFORMATION NOTE FOR THE SPAW PROTOCOL SCIENTIFIC AND TECHNICAL ADVISORY COMMITTEE

Addendum 1-the reports

This meeting is being convened virtually. Delegates are kindly requested to access all meeting documents electronically for download as necessary.

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Call for proposals
Short-term Small Grants
- year 2021 -

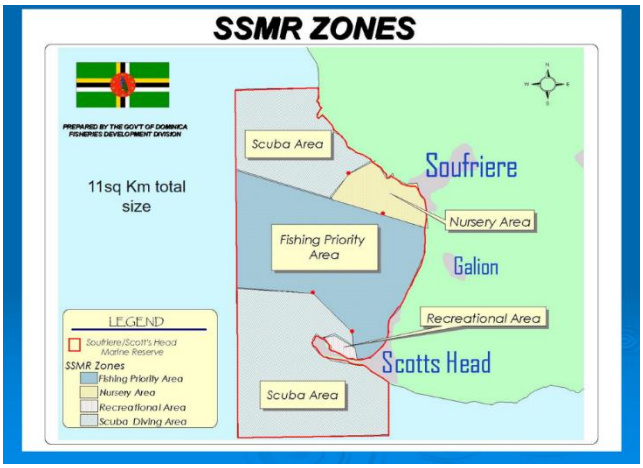
Final report

Name of the organization:

Local Area Management Authority of the Soufriere Scotts Head Marine Reserve (LAMA of the SSMR)

Name of the project:

Improving the Soufriere Scotts Head Marine Managed Area for Conservation and Sustainability



Total budget of the project: €14,000

SPAW-RAC grant: 7000 euros

Timeframe for implementation: 6 months from first disbursement

This report is intended to provide information on the organization(s) involved, the project, the concerned species and sites, the threats to their conservation, the methodology developed within the framework of the project, its implementation, the objectives sought, the results obtained,

and the perspectives for the future, in order to enlighten the Parties on the interest of such a project for the achievement of the objectives of the SPAW Protocol.

1. Your organization	
Name / Title	Local Area Management Authority of the Soufriere Scotts Head Marine Reserve
Category (public entity, NGO, laboratory, private company, managers,...)	NGO
Is the organization already in contact with national or international networks? If yes, which ones?	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)/ GIZ has been a key Partner of the Soufriere Scotts Head Marine réserve for the past 9 years
Address	LAMA Building, Bay Side, Soufriere, St Mark, Commonwealth of Dominica
Phone number	c/o +(767)614-1102
Website	www.smrdominica.com (being finalized)
Email address	Ssmrdominica.@gmail.com (also c/o Izzydiving@gmail.com pro tem)
Legal representative (person designated in the legal status)	Arun Madisetti President of the Board LAMA of the SSMR
Phone number of the legal representative	+(767)614-1102
Email address of the legal representative	Izzydiving@gmail.com
Name of the person responsible for this project (if different from the legal representative)	As above
Phone number of the person responsible for this project	As above
Email address of the person responsible for this project	izzydiving@gmail.com
Indicative annual budget of the organization	Due to the issues of Tropical Storm Erica, Hurricane Maria and COVID-19 there is no clearer picture of annual budget, the reserve is funded by user fees and generous grant support
Staff means (number of staff members, volunteers… etc)	Currently 3 full time wardens, and volunteer local divers treating coral disease as often as possible.

Preferred area for intervention (country(ies), region...)	Soufriere Scotts Head Marine Reserve, SW Commonwealth of Dominica
Additional contextualizing elements you wish to notify to SPAW-RAC or to the SPAW protocol signatory countries:	

2. Your project	
Name of the project	Improving the Soufriere Scotts Head Marine Managed Area for Conservation and Sustainability
Timeframe for implementation	*from I_0_I 8_I 2_I 0_I 2_I 1_I to I_0_I_6_I_2_I_0_I_2_I_2_I* *Main stages:* Month 1- Sourcing & procuring and of the material and equipment - **Completed** Month 2- Sensitization and Mobiliization project partners - **completed** Month 3+- Site survey and installation of equipment -**Underway**
Targeted specie(s)	
Site(s) location	Soufriere Scotts Head Marine Reserve, St Mark Parish, Commonwealth of Dominica
Major threats	Major threats include Stony Coral Tissue Loss Disease (SCTLD) which is reducing the regions coral cover, lack of baseline studies, limited ability to effectvely treat diseased corals.
Methodology developed within the framework of this project	The desired end point of the project was to procure materials necessary to outfit the SSMR patrol vessel, making it an effective tool for enforcement and monitoring. Matching funds from GIZ procured materials for the deployment of dive moorings at all sites within the reserve. A smaller grant was written and given to assist with office equipment and a computer.
Update on the implementation, progress and possible issues	The vessel has been renovated, the engine and streering repaired mounted and tested. (not part of this project). **From this disbursement :** Life jackets, wet weather equipment, handheld and a base radio have been procured, binoculars, navigation lights and mooring materials have all arrived. **Outstanding** items still on back order from the supplier include : GPS/depth sounder, and boat fenders, as soon as these arrive they will be shipped to Dominica.
Objectives sought and/or results obtained	Objectives : 1) Fully functioning patrol vessel – awaiting final equipment 2) Additional funds to purchase additional materials for SCTLD treatment (2nd and final SPAW disbursement) 3) Mooring deployment at all sites within the reserve (underway) 4) Safety and communication equipment purchased.

How did the results and outcomes of your project have in the past contributed, are contribuing or will contribute in the future, to meet the needs of the agreements of your country to the SPAW Protocole ?	Member operations of the Dominica Watersports Association are assisting with deployment of moorings, Trained local divers are currently undertaking to treat corals daily by hand within the reserve. It is hoped that with future grants we can procure materials sufficient to continue the treatment and make a small disbursement towards the cost of diving and treatment.
Outcomes and lessons learned	Currently the disbursements made by SPAW and GIZ have progressed as far as they can, when the remaining items arrive they will be deployed. Much of the work being done on a daily bais with regard SCTLD is being done pro bono by the local divers, however, there is a cost for equipment and treatment.
Perspectives, renewal, evolution of such a project	It is hoped that despte setbacks due to COVID-19 and global delays with shipping, that the LAMA of the SSMR would be eligible for additional grants through SPAW in managing, monitoring, and maintaining the marine enviironment within the reserve. It is hoped that by the spring of 2023 a clearer picture of annual budget will emerge from which better décisions can be made towards implementing smaller long term programs.
Additional contextualizing elements you wish to notify to SPAW-RAC or to the SPAW protocol signatory countries:	
Please annex any technical report, communication tools, pictures, maps etc you feel to be useful for the understanding of your project.	

3. Budget of your project (in Euros)			
Expenses		**Resources**	
Procurement	**Amount**	**Products**	**Amount**
Material	10,050	**Subsidies**	
Rentals	n/a	SPAW-RAC	7,000.00
Insurance	n/a	GIZ	7,000.00
Documentation	n/a	Import Duty	waived
Communication	n/a	Port fees	200
Marketing	n/a	Other...	
External services	volunteer	Other...	
Bank services	20	**Product sales**	
Taxes		**Service sales**	
Staff costs		**Donations, legacy...**	
Staff salaries	4,700.00	**Subscription**	
Travel expenses	n/a	Other...	
Other staff costs	volunteer	Other...	
Functioning / operational costs		Other...	
		TOTAL	**€14,000.00**
Additional contextualizing elements you wish to notify to SPAW-RAC or to the SPAW protocol signatory countries:			

4. Assessment of the call for proposals	
How did you hear about this call?	From a grant database, applied for because ‘it couldnt hurt to try’.
Were the terms of references for this call for proposals clear enought?	yes
Have you encoutered any difficulties regarding the preparation of your project, the submission process and then its implementation?	Thre were some « fine tuning » issues with the grantwriting, but these were dealt with. COVID -19 and global lockdown has hampered aspects of the implementation, delays in shipments mean we do not have all items paid for.
Were the discussions with SPAW-RAC helpful?	very
How this grant has been beneficial for your organization, territory or country?	We are rebuilding the reserve from the ground up, Tropical Storm Erica damaged the vessel, Hurricane Maria destroyed the building and all infrastructure. Having a vessel means a presence on the water to show the reserve is functioning, mooring balls show that the users (divers/snorkelers/freedivers) can see something for their fee. These visible actions combined show that although not still fully self supporting, the reserve is functional.
What is your general impression on this call?	Well timed and applicable to our needs.
Will you propose new projects to such a call?	Yes, please keep us informed of anything
What would you suggest to improve such a call?	Email to anyone/agency who had appliied for a grant before.
Additional contextualizing elements you wish to notify to SPAW-RAC or to the SPAW protocol signatory countries:	

5. Annexes

Image 1
SSMR Patrol vessel, trailer repaired, hull repaired, steering and engine fitted mounted and tested. GPS / Depth delayed due to shipping. Bimini top will be welded and navgation lights installed prior to relaunch.

Image 2
Dive mooring ready to be deployed.

CLEARWATER MARINE AQUARIUM

SPAW Final Report

Protecting the Endangered Antillean Manatee & Sea turtles within Gales Point Wildlife Sanctuary Through Conservation Interventions and Community Engagement

Introduction

Clearwater Marine Aquarium is pleased to present our final report on the project, "Protecting the Endangered Antillean Manatee and Sea Turtles Within Gales Point Wildlife Sanctuary Through Conservation Interventions and Community Engagement" for the consideration of the SPAW-RAC.

Project Deliverables

1. **Improve monitoring and enforcement within the Gales Point Wildlife Sanctuary through monthly boat patrols.**

We conducted six day and night patrols within the Gales Point Wildlife Sanctuary, Southern Lagoon, to monitor boater's compliance to speed restrictions and to look for illegal gillnets (gillnets have been banned in Belize since November 2020). During our boaters' compliance patrols our team noted an increase in the number of motorized boats within the Wildlife Sanctuary primarily by boaters from outside of the community who travel to the lagoon for sport fishing activities. In August, we observed ten boats in the lagoon, none in September through December, and two in January. Most boats observed during our patrols operated at an acceptable slow speed, while we noted three boats speeding while they were exiting the sanctuary. This area of speeding was one of the locations chosen to install a "slow speed" sign. No gillnets were present in the lagoon during any of our day and night patrols.

Figure 1. Day patrol in Gales Point Wildlife Sanctuary to monitor boaters' compliance to speed restriction and to look for illegal gillnets.

Figure 2. Night patrol in Gales Point Wildlife Sanctuary to look for illegal gillnets.

2. Identify high manatee use areas within the Gales Point Wildlife Sanctuary and install speed restriction signs in these areas.

Since 1997, our team has been conducting annual manatee health assessments, tagging, and tracking in Gales Point, Southern Lagoon. This is the longest longitudinal study of this species outside of Florida. This historical research provides us with the knowledge of where manatees aggregate, forage, access freshwater, rest, and their travel routes. Through this grant, our team utilized drones to identify manatee hotspots within the Gales Point Wildlife Sanctuary to inform us of the most strategic locations to install speed restriction conservation signs. These conservation signs are targeted to help reduce the risk of manatee watercraft collision in manatee hotspots within the sanctuary. Five "slow speed" signs were designed, printed, and installed in the Gales Point Wildlife Sanctuary, Southern Lagoon. These signs will alert boaters of manatee hotspots and caution them to slow down to reduce the risk of colliding with manatees.

Figure 3. Drone survey to help identify manatee hotspots for installation of slow speed signs.

Figure 5. Slow speed signs installed in the Gales Point Wildlife Sanctuary.

3. **Host a certificate-based tour-guide training for Gales Point villagers to diversify their livelihoods and protect Sanctuary species.**

Since 2012, our team has been conducting certification workshops for tour guides and boat captains on how to operate safely in manatee hotspots. Through this grant, we were able to conduct the first of these workshops in Gales Point Village.

Our team hosted a tour guide and boat captain's certificate training in Gales Point for 25 villagers. The training is endorsed by the Belize Tourism Board and included presentations about manatees' natural history, what to look for when conducting manatee tours, description of manatee behaviors, tips on how to make tours "manatee-friendly", and boating tips on how to operate safely in manatee hotspots. The training was well received by the participants. At the end of the training, certificates were issued to each participant recognizing them as "manatee friendly" tour guides and boat captains. The group discussed the next steps for manatee-related tourism activities within Gales Point, Southern Lagoon. Many of the participants expressed interest in becoming licensed tour guides by the Belize Tourism Board.

The training was conducted in accordance with Belize's Covid-19 protocols (temperature check, wearing of face masks, social distancing, and sanitizing). Lunch was also provided to each participant and trainer.

Figure 6. Tour-guide and boat captains' certificate training in Gales Point Village.

4. **Engage Gales Point Students through our Marine Conservation Children's Summer Camp.**

Our team hosted a two-day Marine Conservation Summer Camp in Gales Point Village. The day camp hosted 35 children at the Gales Point Government School. During the camp, our team presented natural history information about manatees and sea turtles, the threats to these species in Belize (and in Southern Lagoon specifically), research and conservation initiatives conducted by our team to help protect these species, and a call to action on how they as children can become stewards and help to protect these species and their habitat in Southern Lagoon.

At the camp, Belize's Covid-19 protocols were adhered to (temperature check, wearing of face masks, social distancing, and sanitizing).

Figure 7. Gales Point Marine Conservation Summer Camp presentation.

Figure 8. Gales Point Marine Conservation Summer Camp art activity.

Figure 9. Gales Point Marine Conservation Summer Camp group photo.

Our team also hosted a movie night screening "Dolphin Tale" in conjunction with the Marine Conservation Summer Camp in Gales Point Village. The movie is based on a true event where a dolphin was entangled in a fishing gear eventually causing her to lose her tail. We utilized this story to reinforce the teachings from the summer camp of the threats, particularly from unsustainable fishing gear like gillnets, to marine life. The movie night hosted 45 attendees including adults and children. Refreshments were provided for all attendees. Belize's Covid-19 protocols were adhered to (temperature check, wearing of face masks, social distancing, and sanitizing).

Figure 10. Movie Night in Gales Point.

Figure 11. Dolphin Tale screened at Movie Night in Gales Point.

5. Safeguard sea turtles from predators through patrols and nest protection to ensure high hatchling rates.

The Gales Point Wildlife Sanctuary beach is one of the most important nesting beaches for three species of sea turtles: the critically endangered Hawksbill sea turtle, and the endangered Green and Loggerhead sea turtles in Belize and the wider Caribbean.

Through this grant, our team conducted two day patrols, and one night patrol on the turtle nesting beach in Gales Point Wildlife Sanctuary to look for turtle nests. During the night patrol, one undisturbed Hawksbill Sea Turtle nest was identified. During the first day patrol, no nest was found. During the second day patrol, we discovered ten nests of which four were undisturbed, one was disturbed and five were destroyed by predators. Nine of the nests were Hawksbill, and one was unknown (either Hawksbill, Loggerhead, or Green) due to the extent of nest destruction.

Our team purchased materials to build protective mesh cages as a conservation intervention measure for the next nesting season in the spring of 2022. These nest protection cages will be used to secure the nests from predators. Prior to hatching, the protective mesh will be removed for easy passage of hatchlings. This intervention will help to reduce the number of nests predated on and to increase the hatchling survival rate of the critically endangered Hawksbill Sea Turtle, and the endangered Green and Loggerhead Sea Turtles.

Figure 12. Turtle nest assessment in Gales Point Wildlife Sanctuary.

Figure 13. Wire mesh for nest protection against predators.

Table 1. Sea Turtle Nest & Hatchling Monitoring in Gales Point Wildlife Sanctuary.

Date	Easting	Northing	Species	Nest Status	# Emerged	# Undeveloped	#W/ Embryo	Clutch Size	Distance from watermark (cm)
11/14/2021	0361412	1905159	Hawksbill	Undisturbed	135	10	2	147	900
11/14/2021	0361405	1905051	Hawksbill	Destroyed	Unknown	Unknown	Unknown	Unknown	780
11/14/2021	0361393	1905002	Hawksbill	Disturbed	130	Unknown	Unknown	Unknown	860
11/14/2021	0361395	1904994	Hawksbill	Undisturbed	64	0	0	Unknown	1000
11/14/2021	0361393	1904990	Hawksbill	Destroyed	Unknown	Unknown	Unknown	Unknown	1050
11/14/2021	0361384	1904959	Hawksbill	Destroyed	Unknown	Unknown	Unknown	Unknown	1300
11/14/2021	0361386	1904933	Hawksbill	Destroyed	Unknown	Unknown	Unknown	Unknown	1120
11/14/2021	0361386	1904936	Hawksbill	Undisturbed	160	2	0	162	1160
11/14/2021	0361384	1904919	Hawksbill	Undisturbed	147	13	0	160	1200
11/14/2021	0361383	1904862	Unknown	Destroyed	Unknown	Unknown	Unknown	Unknown	800

Figure 14. Map of turtle nests in Gales Point.

6. **Conduct beach clean-up on critical sea turtle nesting beaches in the Sanctuary with villagers and children to ensure the safety of habitat and engage the community in conservation.**

Through this grant, our team transported 40 clean-up participants to the uninhabited turtle nesting beach situated east of the village. Our team provided face masks, gloves, trash bags, and t-shirts to each participant. The group was divided into teams of five. The teams dispersed to the north and south of the beach, collecting trash that washed ashore along 1.5 miles of this prime turtle nesting beach. At the end of this cleanup, the group collected approximately 325lbs of trash, mostly comprised of plastics. The bagged trash was collected and transported to the Village's dumpsite for transfer to the country's landfill.

Figure 15. Distribution of face masks, gloves, and trash bags to participants.

Figure 16. Clean-up groups dispersing along the turtle nesting beach.

Figure 17. Close-up view of some of the trash collected during the clean-up.

Figure 18. Group photo of clean-up participants.

Convocatoria de propuestas
Subvención a pequeña escala y a corto plazo
- Año 2021 -

Formulario de aplicación por subvenciones

Nombre de la organización : Science and Conservation of Reef Fish Aggregations (SCRFA)
Nombre del proyecto : Radio para pesca inteligente

La solicitud de subvención es elegible cuando incluye el formulario completado adjunto, una nota que presenta la organización solicitante, el proyecto, el contexto, el territorio elegido para la implementación, los socios y los donantes potenciales, el plazo para la implementación y los resultados esperados como así como los datos bancarios completos proporcionados por su banco mencionando toda la información relacionada con la recepción de transferencias internacionales de dinero en euros.

El CAR-SPAW se reserva el derecho de solicitar información y documentos adicionales si es necesario.

1. Organización	
Nombre / Título	SCRFA / SCIENCE AND CONSERVATION OF REEF FISH Radio para pesca inteligente
Categoría[2] (entidad pública, ONG, laboratorio, empresa privada, gestores...)	ONG -artículos adjuntos
Dirección	1595 S Mission Rd Fallbrook, CA 92028, USA
Números de teléfono	+ 760
Sitio web	scrfa.org
Dirección de **correo electrónico**	chad@pathwaycg.com
Representante legal (persona designada en el estatus legal)	Chad Wauschek, CPA, CFP
Número de teléfono del representante legal	+1 760 723 7724
Dirección de correo electrónico del representante legal	chad@pathwaycg.com
Nombre de la **persona a cargo de este proyecto** (si es diferente del representante legal)	Ana E Salceda
Número de teléfono del responsable de este proyecto	+1 831 920 8311 +34 641 348 976
Dirección de correo electrónico del responsable de este proyecto	production@belugasmile.com anasalceda@mac.com
¿La organización ya está en contacto con **redes nacionales o internacionales**? Si es así, ¿cuáles?	FAO WESTERN CENTRAL ATLANTIC FISHERIES COMMISSION (WECAFC): http://www.fao.org/fishery/rfb/wecafc/en International Union for Conservation of Nature (IUCN) w ww.iucn.org/ssc-groups/fishes/grouper-wrasse CARIBBEAN FISHERIES MANAGEMENTE COUNCIL (CFMC): https://caribbeanfmc.com FISHBASE GLOBAL DATABASE (www.Fishbase.org) GULF AND CARIBBEAN FISHERIES INSTITUTE (GCFI): https://www.gcfi.org/
Presupuesto anual indicativo de la organización	USD30,000

1. Organización	
Nombre / Título	SCRFA / SCIENCE AND CONSERVATION OF REEF FISH Radio para pesca inteligente
Categoría[2] (entidad pública, ONG, laboratorio, empresa privada, gestores...)	ONG -artículos adjuntos
Dirección	1595 S Mission Rd Fallbrook, CA 92028, USA
Números de teléfono	+ 760
Sitio web	scrfa.org
Dirección de **correo electrónico**	chad@pathwaycg.com
Representante legal (persona designada en el estatus legal)	Chad Wauschek, CPA, CFP
Número de teléfono del representante legal	+1 760 723 7724
Dirección de correo electrónico del representante legal	chad@pathwaycg.com
Nombre de la **persona a cargo de este proyecto** (si es diferente del representante legal)	Ana E Salceda
Número de teléfono del responsable de este proyecto	+1 831 920 8311 +34 641 348 976
Dirección de correo electrónico del responsable de este proyecto	production@belugasmile.com anasalceda@mac.com
¿La organización ya está en contacto con **redes nacionales o internacionales?** Si es así, ¿cuáles?	FAO WESTERN CENTRAL ATLANTIC FISHERIES COMMISSION (WECAFC): http://www.fao.org/fishery/rfb/wecafc/en International Union for Conservation of Nature (IUCN) w ww.iucn.org/ssc-groups/fishes/grouper-wrasse CARIBBEAN FISHERIES MANAGEMENTE COUNCIL (CFMC): https://caribbeanfmc.com FISHBASE GLOBAL DATABASE (www.Fishbase.org) GULF AND CARIBBEAN FISHERIES INSTITUTE (GCFI): https://www.gcfi.org/
Presupuesto anual indicativo de la organización	USD30,000

Interim report

COMPLETED TO DATE (CONCEPT/PRE-PRODUCTION AND MATERIALS): **ENGLISH LANGUAGE**

CREATIVE CONCEPT

a. Creative concept for two **podcasts** addressing fishers and fishing communities:

i. The Secret Language of Nassau Grouper: female narrator guides the audience through the natural history of this species, emphasizing reproductive behavior. This podcast relies on underwater acoustics ---fish calls of courtship and territorial behavior in crescendo until the final silence of the spawning.
ii. Fish Smart: Zoom meeting between fishers and managers of diverse genders and accents connecting the dots for the audience focused on benefits of protecting spawning aggregations and the downside of fishing species during reproductive season.

- Creative concept for 2 public service announcements:
  - Promotion of the regional closure season for Nassau grouper from December through March, delivered as a phone message.
  - Promotion of the regional closure season for mutton snapper from April through July: main message emerges from a cacophony of voices and accents in a fish market.

PRE-PRODUCTION

- Casting and contact of hosts and talent of the podcasts

- Collection of underwater acoustics sound files for the pieces, including groupers calls (different behaviors) and reef soundscape.

- Coordination with Belizean and Bahamian partners for review, soft release and gathering metrics:
  - Belize: Fisheries Department (government) & Environmental Defense Fund (civil society / NGO)
  - The Bahamas: Perry Institute for Marine Science

NEXT STEPS FOR PRODUCTION OF 2 PODCASTS* AND 2 PUBLIC SERVICE ANNOUNCEMENT
***The Perry Institute will be applying a one-narrator structure for the podcasts.**

- Schedule 2022:
  - Production: June/July
  - Post-production: July/August
  - Testing: August/September
  - Final Cut: October
  - Delivery to SPAW: November
- The Perry Institute for Marine Science will be in charge of the PRODUCTION of the Radio kit in English.
  - Producer: Krista Sherman
  - Director: Lily Haines
  - Executive producer for alignment to the WECAFC SAWG Big Fish Campaign and Belize liaison: Ana Salceda

Ecologically - Sustainable + Increased Profitability: An experiment on fish traps to be used outside Marine Protected Areas

REEF CHECK DOMINICAN REPUBLIC

PROJECT REPORT

Introduction

The Caleta Marine Park (MPA) was recognized as a National Park by Dominican Republic Law No. 67 of November 8 of 1974 and declared an Underwater National Park by Presidential Decree 1026-86-249, of September 30, 1986.

This same Decree expresses the conditions of La Caleta MPA as an ideal place for the practice of the SCUBA diving due to its proximity to the city of Santo Domingo, the ideal depths, the conditions of

protected bay and the presence of submerged structures sunken to create artificial reefs. Subsequently, the decree was ratified by the General Law on the Environment and Natural Resources (64-00 of August 18, 2000) and the Sectoral Law on Protected Areas and Biodiversity (202-2004).

La Caleta MPA is 20 kms away to the east of the city of Santo Domingo, right in front of the Las Americas International Airport (SDQ) in the vicinity of the town of La Caleta. It is a protected bay with shallow waters. Its western limit begins in the cave of Las Golondrinas, to the south is the isobathic line of 100 fathoms deep until reaching the southwestern end of Punta Caucedo. La Caleta is considered by experts as one of the best diving spots in the country.

It has an area of about 12 km², and an approximate depth of 60 feet of sandy and coral reef bottom. The main attraction of this protected area is the variety of artificial structures sunk to encourage diving, such as the "Hickory" a ship expressly sunk in 1984 by the Underwater Research Group (GIS), with the aim of creating an artificial reef that would promote the proliferation of marine life. In addition, in the background, two other ships coexist with him that it is also possible to explore, the "Captain Alsina" and "El Limón".

The Park has an irregular topography with 3 well-defined terraces, extending parallel to the coastline. The different levels of the bottom reach depths of 10 to 50 m, finding in them reef communities in a state of recovery and a large number of multicolored fish that use coral colonies as a refuge for food source. Divers will be able to contemplate its corals and the immense variety of fish that inhabit the area, such as lamps, sunfish, soldier lamps and sergeant majors.

With the endorsement of the Ministry of the Environment and Natural Resources, Reef Check Dominican Republic, and the involvement of the local community represented by the Cooperative of Fisheries and Tourism Service Providers of La Caleta (COOPRESCA) and the support of international institutions and governments and local business, the La Caleta Underwater National Park efforts are being made to turn this important protected area into the main tourist diving destination of the Dominican Republic.

One of the first initiatives has been the installation of a system of mooring and delimitation buoys, which serve for the marking of the marine boundaries of the La Caleta Underwater National Park, these delimitation buoys clearly and physically indicate the area inside and outside the park which facilitates the implementation of the different uses of the park and the enforcement of existing regulations.

The fishing community, through COOPRESCA, undertook to respect exclusive areas becoming no-fishing areas, resulting in a significant increase in the population of fish and other components of marine life over the years. Despite to the implementation of a no-take zone, local fishermen were, however, able to continue their traditional artisanal fishing activities, but had to conduct sustainable fishing practices, and diversify their livelihoods with activities dedicated to ecotourism such as snorkeling, scuba diving, kayaking and other beach gear.

In view of the current regulations of the marine protected area, fishermen are only allowed to use fish traps outside the no-take zone; spearfishing and the use of nets remain prohibited. However, the traps used do not meet regulatory standards in terms of mesh size, and fishermen tend to use mesh sizes that are too small. This project aimed to determine and document the use of fish traps with different mesh sizes to determine and document the balance between ecological sustainability and economic profitability for local fishermen, so that they can improve their practices for more sustainable fishing. and with high profits.

The objective of this project was to have fishermen conduct an *in-situ* experiment on the use of fish traps with different mesh sizes to determine and document the balance between ecological sustainability and economic profitability for local fishermen.

Methods

An experimental approach was designed and consulted with local fishermen expertise to produce 2 sets of fish traps: One set (control) was determined to be the same one the currently use to fish outside of the no-fishing area (arow-head fish traps, see figure 1), and another set (experiment) was designed to include some mesh panels using a larger mesh size than the one commonly used by them over many years.

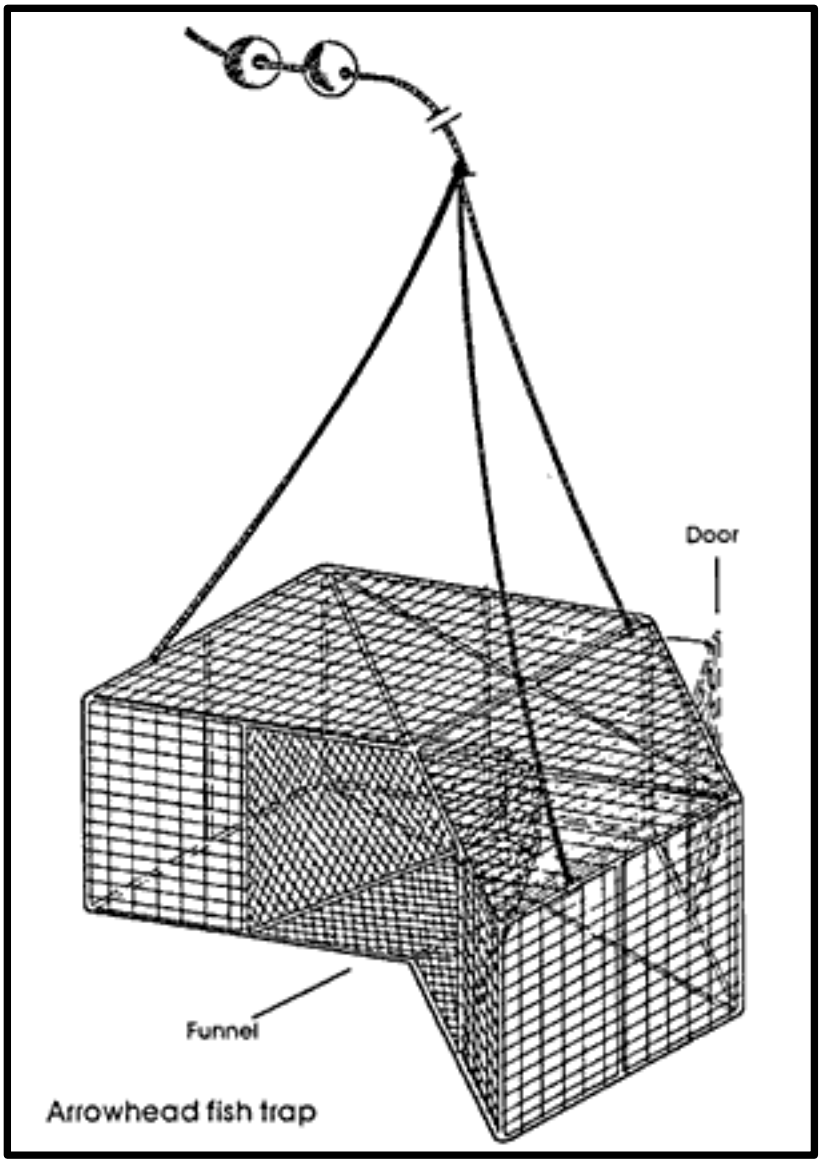


Figure 1. Arrowhead fish trap commonly used in the Caribbean Region. Image taken from FAO.

The control fish traps were built using with mesh commonly called chicken wire that has a mesh size of 1 inch in all panels. The experiment fish traps were built using the same 1-inch chicken wire mesh as the control, but panels on the bottom were replaced with a mesh size of 4 inches to allow smaller fish to scape or drop out when the traps were been raised to the surface.

To made handling at sea more user-friendly, fish traps were color coded. The control fish traps were painted with orange color in the corners and experiment traps were painted with blue color in the corners. Also, color-coded plastic Buckets were provided to fishermen when fish traps were raised from the sea, to place the catch from each different fish trap in different buckets and maintain separation of the catch from each trap until fish were measured and weighted back on land using a ruler and a scale (Figure 2 and 3). Pictures were taken as reference, and data was annotated for further analysis. Fish trap catch were collected approximately every 3 days (same as fishermen usually do) eight times between May and June 2022.

Figure 2. Two sets of fish trap were built, and color coded to allow the collection and separation of the catch until these were analyzed back on land. Control traps were colored in orange and experiment traps were colored in blue. Corresponding color buckets were provided to fishermen to main separation of the catch.

Figure 3. Catch was measured and weighted maintaining the same color code to minimize human error on handling the catch and potentially altering the results.

Results

Data collected and analyzed shows that control fish traps with smaller mesh size (regularly used by fishermen) trapped more fish than experiment traps with large mesh size, indicating that smaller fish were able to escape from traps while being raised to the surface, this was observed by fishermen (Figure 4 and 5).

Fish weight from each of the traps was similar between control and experiment, indicating what was hypothesized that fish traps with smaller mesh size trapped more fish, but including fish of smaller sizes, while fish traps with larger mesh size, trapped fewer fish, but mostly larger ones, as smaller were able to escape from the traps as these were being raised (Figure 6 and 7).

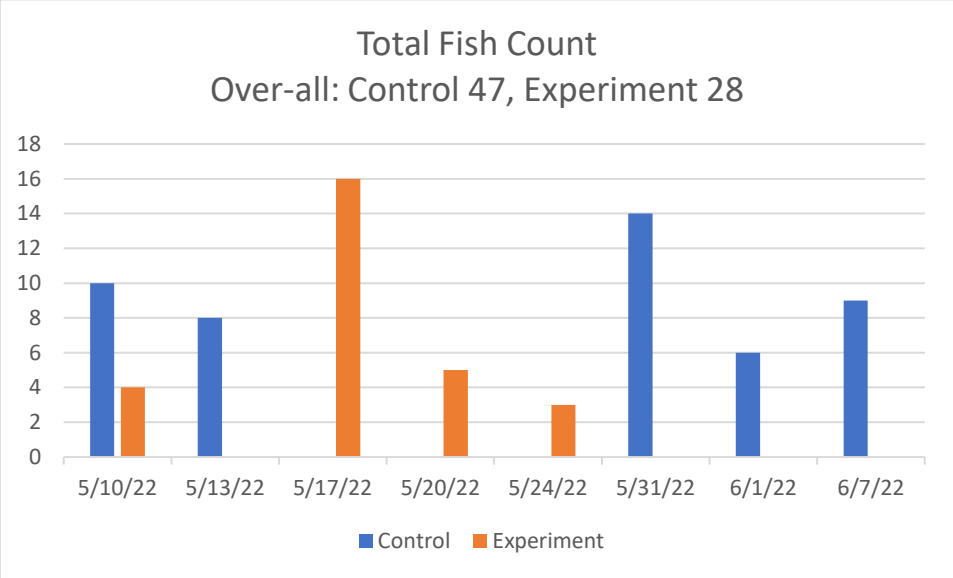


Figure 4. Total fish counts captured by each of the control (blue columns) and experiment traps (orange colors). Total counts for each treatment is also indicated in the title.

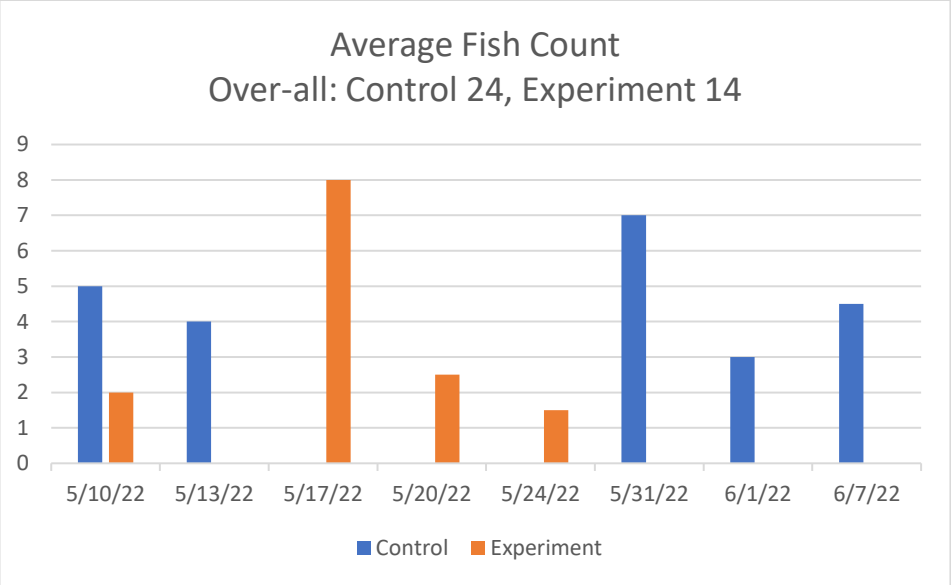


Figure 5. Average fish counts captured by each of the control (blue columns) and experiment traps (orange colors). Average counts for each treatment is also indicated in the title.

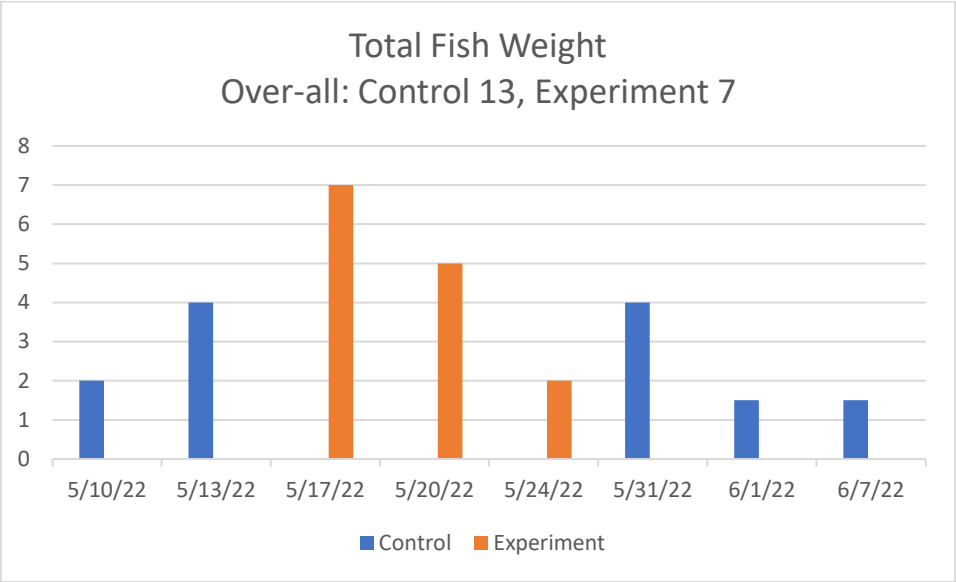


Figure 6. Average fish counts captured by each of the control (blue columns) and experiment traps (orange colors). Average counts for each treatment is also indicated in the title.

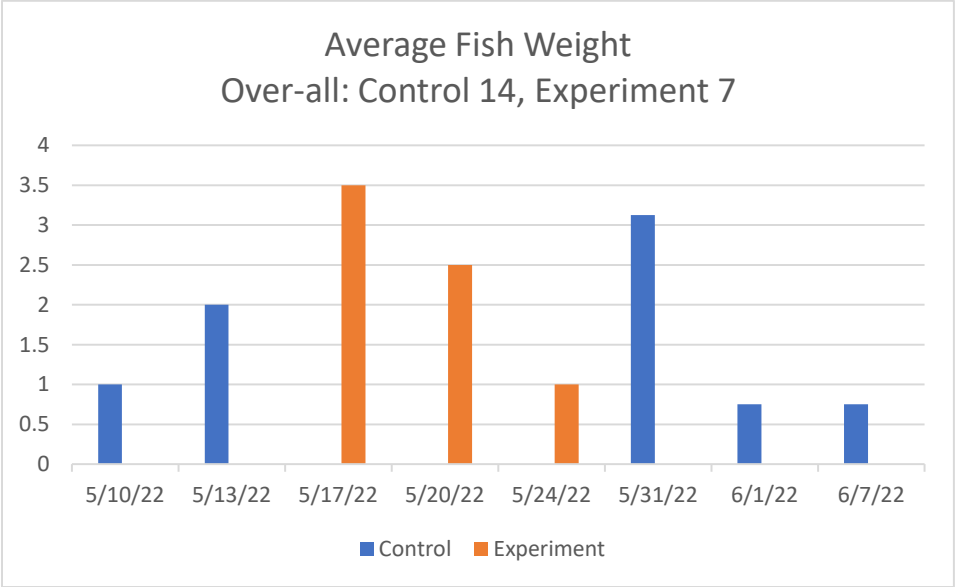


Figure 7. Average fish weight captured by each of the control (blue columns) and experiment traps (orange colors). Average weight for each treatment is also indicated in the title.

Conclusion

The objective of this project was to have fishermen conduct an *in-situ* experiment on the use of fish traps with different mesh sizes to determine and document the balance between ecological

sustainability and economic profitability for local fishermen. First of all, having fishermen conduct this experiment was of great importance as they were able to witness results as they conducted the fishing labor and thus convinced on-site of such finding, empowering them to adapt their fishing practices as needed by supported by this experiment.

Results were clear in documenting that the commonly used fish traps with smaller mesh size, may capture more fish individuals, but some of there were smaller (juveniles) individuals that would most likely not be used for consumption, but were taken from the reefs, disrupting the ecosystem over the long term, and getting to a point of overfished state of the coral reef. Also, the fact that fish traps with larger mesh size let smaller fish escape from traps as these were being raised from the bottom, allow smaller (juvenile) fish to stay in the reefs, allowing them to grow for future generation's use. Larger fish being caught also represented more food per fish caught, which is indicative of a more productive and sustainable fishing practice.

Next steps may include the suggestion to local authorities to promote or regulate mesh size, to include fish traps with panels of larger mesh sizes that allow juvenile fish to escape back to the reefs, maintaining a healthier ecosystem, without disrupting fishermen income and livelihoods.

Images taken during this experiment can be found by accessing this cloud drive.

Short-termSmallScaleGrant
Year2021

Financial and Technical Report

1.

Conservation of critical fish spawning aggregations (FSAs)at Glover's Reef Atoll, Belize

Male Tiger Grouper at Tiger Bank FSA, Glover's Atoll. Credit: A. Navarro/WCS

Awardee: The Wildlife Conservation Society (WCS) - Belize Program

Award Amount: Eight Thousand Euros (€8,000.00)

Date of Signature/Project Commencement:

Project Closing Date: February 28th, 2022

Report Prepared by: Myles Phillips, Technical Coordinator - Marine

Achievement of Objectives

1. To continue to gather FSA monitoring data at WCS's two focal sites at Glover's Reef Atoll using diver visual survey sand laser/video sizing systems during peaks pawning events.

Visual surveys were conducted at the Northeast Point and Tiger Bank spawning aggregation sites (Fig. 1)during peaks pawning periods(3-8daysafterthefull moon)in January and February2022.

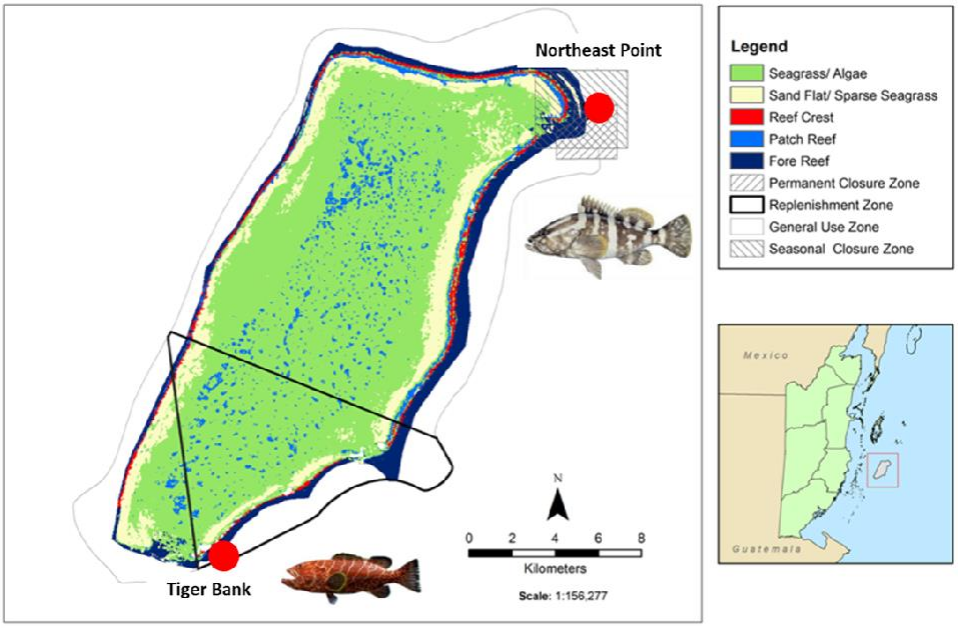


Figure1. Map showing two spawning aggregation sites in Glover's Reef Marine Reserve, Belize.

Successful surveys were conducted at the Northeast Point (Nassau Grouper/multi species) FSA on January20-22, with size data collected using laser calliper systems on January 21-22. In February, an extended period of abundance monitoring (February 17-24th) was achieved due to collaboration with a team of rebreather divers filming for an upcoming documentary "The Secret Crown". The maximum mean daily count for the season was 700 in February. This represents a continuation of the trend of decline in abundance of Nassau Grouper (*Epinephelus striatus*) at this well-known aggregation site over time (Fig.2). Maximum mean daily count in January was 375. Tiger Groupers (*Mycteroperca tigris*) and BlackGroupers (*Mycteroperca bonaci*) were also conspicuous at the Northeast Point site during both survey events, presumably also using this site for spawning.

Divers were able to survey at Tiger Bank from January 22-24, collecting size data every day during that period. February surveys occurred on February21st, 24th and 25th. Unfortunately, maximum daily counting both January and February was seven (7) groupers, comprising 4 males and three females. This was a tremendous and surprising decrease in abundance for this aggregation, which has not shown statisticallysignificantdecreasesinabundancesince2001(Fig.3). Size data was not collected for Tiger Groupers in February. Parrot fish spawning(*Sparisoma aurofrenatum*)was observed in morning surveys during February, as well as high densities of queen parrot fish (*Scarus vetula*), yellow tail parrot fish (*Sparisoma rubripinne*) and midnight parrot fish(*Scarus coelestinus*).

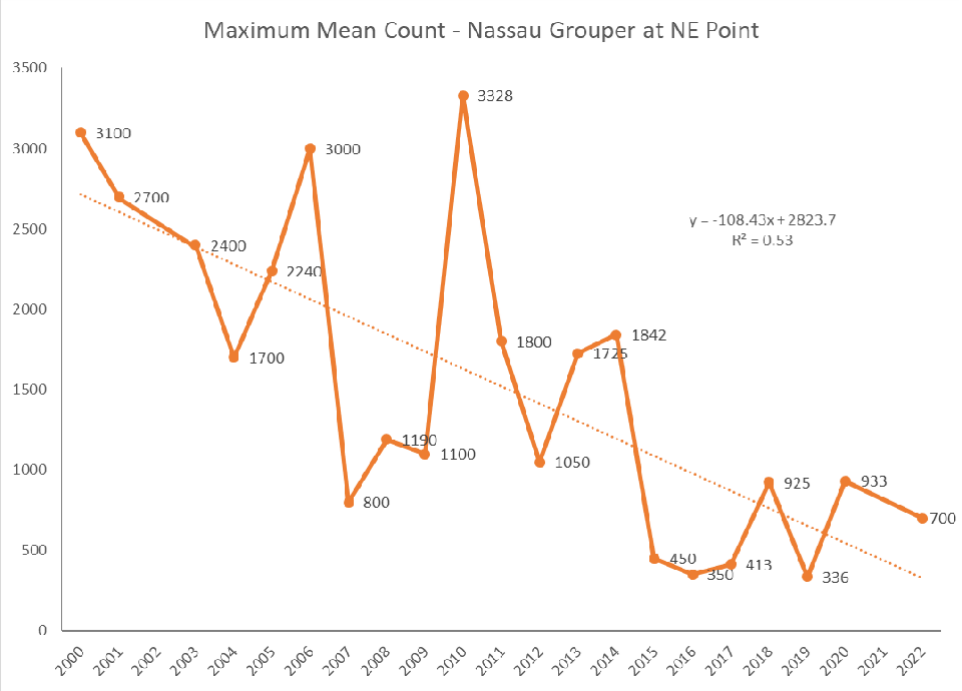


Figure2.Maximum Mean Daily Count of Nassau Grouper during peak spawning period at Northeast Point FSA, Glover's Atoll, Belize from 2000-2022.

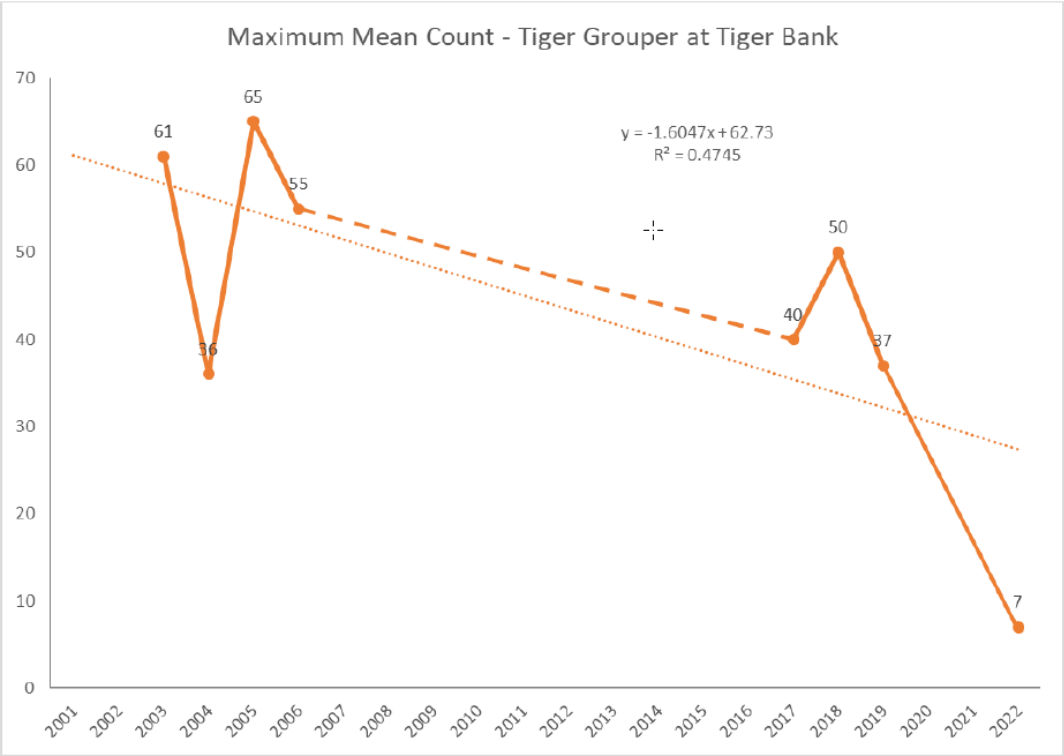


Figure3.Maximum Mean Daily Count of Nassau Grouper during peak spawning period at Tiger Bank FSA, Glover's Atoll, Belize from2000-2022.

A laser calliper was used at the fish spawning aggregation sites to capture footage for post-survey analysis. Still captures from laser calliper footage were processed to estimate the actual size of individual fish using measurement software (IC Measure) and the known distance (18cm) between the laser points (Fig. 4). There was a relatively even distribution of size categories among the 40 Nassau Grouper measurements which could be acquired from the footage, with the 750-800 cm category exhibiting the greatest frequency (Fig. 5). It is noteworthy that despite the gradually decreasing abundance of spawners, large, highly fecund (and presumably older) individuals remain present at the aggregation. At Tiger Bank, 27 measurements were taken which reflect the protogynous (small females maturing into larger males) ecology of Tiger Groupers (Fig.6).

Figure 4. Nassau Grouper aggregating to spawn at Northeast Point FSA in January 2022. Laser calliperpointsareindicatedbyreddots.

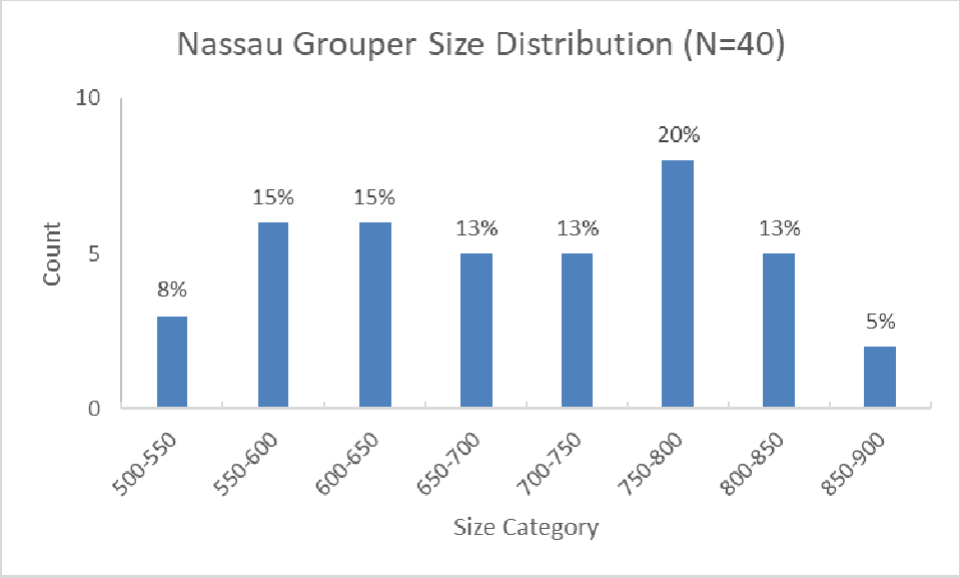


Figure 5. Size distribution of *E. striatusmeasured* at Northeast Point FSA in2022. Measurements in centimetres.

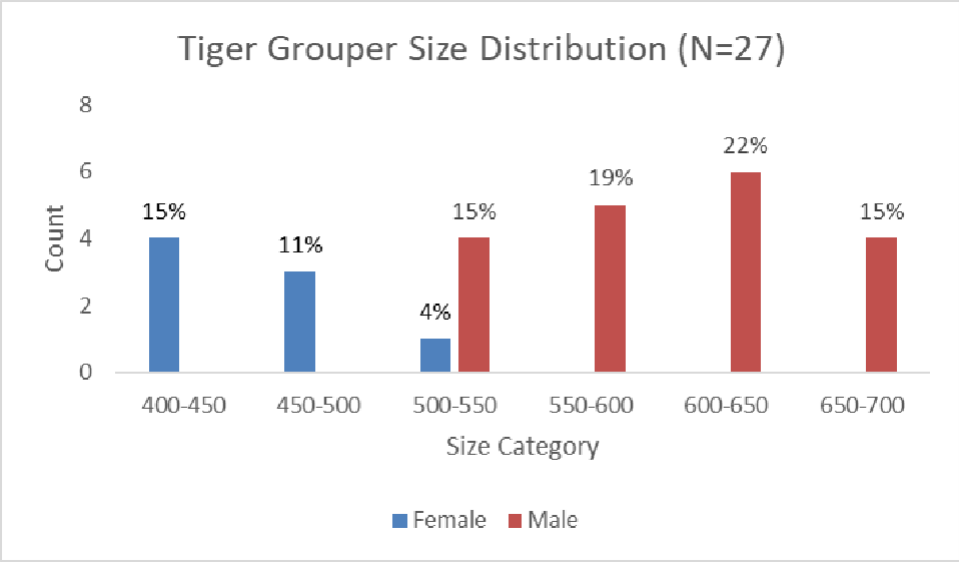


Figure 6. Size distribution of *M. tigris*measured at Northeast Point FSA in 2022. Measurements in centimetres.

2. To assist the Belize Fisheries department with fulfillment of their mandate to monitor nationally protected FSA sites

Belize Fisheries Department Staff participated in hydrophone deployment and visual survey activities at both aggregation sites in December, January,and February. While the department did not have a significant budget allocation for monitoring FSAs independently in 2021/2022, this grant allowed WCS toprovide opportunities for fisheries officers to observe and engage with the aggregations at Glover's Reeffirst hand. Fisheries Officers also noted the vast evidence of illegal fishing activities, including discarded fishing lines, discarded anchors attached to severe drope, and even a vessel that lingered in the restricted are around theFSA overnight.

Further, match funding from another project allowed WCS to supplement the fuel allocations of the Fisheries Department and its Conservation Compliance Unit, which facilitated a greater enforcement presence at Glover's Reef Atoll during the peak spawning period for Nassau Grouper. Additional fisheries officers and another enforcement vessel were stationed at WCS's research station during this time.

3. To continue WCS's hydrophone studies with experts from Puerto Rico and the US to broaden our understanding of temporal patterns of activity from critically endangered Nassau Groupers(*Epinephelus striatus*) and other aggregating fishery species at Northeast Point, a multi species FSA site.

WCS has variously partnered with collaborators from HJR Reefscaping, NOAA and CSIRO who have generously loaned our program passive acoustic recording devices (hydrophones; Fig. 7). In 2022, WCS deployed Soundtrap ST300 devices at Northeast Point and Tiger Bank to record the frequency of courtship associated sounds by both species. This is the third season of passive acoustic monitoring (2019, 2020,2022) at Tiger Bank, and the second season of passive acoustic monitoring (2021, 2022) at Northeast Point. A collaborator, Beluga Smile Productions, covered the cost of analyses of acoustic monitoring data from Northeast Point in 2021 to inform the filming of the documentary "The Secret Crown ".These

analyses only considered a daily sample period where greatest spawning activity is expected to occur (6-7pm from December 1st2020 - March 31st2021) but were able to indicate daily patterns of spawning activity during the peak spawning period from December 2020-February 2021. An initial assessment ofthe 24 hours of the fourth and fifth day after the full moon in February 2021 revealed that courtship associated sounds produced by other grouper species (*Red Hind Epinephelus guttatus*, Black Grouper *Mycteroperca bonaci*, Yellowfin Grouper *Mycteroperca venenosa*) were also audible.This supports reports of Northeast Point representing an important multi species aggregation site for groupers. The greatest number of courtship-associated sounds for Nassau Grouper were heard during the February aggregation event, followed by Marchand January.

WCS was also loaned two fish eye cameras (Fig. 8) by VRTUL for deployment at the Tiger Bank site to capture simultaneous video/audio of Tiger Grouper behaviors by synchronising video footage with hydrophone audio. This effort is significant due to its novelty; the sound production of Tiger Groupers is yet to be unambiguously recorded and documented – video footage will provide incontrovertible proof that Tiger Groupers are in fact producing the sounds recorded by hydrophones. Due to weather and other logistical restrictions, only one day of footage was obtained. The footage revealed many behaviors over the course of 10hours, including chasing and sparring. The process of cleaning the audio and synchronising it with the video footage Is yet to be undertaken.

Partners at NOAA have also volunteered further equipment towards our efforts in 2023, including a precalibrated laser array towards a second laser calliper for the team, which would allow us to measure more fish on each dive, as well as a stereo camera which would allow all fish captured in the field of view of the cameras to be measured.

Figure 7. Hydrophones and temperature logger deployed by WCS and LGL Consulting/Big Fish Initiative at Tiger Bank FSA, Glover's Reef Atoll, Belize. Credit: M. Phillips/WCS.

Figure 8. Three hundred and sixty-degree camera (360º) mounted on BRUV at Tiger Bank FSA, Glover's Reef Atoll, Belize. Credit:M. Phillips/WCS.

4. To assess the viability of the use of hydrophones for understanding movement patterns of illegal fishers to inform enforcement strategies during seasonal closure periodss

Acoustic data analyses from 2021 revealed extended periods of vessel activity within 300m of the spawning site on multiple occasions. Four days of the first aggregation period featured gear shifting “pops” and sudden changes in speed, which can be associated with fishing activity as vessels attempt to maintain position. It must be noted that in the 2020 sampling season, loss of funding due to the COVID-19 pandemic meant that neither the Fisheries Department nor WCS Belize were able to travel to these sites. In short, this report acts as proof of concept for the use of hydrophones to detect the frequency of unsanctioned vessel activity, including illegal fishing, at the restricted Northeast Point FSA and is currently being used as empirical evidence to support adaptive management efforts for better enforcement of this sensitive area.

Challenges and Lessons Learned

• Weather conditions were largely favorable for long-distance travel to the FSAs in the 2022 spawning season. In February, where opportunities were further decreased by commitments to our clients, weather played a greater role in preventing daily dives at the survey sites.

- o Time must be kept open as much as possible to permit opportunistic surveys.

• Our many collaborations incorporated new equipment into our dive operations. With a small team, it was not feasible to attempt to deploy and retrieve bulky equipment (I.e. 360o camera mounted on baited remote underwater viewing (BRUV) platform) and safely carry our laser callipers down to the dive site.

- o Full size team necessary especially as collaborations increase
- o Lift bags are a necessary investment to ease deployment and retrieval processes for bulky equipment

• In 2020, an intentional shift in the period of the monitoring effort from 3-8 days after the full moon (DAFM) to 1-5 days after the full moon caused the survey team to completely miss the Tiger Grouper aggregation at Tiger Bank, as these groupers aggregate from 5-10 DAFM. The COVID-19 pandemic disrupted plans for monitoring both aggregations in 2021. As a result, there is a twoyear gap in the Tiger Grouper data, during which time a drastic decrease in abundance occurred. It is unknown whether this change happened just prior to the pandemic or during the pandemic. This period is also associated with an increase in dissemination of fishing licenses to offset economic losses to those employed in the tourism sector.

- o This highlights the importance of the study to identify Tiger Grouper courtship associated sounds. Once identified, these sounds can be used at any FSA featuring Tiger Groupers to capture indicators of grouper presence and courtship activity using passive acoustic devices deployed before the spawning period begins.
- o Proof of concept exists in the 2021 Nassau Grouper data – the hydrophone at Northeast Point provides a baseline for the quantity of courtship activity as well as relative daily frequency despite the absence of visual surveys by research divers.
- o This decrease in abundance may reflect illegal fishing in the conservation zone of the Glovers Reef Marine Reserve. It is also possible that this aggregation has shifted to a nearby location in response to some stimulus which is not apparent.

• The absence of long-term data on annual variability in calling activity of Nassau Grouper do not allow for annual patterns to be used to predict timing of the aggregation in future years, or to assess changes in the frequency of call types to infer patterns of behavior.

- o It is important for us to continue annual monitoring at Northeast Point to contribute to this emerging field of study.

• Hydrophone data did allow for suspicious vessel activity to be identified during the previous season but does not allow immediate response by enforcement agencies.

- o It will be key for WCS to continue efforts to supplement constant enforcement presence by Belize Fisheries Department and the Coast Guard during peak spawning periods for Nassau Grouper
- o Dedicated education and outreach efforts may be an area where WCS may be able to support top-down enforcement by engaging the issue of demand for supply of Nassau Grouper during the closed season. The CFMC/WECAFC/OSPESCA/CRFM Working Group on Fish Spawning Aggregations has created a regional communications strategy ("Recovering Big Fish") which provides guidance and regional context for generating content which raises awareness and sensitizes consumers and producers about the importance of FSA conservation. Two short films were released in 2021 - "Nassau Grouper Against the Clock" (https://youtu.be/45_OIs2jJ8I) and "F2F Advice: Fish Smart" (https://youtu.be/M87V4yEBENM) - and WCS has used this content on its social media as part of community sensitisation efforts in 2021 and 2022.

• Hydrophone data collection is ongoing, but WCS lacks in-house capacity to analyse this data, which can be very costly. There is also no capacity in-country.

    o WCS may need to seek funding to invest in capacity building for interpretation of passive acoustic data so that these activities can be covered by staff time under one of the organisations of the Belize National Spawning Aggregation Working Group. This might be less expensive in the long term than paying for it to be done externally.

Call for proposals

Short-term Small Grants
- year 2021-

Finalreport

Name of the organization:	**Ocean** Spirits Inc.
Name of the project:	**Biodiversity** Inventories of Remote Uninhabited Grenadine Islands

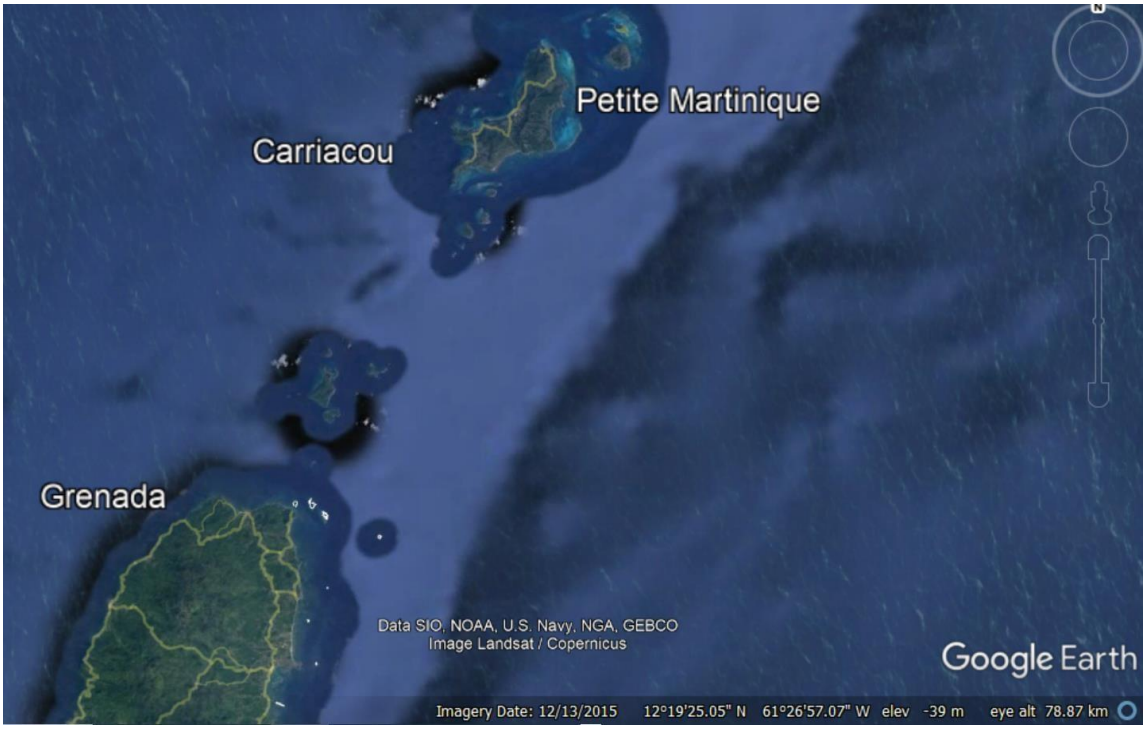


Figure1.Map of study area (Google Earth)

Total budget of the project:9,310 Euro
SPAW-RAC grant:6,000 Euro
Time frame for implementation: September 2021 – January 2022

This report is intended to provide information on the organization(s) involved, the project, the concerned species and sites, the threats to their conservation, the methodology developed within the framework of the project, its implementation, the objectives sought, the results obtained, and the perspectives for the future, in order to enlighten the Parties on the interest of such a project for the achievement of the objectives of the SPAW Protocol.

1. Your organization

Name / Title	Ocean Spirits Inc
Category (public entity, NGO, laboratory, private company, managers,...)	NGO
Is the organization already in contact with national or international networks?	
If yes, which ones?	• WIDECAST (Wider Caribbean Sea Turtle Conservation Network) • CANARI

	• BirdsCaribbean • Environmental Protection in the Caribbean (EPIC) and the Grenadines Seabird Guardians • Government of Grenada
Address	P.O.BOX 1373, Grand Anse, St George, Grenada
Phone number	+1473-537-2512
Website	www.oceanspirits.org
Email address	kate@oceanspirits.org
Legal representative (person designated in the legal status)	N/A
Phone number of the legal representative	N/A
Email address of the legal representative	N/A
Name of the person responsible for this project (if different from the legal representative)	Kate Charles (Ocean Spirits) Co-investigator: Juliana Coffey (Birds of the Transboundary Grenadines)
Phone number of the person responsible for this project	+1473-537-2512
Email address of the person responsible for this project	kate@oceanspirits.org / juliana@grenadinesbirds.com
Indicative annual budget of the organization	US$75,000
Staff means (number of staff members, volunteers… etc)	**Ocean Spirits** – a team consisting of marine biologists, conservationists, a sea turtle veterinarian, fisherfolk and community members committed to carrying out in water and beach surveys for nesting turtles, foraging turtles and providing community outreach, summer camps and environmental science clubs. In non-Covid conditions: 1 full time staff member, 6 seasonal field workers, 2 interns, 20-30 international volunteers annually and 100+ vet students from local School of Veterinary Medicine.

Birds of the Transboundary Grenadines – A research and outreach initiative and collaboration to document avian biodiversity / distribution and local ecological knowledge (LEK) throughout the Grenadines archipelago; team consists of an ornithologist, ethnobiologist, cartographer, graphic designer, tour guide and boat captain.

Kipaji Development Initiative Inc. - Kipaji Development Initiative is a non-profit, community development organization. Kipaji focuses on activities that tackle climate change, and that will contribute to the preservation of heritage, the conservation of natural spaces and species, the

protection of island biodiversity, and the building of local capacity to do all of these things. Based primarily on Carriacou, Grenada, members have been trained and are proficient in drone operations.

Preferred area for intervention (country(ies), region...)	The Grenadines archipelago; a transboundary biodiversity hotspot located on the Grenada Bank, divided between the nations of Grenada and St. Vincent and the Grenadines (SVG)

Additional contextualizing elements you wish to notify to SPAW-RAC or to the SPAW protocol signatory countries:
This project sought to conduct activities to address data deficiency of uninhabited offshore islands for the multi-year CANARI National Ecosystem Assessment (NEA) being conducted for Grenada and the Grenadines. Both co-investigators for this project are two of the Contributing Lead Authors (CLAs) for the chapter « Ecosystems Status and Trends » focused on the offshore islands.
The project objectives and activities additionally continued to build upon activities funded by SPAW-RAC conducted between September 2020-January 2021, the results of which are detailed in the report «Mobilizing citizen scientists for biodiversity monitoring and mitigation of threats at remote Grenadine Islands » (Charles et al. 2021).

2. Your project

Name of the project	Biodiversity Inventories of Remote Uninhabited Grenadine Islands
Time frame for implementation	Original: September 2021 – 31 December 2021 Actual: September 2021-January 2022 This timeframe was selected in particular due to it being outside of the peak nesting season for turtles (March – August) and seabirds (April to August), which prevents significant and unnecessary disturbance to species of concern during sensitive times. Drones and human presence at seabird colonies cause significant disturbance to nesting birds and it is therefore critical that these activities were conducted outside of the peak breeding season. Note that the timeframe of this project was adjusted due to a covid-19 outbreak in Grenada and the Grenadines in September/October 2021, causing interruptions to local, inter-island and international travel, as well as size restrictions related to field crew and group activities. Main stages: 1. Planning and logistics coordination - Original - September 2021; Actual – September-November 2021 2. Field data collection – Original - October 2021; Actual – November-December 2021 3. Interpretation of data, verification of species with regional subject experts and cartographic analysis of aerial drone footage – Original - November 2021; Actual – December-February 2022 4. Final report writing and incorporation of data into the Grenada National Ecosystem Assessment (NEA) – Original - December 2021; Actual – January-March 2022
Targeted specie(s)	Species specifically benefitting from this project: See Table 1 at end of this report.

Site(s) location	The Grenadines archipelago: A transboundary biodiversity hotspot located on the Grenada Bank, divided between the nations of Grenada and St. Vincent and the Grenadines (SVG), covering ten human-inhabited islands, and 89 remote islands and cays with no permanent habitation. Given the remote setting of the majority of these islands, fisherfolk are typically the only regular visitors year-round.
Major threats	Despite the presence of endangered species and significant populations of breeding seabirds and wildlife at these islands, they are highly threatened, due primarily to illegal harvesting, introduced mammals, periodic vegetation control fires and development/disturbance. While harvesting of seabirds is prohibited year-round, Grenada allows a seasonal regulated harvest of sea turtles. Introduced mammal populations are present in many sensitive areas, including both predatory (e.g., rodents and cats) and herbivory species (e.g., goats and sheep). Marine debris is present on all remote islands, and in some cases a major concern. All the turtle species and many of the seabird species included in this proposal have been documented ingesting plastic. Seabird species additionally interact with marine debris at-sea and on land, and use locally sourced marine litter in construction of nests (recently documented in the Grenadines in 2019 and 2020). Lack of biodiversity assessments at offshore islands hinder conservation and management activities and understanding of the true scale of impact on native species. In order to preserve this biodiversity, knowledge of the presence and distribution of sensitive species is much needed, to understand cumulative impacts of these threats at offshore islands.

Methodology developed/utilized within the framework of this project	1. Reptile diversity assessments • Rapid assessment method • Photo documentation 2. Terrestrial invertebrate (insect) assessments • Rapid assessment method • Photo documentation 3. Avian diversity assessments • Point counts • Incidentals 4. Marine litter • Aerial drone imagery surveys • Beach transect surveys • Classification of marine litter through collection, sorting, measurements, weight and type class 5. Island habitat and vegetation communities • Aerial drone imagery • Imagery from vantage points
Update on the implementation, progress and possible issues	**Progress – project completed. Write-up of results within sub-categories underway and currently being incorporated into the Grenada National Ecosystem Assessment (NEA) second draft. A subsequent draft of the NEA will allow for additional information from this project to be incorporated.** **Possible Issues** • Reduction in awarded amount versus amount requested meant that several

consultant / contractor fees were either reduced, became in-kind contributions and/or were covered by the applicants.

- • Covid-19 – Continuation of related restrictions reduced field crew representation / capacity and altered the timing of the project activities slightly.
- • No overnight field activities were conducted due to the aforementioned reduction in grant awarded and crew availability due to covid-19 restrictions.

Objectives sought and/or results obtained

Objectives sought.

1. Reptile diversity assessments (rapid assessment method and photo documentation)
2. Terrestrial invertebrate (insect) assessments (rapid assessment method and photo documentation)
3. Avian diversity assessments (point counts and incidentals)
4. Aerial drone imagery of island habitat and vegetation communities
5. Aerial drone imagery of marine litter accumulations
6. Marine litter beach debris surveys and removal from offshore islands
7. Incorporate information on biodiversity status and threats into national planning (i.e. National Ecosystem Assessment and Draft Marine Protected Area Management Plans)

Objectives completed / Results

1. Reptile diversity assessments (rapid assessment method and photo documentation)

    8. Islands accessed: 7 (+1 mangroves Tyrrel Bay, Carriacou)
    9. Results – Reptile surveys benefited from long range, high-quality cameras that enabled documentation from a distance without disturbing individuals. Several new island records have been

documented to enhance knowledge of previously unknown ranges / presence. Individual specimens documented were primarily restricted-range, regional endemics (Grenada Bank) and knowledge of their distribution can contribute significantly to their conservation.

2. Terrestrial invertebrate (insect) assessments (rapid assessment method and photo documentation)

- Islands accessed – 7

Photos were taken of specimens for identification.

3. Avian diversity assessments (point counts and incidentals)

- Number of islands: 19
- Breeding and non-breeding seabird surveys (Islands surveyed: Grenada (main jetty), Upper Rock, Lee Rock, Ronde Island, Diamond Rock, Large Island, Mabouya, Sisters Rocks, Sandy Island, Jack A Dan, Mushroom (Cola), Little Mel, White Island, Saline Island, Large / Laidlarge, Bonaparte Rocks, London Bridge, Rose Rock, Petit Cola)
- For notable highlights, please refer to the interim report provided.

4. Aerial drone imagery of island habitat and vegetation communities

Nineteen remote islands were photographed from aerial drone imagery or from island vantage points enabling views of remote and inaccessible areas

5. Aerial drone imagery of marine litter accumulations

- Beaches surveyed : 10 ; Total drone flights = 15 ; Total images for stitching (all islands) : 821

6. Marine litter beach debris surveys and removal from offshore islands

- Marine anthropogenic litter surveys - Islands accessed = 7; Sites were assessed both by foot and by drone flights;

removal of trash along 25m transects was performed at sites surveyed

7. Incorporate information on biodiversity status and threats into national planning
    - A second draft of the NEA was submitted end of January 2022. Information from this project was incorporated into the second draft (Chapter 2 – Status of Ecosystems), with additional information available for subsequent drafts. Information will additionally be available for insertion into draft management plans for one existing and several proposed marine protected areas (MPAs) in the study area. Surveys in this study were designed so that repeat surveys are possible by other researchers and organizations in the future for comparison and/or compiling additional information.
8. Invasive species surveys
    - Islands observed from land or water = 19; No new records, but updated status for several known existing populations, such as Diamond Rock (Goats), Mabouya (Goats), Saline Island (Sheep), White Island (Dog), Sandy Island (Rat nests in palm trees).

How did the results and outcomes of your project have in the past contributed, are contributing or will contribute in the future, to meet the needs of the agreements of your country to the SPAW Protocol?	The overall goal of this project was to collect baseline data on biodiversity and threats to wildlife in the Grenada Grenadines which governmental departments and non-governmental agencies (NGOs) can use to guide and implement best practices and commitment to international conservation agreements (e.g., SPAW Protocol / Cartagena Convention, Sustainable Development Goals, etc.). This project in particular builds upon previous efforts by project partners to assess the regional and global importance of biodiversity in the Grenadines. Previous efforts by the project partners have involved conducting seabird and sea turtle surveys, invasive species surveys, BioBlitz biodiversity surveys, establishing photo points for habitat monitoring and marine litter removal from offshore islands. Data built up by the partners over the years strongly suggests that islands in the Grenadines (including several in this study) meet the criteria for Key Biodiversity Areas

(KBAs), and the partners have engaged BirdLife International in discussions to contribute this data to designate additional Important Bird Areas (IBAs) and Key Biodiversity Areas (KBAs).
Through implementation of recommendations and incorporation of collected data into management programs, the goal is to ensure healthy populations of seabirds, sea turtles, regionally endemic reptiles, and other sensitive species are protected and managed appropriately. This includes mitigating the factors that most threaten wildlife at the sites, such as invasive species and illegal harvesting. The timing of this particular project has enabled the opportunity for this data to be incorporated into the CANARI Grenada National Ecosystem Assessment (NEA) which is currently underway and will provide the most current and comprehensive status of ecosystems in the nation once finalized. This project was instrumental for alleviating some of the data deficiencies for the offshore, uninhabited islands in the Grenadines, which have global significance for biodiversity, such as with their seabird colonies, nesting sea turtles, and regionally endemic reptiles. In addition, one established and several proposed marine protected areas (MPAs) overlap with the study area, and this information will be available to incorporate into current and draft management plans for the MPAs.

Outcomes and lessons learned	Outcomes • Understanding of the type and distribution of marine litter at offshore islands, as well as insight into the origins (e.g., through labels / brands) • New island records of regionally endemic reptile species in the Grenada Grenadines. • Enhanced knowledge of seabird nesting timing and distribution at regionally/globally important colonies; new island confirmed for Red-billed Tropicbird nesting. • Insight into contemporary habitat classification and types at offshore islands. The most recent assessment at these islands was published in 1952, and this information will greatly contribute to knowledge of current land-use activities and status of ecosystems. • Data deficiency of offshore islands alleviated to a certain extent by conducting multiple simultaneous assessments at offshore islands. • Mobilizing and training local citizen scientists to ensure long-term sustainability of research and conservation activities in this remote, understudied region. Lessons learned • A major lesson learned during this project through uncontrollable circumstances is how to be adaptive with project plans under the fluctuating covid travel and group gathering restrictions imposed both locally and internationally.

Perspectives, renewal, evolution of such a project	Recommendations for future research • Conduct seabird breeding assessments / censuses at the offshore islands during peak breeding season. Thus far, SPAW-RAC funding has supported activities occurring outside of the major breeding season to avoid disturbance to nesting seabirds. However, as the most prominent type of wildlife at the offshore islands during periods throughout the year, updated and accurate inventories of species diversity and abundance is recommended. This is especially important due to the capacity of seabird colonies to influence terrestrial vegetation type and distribution, which in turn influences other terrestrial wildlife communities such as reptiles, invertebrates and other bird species. While citizen science data exists for some of these areas, an updated systematic census is much needed. • Continue to conduct clean-ups at offshore islands. Marine litter is collected at the inhabited islands, but continues to accrue unabated at offshore islands where sensitive wildlife is most exposed and vulnerable to this threat. This global and pervasive threat requires more attention in remote areas where native biodiversity is most vulnerable. • Continue to take a community-science approach to research, outreach and conservation. A community-science approach is ideal in the Grenadines where there are numerous islands but limited enforcement and monitoring capacity and resources. Such an approach is not only practical but builds capacity for long-term effectiveness and conservation success. • Invasive species mitigation. During this project and the previously funded SPAW-RAC project, invasive species (rodents, etc.) were detected at offshore islands. Invasive species are a primary threat to the survival of sea turtle hatchlings, regionally endemic terrestrial reptiles, and seabird eggs/chicks. Furthermore, they damage critical habitat that supports native biodiversity. Mitigating the

effects of invasive species, such as through eradication, would have long-term conservation benefits for numerous species.

Additional contextualizing elements you wish to notify to SPAW-RAC or to the SPAW protocol signatory countries: N/A
Please annex any technical report, communication tools, pictures, maps etc you feel to be useful for the understanding of your project.
• Please see attached interim report (final field report) completed January 2022.

• Data incorporation to the CANARI Grenada National Ecosystem Assessment (NEA) is ongoing and will be available upon the NEA being publicly available.

4. Assessment of the call for proposals

How did you hear about this call?	Through WIDECAST notification emails.
Were the terms of references for this call for proposals clear enought?	Yes the proposal requirements were clear.
Have you encountered any difficulties regarding the preparation of your project, the submission process and then its implementation?	We found the preparation and submission process straight forward, Implementation was hindered by a covid-19 outbreak in the region during this project's timeline, affecting both local and international travel, as well as group activity restrictions. However, an extension was happily granted to allow us to complete our project.
Were the discussions with SPAW-RAC helpful?	Communications were efficient and we found SPAW-RAC to be quick to respond.

How this grant has been beneficial for your organization, territory or country?	This grant has given us an excellent opportunity to contribute to knowledge of the biodiversity and threats to wildlife and protected areas throughout the Grenada's offshore islands. Data collected as a result of this project will guide us in future research and conservation efforts and allow us to prepare recommendations to government departments and non-governmental agencies responsible for protecting nesting seabirds, sea turtles, regionally endemic reptiles, and their offshore island habitats. Furthermore, insight into several major threats, such as marine litter and invasive species will assist with mitigating these factors that affect the entire nation. Some of these species, such as the seabirds and sea turtles, are transboundary and wide-ranging, meaning that protection of their habitats in Grenada and mitigation of threats can have a positive outcome beyond national borders. This data will be incorporated into the CANARI National Ecosystem Assessment (NEA) of Grenada currently being conducted, and contributes to implementation of recommendations identified in EPIC's « Community-based Conservation Management Plan for the Seabirds of the Grenadines Archipelago » for Grenada and Saint Vincent and the Grenadines. Furthermore, this data is critical for implementation of the Sustainable Development Goals (SDGs), such as by identifying threats to human health, livelihoods and food security through invasive species, and for adhering to the SPAW protocol. On an organizational level, this grant has allowed participating organizations to emerge as local leaders in the research and conservation of offshore islands in the Grenadines. In addition, it has strengthened the partnership between participating organizations and individuals, and has allowed for enhanced experience, expertise and skills.
What is your general impression on this call?	The call and subsequent award of funding was critical to continue research and conservation efforts at a time when many funding

	agencies are holding onto funds or postponing due to Covid pandemic uncertainty and restrictions.
Will you propose new projects to such a call?	Yes, we will certainly apply to SPAW-RAC again to support future projects.

5. Annexes

• Please see attached interim report (final field report) completed January 2022.

• Data incorporation to the CANARI Grenada National Ecosystem Assessment (NEA) is ongoing and will be available upon the NEA being publicly available.

Table 1. Species benefiting from this project. Note that this project also focused on regionally endemic terrestrial reptiles, invertebrates, and habitats that are not listed in the below table.

Species (common name)	Status in SVG and GRE	SPAW	USFWS	Bradley and Norton 2009[1]
Hawksbill Turtle	Nesting	Critically Endangered		
Green Turtle	Nesting	Endangered		
Leatherback Turtle	Nesting	Vulnerable		
Loggerhead Turtle	Foraging	Vulnerable		
Roseate Tern	Nesting	Not evaluated	Threatened	Caribbean At-Risk Species
Audubon's Shearwater	Nesting	Least Concern	Endangered	Caribbean At-Risk Species
White-tailed Tropicbird	Nesting			Caribbean At-Risk Species
Masked Booby	Nesting			Caribbean At-Risk Species
Brown Booby	Nesting			Caribbean At-Risk Species
Magnificent Frigatebird	Nesting			Caribbean At-Risk Species
Sooty Tern	Nesting			Caribbean At-Risk Species
Least Tern	Non-breeding resident	Not evaluated	Endangered	Caribbean At-Risk Species
Brown Pelican	Non-breeding resident		Threatened	Caribbean At-Risk Species
Common Tern	Non-breeding resident			Caribbean At-Risk Species
Sandwich Tern	Non-breeding resident			Caribbean At-Risk Species
Royal Tern	Non-breeding resident			Caribbean At-Risk Species

[1] Bradley, P. and R. Norton. 2009. Status of Caribbean seabirds. Pp. 270–284 *in*: An inventory of breeding seabirds in the Caribbean (P. Bradley and R. Norton eds.). University Press of Florida, Gainesville.

Category	Planned Euro	SPAW Actual Euro	$ Other / In-Kind	Notes
Airfare and Fees	0	0	1048.8	Project researcher cash contribution of airfare and fees
Boat Rental	2360.4	2700	0	Additional funds for travel and use of stationary floating platform that served as a mobile lab for processing collected items/samples.
Accoms	462	462	92.17	Project researcher cash contribution in-transit hotel accoms.
Food/Drink	2049.6	806.4	0	Covid restrictions prevented full field crew
Stipend for Drone Pilot	352.8	0	403.2	Local drone pilot equipment broken; Project Researcher provided in-kind drone services and drone equipment (drone, SD cards, USBs, etc.)
Containers	50.4	0	50.4	Local partners provided containers and sample vials for invertebrates
Nets	50.4	0	0	No nets used as no overnights conducted due to limited field crew
Nikon Macro Lens	420	41.09	1410	Due to reduction in requested funds, alternative lens sourced; Project Researcher provided digital SLR with zoom lenses and point and shoot cameras.
Tarpaulin	42	0	0	No tarpaulin used as no overnights conducted due to limited crew.
Travel (Ferry, Taxis, Mooring Fees)	84	124.05	0	Local transport only; other travel fees covered by Project Researcher.
Handheld radios	168	0	0	No handheld radios used as smaller field crew deployed due to local covid situation and crew conducted activities together without need for long-distance communication.
Beach litter clean-up materials	168	21	0	Limited materials required due to reduced crew size.
Cartography / Georeferencing	420	840	0	840 Euro to be paid out from SPAW funds on receipt of final disbursement for drone photo processing, cartography and georeferencing services by project partner
Coordination, Admin, Data Processing	1680	814	1260	Due to reduction in provided funds, Project Researcher coordinated and performed admin services primarily in-kind; 510 Euro to be paid out from SPAW funds upon receipt of final disbursement for data entry/processing.
Final Report	840	0	840	Project Researcher provided in-kind services for completion of final report and associated write-ups.
Consumables (e.g. stationary, etc.)	126	128.81	25	In-kind zip ties, rope, etc.
Shipping / Customs Fees	168	63.44	70.5	In-kind baggage fee for transport
Totals	9441.6	6000.79	5200.07	11200.86

Appendix 1 – Background and rationale of project from initial proposal.

The Caribbean Natural Resources Institute (CANARI) is working with the Government of Grenada to execute a National Ecosystem Assessment (NEA) of the tri-island state of Grenada, Carriacou and Petite Martinique. This project is part of a global initiative on supporting decision making and building capacity to support the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) through national ecosystem assessments. Many of the offshore islands however, have not been inventoried for their biodiversity, and recent discoveries of endemics on other Grenadine islands (e.g., Gonatodes daudini) could reveal additional endemic species, regionally endemic species and/or relict populations formerly more widespread, supporting the need for biodiversity and habitat assessments at these remote islands. Moreover, due to the infrequency of visits to these islands by researchers, the status of biodiversity, ecosystem health and threats is poorly understood. Proportionally, island ecosystems support more biodiversity than their respective mainlands, and as such are a focus for global biodiversity preservation (Rendell et al. 2014). There are more than 35 uninhabited islands, islets, cays and rocks in Grenada, including satellites of mainland Grenada and Grenadine islands ranging in size from <1-265ha. All of these islands are found on the relatively shallow Grenada Bank, the majority of which are considered part of the transboundary Grenadines archipelago shared between Grenada and St. Vincent and the Grenadines, recognized as a biodiversity hotspot (e.g., Coffey and Collier 2020). Island biogeography theory supports the protection of entire islands.

More than 120 species of breeding, non-breeding resident, migratory, restricted-range and regionally endemic birds have been recorded at offshore Grenadine islands (Coffey and Ollivierre 2019), five bat species (Genoways et al. 2010), and a variety of regionally endemic reptile species (e.g., Powell and Henderson 2012). Islands on the Grenada Bank harbour several endemic herpetofauna species, such as the recently discovered Union Island Gecko (Gonatodes daudini), the Grenada Bank Tree Boa (Corallus grenadensis), anole species (Anolis aeneus and Anolis richardii) and the IUCN Vulnerable Grenadines Sphaero (Sphaerodactylus kirbyi). These Grenadine islands are key nesting areas for three species of sea turtles, including Green (SPAW-EN), Hawksbill (SPAW-CR) and Leatherback (SPAW-VU), with Loggerhead (SPAW-VU) present as a foraging species. The critically endangered Hawksbill are reported to use beaches on nearly all Grenadine islands. Grenada hosts the 3rd largest nesting population of Leatherbacks in the region. The transboundary Grenadines host more than 54,000 breeding pairs of seabirds, with 3 globally important and 18 regionally important colonies. Although many of these sites in the Saint Vincent Grenadines have been declared as national wildlife reserves, all of the major colonies in the Grenada Grenadines remain unprotected. While 12 breeding seabird species are present, 7 of these are listed as Caribbean At-Risk Species (Bradley and Norton 2009). Two seabird species, the Roseate Tern and the Least Tern are listed as SPAW “Not evaluated”, with the former as a breeding resident at many remote islands. The unique concentration of globally and regionally significant seabird colonies makes it a vital conservation zone for seabirds, crucial to rebuilding declining and decimated Caribbean populations. Avian communities will be surveyed by point counts with incidental sightings recorded.

Despite the presence of endangered species and significant populations of breeding seabirds, wildlife at these islands remain highly threatened, due primarily to illegal harvesting, introduced mammals, marine litter, periodic vegetation control fires and development/disturbance. The activities outlined in this proposal will collect data critical to the Grenada National Ecosystem Assessment (NEA), specifically biodiversity and threat status at offshore uninhabited islands, for which data is currently limited.
In 2020, SPAW-RAC funding allowed for investigations into invasive species presence at offshore

Grenadine islands. This study revealed that many of the offshore uninhabited islands have thriving populations of rodents (Brown Rat, Black Rat and Mouse) and opossum (Didelphis insularis), which are known to significantly predate native species of birds, reptiles and invertebrates and alter terrestrial vegetation communities. The effects of these introduced (invasive) mammals can lead to reduced species richness and abundance, up to and including extirpations. This project seeks to document biodiversity at key sites that are especially vulnerable to direct and indirect effects of non-native predators on islands.
The recently described regional endemic Grenadines Pink Rhino Iguana (Iguana iguana insularis) (Breuil et al. 2019) subspecies has been confirmed present on Mabouya Island in 2020 (Charles et al. 2021), but is likely present on many additional offshore islands. Iguana hunting is permitted seasonally, and it is unknown the extent to which this subspecies is harvested. The discovery of this subspecies was made possible through surveys on several Grenadine islands through SPAW-RAC funding in 2020, which added additional species to island lists where they were not documented prior, or on islands that had not previously been surveyed. Information on invertebrate (e.g., insects) diversity at offshore Grenadine islands is scant, and no recent or thorough inventories have been conducted (e.g., Clark 1905; Woodruff et al. 1998). A yet to be identified wood borer insect species was photographed on an offshore Grenadine Island in 2021 (M. Ivie pers. comm.). Insects are critically important components of ecosystem functioning, given their role as herbivores, detritivores, predators, and pollinators (Hauser and Riede 2015), yet almost nothing is known about their diversity at offshore Grenadine islands. They are also highly vulnerable to the introduced predator species (i.e., rats, mice and opossum) detected at offshore islands in 2020-21. It is therefore imperative to collect data on their diversity, which could boost conservation value for numerous islands. Both diurnal and nocturnal assessments will be conducted. Methods will follow rapid assessment and photographic verification.

The offshore islands are considered to be substantially contaminated with marine litter (e.g., Lowrie et al. 2012; Schmuck et al. 2017; Coffey and Collier 2020; Coffey, submitted), which until 2020 had not been the focus of any clean-up efforts (Charles et al. 2021). Seabird and sea turtle species at offshore islands in the Grenadines have been observed nesting amongst, entangled in, and killed through interactions with marine litter encountered at sea and on land (e.g., Coffey, submitted). Both types of animals are known to ingest marine litter leading to starvation, poor body condition, exposure to contaminants and mortality. In addition, there is recent evidence in the Grenadines of seabirds intentionally incorporating marine litter into nests (Coffey, submitted). The prevention of marine litter at offshore islands is complex due to the non-point source nature of items found. No data on daily accumulation of marine litter exists for the offshore islands. Some trash is discarded directly on offshore islands, such as during picnics, BBQs and day trips. In 2020, several clean-ups on islands were made possible through SPAW-RAC funding – the first time that coastal clean-ups have been conducted at offshore uninhabited islands. More than 600lbs of waste was removed, with a total of 4424 items. This proposal seeks to conduct beach litter surveys to determine the predominant composition of items (e.g., fishing gear, plastic bottles, clothing, etc.) and origin (where possible, by label). Daily accumulation rates will be possible at islands with biodiversity assessments overnight. Aerial drone imagery will reveal accumulations of marine litter prior to collection. Beach debris will be collected from several islands not targeted in 2020.

Biodiversity Inventories of Remote Uninhabited Grenadine Islands

Progress report for Ocean Spirits SPAW-RAC Project

Report prepared by: Juliana Coffey, Birds of the Transboundary Grenadines

info@grenadinesbirds.com

December 2021

Overview:

Core field and laboratory activities outlined in the project "Biodiversity Inventories of Remote Uninhabited Grenadine Islands" project took place between 2-10 December. Field activities and logistics

Beach Marine Litter Surveys

- Islands: 7
- Number of beaches: 9
- Purpose: To conduct beach litter surveys to determine the predominant composition of items (e.g. fishing gear, plastic bottles, clothing, etc.) and origin (where possible, by label).
- Method: Marine litter surveys were conducted along 25 meter transects at the high tide line on beaches of offshore islands with varying orientations to the sea and substrates. All anthropogenic litter within 1m of the transect line was documented and collected where possible (i.e. not too heavy/big, buried or entangled to transport). All items >1cm collected along a 25m transect were removed from the island and taken back to mainland Carriacou for classification, measurements (length/width and weight), sorting and proper disposal. Items were measured with a standard measuring tape and various sizes of Pesola scales.
- Beaches surveyed: Grenada (Sauteurs x1), Ronde Island (x1), White Island (x2), Mabouya (x1), Sandy Island (x1), Jack A Dan (x2), Saline Island (x1)
- Total individual pieces collected: **Over 1200 individual pieces** 1cm+, ranging from fragments and strands to identifiable items of size. Weight to be calculated during data processing.

Figure 4-8. Marine litter accumulations, beach transect surveys, collection and processing of collected items (J. Coffey)

Reptile Surveys

- Islands Accessed: **7 (+1 mangroves Tyrrel Bay, Carriacou)**
- Purpose – To document reptile presence and diversity at offshore islands to enhance knowledge of presence and distribution throughout the remote, uninhabited islands.
- Methods – Rapid assessment and photo documentation.
- Results – Reptile surveys benefited from long range, high-quality cameras that enabled documentation from a distance without disturbing individuals. Initial results show that several new island records have been documented to enhance knowledge of previously unknown ranges / presence. Individual specimens documented are primarily restricted-range, regional endemics (Grenada Bank) and knowledge of their distribution can contribute significantly to their conservation.

Figure 9-14. Reptile diversity at offshore islands (J. Coffey)

Terrestrial Invertebrates

- Islands – 7
- Purpose – To document invertebrate species at offshore islands opportunistically and using pitfall traps.
- Methods – Five pitfall traps were set and an assortment of bait was trialed. Pitfall traps were only set on islands where time allowed due to the timing required for additional project activities with reduced field crew. Photo documentation using a macro lens was utilized where

possible for both specimens caught in pitfall traps as well as encountered incidentally, with specimens being temporarily captured for photos unless already stationary.

- Results – Photos were taken of specimens for identification.

Figure 21-26. Avian diversity assessments at offshore islands (J. Coffey)

Invasive species surveys

- Islands – **19**
- Purpose – To document new and update status of existing non-native species at offshore islands through visual observation.
- Methods - Visual sightings of non-native mammals on uninhabited islands were noted throughout the trip. In addition, two camera traps and baited tracking tunnels were placed on Mabouya Island for two nights.
- Results: No new records, but updated status for several known existing populations, such as Diamond Rock (Goats), Mabouya (Goats), Saline Island (Sheep), White Island (Dog), Sandy Island (Rat nests in palm trees).

Figure 27-29. Non-native mammal presence at offshore islands (Goats on Mabouya, sheep on Saline Island and rat nests on Sandy Island) (J. Coffey).

Aerial Drone Imagery of Island Habitat and Vegetative Communities

- Islands – **19**
- Purpose – To document island habitat and vegetative communities of remote islands using

  - Insects
    - Individual images from islands to be sent to Dr. Michael Ivie (Montana Entomology Collection) and other regional experts for identification.
  - Avian diversity assessments
    - Add results to eBird and regional databases
  - Invasive species presence
    - Add results to regional (Grenadines-wide) database maintained by J. Coffey (Coffey and Collier 2021; Charles et al. 2021)
  - Aerial imagery of island habitat and vegetative communities
    - Classification of island habitat and vegetative communities

- Report writing
  - General mapping of project activities and sites
  - Results from data analysis and information collected
  - Summary of activities and future recommendations

Future Activities and Application of Data

- Incorporate collected information into the Grenada National Ecosystem Assessment (NEA). A second draft of the NEA is to be submitted January 29, 2022. Where appropriate, information from this project will be incorporated into the second draft (Chapter 2 – Status of Ecosystems), with additional information available for subsequent drafts upon data processing and analysis. Information will additionally be available for insertion into draft management plans for one existing and several proposed marine protected areas (MPAs) in the study area.
- Surveys in this study were designed so that repeat surveys are possible by other researchers and organizations in the future for comparison and/or compiling additional information.

  - Reptiles
    - Individual images from islands to be sent to Dr. Robert Henderson for verification of specimens, confirmation of new island records and addition to regional lists maintained by R. Henderson.

Association "Mon École, Ma Baleine"
juin 2022

Mon École Ma Baleine
JE PROTÈGE LES CÉTACÉS

Compte rendu de demande de subvention à Car Spaw pour la sensibilisation et la réalisation d'outils pédagogiques pour la protection des cétacés de la Caraïbe.

Montant du projet : 9 710 €

Association loi 1901 enregistrée en préfecture de Pointe à Pitre sous le n° W9G2001372
SIRET N° 533 005 971 00015
Siège social : rue Hégésippe Légitimus –
Beauport – 97117 PORT-LOUIS/ GUADELOUPE
contact.monecolemabaleine@gmail.com
0690 71 54 81
Site Internet : www.monecolemabaleine.org

Bilan rédigée par Nelly Pélisson et Julie Mellinger

I. Le Projet :

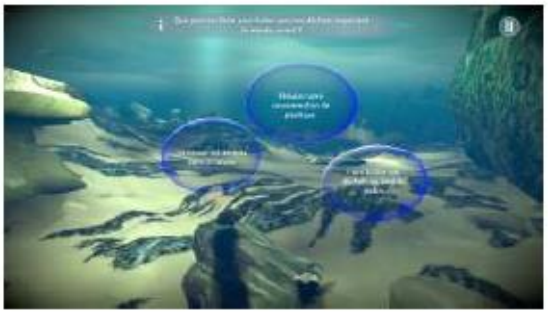
▪ Création d'un 7 ème jeu 3D :

Pour cette année scolaire 2021 - 2022 l'association a voulu rajouter un 7 ème jeu au projet « Jojo sous l'eau ». Ce 7 ème jeu, appelé Écolo quiz, est orienté sur :

- les menaces qui pèsent sur les océans et qui ont donc un impact sur les cétacés
- une réflexion sur la façon de réduire leur impact dans nos choix au quotidien.

Pour réaliser ce jeu, MEMB a formé plusieurs classes sur la thématique du Grand dauphin et suite à ces interventions, les élèves ont participé à la réflexion sur les différentes thématiques qui devaient être abordées selon eux dans ce jeu. C'est ainsi qu'il leur a paru important de parler des filets dérivants, des déchets, de la crème solaire etc.

Nous avons voulu que ce jeu apporte des connaissances sur les différentes menaces mais aussi qu'il apporte des solutions. C'est pourquoi chaque question portant sur une menace est suivie d'une question de réflexion pour réduire son impact sur l'environnement.



Ce quiz est bien entendu traduit en 3 langues (français, anglais et espagnol).
Pour réaliser ce jeu nous avons donc été entourés de programmeurs informatiques, de bénévoles, d'enseignants et d'élèves, d'une salariée animatrice et biologiste et d'une personne en service civique.

Mon Ecole Ma Baleine
Publié par Memb Bureau · 25 novembre 2021 ·

Voici un aperçu de comment nous travaillons sur le 7ème jeu !

Cette courte vidéo est tirée d'une réunion que nous avons faites avec les développeurs Olivier et Julien, et le CAR SPAW.

Vous pouvez donc voir le making-off du 7ème jeu, pour vous donner l'eau à la bouche en attendant sa sortie officielle !

Bon visionnage

308
Personnes touchées

33
Interactions

Booster la publication

La plupart des enfants jouent sur des jeux vidéo. Mais comment faire des choix sur les animaux, le circuit qu'ils vont faire, les voies à choisir ... Tout ceci a pu être partagé presque en direct.

Une participation interactive sur nos réseaux sociaux

▪ Les interventions :

Pour cette année, plusieurs interventions avec les scolaires ont été mises en place :

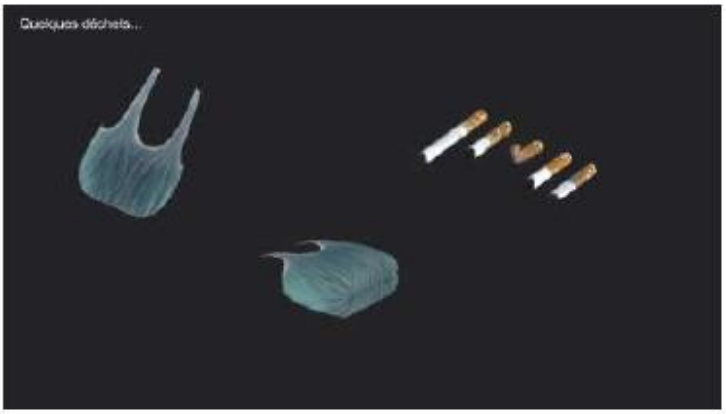
- Des interventions pour réaliser le jeu 3D : voir détails ci-dessous. Des photos ont pu être intégrées quand le droit à l'image était possible

Date	classe	Nombre d'enfant	Nombre d'adulte	photos
25/10/21	Formation des écodélégués du collège de Port Louis à la découverte des cétacés.	23	1	
13/12/2021	Formation des 6ème du collège de Port Louis	21	3	
25/01/22	Formation des 6 ème Collège de Guénette et découverte des jeux 3D	19	1	
07/02/22	Formation des CP de l'école élémentaire Robert Naranayan à Port Louis	12	1	

14/03/22	Formation des SEGPA du Collège Fontaine à Bouillante	8	2	
14/03/22	Formation des 6 ème du Collège Fontaine à Bouillante	16	1	
14/03/22	Formation des 6 ème du Collège Fontaine à Bouillante	16	1	
14/03/22	Formation des 6 ème du Collège Fontaine à Bouillante	18	1	
16/06/22	Formation des CM2 de l'école primaire Christophe Proto à Saint François	24	1	
17/06/22	Formation des CP à l'école élèmentaire Marie Antoinette Cellon à Marie Galante	19	3	

Grâce à votre soutien, ce sont **176 enfants et 15 adultes** qui ont été sensibilisés à la protection des cétacés et du milieu marin lors des 10 interventions mises en place.

Des dessins réalisés par nos développeurs et qui sont de très belle qualité ont pu être récupérés pour être intégrés dans d'autres nouveaux outils, notamment nos diaporamas.



II. Budget du projet :

Demande MEMB - CAR SPAW 2021			
Pôles	**Quantité**	**Dépenses prévisionnelles**	**Dépenses réelles**
60- ACHATS			
Prestation de service		**3200**	**3200**
10 interventions dans les écoles	10	900	900
Suivi de dossier et relecture		2300	2300
62- AUTRES SERVICES EXTERIEURS			
Rémunération des intermédiaires et honoraires		**3372**	**3372**
Programmateur pour création d'un jeu 3D		2272	2272
Mise en ligne de la nouvelle version de Jojo sous l'eau avec le 7 ème jeu intégré		1100	1100
Déplacements et missions		**688**	**688**
Indemnités kilométriques		488	488
Frais de bouche		200	200
Divers		**2450**	**2450**
Charges indirectes	7%	508	508
Contribution volontaire		1942	1942
Total du projet		**9710**	**9710**
Part MEMB contributions volontaires	20%	1942	1942
Part CAR SPAW	80%	7768	7768

III. Conclusion

Nous sommes fiers de ce que nous avons pu réaliser cette année. L'avenant que vous nous avez octroyé a permis de dépasser les perturbations dues à la crise sanitaire et aux mouvements sociaux. Nous avons pu réaliser le projet que nous nous étions fixé et, grâce à vous, nous avons pu élargir encore notre public et ainsi agir plus largement pour la protection des cétacés et du milieu marin.
Les membres de l'association Mon École, Ma Baleine vous remercie et les cétacés aussi !
Nelly Pélisson, présidente de MEMB et toute l'équipe de Mon École, Ma Baleine".

Call for proposals
Short-term Small Grants
- year 2021 -

Final report

Name of the organization: Fondation Haiti Ocean Project
Name of the project: Conserving Haiti's endangered marine megafauna
 Map of Haiti – Nippes and Grand'Anse target area circled in purple
Total budget of the project: € 8,171
SPAW-RAC grant: € 8,171
Timeframe for implementation: 5 months

This report is intended to provide information on the organization(s) involved, the project, the concerned species and sites, the threats to their conservation, the methodology developed within the framework of the project, its implementation, the objectives sought, the results obtained, and the perspectives for the future, in order to enlighten the Parties on the interest of such a project for the achievement of the objectives of the SPAW Protocol.

1. Your organization	
Name / Title	Fondation Haiti Ocean Project
Category (public entity, NGO, laboratory, private company, managers,...)	NGO
Is the organization already in contact with national or international networks? If yes, which ones?	Yes, CARIMAM and WIDECAST
Address	46 Dupuy 1, Petite Riviere de Nippes, Haiti
Phone number	954-439-6458
Website	www.haitioceanproject.org
Email address	hopcontacthaiti@gmail.com
Legal representative (person designated in the legal status)	Jamie Aquino
Phone number of the legal representative	954-439-6458
Email address of the legal representative	jamieaquino@yahoo.com
Name of the person responsible for this project (if different from the legal representative)	Frederic Bellande
Phone number of the person responsible for this project	509-3446-3794
Email address of the person responsible for this project	fbellande@hotmail.com
Indicative annual budget of the organization	€ 8,171
Staff means (number of staff members, volunteers... etc)	We have a president, 2 officers, 5 local coordinators and 25 volunteers
Preferred area for intervention (country(ies), region...)	Haiti (Nippes/Grand'Anse Departments)
Additional contextualizing elements you wish to notify to SPAW-RAC or to the SPAW protocol signatory countries: **Since 2007, our primary mission is the conservation and protection of high-profile marine species and critical habitat, including a focus on marine mammals, sea turtles, sharks and stingrays, through education of youth, research and data collection, community outreach, public policy and ecotourism. We are a leader in advocacy between Haiti and the world, guiding communities, fishermen, youth and policies, to bring about positive change in the way marine species are viewed and utilized in Haiti. At our core, our goals are about building relationships and tackling the root cause of poverty, which endangers local marine species and promotes protection of ecologically important marine life in Haiti.**	

Through this funding, we were able to continue our work with young people and local fishermen from several fishing villages in the Nippes and Grand'Anse regions to teach them about their ocean and the precious marine life that live there. We also obtained additional data from our unique juvenile oceanic whitetip shark population, which is important collaborative research that contributes to reducing mortality at these early stages of life and ultimately constitutes the missing piece of the puzzle in the management of this species regionally. We were also able to continue our monitoring of sea turtle populations and rescue/release of injured sea turtles caught by local fishermen. We documented species, patterns and behaviors of our local marine mammal populations and empowered fishermen (who are already at sea daily) to collect basic information about marine megafauna, helping them to understand distribution and threats they face in Haiti.

From August 2021 – December 2021, we reaffirmed the presence of the following vulnerable/endangered marine megafauna species in our Nippes/Grand'Anse Department waters, which are all listed as protected under the SPAW Annexes : Sea turtles – Green (EN), Hawksbill (CR), Leatherback (VU) ; Sharks (Oceanic Whitetip (VU), Silky (VU), Whale Shark (EN) ; Marine mammals – Sperm Whale (VU). During this time, August 2021-December 2021, we did not observe or encounter three species we have previous observed/encountered in past years. They are : Sea turtle – Loggerhead (VU) ; Shark – Scalloped hammerhead (EN) and Marine mammal – West Indian Manatee (VU). However we also confirmed two new species in Haiti waters, not previously confirmed, both in the Grand'Anse Departments. They are : Short-finned mako shark (EN) and Common thresher shark (VU). All of these species are targeted (directly and indirectly) and are at risk of exploitation.

2. Your project	
Name of the project	Conserving Haiti's endangered marine megafauna
Timeframe for implementation	*from I_8_I_1_I 2021 to I_12_I_31_I_2021* *Main stages: fishermen training workshops/fishermen surveys ; passive shark and sea turtle tagging/ monitoring of marine mammals.*
Targeted specie(s)	Loggerhead sea turtle, green sea turtle, hawksbill sea turtle, leatherback sea turtle, oceanic whitetip shark, silky shark, whale shark, scalloped hammerhead shark, sperm whale, west indian manatee.
Site(s) location	Nippes and Grand'Anse Departments, Haiti
Major threats	Direct fisheries, by-catch, habitat loss or alteration, disease and marine pollution
Methodology developed within the framework of this project	**Shark tagging program** : sharks measured for total length and tagged using a spaghetti tag and kept in the water as long as possible during the process. Fishing hooks completely removed using pliers and bolt cutters to minimize and long-term impact of the capture. **Sea turtle tagging program** : Sea turtles worked up quickly and efficiently to determine straight and curved carapace lengths and widths (mm) and weight (kg) using a measuring tape, calipers and a scale. Sea turtles tagged with an Iconel metal tag on both front or rear flippers (depending on size of turtle) unless previously tagged, and then released. A towel placed over eyes to help it remain calm. In warmer weather, turtles kept cool in the shade. Handling kept at a minimum. The data obtained from the tagging program is sent to WIDECAST, specifically Julia Horrocks/Barbados for input into their database which includes all Caribbean countries. This regional database identifies patterns/trends of these sea turtles, and helps all members of WIDECAST gain a better understanding of the connectivity between sea turtles and our countries. **Marine mammal monitoring program** : Involved fishers to observe marine mammals at sea, using small boat visual surveys. Provided each fisher with a laminated full-color Haiti marine species guide for reference. We will upload all of these photographs of flukes, dorsal fins, and scars to Flukebook, to contribute to a larger global database, which can help fill gaps in data from marine mammals in Haiti. **Fishermen training workshops** : held at our marine conservation center, in Petite Riviere de Nippes, where we conducted brief, semi-structured oral interviews. Trained fishers on how to switch to circle hooks and discussed sustainable fishing practices. Provided each fisher with a Haiti marine species guide for reference. **Youth marine megafauna education workshops** : Focused on education of marine megafauna for youth by conducting workshops in key coastal communities in the Nippes Department, using a hands-on approach and interactive learning to develop passionate ambassador's for Haiti's marine megafauna. These were held at our marine conservation center in Petite Riviere de Nippes.
Update on the implementation, progress and possible issues	We were able to fully execute all initiatives under this project in a timely manner. We encountered some issues as there is currently a great deal of COVID-19 and flu in Haiti, and at times, some of our fishers and youth got sick. So we had to accommodate schedules and do our best to ensure everyone was able to recover for their illnesses.

Objectives sought and/or results obtained	To increase knowledge relating to marine megafauna ecology and conservation issues throughout the Nippes and Grand'Anse department communities and to provide data for policy-makers and future management, to help reduce pressure on local populations. All our data is stored in an excel spreadsheet we created to document marine mammal sightings and marine megafauna incidents and to record sea turtle and shark tagging information. We also created a Google Earth map pinpointing all large ocean megafauna sightings. We determined the extent to which Haitians know about local marine megafauna, while concurrently delivering educational efforts concerning these species and their conservation needs, and to monitor the distribution and abundance of sharks, sea turtles, marine mammals and ray species in nearshore and pelagic habitats. We were able to accomplish these objective, and confirmed the prescence of multiple marine megafauna species off the coast of the Nippes and Grand'Anse Departments. We also trained fishers and education local youth about their marine megafauna We provided the information obtained from all this data and information to our shark, stingray, sea turtle and marine mammal experts.
How did the results and outcomes of your project have in the past contributed, are contribuing or will contribute in the future, to meet the needs of the agreements of your country to the SPAW Protocole ?	*(eg: Have the results (or progress) been, are they or will they be shared with the governmental administration charged of implementing the SPAW protocol? Have discussions with these services made it possible to work to the development or implementation of regulatory or conventional measures toward species or areas protected under SPAW?)* Haiti is considering joining the SPAW Protocol. At the heart of the Protocol is the implementation of projects to protect or restore biodiversity, including a large focus on marine protected areas. We are hopeful that our community outreach and work to protect the marine environment in Haiti will inspire the government to adopt the SPAW Protocol, which will enhance capacity building and collaborative initiatives on the ground in Haiti. Our data is being shared with the Ministry of the Environment and Ministry of Agriculture, to emphasize the need for protection of these species in Haiti waters. We are also sharing our information acquired with the Ministry of Education, as we are developing a Haiti marine megafauna curriculum for Haitian students in grades K-12.
Outcomes and lessons learned	Despite a major category 7.2 earthquake in mid-August, we have been instrumental in accomplishing all our goals through this funding. We were able to continue our shark tagging program, although there were less sharks present in our Nippes Department waters this fall, which may have been the result of less fisher presence, due to the fact that these fishers suffered loss in the earthquake. Still, we were able to successfully place spaghetti tags on 6 sharks, all juvenile oceanic, the predominent species and life stage in our Nippes Department waters. The shark tagging is significant to help us confirm the connection between our juvenile oceanics and adult oceanics tagged over a decade ago off CAT Island in eastern Bahamas. The conclusion is that Haiti's juvenile oceanic white tip shark population may be the offspring of the pregnant adult females previously tagged in the Bahamas. We were also able to obtain photographic identification of adult oceanics, including females filled with pups farther west down the inner southern peninsula, in the Grand'Anse Department. This is also helping us confirm that the adult female oceanics may be giving birth at the end of the southern peninsula,

	while the pups travel least to our Nippes Department waters and spend their formative years. As a partner in the oceanic whitetip consortium, we are sharing this data with Florida International University, MOTE Marine Laboratory & Aquarium, NOAA and Cape Eleuthera Institute. This important research can help reduce mortality in these early life stages and ultimately provide the missing piece to the management puzzle for this critically endangered species.The Caribbean, specifically Haiti, is a lasting stronghold of this Critically Endangered shark species, Through our sea turtle tagging program, we were able to tag 8 total sea turtles – 5 juvenile green and 3 juvenile hawksbill this fall. The results of this continued tagging program confirm that the waters off the coast of Petite Riviere de Nippes and Grand Riviere are both habitats for juvenile green and hawksbill sea turtles. The importance of identifying these habitats gives us a greater understanding of the patterns and behaviors of these large ocean fauna. This is important because Haiti is a potential nesting ground for these species, and through our tagging program, we have identified beaches where green, hawksbill and leatherbacks have tried to nest as these areas are close to where the juveniles reside.Through our marine mammal monitoring program, with the help of local fishers, we were also able to show more detailed routes taken by pantropical spotted dolphins from October-December within 2-3 miles off the coast of Anse a Veau and Petite Riviere de Nippes. Our fishermen training workshops were very helpful as they introduced 52 more local fishers to circle hooks, making the release of sharks much easier. Also, through the photographic documentation of the fishers, we confirmed two sharks for the first time in Haiti waters – the thresher shark and short-finned mako shark. We also educated 150 new youth to marine megafauna through the education workshops. This was definitely one of the most challenging years for us, having to stay focused on our marine conservation, education and research work, while navigating through all the roadblocks and setbacks we encountered along the way. While we were successful in our efforts, we learned a great deal about our own resilience, both personal and at the organizational levels. We also learned that we can rely on the local fishers that we have been working with over the years, to be more involved in all our efforts, as many of them are now comfortable with handling sharks and taking measurements prior to release, assisting with release of sea turtles, and in obtaining more specific information on the marine mammals they observe.
Perspectives, renewal, evolution of such a project	Our marine conservation, education and research work is significant in Haiti because we are working in arguably one of the most biologically diverse parts of the country. Through this grant, we have been able to further confirm and document marine megafauna we have already been aware of, plus some new additions to the list. We will be presenting our marine mammal documentation at the Society for Marine Mammalogy meeting in West Palm Beach in August, 2022. The marine megafauna of Haiti are faced with numerous threats and issues, and the only way to successfully protect them is to not only acknowledge these threats and issues, but also find sustainable solutions to address them. The biggest threat to these endangered marine megafauna is human, including local fishers and villagers, which is why we focus heavily on fisher training and youth marine education workshops. The fishers are a direct threat, so we involve and engage them in our initiatives, getting their feedback and input in

	the decision making. As for the youth, they are the future generations, so it's important we also include them in our marine conservation work. By working with the local communities, we can ensure that their needs are addressed, as well as what's in the best interest for the endangered marine megafauna. As a co-manager with ANAP (Haiti protected areas agency) for one MPA, the Baraderes-Cayemites, we are already in talks to co-manage additional MPA's, at the request of ANAP. It's clear we are now in a position to work with Haiti's government and people to find ways to create policy to protect the endangered marine megafauna and successfully implement that policy.

Additional contextualizing elements you wish to notify to SPAW-RAC or to the SPAW protocol signatory countries:

As the Caribbean Biological Corridor project focuses on biodiversity conservation, our data and information is an important contribution. The area we are focusing on – the Nippes and Grand'Anse Department waters, are a critical habitat for large ocean fauna, and therefore valuable to cross-country cooperation with countries such as the Dominican Republic and Cuba. By extending our knowledge of the distribution, abundance and habitat requirements of marine megafauna in Haiti, we are now able to better inform future policy stakeholders and the local communities we work in, to protect and conserve these vital habitats and contribute to conservation objectives of the Wider Caribbean Region.

Please annex any technical report, communication tools, pictures, maps etc you feel to be useful for the understanding of your project.

Meeting with fishers at Bon Bon, Grand'Anse Department, Haiti

Taking youth on our boat to learn more about the marine megafauna in our Haiti waters

First documented common thresher Shark in Haiti – Jeremie, Grand'Anse Department

First documented short-finned mako shark in Haiti – Jeremie, Grand'Anse Department

Sperm whale sighting by local fisher off coast Of Petite Riviere de Nippes, Nippes Department

Juvenile hawksbill caught by local fisher in net off coast of Grand Riviere De Nippes, Haiti – tagged and released

Juvenile oceanic whitetip shark – Spaghetti tagged with help of local fisher. Shark caught near FAD at Anse a Veau, Nippes Department, Haiti

3. Budget of your project (in Euros)	
Expenses	Resources

4. Assessment of the call for proposals	
How did you hear about this call?	Through CARIMAM and WIDECAST
Were the terms of references for this call for proposals clear enough?	Yes, the terms of reference were very clear
Have you encoutered any difficulties regarding the preparation of your project, the submission process and then its implementation?	No, we did not encounter any difficulties
Were the discussions with SPAW-RAC helpful?	Yes
How this grant has been beneficial for your organization, territory or country?	This grant provided us with funded needed to continue our shark and sea turtle tagging programs, as well as marine mammal monitoring programs, fishermen training workshops and youth marine megafauna education workshops
What is your general impression on this call?	Overall, very pleased about the entire process
Will you propose new projects to such a call?	Yes, through our existing programs and projects, we have identified new and equally important projects
What would you suggest to improve such a call?	I have no suggestions as I felt this ran very efficiently and smoothly.
Additional contextualizing elements you wish to notify to SPAW-RAC or to the SPAW protocol signatory countries: Through our marine mammal observations and further confirmation of patterns/behaviors and habitats of these migratory species, specifically with the more common sightings of pantropical spotted dolphins and sperm whales in our Nippes Department waters, we are creating a local, citizen science whale/dolphin watching program. This will involve local fishers that have small boats, to take locals to the deeper waters off our coastline to look for marine mammals. The locals on the boat would help document and record the sightings. This would engage locals and create future economic revenue for local fishers.	

We utilized our own boat (22-foot panga-style with a 75ph Mercury engine high-thrust) which we used to tag sharks. We also used our tagging applicators (tag pliers) to apply the tags for the sea turtles. We held the fisherfolk training and marine education workshops at our marine conservation center.

31 de diciembre de 2021

INFORME FINAL DEL PROYECTO "EVALUACIÓN DEL GRADO DE PERTURBACIÓN Y CAPACIDAD DE ADAPTACIÓN DE LA CRESTA ARRECIFAL LOS CONGRIS. PARQUE NACIONAL CAYOS DE SAN FELIPE. PROPUESTAS PARA SU RESTAURACIÓN."

En los meses de septiembre a diciembre del presente año 2021 se desarrolló el proyecto "Evaluación del grado de perturbación y capacidad de adaptación de la cresta arrecifal Los Congris. Parque Nacional Cayos de San Felipe. Propuestas para su restauración." Por la Fundación Antonio Núñez Jiménez de la Naturaleza y el Hombre (FANJ) y el Parque Nacional Cayos de San Felipe del Grupo Empresarial Flora y Fauna, con el financiamiento CAR-SPAW y un cofinanciamiento adicional de Wildlife Conservation Society (WCS).

Objetivos:

5) Evaluar el estado actual de la cresta arrecifal.
6) Determinar el grado de perturbación.
7) Determinar sitios para la colecta de fragmentos de colonias de coral.
8) Seleccionar áreas viables para el establecimiento del vivero.
9) Colectar fragmentos.
10) Montar vivero (3 árboles) y plantar los fragmentos en el vivero.
11) Involucrar a la población.

Evaluación del estado actual de la cresta arrecifal.

En una primera expedición, del 5 al 7 de noviembre y en las coordenadas 21°58'2.803"N, 83°37'52.377"W, se realizó una evaluación AGRRA de la cresta Los Congris, obteniéndose además una comparación con los resultados obtenidos en 2006. En ambos casos las especies predominantes fueron *Millepora complanata* y *Porites astreoides*. En el 2021 no se encontraron individuos de *A. palmata* vivos, solo colonias viradas y totalmente muertas; es notable la ausencia de esta especie dado que la misma generalmente es dominante en los arrecifes someros. Al parecer, *A. palmata* ha sido afectada considerablemente por el paso de los huracanes o por otros disturbios naturales (Anexo 1). Contrariamente, la salud de las colonias de *Millepora complanata* es favorable, encontrándose colonias con más de 1m de diámetro. Se identificaron en total 8 especies; la heterogeneidad fue baja al igual que la equitatividad (Tabla 1).

Tabla 1. Especies de coral encontradas en el arrecife en 2006 y 2021. Se muestran los resultados de abundancia relativa (%) para cada especie. N: Total de colonias, S: riqueza de especies, H´: Heterogeneidad de Shannon-Weaver y J´: Equitatividad de Pielou.

Especies	Los Congris	
	2006	**2021**
Siderastrea siderea	1.2	6.06
Porites astreoides	31.3	37.88
Agaricia agaricites	19.3	4.55
Millepora complanata	41.0	43.94
Orbicella faveolata	1.2	
Montastrea cavernosa	2.4	
Porites porites	0.0	1.52
Pseudodiploria strigosa	1.2	1.52
Pseudodiploria clivosa	0.0	1.52
Orbicella annularis	1.2	3.03
Acropora palmata	1.2	
N	83	66
S	9	8
H´	1.40	1.34
J´	0.63	0.64

La cobertura de coral vivo detectada en el 2021 fue de 8.3 %, con un diámetro máximo promedio de 36, 6 cm y un promedio de 50.8 % de mortalidad antigua.
Peces

Se contabilizaron 500 individuos correspondientes a 15 especies (tabla 2), aportando una densidad de 0.833 de ind/m2, y una biomasa de 211.44 g/m2. Tabla 2: Listado de especies de peces observado en él muestreo.

	Listado de especies
1	*Epinephelus striatus*
2	*Sphyraena barracuda*
3	*Lutjanus apodus*
4	*Lutjanus synagris*
5	*Ocyurus chrysurus*
6	*Haemulon flavolineatum*
7	*Haemulon sciurus*
8	*Haemulon macrostomus*
9	*Abudefduf saxatilis*

10 *Stegastes partitus*
11 *Bodianus rufus*
12 *Scarus taeniopterus*
13 *Sparisoma aurofrenatum*
14 *Acanthurus coeruleus*
15 *Bodianus rufus*

Los herbívoros representaron el 22.82% de las especies. La remoción de este grupo puede provocar un incremento excesivo en la cobertura de macroalgas (Pauly et al. 1998, McCook et al. 2001, Quinn & Kojis 2005), lo cual incide negativamente en la salud del arrecife. Si esto sucede, la competencia por espacio entre corales y macroalgas incrementa, generando efectos negativos a corto y largo plazo que comprometen la recuperación del arrecife (Hughes et al. 2007), como por ejemplo, una mayor incidencia de mortalidad coralina y limitación del reclutamiento de coral (Meesters et al. 1996a; Lirman et al. 2013). No obstante, es difícil determinar las relaciones causa efecto cuando se observa exceso de macroalgas, ya que éstas también responden al exceso de nutrientes (Fabricius et al. 2005).

Algas

El porcentaje alto de algas coralinas costrosas encontrado, 33.6 % (±15.7), pudiera ofrecer capacidad de recuperación al arrecife. Los géneros *Amphiroa*, (*Rhodophyta*), *Halimeda* (*Chlorophyta*) dominaron entre las macroalgas calcáreas. La cobertura del sustrato por macroalgas calcáreas promedio fue de 35% (±15.8). El cubrimiento del sustrato por macroalgas foliosas promedio para el arrecife fue de 25.4% (±15.8) (media ± DS).

Determinación del grado de perturbación de la Cresta Los Congris.

La ausencia de *Acropora palmata y Acropora cervicornis* muestra el deterioro de la cresta arrecifal. Sin embargo, el buen estado de salud de otras especies pudiera indicar la calidad del sitio y la posibilidad de una recuperación (Anexo 2) de igual forma, el porciento de cobertura de algas carnosas no se mostró con altos valores, elemento favorable para una evolución satisfactoria del sitio.

Determinación de los sitios para la colecta de fragmentos de colonias de coral.

Del 23 al 26 de diciembre se realizó una segunda expedición para extraer los fragmentos del sitio preliminarmente evaluado en la primera expedición. El sitio donde fueron colectados los fragmentos se encuentra al sur oeste de Cayo Real 21°57'1.979"N, 83°37'0.909"W, a una profundidad 10 - 15m. Su estructura está conformada por camellones de una altura de 3 m, con la presencia de la especie *Acropora cervicornis* en buen estado de salud.

Selección de áreas viables para el establecimiento del vivero.

Teniendo en cuenta la protección de los árboles, la accesibilidad del personal del área para su protección, limpieza y evolución, se determinó ubicar los árboles en el sitio localizado en 21°58'0.227"N, 83°37'43.958"W, en la zona NE de la cresta arrecifal.

Es un sitio resguardado del embate de fuerte oleaje, con una circulación media de las corrientes y una transparencia de 100 %.

Colección de fragmentos

Los fragmentos colectados fueron extraídos de 3 colonias donantes (Anexo 3) las que fueron previamente marcadas para su posterior seguimiento. En el sitio de colecta se realizó monitoreo del cubrimiento de coral mediante la metodología AGRRA, donde se contabilizaron 12 especies y un total de 155 colonias (16 de ellas de *A. cervicornis*) en 15 transeptos de 10 m con una cobertura de coral vivo de 15.1 %, donde el diámetro máximo promedio fue de 35.8 cm y una mortalidad antigua de 1.7 %. La especie *Acropora cervicornis* represento el 10.5 % de la cobertura de coral vivo.

Diversidad Shannon (natios)	H´=	2,31
Equitatividad Pielou	J' =	0,93
Riqueza Margalef	R =	2,39
Total especies	S =	12

.

Fueron seleccionadas 3 colonias sanas de un diámetro máximo entre 1.20 m y 1.40 m.

Montaje de vivero (árboles) y puesta de los fragmentos en el vivero.

Para la fijación del vivero fueron colocadas 4 clavijas estas se enterraron en el sustrato para evitar el movimiento horizontal de los mismos, además se les adicionó peso para evitar el movimiento vertical. Fueron montados 4 árboles con un total de 126 fragmentos a una profundidad de 3 m (Anexo 4).

Como actividad adicional se realizaron 2 transeptos de 400 m establecidos en 21°56'8.571"N, 83°31'5.633"W y 21°56'4.679"N, 83°30'8.608"W, para el monitoreo de erizos negros (*Diadema antillarum*) con el objetivo de conocer la densidad en la zona para su reintroducción en el área a restaurar de ser necesario (Anexo 7). Estos se realizaron en el sector sur de cayo Sijú, a una profundidad de 5 m en fondo rocoso con cubrimiento algal y aislados cabezos. En general se contaron 103 individuos en los 800 m de largo por 1 m de ancho, para una densidad de 0.12 individuos/m2. La cual se considera aceptable si tenemos en cuenta que en la década de los 80 este redujo su densidad de 25 a 0.03 individuos/m2 en algunas zonas del Mar Caribe (Lessios, 1988).

Involucrar a la población.

Fueron desarrollados 3 talleres comunitarios con una participación de 110 personas de ellos 25 niños y 85 adultos. De ellos 67 mujeres y 43 hombres.

Se contó con la participación del gobierno local, cultura, educación, además fueron involucrados los instructores de arte de la comunidad los que colaboraron con la confección de la escenografía de las actividades (Anexo 5).

Se desarrolló un primer taller comunitario (12 de octubre), con la participación de 40 personas (Anexo 6) en coordinación con el proyecto comunitario Joven Mar fundado en el 2005 con el objetivo de rescatar la cultura, tradiciones y salvaguardar el medio ambiente en la Coloma, En el mismo se dieron los objetivos del proyecto, su importancia local y regional, el estado de los arrecifes a nivel mundial y en la región del caribe, así como su significación para las comunidades pesqueras y el mantenimiento de las pesquerías.
También se abordaron las experiencias existentes en el país y los resultados preliminares que se han obtenido. Las técnicas más usadas en la restauración y la propuesta a desarrollar en el AP. Se les mostró la modalidad de árbol a usar en los sitios de viveros y como funcionaran, los materiales y métodos a emplear y proyecciones futuras.
Un segundo taller (18 de noviembre) con la participación principalmente del personal del área protegida en el cual se les explicó la realización del proyecto los métodos para su implementación y seguimiento una vez concluido el mismo.

Un tercero (16 de diciembre) con la participación de estudiantes y actores comunitarios donde se abordó los principales resultados y una gala cultural para engalanar la ocasión.

Divulgación

1. Fue confeccionado un logo para promoción del proyecto.
2. Fueron confeccionados y emitidos más de 22 notas en las plataformas de Instagram, Twitter y Facebook.
3. Fue confeccionado un almanaque 2022 divulgativo, alegórico a la zona, la conservación de sus recursos y el medio ambiente en general.

Capacitación

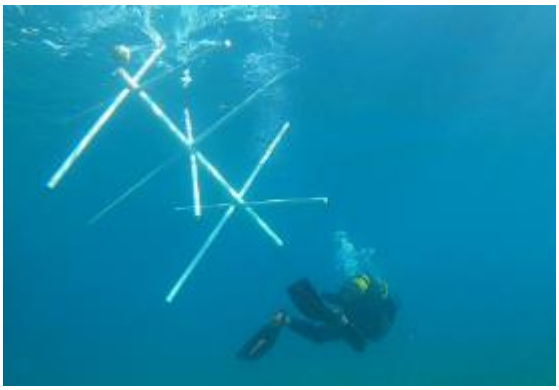
Con el objetivo de darle seguimiento a los arboles colocados se capacitan 6 compañeros de ellos 4 hombres y 2 mujeres con el curso de buceo SCUBA Open Water, con la didáctica SSI, que se encargarán de la limpieza de los árboles y los fragmentos de corales colocados y su posterior siembra.

Anexo: 1 *Acropora palmata* y *Acropora cervicornis* dañadas en la cresta arrecifal Los Congris, Parque Nacional Cayos de San Felipe

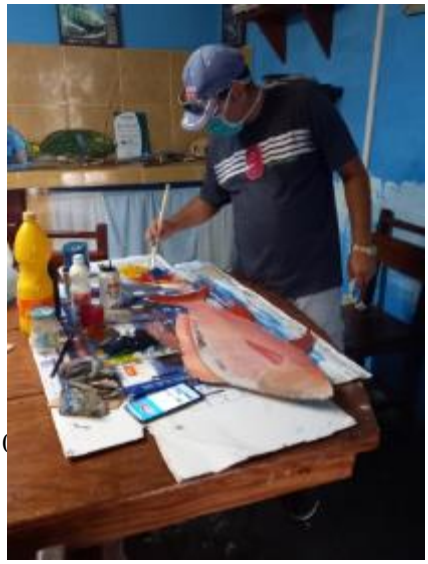
Anexo 2: Evaluación de la cresta Los Congris, Parque Nacional Cayos de San Felipe

Anexo 3: Colecta de fragmentos de *Acropora cervicornis,* para la siembra en el vivero

Anexo 4: Colocación de árboles en la cresta Los Congris, Parque Nacional Cayos de San Felipe



Anexo 5. Participación de instructores de arte comunitario en la elaboración de la escenografía para la celebración de talleres comunitarios.



Anexo 6: Talleres comunitarios celebrados en las instalaciones administrativas del Parque Nacional Cayos de San Felipe

Primer taller comunitario




Segundo taller personal del AP


Tercer taller

Anexo 7: Conteo de erizos negros (*Diadema antillarum*).

Anexo 8. Algunos enlaces de publicaciones del proyecto en Redes Sociales

https://twitter.com/FANJ_Cuba/status/1461413765145112578?t=lJIH5BdygwaV-wJ-zdKVXQ&s=08
https://www.instagram.com/p/CWbbXQPP54X/?utm_medium=share_sheet
https://twitter.com/FANJ_Cuba/status/1461764906701701121?t=50C5iDpBm-oPEpEDYrcmpA&s=08
https://www.instagram.com/p/CWd6s1SvL4w/?utm_medium=share_sheet
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https://www.instagram.com/p/CWq_YLdvWcD/?utm_medium=share_sheet
https://twitter.com/FANJ_Cuba/status/1465360954791809025?t=5zO58AUOm-0hg06qjWDf7w&s=08
https://www.instagram.com/tv/CW3eVYjAAw_/?utm_medium=share_sheet
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https://www.instagram.com/p/CXuALFNvi3x/?utm_medium=share_sheet
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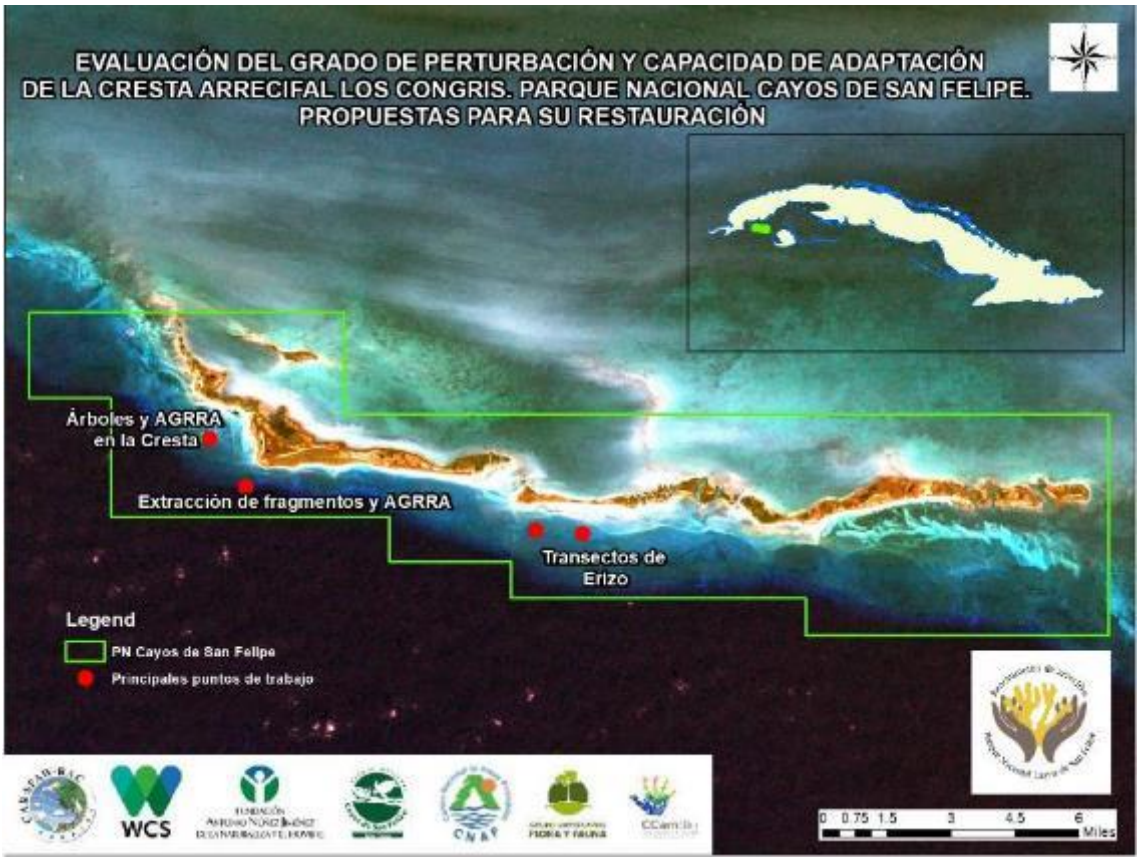
https://www.facebook.com/Proyecto-CCamBio-817864764998270
https://www.facebook.com/groups/553069898649641/permalink/881788845777743/
https://www.facebook.com/groups/553069898649641/permalink/881781192445175/
https://www.facebook.com/fanj.org/
https://www.facebook.com/Proyecto-CCamBio-817864764998270

Anexo 9. Logo, almanaque y diseños varios para pullovers

Anexo 10. Mapa del área



Nombre del proyecto: **Protectores del Océano: empoderando a las comunidades para restaurar los arrecifes de coral**
Autor: **Egla Vidotto, Laura Zaldivar, & Gisselle Brady**
Periodo del informe: **1 de mayo del 2021- 31 mayo del 2022**
Fecha de presentación del informe: **31 mayo del 2022**

Resumen: Hoy en día, el efecto de las enfermedades ha aumentado rápidamente con la aparición de la enfermedad de pérdida de tejido del coral pétreo (SCTLD), que afecta a más de 20 especies de coral pétreo. Teniendo en cuenta la expansión rápida de esta enfermedad y la muestra significativa del MAR, del cual forma parte el Parque Nacional Marino Islas de la Bahía (PNMIB); el proyecto "Protectores del Océano: empoderando a las comunidades para restaurar los arrecifes de coral" estableció y expandió dos viveros en el PNMIB. Además, aumentó la capacidad y el conocimiento de 27 personas (6 técnicos de BICA, 4 técnicos del Departamento de Ambiente del Municipio de Roatán, 2 técnicos de ZOLITUR, 1 técnico del Instituto de Conservacion Forestal, 1 técnico de MiAmbiente, 8 Protectores del Océano y 5 voluntarios) para la restauración de corales. Se restauró un área con 402 colonias en la Zona de Protección Especial Marina Sandy Bay - West End del PNMIB en el año 2021; se finalizará el año 2022 restaurando 998 colonias en el PNMIB.

Objetivos:

1. Establecer dos viveros de coral en el Parque Nacional Marino de las Islas de la Bahía (PNMIB) para 2022.
2. Aumentar la capacidad y el conocimiento en la gestión y conservación de los arrecifes de coral en las comunidades aledañas al PNMIB a través de la restauración de corales para 2022.
3. Recuperar áreas degradadas en el PNMIB afectadas por actividades antropogénicas y enfermedades.

Actividad 1 Entrenamiento

1.1 Capacitación de técnicos y voluntarios de BICA:

- 5 de julio del 2021, los técnicos (4) de BICA, capítulo Roatán y Guanaja, recibieron un taller sobre el monitoreo, mantenimiento en viveros y trasplantes de las colonias de *Acropora cervicornis* y *Acropora palmata*, impartido por Oceanus; Gabriela Nava y Edgar Ramos.

Fig. 1: Capacitación para técnicos de BICA, capítulo Roatán y Guanaja por parte de Oceanus de México.

- 8 y 9 de diciembre del 2021, se llevó a cabo el evento de Coralmania en los países de Honduras, Costa Rica y República Dominicana; una iniciativa orientada a la protección y restauración de la vida submarina y los océanos. Durante los dos días se capacitaron 15 participantes, entre ellos representantes de la Unidad Municipal Ambiental (UMA), Zona Libre Turística (ZOLITUR), Mi Ambiente, y otros voluntarios. Cada participante recibió una charla de la importancia de los arrecifes de coral, la metodología de restauración (mediante videos e imágenes) y participaron en la colecta, preparación y restauración de las colonias de corales (*Acropora cervicornis*).

Fig. 2: Capacitación de técnicos y voluntarios por parte de BICA, capítulo Roatán.

1.2 Formación de Protectores del Océano:

- 20 abril del 2021, se capacitaron 8 jóvenes del programa Protectores del Océano en Guanaja. Para el entrenamiento se utilizaron materiales bibliográficos, como las consideraciones para la aplicación del método Coral Tree Nursery en la recuperación de poblaciones de la especie Acropora, selección de sitios para la instalación de viveros, recolección de fragmentos, y monitoreo de los mismos. También se visualizaron videos para la instalación de las anclas. El entrenamiento fue impartido por la coordinadora de programas de BICA, capítulo Guanaja, Laura Zaldivar.

Actividad 2 Viveros

2.1 Construir y ampliar viveros:

- 15 de julio del 2021 se extrajeron del vivero de coral, 15 colonias de acropora cervicornis, las cuales se fragmentaron, obteniendo un total de 180 fragmentos que se colocaron en dos (2) árboles.
- 26 de agosto del 2021 se inició con la instalación de cinco (5) anclas, para colocar los árboles en el vivero dentro de la Zona de Protección Especial Marina Sandy Bay - West End (ZPEMSB-WE). Se utilizó para darle estabilidad a los árboles en la arena, y son fáciles de instalar. Para adherirlas se utilizó un mazo de 20 libras o más y una varilla para clavar el

ancla a la arena. Se fabricaron los árboles a base de tubos de pvc y se les hicieron los agujeros donde van colocados las colonias.

- 20 de octubre del 2021, se fabricaron 7 árboles más para expandir la capacidad de restaurar más áreas anualmente en la isla de Roatán, completando un total de 10 árboles para el cultivo de ***Acropora cervicornis, Acropora palmata*** y ***Acropora prolifera.***
- En noviembre del 2021 se elaboraron 100 bases de cemento con adaptadores de pvc. Estas bases se utilizan para colocar las colonias al momento de realizar la restauración en áreas degradadas.

Fig. 3: Bases elaboradas por personal técnico y voluntarios.

- 26 de enero del 2022, se colocaron los árboles en el vivero de Roatán.

Fig. 4: Expansión de vivero en Roatán.

- 27 de enero del 2022, se colocaron 236 fragmentos de *Acropora cervicornis,* 36 fragmentos de *Acropora palmata* y 58 fragmentos de *Acropora prolifera*; los cuales se sujetaron a los árboles y parrilla de coral en Roatán.

Fig. 5: Colecta de fragmentos de oportunidad en Roatán.

- 10 de diciembre del 2021, se realizó la construcción de 10 estructuras (árboles) para la instalación de un vivero en la isla de Guanaja; el vivero se encontrara en la zona protección especial marina (ZPEMLR-HM), y contigua a una zona de recuperación pesquera (ZRP), dichas estructuras

fueron construidas por los voluntarios, que son parte del programa Protectores del Océano.

Fig. 6: Elaboración de los árboles para el vivero de coral en Guanaja por los Protectores del Océano y personal de BICA.

- 18 de enero del 2021, se continuó con las actividades de construcción de estructuras con el apoyo de la practicante de la carrera de Biología de la Universidad Autónoma de Honduras (UNAH), Elisa Murillo, en BICA, capítulo Guanaja, y voluntarios. Realizaron la labor de adherir los tapones a los árboles, para evitar que los huecos del tronco sean refugios de gusanos de fuego u otro depredador de los fragmentos que están en los árboles.
- 09 de abril del 2021, se realizó la instalación de anclas para colocar los árboles en el vivero de coral en Guanaja; también se instaló un árbol de corales donde se colocaron ochenta (80) fragmentos de *Acropora cervicornis* en los árboles de coral en Guanaja.

Fig. 7: Instalación de árboles en el vivero de coral en Guanaja.

Fig. 8: Colocación de fragmentos de *Acropora cervicornis* en vivero de coral en Guanaja.

2.2 Seguimiento y Mantenimiento de Viveros:

Los monitoreos y mantenimientos del jardín de coral se llevaron a cabo desde mayo del 2021 hasta la fecha mayo 2022.

Mensualmente se realizan los monitoreos; tomando nota de la tasa de crecimiento en el cual se saca el 10% de cada especie. También se realizaron mensualmente los mantenimientos de las estructuras (árboles y parrillas), eliminando las algas que crecen en las estructuras para evitar que las mismas lleguen a las colonias y se apoderen ocasionando la muerte total de las colonias.

Fig. 9: Monitoreo de colonias de coral en vivero en Guanaja.

Fig. 10: Monitoreo de colonias trasplantadas en sitio de restauración en Roatán.

A la fecha, en Roatán y Guanaja tenemos un 90% de sobrevivencia de las colonias de corales.

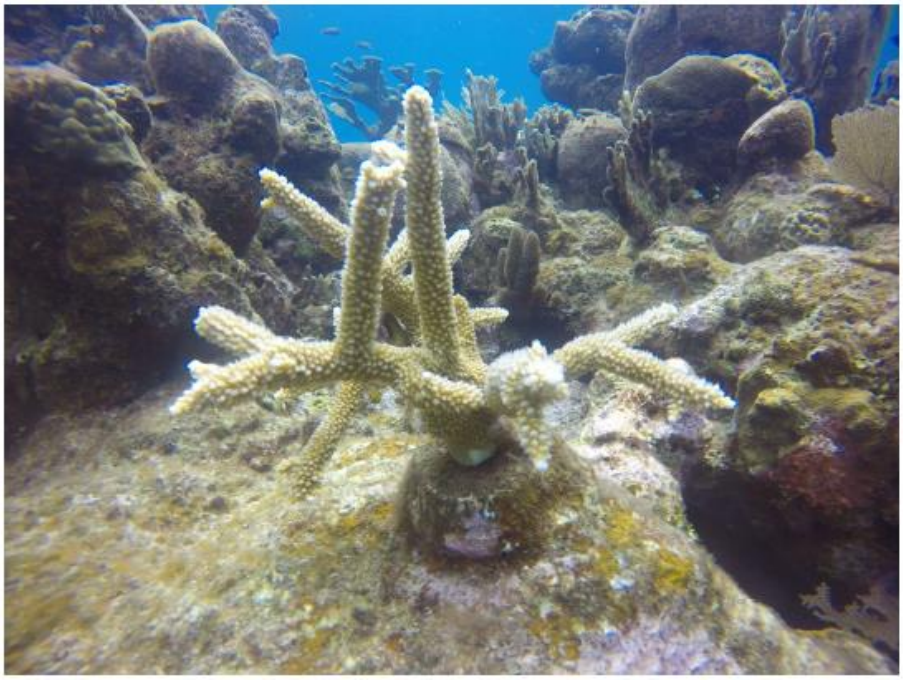


Fig. 11: Colonia de Acropora cervicornis trasplantada en la ZPEMSB-WE, PNMIB.

Actividad 3 Restauración

3.1 Trasplantar corales en áreas degradadas del AMP:

- 15 y 16 de julio del 2021, se trasplantaron 300 colonias colocándose en las bases distribuidas en los sitios de restauración. La actividad se realizó con el apoyo de técnicos de BICA y Zolitur.
- Se realizaron dos demostraciones de trasplantes, una el 22 Julio del 2021 a representantes de GIZ-Cooperación Alemana y Dirección de Biodiversidad/Mi Ambiente (DIBIO), y otra el 20 de septiembre del 2021 a representantes de la embajada de Alemania y la Cooperación Alemana e Instituto de Conservación Forestal y Vida Silvestre. Para ambas demostraciones se tomó un coral desarrollado en la parrilla y se trasplantó a una de las bases distribuidas en el arrecife cercano.

Fig. 12: Demostración de trasplante de *Acropora cervicornis.*

- El 8 y 9 de diciembre del 2021, se trasplantaron 100 colonias durante el evento de Coralmania (Restauración de corales en la ZPEM-SBWE), una actividad que tenía como objetivo conservar y restaurar la biodiversidad submarina, dicha actividad se realizó con el apoyo de miembros del Comité Técnico del PNMIB, (BICA Roatán, Municipalidad de Roatán, Zolitur, Departamento de Ambiente y voluntarios).

Fig. 13: Técnico de BICA, Egla Vidotto, realizando trasplante en la ZPEMSB-WE, PNMIB.

Resultados:

- R1. Se establecieron y expandieron dos viveros de coral para recuperar áreas degradadas en el AMP.
    - En la Zona Especial Marina Long Reef - Half Moon Key, Guanaja
    - En la Zona de Protección Especial Marina Sandy Bay - West End, Roatan
- R2. Ocho protectores de océanos, seis técnicos de BICA, personal institucional (dos técnicos de ZOLITUR, un técnico de MiAmbiente, un técnico ICF y cuatro técnicos Departamento Ambiental Municipalidad de Roatán) y cinco voluntarios fueron capacitados en metodologías de restauración de arrecifes y colaborarán con las actividades de mantenimiento de viveros de coral, restauración en el arrecife y sensibilización de las comunidades.
- R3. Se restaurarán 402 colonias de coral en el 2021 y se finalizará el 2022 restaurando 998 colonias de coral.

Siguientes Pasos:

- Continuar con la socialización sobre los viveros de coral y la importancia del ecosistema marino. Instalar otras metodologías (Cuerdas) en el vivero de coral y en las restauraciones (microfragmentación). Aumentar la capacidad de gestión y la capacidad técnica de los actores claves dentro del PNMIB.
    - Se realizará un intercambio con Fragments of Hope de Belice para aprender nuevas técnicas de reproducción de corales (microfragmentación) donde participaran técnicos de BICA y Protectores del Océano.
    - Se participará en el Taller de Elaboración del Plan Nacional de Restauración de Arrecifes en Honduras.
- Expandir los sitios de restauración y aumentar los números de colonias trasplantadas para recuperar más áreas degradadas.
- Instalar viveros en la comunidad de French Cay como medio de sustentabilidad para el manejo de la zona de recuperación pesquera.
- Gestionar la sostenibilidad financiera a través de alianzas estratégicas con centros de buceo.

Offsetting Impacts of Black-capped Petrel Collision and Grounding Hazards in the Dominican Republic

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INTRODUCTION

The IUCN classifies the Black-capped Petrel as Endangered because it has a "very small, fragmented, and declining breeding range and population. It has already been extirpated from some sites, and declines are likely to continue because of habitat loss and degradation, hunting and invasive predators." (Wheeler *et al.* 2021). The population is estimated as no more than 1,000 breeding pairs, perhaps as few as 500, and a total population of 2,000 – 4,000 birds. Petrel nests (burrows) have been in just four areas on Hispaniola (comprised of Haiti and Dominican Republic) thus far, though audio and radar evidence suggest other areas are possible (Wheeler *et al* 2021).

The International Black-capped Petrel Conservation Group has been able to successfully identify petrel nesting areas throughout Hispaniola, identify critical nesting habitat for the species, identify priority conservation threats to the birds and their habitats, undertake strategies to address those threats, create conservation partnerships among varied stakeholders, and raise awareness of conservation campaign to a global audience via story-telling and social media. Yet some elements of our conservation program are underserved.

Within this project, we sought to advance Black-capped Petrel conservation by expanding the strategies to address threats from strikes and groundings. The threat from strikes and groundings has been documented in various locations on Hispaniola, but there are data gaps about the full extent of the hazards in the various nesting areas and flyways.

The largest known nesting colony of Black-capped Petrels in the Dominican Republic is located on the peak, Loma del Toro. The main nightly flyway for petrels between the Caribbean Sea and the nesting colony at Loma del Toro is along the Rio Pedernales watershed, starting at the coastal village of Pedernales in the southwest of the country and connecting to the southern flanks and petrel nesting colony at Loma del Toro.

The goal of this project was to inventory communication and other towers within the Rio Pedernales watershed petrel flight corridor, defining their specific characteristics (height, lighting, guy wires). The location and magnitude of light pollution from the Pedernales population center was determined. Information on strikes and groundings was gathered from local sources via interviews and through observation. This information was synthesized with specific recommendations for towers and light sources and shared with appropriate parties, e.g., local communities, communication companies, Ministry of the Environment, and conservation organizations. A flyway-specific plan was developed that prioritizes interventions to reduce strike and grounding threats as well as prioritize trainings for locals to reduce mortalities through rescue protocols.

PROJECT OBJECTIVES

Expanding the strategies to address threats from strikes and groundings. The threat from strikes and groundings has been documented in various locations on Hispaniola, but there are data gaps about the full extent of the hazards in the various nesting areas and flyways.

1. *Communication and other towers within petrel flight corridors will be inventoried and their specific characteristics (height, lighting, guy wires) assessed.*

2. *The location and magnitude of light pollution from population centers will also be determined for each flyway. Information on strikes and groundings will also be gathered from local sources via interviews and through observation.*
3. *This information will be synthesized with specific recommendations for towers and light sources and shared with appropriate parties, e.g., local communities, communication companies, Ministry of the Environment, and conservation organizations.*
4. *Flyway-specific plans will be developed that prioritize interventions to reduce strike and grounding threats as well as prioritize trainings for locals to reduce mortalities through rescue protocols.*

METHODS

Field team was constituted, informed, and trained on work in December 2021. The constituted team was informed on the objectives and tasks of the project. The team members received training by senior staff on the use of clinometers (height surveys) and light meters. They were also instructed by senior staff members, in the application of semi-structured interviews of the public.

Two questionnaires were developed; one in Spanish and one in Haitian Creole, to take notes during the interviews on knowledge of the local population regarding the Black-capped Petrel.

Photos were prepared containing bird images, including, a duck, a chicken, the Northern Potoo (*Nyctibius jamaicensis*), Burrowing Owl (*Athene cunicularia*), Perico (*Aratinga chloroptera*), Pitangua (*Caprimulgus ekmani*), Cotorra (*Amazona ventralis*), and a Black-capped Petrel. These photos were used during the interviews to see if the persons, in case they responded positive to having seen a Black-capped Petrel, were able to identify it.

Soundtracks of the mentioned bird species were also played to see if the interviewed persons had heard any of them and could identify them by sound, especially the petrel.

Release protocols (in Spanish and Kreyol) were developed, alongside community groups, to train people in the communities to respond and act in the correct way to save downed birds.

Organization and institutions as well as individual persons were defined to be visited and interviewed. A schedule was developed to visit the different communities.

The following field trips were made during 2022 (see **Map 1** for locations):

February 1 to 3: Community of Las Mercedes (farmers association)
February 7 to 12: Communities of Mencia, Nan Banbou, La Migua, Mencia, Los Arroyos, Aguas Negras y La Altagracia (farmers association and associations for coffee growers and avocado growers
February 16 to 19: Communities of Aguas Negras y Abila
March 16 to 20: Antennas of Loma del Toro
May 22 to June 22: Town of Pedernales and surroundings as well as coast between Pedernales and Cabo Rojo (association of fishermen, Pedernales Ecological Society, local office of Ministry of Environment)

During the field trips the team visited communities, applied questionnaires, and informed on release protocol. Interviews were semi-structured, and answers recorded on questionnaires. Communication towers and antennas as well as power line towers within petrel flight corridors were inventoried and their specific characteristics height like height (measured with Lizi Pai Pocket Clinometer), lighting, guy wires assessed.

Coordinates of location of towers and antennas were taken with GPS (Garmin eTrex 10). Structures with intensive lights had their light intensity on the ground measured with a light meter (881DDigital Illuminance Meter).

Information of questionnaires was inserted into an Excel table and analyzed according to the specific criteria. Data of antennas and other structures was registered, analyzed, and mapped.

Data and results of the study were shared with the Department of Biodiversity of the Ministry of the Environment

RESULTS

Communication and other towers within petrel flight corridors inventoried and their specific characteristics (height, lighting, guy wires) assessed.

Data of total of 21 antennas and communication towers was registered (see **Map 2**).

Sixteen structures were encountered in Pedernales (see **Map 3**), with a major concentration in the center of the town and close to the coast. Antenna height measured ranges from 22.5m to 38.5 m with a calculated average of 33.5m. Ten of the antennas have guy wires ranging from three to fifteen cables per antenna. Most of the antennas do not have positioning lights, only the military fortress antennas and the ones of the communication companies did have small lights at the top.

Along the flight pathway inland, only one additional major antenna was registered with its location in Aguas Negras. It has a height of 35m. Two lights on the ground illuminate the surrounding area for security reasons. It has no positioning lights.

Four antennas are installed at Loma del Toro, the highest point of the Sierra de Bahoruco mountains. A special account is given below on these structures and their impact on petrels.

Since 2019 a new power line is being constructed to supply electric energy to Pedernales. The electricity is being generated in a wind park about 70 km east of the town. During the study period the final touches have been made on this power line. It is located along the highway which stretches along the coast and leading into Pedernales from the southeast (see **Map 1 and 2**). Twenty-five towers are spaced along the highway, with approximately 330m between each tower. Each tower is 48m high and the line consists of seven power cables. The whole coastal line serves the petrels as entering area to the flight path, and the effects of the power line with its seven cables may well be negative - not only the towers and the cables being obstructions to the

flight of the petrels, but also the high voltage cables electrocuting the birds. Examples of electrocuted, White-crowned Pigeons (*Patagioenas leucocephala*) have already been reported from the town of Oviedo after the installation of the power line.

Conservation Issues for the Black-capped Petrel *in Loma del Toro*

1) Nesting site

Loma del Toro is a key nesting site for the Black-capped Petrel. Along approximately seven (7) kilometers of its northern slope there are places where birds have nests (see **Map 4**). These places are located on both sides of the Dominican-Haitian border. To date, more than 50 nests have been detected in the area and it is estimated that there may be twice as many. Considering that the total reproductive population is estimated at between one thousand and two thousand pairs, Loma del Toro can be considered a place of great importance for the survival of the species, since it is home to approximately 10% of the global population.

2) Infrastructure and communication antennas in Loma del Toro

Loma del Toro houses four (4) communication structures. A description of each structure follows:

a) **Altice communication tower**

It is a typical signal amplification tower with a height of approximately 40 meters. It consists of metal tubes. It has several satellite dishes on its top. Next to the tower there is a small building that contains a diesel plant, which supplies the electrical energy for the operation of the antennas. This plant does not work continuously, but according to a defined schedule, to keep the support batteries charged. The noise emitted is minimal. Apparently, it has an effective muffler to suppress the noises of the plant, since the plant is hardly felt when it is in operation. The tower has three (3) continuous emitting green lights at the top that possibly serve as locator lights for aircraft air traffic.

b) **Claro communication tower**

The Claro communication tower has a similar design to the Altice tower, it has a height of approximately 40 meters. Like a small building that contains a plant that supplies electricity for the operation of the parabolas. The plant does not have a silencer and emits high intensity noise (estimated above 100 decibels). The combustion gases that are emitted are not being filtered either. The tower does not have location lights on its top.

c) **Civil Defense Antenna**

It is a thin antenna with a height of approximately 12 meters. It is located on a small building and tied with nine (9) support cables that stabilize it against the force of strong winds and breezes. This antenna does not exceed in height the pine canopy that surrounds this site. It does not have location lights on its top.

d) **Antenna of the Ministry of the Environment**

It is a thin antenna with approximately 50-meters, and it is the tallest structure in the place. It has 21 guy wires (curb) to keep it stable against strong winds and gusts. It is located next to the booth that is usually the home of the park rangers and guardians of the communication towers. It does not have location lights on its top.

3) Significant impact of lights on the Black-capped Petrel
Various lights are present at night in Loma del Toro. There is a light in front of the Claro tower. It is bright white and illuminates the surroundings of the tower itself. It has no cap or cover to prevent light from shining to the sides and up. In a corner of the Altice building there is another light that brightly illuminates the surroundings of that tower. It has a narrow lid, which is not wide enough to ensure that the light does not shine upwards.

4) Noise and polluting emissions
While the Altice power plant works silently without having major visible emissions of polluting gases, the Claro plant works without a muffler and the exhaust gases go directly into the air without any filter cleaning them.

Impacts suffered by Black-capped Petrel in Loma del Toro
Map 4 shows the location of Black-capped Petrel nests in the Loma del Toro area. The nests are found in a narrow but long strip along the northern slope just below the top of the Sierra de Bahoruco.

Every year during the entire nesting season, birds in flight can be seen with night vision binoculars in that strip as well as their songs be heard. Birds also tend to fly over the towers and antennas of Loma del Toro.

On occasion, park ranger and antenna surveillance personnel stationed at Loma del Toro have encountered petrels walking on the ground just below or near the towers or antennas. Of those birds there were many with injuries, but also some apparently without injuries. It has not been possible to make a systematic study of fallen birds over the years, mainly due to lack of good communication with the personnel stationed at Loma del Toro. Instructions and information have been provided on how to deal with downed birds and how to document and report grounded birds to the Grupo Jaragua staff. They have also been trained in the handling and release of uninjured birds. Unfortunately, the frequent change of the people stationed at the site, or the non-attendance has sometimes prevented a good documentation of the cases.

Even so, cases of fallen birds have been reported, each year a minimum of three (3) grounded birds or more are found. Many of them with cuts on the wings, which indicate that the birds have collided with one of the cables that support the antennas. We have been able to establish a better direct communication channel this year with the WhatsApp application, which is used by service personnel to maintain contact with the corresponding communication companies and with their families.

To date, three (3) falls have been reported so far in 2022, two were birds without injuries, which were successfully released. The third animal had a wing in very poor condition with the left humerus having multiple fractures.

It is assumed that most of the cases of birds colliding with the antennas and towers, falling to the ground are not reported since these events go undetected. Considering the documentation of

Loncore *et al* (2008) on the causes of death of birds in communication towers, we can identify three (3) that have a negative impact on Black-capped Petrel in Loma del Toro:

1. The topography forces the birds to fly over the area of the antennas and towers.
2. Bright white lights emitted that can disorient birds, especially juveniles with little experience on the spot. Frequent fog and strong breezes in Loma del Toro can strengthen this effect.
3. The support cables with which disoriented birds can collide causing serious injuries to their wings and body.

Another impact must also be mentioned, which can easily be forgotten considering the danger that bright lights and guy wires are to the species. This is the noise emitted by the plant installed to maintain the flow of energy for the Claro company antenna. That noise leaves the surroundings of the plant polluted so heavily that no other sounds are allowed to be heard. The little devils in their courtship flights and during their arrivals at the nests emit songs of very specific sounds. The noise emission from the Claro plant can cover the songs of the species and thus hinder communication between the birds.

The location and magnitude of light pollution from population centers will also be determined for each flyway. Information on strikes and groundings gathered from local sources via interviews and through observation.

Regarding the observation and knowledge of petrels along the flight path of Pedernales including strikes and possible groundings the following results have been acquired interviewing people in the communities:

A total of 191 interviews were completed.

a) General socioeconomic data

- Number of interviews in the communities: Less than one third of the persons interviewed were women.
- Most interviewed persons were below 40 years of age (60%).
- Roughly 60 percent of the persons interviewed were of Haitian nationality. The study clearly shows the strong presence of Haitian nationals on the Dominican side of the border
- More of 30 percent of the interviewed had no formal education, and another 40 percent only attended part of the primary school.
- More than 50% of the interviewed persons are working in agriculture, mainly coffee and avocado production, or working small subsistence plots in the upper hills of the flight path. Another important occupational group are the fishermen fishing of the coast and mostly living in Pedernales. The rest of occupations show a great variety and reflects the general population diversity.
- General information on persons interviewed reflects a good social-economic sample of the population within the flight path of the petrels.

b) Specific data on knowledge of petrels

Regarding knowledge about petrels and encounters with the petrels of the persons interviewed the following results were obtained:

- 126 persons (65%) never had heard anything about the petrel.
- 65 (34%) affirmed they knew the petrel.
- A detailed revision of the knowledge of these people, using the photographs of different birds and the soundtracks of these species soon revealed, that the majority had no idea of the Black-capped Petrel.
- Answers like the following were given:
    - "It is called Cucharreta (*Platalea ajaja*). Formerly, they were walking along the seashore."
    - "It is a Paloma ceniza, English: Plain pigeon (*Patagioenas inornata*). It is a bird that eats wild eggplant."
    - "It is like a duck, it is gray. I saw it in the farm of my boss."

Based on the results of the reaction of the interviewed persons to the photographs and soundtracks, most of the positive answers regarding the knowledge about the petrel had to be discarded. At the end only three reliable answers were left:

- Two came from watchmen at Loma del Toro, who are regularly stationed at Loma del Toro. They have come into direct contact with downed birds and have been witnessing the work of the petrel monitoring crew.
- The third reliable answer came from an official of the local office of the Ministry of Environment in Pedernales. His name is José Luis Castillo. He is the actual supervisor of the coastal and seaside area of Pedernales. José Luis has taken part in the monitoring of the petrels, which explains his knowledge about the species.

The results of the interview show clearly that the petrels travel through their flight path practically unnoticed and unperceived by the public, neither in the town of Pedernales, nor in the rural communities north of the town. No downed birds were reported for the flight path. During the visits to the communities the members of the interviewing team also distributed the rescue protocols for petrels (in both languages), and gave verbal explanations, since a good portion of the population in the hills is illiterate. It is hoped that in this manner, the cases of downed birds may become known and possible rescue activities can be initiated.

c) Location and magnitude of light pollution from population centers

The flight path leading to Loma del Toro does not have major intensive light sources.

In the town of Pedernales normal light sources like streetlights and illumination of houses is of typical intensity of towns in the Dominican Republic. Only in the baseball and softball stadium of Pedernales lights are often lit at night with a strong intensity for the naked eye. Measured intensity on the ground of the stadium was 275 lux. This appears a lot much lower compared to

a professional baseball stadium, where a minimum of 1000 lux is recommended. Light posts are placed around the stadium of Pedernales, each pole with a height of 14m. The direction of the light emission is downwards in direction towards the ground. How strongly the actual light situation of Pedernales affects petrel flight is difficult to judge based on the data collected, to date.

More problematic conditions are starting to arise from tourism development. The government of the Dominican Republic has initiated ambitious long-term plans to promote major tourism development in the region. These plans are focused on the coastal area of Pedernales/Cabo Rojo and include several major resort hotels, apartment complexes, golf courses, a major international airport, and a large marina. According to current projections, the airport is expected to become the second largest in the Dominican Republic in terms of passenger traffic, with an estimated 1.6 million passengers/year at project completion. Further associated with the development will be an increase in existing wind turbines in the region and a new 138 kilovolt electrical transmission grid parallel to the coast. Inevitably, a significant increase in the local human population and artificial lighting will be associated with this development, including that associated with nighttime arrivals and departures of commercial and private aircraft, all of which will be located between petrel nesting areas in the Sierra del Bahoruco and the Caribbean Sea and along petrel flight paths to and from such areas.

CONCLUSIONS and FUTURE CONSIDERATIONS

- The public living within the flight path has no knowledge of the petrels
- Sixteen antennas in Pedernales, one in La Altagracia, and four at Loma del Toro may obstruct the flight of the petrels. While there is no information of impact of antennas on petrels for Pedernales and La Altagracia, there have been bird strikes recorded at Loma del Toro
- A new power line along the coast may be become a major threat to petrels
- The height above ground which petrels are using while flying over Pedernales or entering the coast is not known. It would be most important to define this height to determine if it is affected by the antennas in Pedernales or the power line along the coast.
- Light pollution of Pedernales is like other Dominican towns. Most intensive light source is the baseball stadium. Direction of light is towards the ground. Impact on petrels is not clear.
- Tourism development projects will create serious problems for the petrels soon, like disorientation due to lights as well as direct flight obstructions
- Training about petrels for locals should be intensified and rescue protocols promoted.
- This should not only be done on the Dominican side of the Pedernales, but on the Haitian side as well.
- In addition, it is recommended to include the other known flight paths within Haiti which lead to the nesting areas in the Massif de la Selle. The training should address the public, but specifically decision makers.
- The young people should be of specific focus. School curriculum must be developed and executed for the purpose.

- Since there is little chance to halt the development of tourism, lobbying must be done to enhance the mitigation of negative effects of development. Light attraction and disorientation for petrels (as well as for other bird species) should be kept to a minimum.

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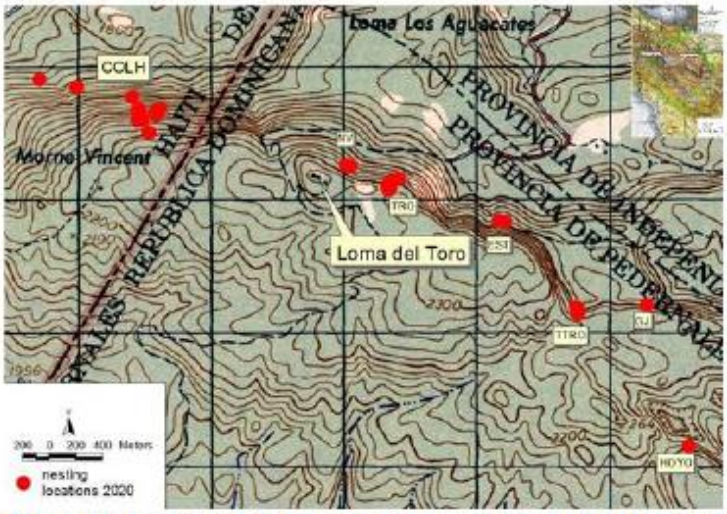
Wheeler, J., Satgé, Y., Brown, A., Goetz, J., Keitt, B., Nevins, H. and Rupp, E. 2021. Black-capped Petrel Conservation Update and Action Plan. Conserving the Diablotin. International Black-capped Petrel Conservation Group. https://www.birdscaribbean.org/our-work/working-groups/black-capped-petrel-wg/

MAPS

Map 1: Communities as well as antennas and powerline towers within Black-capped Petrel flight path

Map 2. Antennas in Pedernales and Power Line along the coast

Map 3. Tower locations in Pedernales



Map 4. Black-capped Petrel nesting locations and tower locations on Loma del Toro

PROJECT IMAGES

Interviewing in Avila

Interviewing in Los Arroyos

Interviewing President of Ecological Society of Pedernales

Measuring height of antenna in La Altagracia with clinometer

Measuring height of power line tower with height meter

Light system of baseball stadium in Pedernales

Call for proposals
Short-term Small Grants
- year 2021 -

Final report

Name of the organization: SCRFA I SCIENCE AND CONSERVATION OF REEF FISH AGGREGATIONS
Name of the project: Big Fish Radio (English)

Total budget of the project: 15,280 Euros
SPAW-RAC grant: 8,000 Euros
Timeframe for implementation: August, 2021 -Nov, 15th, 2022

This report is intended to provide information on the organization(s) involved, the project, the concerned species and sites, the threats to their conservation, the methodology developed within the framework of the project, its implementation, the objectives sought, the results obtained, and the perspectives for the future, in order to enlighten the Parties on the interest of such a project for the achievement of the objectives of the SPAW Protocol.

1. Your organization	
Name / Title	SCRFA I SCI ENCE AND CONSERVATION OF REEF FISH AGGREGATION S // Big Fish RADIO
Category (public entity, NGO, laboratory, private company, managers,...)	NGO
Is the organization already in contact with national or international networks? If yes, which ones?	
Address	1595 S Mission Rd. Fallbrook, CA 92028, USA
Phone number	+1 760 723 7724
Website	www.scrfa.org
Email address	chad@pathwaycg.com
Legal representative (person designated in the legal status)	Chad Wauschek, CPA, CFP
Phone number of the legal representative	+1 760 723 7724
Email address of the legal representative	chad@pathwaycg.com
Name of the person responsible for this project (if different from the legal representative)	Yvonne Sadovy Ana Salceda
Phone number of the person responsible for this project	+852 977055535 +1 (831) 9208311
Email address of the person responsible for this project	yjsadovy@hku.hk anasalceda@mac.com // production@belugasmile.com
Indicative annual budget of the organization	$30,000 USD
Staff means (number of staff members, volunteers… etc)	A board and accountant/representative
Preferred area for intervention (country(ies), region...)	Global, mainly tropical reef ecosystems (particularly threatened species and those of commercial importance in small-scale fisheries)

Additional contextualizing elements you wish to notify to SPAW-RAC or to the SPAW protocol signatory countries:

2. Your project	
Name of the project	Big Fish Radio
Timeframe for implementation	*from I_08_I_01_I_2_I_0_I_2_I_1_I to I_11_I_15_I_2_I_0_I 2_I_2_I* *Main stages:* a. Pre-Production : August – October, 2021 b. Production: June-August, 2022 c. Post-production: August-Sept, 15, 2022 d. Testing: September-October, 15, 2022 e. Final Cut: October f. Delivery to SPAW: November, 15, 2022
Targeted specie(s)	Species that aggregate to spawn in the WECAFC region –specifically, Nassau grouper and mutton snapper
Site(s) location	The Bahamas and Belize
Major threats	Overfishing/fishing during spawning season of the species within the snapper-grouper complex and limited management.
Methodology developed within the framework of this project	The Executive Producer of the project connected and supervised the work of the teams in The Bahamas and Belize making sure that the guidelines of this grant were followed, and the fundamentals of the «Recovering Big Fish» communication strategy (messaging, tone, style…) were incorporated in the production of this radio kit, including the testing and evaluation methodology. Perry Institute for Marine Science in The Bahamas assisted with the production (recording studio and talent) of the (2) Podcasts, while PGTV assisted with the production of the public service announcements (PSAs), as well as the distribution in Belize. EDF, in addition to other partners of the Big Fish campaign, will collaborate with the regional distribution of Big Fish Radio through the SSF Hub Resource Review. To learn more about the communication strategy, Recovering Big Fish, see: https://www.dropbox.com/sh/zv9ntdfqfn8jfbs/AAC1QDADHRdgwE90IyIn10Epa?dl=0
Update on the implementation, progress and possible issues	As result of the 2020-22 COVID pandemic, the project faced challenges during the production phase. Thanks to the extension period granted by SPAW, the project is on its post-production phase, and currently on schedule. The production team has advanced the testing & evaluation plan.
Objectives sought and/or results obtained	Collaboration between the two countries -- Belize & The Bahamas -- has been successful due in part to the networking work previously done as part of the Big Fish Campaign within the WECAFC SAWG Communication Sub-Committee, and in part to the commitment of the parties involved in this specific project. We feel confident that this project will have the expected impact which will be enhanced with the regional distribution of this product.
How did the results and outcomes of your project have in the past	*(eg: Have the results (or progress) been, are they or will they be shared with the governmental administration charged of implementing the SPAW protocol? Have discussions with these services made it possible to work to the development or implementation of regulatory or conventional measures toward species or areas protected under SPAW?)*

contributed, are contributing or will contribute in the future, to meet the needs of the agreements of your country to the SPAW Protocole ?	The executive producer of Big Fish Radio, coordinator of the Big Fish Campaign and producer/Director of «The Secret Crown» has been in constant communication with the Fisheries Department in Belize, where our main contacts are Beverly Wade* and Vivian Ramnarace**, SPAW Focal Point in Belize, who endorsed the project in 2021. The government of Belize is a champion in the region in the protection of FSAs, and is well aware of the implications of this regional push to ban fishing and sales of Nassau grouper and mutton snapper during the spawning season. Based on our information, the Belizean government is currently working on strengthening regulations for finfish to further protect these species during the spawning season and all year around. Additionally, Perry Institute for Marine Science has a close relationship with the Government of The Bahamas. *Department of Fisheries, who endorsed the production of the 1-hour film «The Secret Crown» in 2018, and «Recovering Big Fish» in 2019. Belize, bawade@yahoo.com ** Vivian.ramnarace@fisheries.gov.bz
Outcomes and lessons learned	The coordination for production work with fishers has proved to be challenging and required more time than previously estimated. However, once fishers and partners got engaged, everything flowed better, and the testing and distribution phases were easier to implement. We have confirmed that direct involvement of fishers in the production is key to the success of the project and spreading the message.
Perspectives, renewal, evolution of such a project	As promised for this grant, the project supports gender equality --not only in the language used in the scripts, but also in the active participation of women (fishers and production team). In fact, three of the five narrators of this radio kit are females. As committed, the products of the Big Fish Radio kit have been produced in close collaboration with fishers. After incorporating the feedback obtained during the testing period of this grant, the final version of this radio kit will be distributed throughout the entire wider Caribbean to reach all English speaking countries, where the (2) focal species are present, with emphasis in countries and islands where these species need protection. We are already in preproduction of the Spanish radio kits, and we will pursue funding opportunities to produce the French radio kits early next year. The radio kits produced in the three languages of the Big Fish Campaign will be distributed by the institutional partners of the campaign, fishers' associations and SM groups, the Big Fish hub, as well as the online platforms of media partners such as Nature, PBS (public broadcast service in the USA).
Additional contextualizing elements you wish to notify to SPAW-RAC or to the SPAW protocol signatory countries: The WECAFC SAWG Big Fish Public Engagement Campaign will be launched in coordination with the premiere of the 1-hour film for broadcast on Nature/PBS on the 26th of April, 2023.	
Please annex any technical report, communication tools, pictures, maps etc. you feel to be useful for the understanding of your project.	

- Please see the (4) scripts of the 2 podcasts + (2) PSAs currently in post-production.
- Please see *“bigFISH Radio English Soft Release, Testing and Evaluation Plan”* to be implemented from September, 15th on.

3. Budget of your project (in Euros)			
Expenses		**Resources**	
Procurement	**Amount**	**Products**	**Amount**
Material : ARCHIVAL / GFX / MUSIC / Drives	1,670	**Subsidies**	
Talent : fishers, narrators	2,500	SPAW-RAC	8,000
Transport : 5 talent + producer (in BZE and The Bahamas)	200	BelugaSmile Productions, LLC	5,990
Documentation		Other funding	1,290
Communication : frame.io	240	Other...	
Applications	200	Other...	
External services : studio recording+ offline edit suit rental	3,500	Other...	
Bank services	100	**Product sales**	
Post Deliveries	120	**Service sales**	
Staff costs		**Donations, legacy...**	
Staff salaries / Production personnel	6,000	**Subscription**	
Travel expenses		Other...	
Other staff costs		Other...	
Functioning / operational costs	750	Other...	
TOTAL CHARGES	15,280		15,280
Additional contextualizing elements you wish to notify to SPAW-RAC or to the SPAW protocol signatory countries:			

4. Assessment of the call for proposals	
How did you hear about this call?	From members of the WECAFC SAWG; specifically Miguel Rolon (CFMC), Yvonne Sadovy and Martha Prada.
Were the terms of references for this call for proposals clear enough?	Yes
Have you encountered any difficulties regarding the preparation of your project, the submission process and then its implementation?	The preparation and postproduction of this product have been smooth. However, as mentioned in previous conversations with SPAW personnel, the COVID 19 pandemic brought a series of unexpected challenges to the production phase of this radio kit. We don't anticipate any problems with the submission or further distribution of this product.
Were the discussions with SPAW-RAC helpful?	They really were. In fact, thanks to our discussions with Geraldine Conruyt, we were able to surmount the pandemic challenges and subsequent delays.
How this grant has been beneficial for your organization, territory or country?	This grant has made it possible to produce one of the most important pieces of the Big Fish Public Engagement Campaign. The main target audience of our campaign is the fishing community, specifically, fishers and decision makers. Importantly, radio is one of the best communication tools to reach fishers. There has also been increase in popularity of podcast among decision-makers, so this radio kit is an indispensable piece of the entire campaign. We envision that this product will be 'evergreen', and will be distributed widely and for several years to come.
What is your general impression on this call?	It is a very helpful call. There's a sense of urgency among scientists, decision makers and the conservation community to produce target-specific communication tools to reach fishers and other stakeholders in order to obtain better results on the ground. Calls and grants like this one really help that effort.
Will you propose new projects to such a call?	Since the Caribbean Fisheries Management Council and NOAA International are funding the Spanish Radio kit, we plan to submit a proposal to SPAW to produce the French radio kit to be distributed in the French speaking countries of the Wider Caribbean. The French Radio Kit is the missing piece of the radio content of the Big Fish Public Engagement Campaign.
What would you suggest to improve such a call?	I have limited experience, since this is the first time that we submitted a proposal to SPAW, but I think that providing distribution support to the products produced with this grant would enhance the impact of the communication products.
Additional contextualizing elements you wish to notify to SPAW-RAC or to the SPAW protocol signatory countries:	

5. Annexes
• Please see the (4) scripts of the 2 podcasts + (2) PSAs currently in post-production. • Please see *“bigFISH Radio English Soft Release, Testing and Evaluation Plan”* to be implemented from September, 15th on.

Big Fish Radio Kit

Testing & Evaluation Strategy

Description and Expected Outcome

The radio kit is designed to reach primarily the fishing community **–fishers, coastal communities and decision makers,** using local radio, social media and WhatsApp. Its content are focused on the natural history of reef species that aggregate to spawn, the importance of seasonal closures during the spawning period for the selected species, and the benefits of respecting the reproduction of these species, supported by success examples from the Caribbean.

The outcome is to change the behaviour of our target audiences during the spawning seasons of the nassau grouper and mutton snapper. The call is clear: don't fish, sell or eat these species from December to March, and form April to July, respectively.

The Radio Kit includes :

- **Two Podcasts:**
  - **The Secret Language of Nassau Grouper**: With the suggestive soundtrack of fish acoustics and reef landscape, this 10–minute podcast will guide listeners into the reproductive behavior of Nassau Grouper that aggregate to spawn in the Wider Caribbean.
  - **Fish Smart**: a 7-minute podcast with a choral structure that opens a space for a conversation between fishers about the reasons why it's bad business to fish spawning aggregations. The cast will also share success stories on fishery recovery within protected areas with proper enforcement. This podcast is also a call for fishers from fishers to participate in the decision making process and the search for alternatives. Ultimately the message is FISH SMART, protect spawning aggregations.
- **Two PSAs** : Regional closure season of **the Nassau Grouper** (From December through March) and **Mutton Snapper** (From April through July)

Beneficiaries

The project will benefit initially the small-scale fishers and local communities in two countries and will support fisheries managers and conservationists there in their fulfillment of their protection of these two threatened species.

This project is designed to support **gender equality** by including female representation in its production team, casting (e.g., female fishers) and messaging.

Countries involved

This proposal focuses on **Belize** and **The Bahamas**, where we have networks in place that will support the production of the radio contents, as well as the distribution of the kits. However, the podcasts and the PSAs have the potential to be distributed throughout the entire wider Caribbean to reach English speaking countries.

Soft Release

Fishers throughout the wider Caribbean region listen to radio, including VHF radio that many fishers keep on to chat regarding local conditions, etc. So the primary distribution channel for the radio kits will be marine radio in Belize and commercial radios in the Bahamas. Many fishers are also avid users of Social Media (SM), and they use WhatsApp to communicate with each other and their networks. Therefore, this kit will also be strategically distributed via fishers' SM & WhatsApp networks from both countries.

Radio

- Belize
    - Marine radio in Belize
    - PGTV
- The Bahamas
    - ZNS-1 1540 (national broadcasting station (radio & news for the country)
    - 96.9 FM Guardian Radio

Whatsapp Groups

- Belize: WhatsApp group managed by fisher & tour guide Kenny Martin that includes 62 members from the fishing community.
- Bahamas: Fishing Association of Fishers Whatsapp Group that includes 36 members.

Social Media

- Platforms in Belize
    - Department of Fisheries in Belize: Facebook page
    - WCS Belize Social media: FB & IG
    - EDF: FB & IG
- Platforms in The Bahamas
    - PIMS Facebook & Instagram

Project Partner Websites

- Belize and beyond: SSF Hub Resource Review
- The Bahamas: Perry Institute for Marine Science

Testing & Evaluation

Local Radio:

The radio kit materials will be summarized in a series of press releases, including links to download materials and a "call to action" to encourage local radio stations to play the podcasts and PSAs. This press release will be distributed to a wide network of journalists within the print, online radio and television media landscape in The Bahamas and Belize.

A designated project coordinator will curate press release metrics by determining the:

- Number of news sources that picked up press release
- Names of news organizations that picked up press release & media links
- Feedback provided by the radio channels

WhatsApp:

We will track the number of fishers reached on Whatsapp Networks, as well as local fishing and media groups reached.

Social Media:

We will track and report on social media engagement metrics (e.g., likes + comments + shares / followers) to unveil how well our radio kits are resonating with our target audience. For each social media channel of project partners, we will synthesize the following metrics:

- **Twitter:** Retweets, likes, replies, branded hashtag performance (e.g., for #BigFish, we will determine the median reach, impressions, likes, saves and comments)
- **Instagram:** Likes, comments, shares, post clicks, profile views, branded hashtag performance (e.g., for #BigFish, we will determine the median reach, impressions, likes, saves and comments)
- **Facebook:** Reacts on posts, shares, comments, impressions
- **LinkedIn:** Comments, shares, link clicks

Project Partner Websites:

Users will be able to listen or download radio kit materials from each project partner's website. Before downloading materials, users will be asked to provide their name, occupation (e.g., fisher), country of residence and email address in a form. ***The form will be optional.*** Specifically, form data will help us determine the number of fishers reached and kickstart an email list for future campaign materials. Those that fill out the form will be sent a **short follow-up survey** on behavioral change via email.

We will synthesize the following information for each partner website involved in distribution (including fishing organizations):

- **Number of page visitors**
- **Number of downloads**
- **Number of unique user downloads**
- **Number of downloads for each material**
- **Average page views per session** (this is a good metric to monitor how interesting the page is, and how enticed users are to get more information; a precursor to behavioural change)
- **Session duration** (similar to average page views per session, this will measure how engaging the page is and how enticed users are to learn more)
- **Top traffic scores** (this will show us where most of our website visitors are directed from, e.g., Facebook, WhatsApp, Instagram, etc). Traffic scores will inform what social media platforms should be prioritized for future campaigns.

Survey:

A short email survey to interested users will help us better determine the audience we're most resonating with whether the radio kit materials are fostering a change in practices (i.e. no fishing, selling, purchasing or eating species during closed season). This survey will be distributed to users who provided their email addresses before viewing/downloading materials on project partner websites and the Big Fish Hub.

The survey will be short (3 questions) in order to maximize participation. An example could be:

1. What have you learned from listening to these podcasts and PSAs?
2. In the future, will you say no to fishing, selling and eating the NG or mutton snapper during their closed season? Why or why not?
3. Do you plan on sharing these Podcasts & PSAs with your community?

Big Fish

Public Engagement Campaign

SPAW grant

PSA / MUTTON SNAPPER

Buyer: Myra Martínez
Fisherman: Carlos Bardalez

> ***AMBIENT*** *(fish market throughout PSA):someone hand ringing a bell, followed by fishmongers selling the day's catch. Sound bites to include: "Mister, mister" (File 00021.mov); "I've got conch, I've got snappa (File 00024.mov); "Fish" and knives sharpening (File 00019.mov) Mix market bg throughout the PSA.*

BUYER: [Hey, Carlos], can I get some Mutton snapper?

FISHERMAN: Not this time of the year. I'm not catching mutton snapper during the spawning season.

BUYER: Hmmm... But other vendors are selling it across the street.

FISHERMAN: Look, madam, we, the fishers, need to think about the future. From April to July, mutton snappers gather to breed. They're easy to catch, yeah, it is a feast today... but famine tomorrow".

BUYER: Wait, are you telling me that you want to fish less?

FISHERMAN: No, I'm saying I want us to fish smart. And people to eat smart.

BUYER: (Wow,) Thank you for telling me. I had no idea!
So no mutton snapper from April to July, ha? Okay, I'll take three grunts instead.

FISHERMAN: You got it! Eat smart. Protect our catch!

> **EXTRO:** *Background music to fade (3 seconds)*

Fish Smart

10-min Podcast

Script

Music intro (4 secs)

Narrator:
Greetings everyone from The Caribbean. My name is Stacy Marshall, and I am your host for this podcast, Fish Smart, that is focused on a crucial natural event that happens every year in our beloved Caribbean ocean.

Some people call them fish spawning aggregations, others know them as spawning banks or breeding grounds… whatever you want to call them, this annual natural event produces the next generation of fish.

To help us understand various aspects of this phenomenon and its implications for millions of people living in Caribbean fishing communities, we have invited a diverse group of people to join us today.

Our guests include several fisher-folks and two scientists who have joined forces to tackle the fisheries crises impacting many commercial species throughout the region.

Despite their diverse backgrounds and nationalities, they have a common interest: protecting spawners throughout the wider Caribbean. They represent a growing movement – called Big Fish that is making waves in the Caribbean.

Beat

Our guests come from all over the Caribbean, starting with Mrs. Anna Ramírez, who is joining us from beautiful Belize. Mrs. Ana has been a fisherwoman for more than 50 years. She comes from a family of fishers and her kids are also fishers. She is a legend in Belize, and you will soon understand why.

Ms. **ANA Ramirez**
01:12:54 I'm proud of being a fisher woman.
01:02:32 It's hard yes, it's hard but you live and you don't have no boss. That is the beauty, you is your own boss.

Kenny Martin
[01:00:27] Hi. My name is Kenworth Martin, also known as Kenny. Local fisherman and

tour guide from Punta Gorda in Belize. [01:00:55] I've been a tour guide for 22 years. I've been working underwater and I do a lot of diving, as well as a dive master for NGOs. Been working as a tour guide for so many years that I get to love everything I do with a passion.

MICHELLE L.A.

02:00:11 M: I'm Michelle Lay and I'm a fisherman as well. I love the ocean. It's excellent being on the water at all times.

MICHELLE SCHÄRER

01:00:00 MS: My name is Michelle Schärer. I'm a marine biologist and I do research in Puerto Rico and the Caribbean.

2

DON DEMARIA

01:00:01 My name is Don DeMaria, I'm a fisherman from Summerland Key
01:22:28 Like everyone else I started fishing when I was a little kid with a rod and reel, probably at like 5 years old or so. You know. You know it just went on from there.

Will Heyman

[00:00:57] My name is Will. Hey, man. Dr. to some; dad to others...I could swim before I could walk.
01:48:06 Fishers are critically important to all the scientific and conservation work that I do.

ELOY CUEVAS

01:23:32 My name is Eloy Cuevas and I am a fisherman from Belize.
01:01:11 my older brother used to go out and dive for lobster and conch and one of my brother in law was also a fisherman. And they had boats so I joined in with them from a very early age: 12, 13 years old. You know, I would say going 45 years.
It was back in 96 when Will Heyman went to Belize, and me and Will start working very close to each other. I as a fisherman, Will as a marine scientist. And that really broke the ice in Belize because nobody have ever seen fishermen and scientists work so closely together.

Will Heyman

01:48:06 I couldn't do it without them [fisherman), particularly guys like Eloy Cuevas. He has been a magician in terms of getting me to places and times and working with me as a colleague. To understand what it is that we're doing.

Narrator:

Thank you everyone for joining us today. I'm excited about diving in, literally, to the focus of your work: These big fish spawning aggregations. I've heard that spawning aggregations are really spectacles of nature. They're very similar to things like the

migrations and the gatherings of wildebeest and zebra (trot effect) and monarch butterflies (flutter effect). They're spectacular events….

Will Heyman
01:14:57 *"Most large commercially important reef fish, snappers, groupers, jacks all migrate great distances and aggregate to spawn in single places at very specific times and that's how they reproduce."*

Michelle Schärer
[00:30:15] *They need to have a lot of fish together. Reproductively ready to spawn in the water column so that that sperm and egg can meet and make the next generation of fish.*

Will Heyman
01:23:08 Fish spawn according to environmental cues. There's physical environmental cues like the geomorphology. They spawn also according to specific lunar cycles and seasonal cycles.

01:21:41 *you get this thing where you know in January and February moons you're getting most of the groupers. Then you move to March and April and you start to move into mostly the snappers and jacks.*

01:34:59 *Lots and lots of different things come in to feed on those eggs including the giant, the largest fish in the sea, the whole shark and they come just (sound effect) right after they spawn.*

Kenny Martin
[01:06:28] There's several different grazers that come around as well. Whenever we are diving there. And big scoops of Barracuda could be found several times throughout our dives. So they would like move along the bottom and kind of feed on some of the fishes that are spawning there.

Will Heyman
01:34:17 It's astonishing. There is so much protein. It's like a, it's like a productivity hot spot!

Kenny Martin
[01:17:27] And many boats will also be out there. So there's a lot of experienced fishermen that knows that this is a critical time not only for the fish to spawn, but for them to get a whole lot of fish during the good weather. You know, and I used to fish a lot at spawning aggregation sites. And we've been seeing a lot of fish being caught and most fish with eggs and the fish that we catch, we will sell here in Belize. Some people will fill it out. But we've noticed that every time you go out, you'll find less fish at that particular site.

Michelle Schärer
01:03:24 MS: Well most of the grouper species, including the Nassau grouper have really declined in their population numbers because when they aggregate to spawn they are really easy to catch

9 Ms. ANA
01:06:51 when the fishes spawn, fish bite, you know. They bite. When the fish comes by, by schools. We call it school bite.

Michelle Schärer
01:03:45 in some places they have been really hard hit

Kenny Martin
[01: :30] We grew up from a fishing family in a coastal community that kind of target finfish at most. And most of the fin fish are targeted during the spawning times when you could harvest as much in a short period of time (…) And we've been fishing for like 25 years… When I learned to scuba dive, then I'd be like, Oh my God, we are really wrecking this precious resource right here. And especially at the critical time when the spawning is happening, which is like the beginning of the fish's life, you know.

Michelle Schärer
01:04:10 so a lot of these species have been plundered during the spawning aggregations and they can no longer sustain ~~their,~~ their populations throughout the whole region.

DON DEMARIA
01:24:16 there's always going to be some but you know it's ~~you know~~ a possibility that some will be commercially extinct and you won't be able to make a living on.

Don de Maria
01:33:05 you don't' kill them when they're spawning. And of course when they land that many fish too the price goes way down. So they're not getting a whole lot for them anyway.

Kenny Martin
[01:23:30] Now, I've noticed that fishermen are starting to become more conscious of what's going on because they're noticing that the fin fish are getting smaller and the stocks are getting less. But when you go to the marketplace and it's overflowing fish, what happened is that the customer will walk around and choose your bigger fish and you'll be left with a group of fish that you would have to sell at a cheaper rate and which

is like, you know, killing as much just to make that amount of money that you would have made if you would have fished sustainably and have bigger fishes being caught.

Don Demaria
01:24:57 DD: It's just, you just lost part of what makes us human I think. Having all these species around us and being able to manage them properly and just taking what we really need.

Will Heyman
[00:16:36] You might consider a spawning aggregation like a bank account. Yet. Two ways to manage it, right? You can leave the bank account there, add to it slightly and harvest the interest indefinitely. Or you can take the interest and take the principal and wind up with nothing.

MICHELLE SCHÄRER
01:16:43 So it's really important to conserve the spawning fish, you know the aggregations which maintain the populations of which they depend on.

Will Heyman
[00:16:14] Fish that spawn in aggregations typically produce 100% of their annual reproductive output strictly during and at the time of spawning aggregations.
[Alternative: 01:45:59 nearly all of the reproductive output for these species occurs at these spawning aggregation sites at these times.]

01:46:09 So if you wipe out the spawning aggregations, you wipe out the species.

Michelle Schärer
[00:30:50] So it's critical if you want next generations of fish to protect these spawning aggregations.

Narrator:
So if I understand correctly, the aggregations are the only time that the reef fish reproduce. If they can't reproduce you don't have the next generation. If you don't have the next generation, you don't have the fishery. And you don't have the food and you can't support the livelihoods.

So Big Fish is proposing a region-wide fishing ban during the spawning season to protect the catch. At the regional level, that would mean no fishing or sales of Nassau Grouper, for example, from December through March. And the same would apply to Mutton Snapper from April through July.

Ms. ANA
01:09:00 All right we have our regulation right now with the lobsters. When lobster is in season for lay the eggs and so on. We don't' catch lobster.
01:09:00 So if, if they were to do all the product in the sea like that, we would have lot of product.

Michelle Scharer
01:16:52 ~~And~~ they already have for example, a closed season for conch. So ~~they~~ (FISHERS) understand the concept of letting them spawn so that you can have them the rest of the years.

Ms. ANA
01:08:35 A: Say no man [….]
01:07:49 I don't going to fishing today because they are spawning
01:08:42 don't do it now. Wait til the season pass

Narrator
We've heard about some inspiring success stories as a result of protecting spawning aggregations. In Belize and Mexico, fishers are leading movements and actively working with scientists to help spawning aggregations recover.

Will Heyman
01:48:50 Fishermen have known about these secret aggregation sites for centuries.
01:49:10 WH: My friends and colleagues have documented I'd say about 50 aggregation sites throughout the wider Caribbean and the gulf of Mexico.

MICHELLE SCHÄRER
01:14:07 MS: yeah there are some really hopeful stories from other places in the Caribbean. For example Belize has 11 Nassau grouper spawning sites protected.

Narrator: *I understand that groupers that were once gone from the Cayman Islands have returned.*

MICHELLE SCHÄRER
01:14:20 (approx.) Cayman has one of the largest spawning aggregations of Nassau grouper, where approximately 3000 Grouper just come together to spawn every year in one place.
01:14:25 They've been really lucky that they've been able to enact bans and enforce them in a way that these fish are really growing their populations.

William Heyman
[00:14:40 *What we realized in Belize. Other people had realized all through the Caribbean and documented spawning aggregations in the Virgin Islands and in Honduras and ~~and~~ all throughout the Caribbean, Cuba and The Bahamas. And what we became*

aware of is that the phenomenon that we saw, that species aggregations occur here at every promontory and every site in Belize. That occurs throughout the wider Caribbean.

DON DEMARIA
01:31:51 If you look at the, the Gulf and the south Atlantic, there's not many success stories, even according to their own stock assessments. Now it seems like about most everything is over fished. The only success story in the south Atlantic is really goliath grouper and that's by default. They closed it completely. That's not really management. And pink porgy. Everything else is, is heading down.

ELOY CUEVAS
01:36:50 So you all have to get together and make that decision. Of what you want to do with that place. You want to keep it healthy. You want to if you're going to use it, use it in a sustainable way, but the bottom line is the fishermen that make the decision, along with the fisheries department (…) Everybody have to come together and come up with the best solution.

Kenny Martin
[01:28:11] Fishermen are out there every day and if they know and understand and learn that we're messing it up, they will eventually have to slow down. And I could see] without fishermen intervening in protection of resources, it won't happen. They got to agree and be comfortable to protect their resources and understand the reason why they're protecting it and protect it for a long term.

DON DEMARIA
01:32:34 yeah well Will Heyman and the group in Belize you know their, their efforts in protecting their spawning aggregations, that's a success. And there maybe some of our fish in the keys are recruited from those areas. From the spawn, cause they drift like 30 days or so. So that, that's a big plus for us. But yeah this is a success story in the Caribbean, the protection of spawning aggregations I suppose is a bigger success. If you can ever get that through.

Michelle Schärer
01:17:03 It's just a matter of finding the right way to do it so it's a win, win for everybody.

Narrator
Listening to all of you, everything makes a lot of sense. But how do you find this happy medium? Fishers need to feed their families all year around… How do you make this a win-win situation?

MICHELLE L.A.

01:38:48 M: Well first there are different ways. There is a transitional period which includes training for some other activity that will insure that your livelihood issues are addressed, simple like that.
01:39:50 I tend to really be more in favor of looking at complimentary livelihoods because fishers are already invested in, in capital stuff. Gear et cetera and have skills that are already developed. So using those skills or adding some other activity that brings economic benefit to those skills. 01:41:43 So fishers can have the same capital investment, targeting other resources you know so that there is a diversification.

ELOY CUEVAS
01:19:34 The fishermen they are, they are not that easy to change but what you got to do is to try and show them different ways of making money. From using the, the same resources. You know and that's what, that was exactly what me and Will start doing for fishermen in southern Belize.

MICHELLE L.A.
01:40:32M: Oh well like the ecotourism stuff would be one. Dive operators, tour guides in terms of marine tour guides. The whole idea of recreational sport fishing. Those are complimentary livelihoods activities that utilize the existing investment as well. But there can be complementary options that don't' necessarily utilize investment but allow you to have part income from fishing and part from somewhere else.
01:42:02 There is the need for, for technical assistance in terms of moving to capacity development

Don Demaria
(01:38:34): If I was talking to a fisherman down here I would tell them they need to get on board on the regulatory process and get involved in it, get some decent rules and regulations going. Otherwise you're just not going to be able to pass this livelihood down that's been so important to you, to your children and grandchildren. It's going to be over.

MICHELLE L.A.
01:21:11 Thus the need to organize fishers build capacity and effectively engage in representation.
01:15:54 There are always problems getting fisher folk involved. You know there are some realities within the industry that cannot be overlooked when you look at organizing fisher folk, fisher folk work at sea not on land. I mean that's one big challenge.
01:17:25 But there are significant examples of fisher folk being organized.

Narrator:
Despite the many challenges and the enormous amount of work ahead....this sounds like a very good beginning.

Optimistic Music

Don Demaria
01:23:47 I want to tell the world just how precious this resource is out here. How many people's lives depend on it and it has to be managed properly. You know.

7 MICHELLE L.A.
01:04:50 It's good the ocean is speaks to a certain potential that seems to be unlimited, both for you and for your community and for your nation.

Kenny Martin
[01:40:05] Usually when I go fishing every day and I take a break, I will just go fishing again. And fishing for food is always fun. And catching fresh seafood is the best thing you could ever do. Once you're addicted to fishing, you can't get it out your DNA.
[01:33:27] So you want to fish and you want to always be fishing, but at the same time you want to always have a good catch.

MICHELLE L.A.
01:05:58 So you know the idea of conservation is not so much a foremost thought but you have a responsibility sustainable use, yes, because if I don't fish responsibly I won't have any tomorrow. And I'd love to fish tomorrow.

Inspiring Music fades in

Narrator:
Thank you all for your contributions to fish and live smart.

[addressing the audience] If you've like what you heard here today, and want to learn more or get involved, visit us on RecoveringBigFish.com.

And remember, if you are a fisher, don't fish or sell Nassau grouper from December through March; and respect breeding mutton snappers from April through July.

If you're buying food for your family, and you want to help to protect the fish, keep those dates in mind. What you buy and when you buy it matters.

#ProtectTheCatch # FishSmart

Now… Let's continue the conversation offline.

Will Heyman
[00:16:14] All right, let's keep rolling.

Mix of voices behind the music

PSA / Nassau Grouper

Script

[audio] Mix of many voices [There should be at least 4 voices (2 male and 2 females) with different accents, if possible.]

[audio] A wave takes the voices away and leads/gives way to narration

NARRATION:
Many things can be said about the Nassau grouper --their life cycle, the threats to their habitat, the reasons for their alarming decline... But let's be honest: we can't understand it all!

[audio] UW soundscape / noisy reef soundscape (3 secs) Volume goes down, and between fish calls, we find the silence for the narration to come back.

NARRATION:
Despite our busy lives and all the noise around us, we must stop and listen to the sounds of nature. Animals talk all the time, we just need to listen. Nassau Grouper tell us when they are ready to breed.

[audio] N2

NARRATION:
If they could, they would ask us to respect their spawning season.

[audio] Combination of N1, N2, N3 (3 secs) – sound goes down to allow narration to come in

NARRATION:
Please, don't fish, sell or eat Nassau Grouper From December through March... if you want to keep hearing them.

[audio] resolución

NARRATION:
Let's listen to them...

[audio] N2

#ProtectTomorrow'sCatch #Fish Smart

bigFISH Radio Kit
SPAW Grant

The Secret Language of the Nassau grouper

7-min Podcast / Script

NATURAL SOUND: *Nassau grouper (NG) spawning aggregation acoustics* (5 seconds)… *leads into ambient background music to be played throughout script*

Narrator: You may find it a surprise… but this is the sound of a fish singing. And not just any fish. It's the song of the Nassau grouper…..

> ***BEAT*** *(NG acoustics crescendos and 3 seconds and fades out slowly until parade music comes in – needs a good mix)*

Narrator: You may not know the song, but you know this fish. The Nassau grouper is one of the most famous coral reef fish and seafood delicacies in the Caribbean. Each year, this fishery brings in millions of dollars to local economies. The Nassau grouper supports our livelihoods, puts food on the table and in many countries, it is a cultural icon.

> ***MUSIC:*** *Cultural parade music plays (maybe junkanoo) enters after local economies and remains after cultural icon (2 seconds) fades out, while…*
> ***AMBIENT*** *(fish market) fades in…*

Narrator: But the Nassau grouper needs our help.

> ***AMBIENT*** *(fish market):some one hand ringing a bell, followed by fishmongers selling the day's catch*

Narrator: Over the years, its popularity as a tasty and nutritious food has led to its downfall.

> ***AMBIENT*** *(cacophony at the fish market) mixes with FX/ emergency music that speaks of "emergency"[[example: Nassau Grouper Against The Clock 33 seg-36 secs]]*

Narrator: Due to high demand and overfishing, the Nassau is NOW **critically endangered** -- it's actually on the brink of extinction! And in some parts of the Caribbean, it's nowhere to be found.

> *SOUND EFFECT Doom / gloom sound effect, 3 seconds.*

Narrator: To address the decline of Nassau grouper, fishers and scientists have started working together throughout the Caribbean.

> *Upbeat MUSIC enters mid sentence until the end of the paragraph when mixes with waves crashing*

Narrator: They're calling on all of us to save this beloved species. To understand what you can do, let's take a deep dive to get to know the secret life of the Nassau grouper… starting from the beginning of their life cycle.

NATURAL SOUND Waves crashing / pelagic ocean sounds 3 seconds
and then continues with bubbles and reef sounds into the next paragraph subtly mixed with delicate baby music

Narrator: Our Nassau's story begins with a fertilized egg, free floating in the wide-open sea. The egg is like a drop in the ocean; so tiny, it's just a millimeter in diameter – or the thickness of a credit card! After a day or two…

SOUND EFFECT for the "pop" – 1 second

Narrator: The egg hatches into a newborn larva.

SOUND EFFECT: an egg hatching (as if it were topside/out of the water). May use eggs for hatching sound – 2 seconds

Narrator: The larva can't sing, but it can already hear!!!
And as it drifts through the surface waters, eating plankton to grow stronger, it will use its "ears" to search for a safe habitat. Depending on the circulation patterns of the current, the tiny larva will either remain close to home or drift farther away.

SOUNND EFFECT: Crashing waves, 3 seconds.

Narrator: After several months, the larva is the size of a paperclip. She begins to look less like a blob and more like a Nassau grouper - with striking brown bars, tuning fork pattern on its heads, and a black blotch near the tail fin.

NATURAL SOUND mangroves enters here. Find in [20220206-07_Lime_Key_Mangrove] See clips notes to find a few examples of ok sections

Narrator: This juvenile will spend the next year of its life in nature's natural nursery – mangroves or seagrass beds.

NATURAL SOUND (Sound of mangroves, 2 seconds).

Narrator: Here, the roots of mangroves and blades of seagrass protect her from predators. She feasts on crustaceans, like small crabs and shrimp [sound of this], as she prepares for the next chapter of her life … (*pause*) the journey to the reef.

BEAT (few seconds of dynamic, adventure music that came in previous paragraph "as she prepares for the….")

Narrator: Strong enough to leave the nursery behind, the Nassau grouper ventures out to sea.

Back to UW sound / [swim sound.MPG] See clip note on frame.io

Sound of open ocean fades in with noise pollution to illustrate next paragraph. For example, small boat on [Sapodillas Recordings / 20220202T165550.wav] See clip note

Narrator: In the open ocean, among the noise pollution from big ships and small boats, she is listening for the bustling and busy sounds of a healthy reef.

NATURAL SOUND (low) of a healthy reef (with) (3 seconds) -- you could use, for example, [Sapodillas Recording / 2021Dec-2022Feb_Sassy_HRI] See clip notes on frame.io

The ambient sound continues into the next paragraph to illustrate narration: find snapping, cracking and clicking

Narrator: As she gets closer, the sounds of the reef --- the snapping, the crackling, the clicking…-- becomes louder.

Reefscape sound crescendos, 3 seconds.

Narrator: She made it. Quickly now, she settles into a small cave within the reef. Her new home marks her transition into adulthood (*pause, reefscape crescendos*). As the months pass, she will hone her skills as a quick and voracious predator.

BEAT: the UW sounds fades out while topside noises start (waves crashing or lapping at the shore, seagulls squawking, etc…

Narrator: Beneath the waves, our Nassau has stopped eating crustaceans and moved on to other fish. She is also taking a new role as a caretaker of the reef: she maintains the balance of her ecosystem by keeping populations of schooling fish in check. She will live and stay here for months, getting bigger, until one day… a mysterious pull draws her far away… the call of the wild. The call to mate.

Background music crescendos (3 seconds)

Narrator: Every winter, around the full moons, Nassau grouper from all around the Caribbean travel hundreds of miles from home to special breeding grounds to reproduce. As a first-time spawner, she'll rely heavily on her ears, listening for courtship sounds to navigate to the right place. All in the name of survival.

SOUNDS of the Open Sea (including topside sounds that indicate actions: winds, waves, etc.)

Narrator: After several days of travel, she finally makes it and finds herself surrounded by hundreds or even thousands of singing fish, and she joins the chorus.

SOUND of a Nassau grouper aggregation (enters subtly with various undistinguishable, not intense calls) [BZ1-various2 NassauGrouper.mp4]

Narrator: Some fish are older, some are younger. Each individual is here for the sole purpose of breeding. This amazing event is called a spawning aggregation.

BEAT

Narrator: This breeding ground is kind of a massive underwater Soca Fete…a real party!

SOUND of a Nassau grouper aggregation is a bit louder, a bit more intense now (use a variety of calls, including UNK.mp3)

Narrator: In small groups, the Nassau spin and circle one another as if they're dancing (*spawning sound bite of dancing fish 2 seconds)*, they change colour (*spawning sound bite 2 seconds*), they flirt (N2 nassau.mp3) *spawning sound bite 2 seconds*), some males even fight to show their dominance and prove themselves as better males (N3_nassau.mp3 2 seconds)… Occasionally, they even change sex! (*spawning sounds*, 2 seconds).

Narrator: Scientists call this courtship behaviour, and as the sun goes down, the intensity of the calls increase…

SOUND of Nassau aggregation is louder and more intense

Narrator: Until at sunset…

SOUND suddenly goes down. SILENCE (3 secs)

Narrator: …it becomes quiet.
Everything leads up to this one magical moment, this silent big bang…the spawning!

MUSIC Upbeat carnival music plays, 3 seconds. Continues throughout the next paragraph fading out

Narrator: The Nassau will party hard for the next several days. After all, these winter moons are the ***only chance*** to mate for the entire year.

BEAT.
OPEN OCEAN sound

Narrator: Eventually, our Nassau grouper will swim back to her home reef, living in solitude once more.

Narrator: Next year, the winter full moon will draw her back to this exact same soca fete, this exact spawning site to reproduce. And she'll have the chance to breed again. That is… if she makes it.

BEAT
MUSIC in minor tone

Narrator: Due to overfishing during the breeding season, most Nassau grouper don't get the chance to reproduce. When Nassau grouper aggregate to spawn, they're extremely vulnerable to fishing because of the predictability – in space and time—and the abundance of fish concentrated in just one site.

BEAT

Narrator: You can see why, it was an easy catch, but it was short sighted…. and misleading! The seemingly endless supply of fish meant less demand. Sales prices dropped in many countries. And overtime, Nassau grouper populations were decimated throughout the Caribbean.

Catching breeding fish doesn't pay off… does it?

Gloomy Sound Effect, 3 seconds

Narrator: Endless supplies of fish

The Nassau grouper was once one of the most common fish on the reef, But now they're on the brink of extinction! To stem the tide, many countries have closed the fishery, at least during the winter months when they breed.

MUSIC change: positive mood and energizing rhythm

Narrator: Can the Nassau grouper make a comeback?

MUSIC: (Upbeat music, 2 seconds)

Narrator: It all comes down to respecting the breeding season to protect the future catch.

BEAT
MUSIC prepares the optimistic exit

Narrator: Together, we can feed our communities today, seed new fisheries for tomorrow and feed future generations.

Extro: *Upbeat/ optimistic bg music to fade (5 seconds)*